Assignment -1

- **What are the four fundamental parts of computer? Explain it with the help of diagram.**

Ans- **Input Unit, CPU, Primary Memory, and Output Unit are the four basic components of a computer system.**

Explanation:

A computer has **four main components**: Input Units, the central processing unit or CPU, the Primary memory, and Output units.

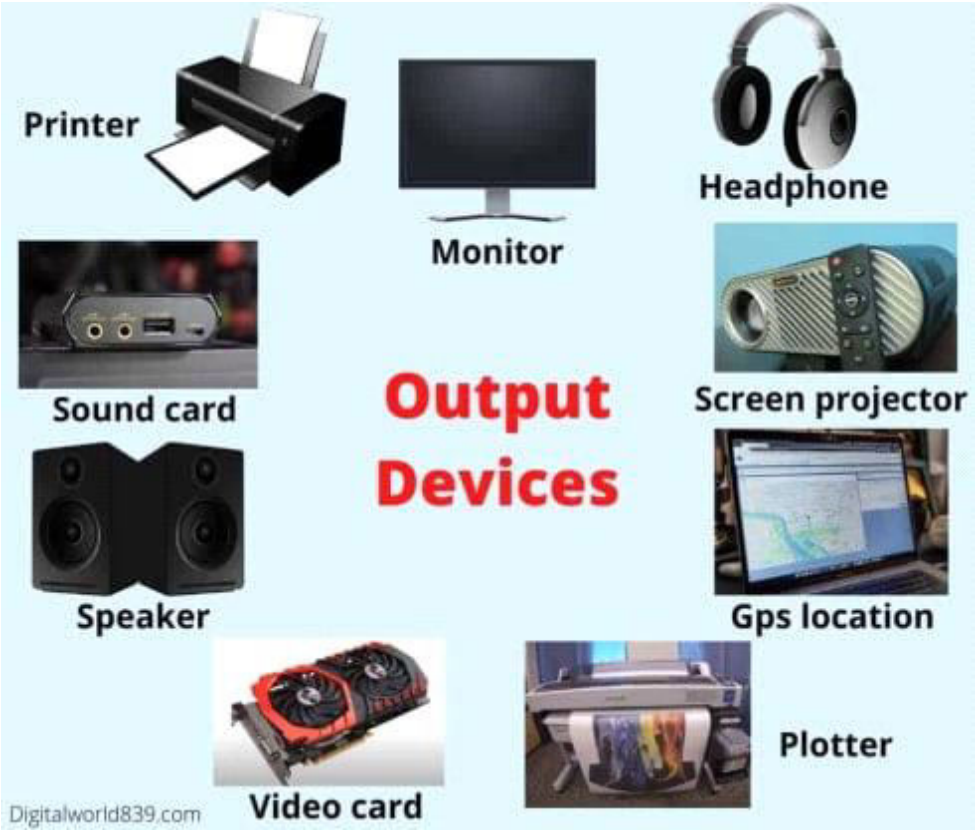
- **Input Unit** - The devices to input information, such as a **keyboard, and**

mouse.

- **CPU** - The CPU is further broken up into **ALU, Control Unit, and Instruction Unit**.

- **Primary Memory** - Computer program instructions converted into machine code are stored in primary storage or memory.

- **Output Unit** - The devices to output information, such as a **printer, monitor, and speaker**.



Q2: Discuss about the classification of computers based on size and capacity.

Ans- **Computers** are **classified** on different parameters, such as, storage **capacity**, processing **speed** and component (CPU) used in **computers**. **Depending** upon the components used and features of different **computers**, they are **classified** into four groups, Microcomputer, Mainframe **computers** and Supercomputers

Q3: What is the meaning of computer generation? How many Computer Generations are defined? What technologies were/are used?

Ans- Computer generations are based on when major technological changes in computers occurred, like the use of vacuum tubes, transistors, and the microprocessor. As of 2020, there are five generations of the computer.

Review each of the generations below for more information and examples of computers and technology that fall into each generation.

- First generation (1940 - 1956)
- Second generation (1956 - 1963)
- Third generation (1964 - 1971)
- Fourth generation (1972 - 2010)
- Fifth generation (2010 to present)
- Sixth generation (future generations)

First generation (1940 - 1956)

The first generation of computers used vacuum tubes as a major piece of technology. Vacuum tubes were widely used in computers from 1940 through 1956. Vacuum tubes were larger

components and resulted in first-generation computers being quite large in size, taking up a lot of space in a room. Some of the first-generation computers took up an entire room.

The ENIAC is a great example of a first-generation computer. It consisted of nearly 20,000 vacuum tubes, 10,000 capacitors, and 70,000 resistors. It weighed over 30 tons and took up a lot of space, requiring a large room to house it. Other examples of first-generation computers include the EDSAC, IBM 701, and Manchester Mark 1.

Second generation (1956 - 1963)

The second generation of computers saw the use of transistors instead of vacuum tubes. Transistors were widely used in computers from 1956 to 1963. Transistors were smaller than vacuum tubes and allowed computers to be smaller in size, faster in speed, and cheaper to build.

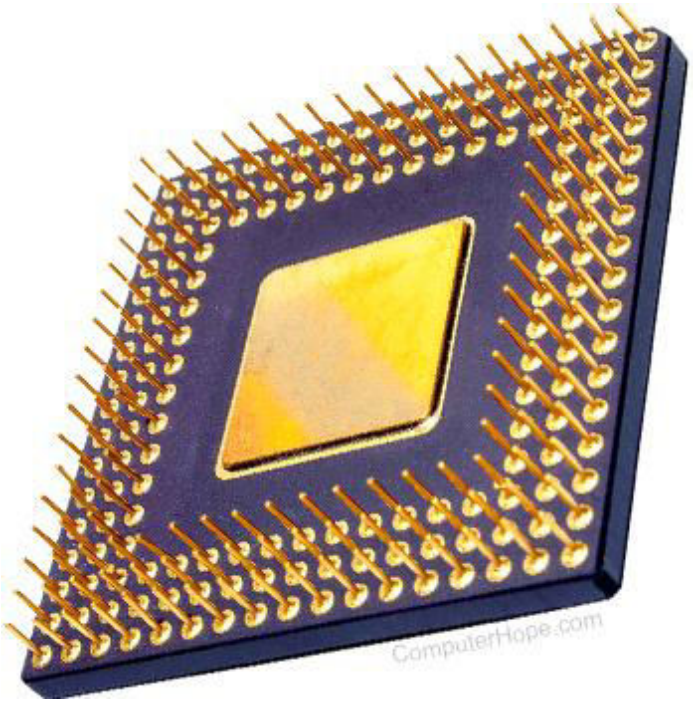
The first computer to use transistors was the TX-0 and was introduced in 1956. Other computers that used transistors include the IBM 7070, Philco Transac S-1000, and RCA 501.

Third generation (1964 - 1971)

The third generation of computers introduced the use of IC (integrated circuits) in computers. Using IC's in computers helped reduce the size of computers even more than second-generation computers, and also made them faster.

Nearly all computers since the mid to late 1960s have utilized IC's. While the third generation is considered by many people to have spanned from 1964 to 1971, IC's are still used in computers today. Over 45 years later, today's computers have deep roots going back to the third generation.

Fourth generation (1972 - 2010)



The fourth generation of computers took advantage of the invention of the microprocessor, more commonly known as a CPU. Microprocessors, with integrated circuits, helped make it possible for computers to fit easily on a desk and for the introduction of the laptop.

Some of the earliest computers to use a microprocessor include the Altair 8800, IBM 5100, and Micral. Today's computers still use a microprocessor, despite the fourth generation being considered to have ended in 2010.

Fifth generation (2010 to present)

The fifth generation of computers is beginning to use AI (artificial intelligence), an exciting technology with many potential applications around the world. Leaps have been made in AI technology and computers, but there is still room for much improvement.

One of the more well-known examples of AI in computers is IBM's Watson, which was featured on the TV show Jeopardy as a contestant. Other better-known examples include Apple's Siri on the iPhone and Microsoft's Cortana on Windows 8 and Windows 10 computers. The Google search engine also utilizes AI to process user searches.

Sixth generation (future generations)

As of 2021, most still consider us to be in the fifth generation as AI continues to be developed. One possible contender for a future sixth generation is with the work being done with quantum computers. However, until it becomes more

developed and widely used, it's still only a promising technology.

Q4: Differentiate between Volatile & Non- Volatile memories

Ans- Difference between Volatile Memory and Non-Volatile Memory

Volatile Memory:
It is the memory hardware that fetches/stores data at a high-speed. It is also referred as temporary memory. The data within the volatile memory is stored till the system is capable of, but once the system is turned off the data within the volatile memory is deleted automatically. RAM (Random Access Memory) and Cache Memory are some common examples of volatile memory. Here, data fetch/store is fast and economical.
Non-Volatile Memory:
It is the type of memory in which data or information is not lost within the memory even power is shut-down. ROM (Read Only Memory) is the most common example of non-

volatile memory. It's not economical and slow in fetch/store as compared to volatile memory however stores higher volume of data. All such information that needs to be stored for an extended amount of time is stored in non-volatile memory. Non-volatile memory has a huge impact on a system's storage capacity. Below are the differences between volatile and non-volatile memory:

S.NO	Volatile Memory	Non-Volatile Memory
1.	Volatile memory is the type of memory in which data is lost as it is powered-off.	Non-volatile memory is the type of memory in which data remains stored even if it is powered-off.
2.	Contents of Volatile memory is stored temporarily.	Contents of Non-volatile memory is stored permanently.
3.	It is faster than non-volatile memory.	It is slower than volatile memory.
4.	**RAM(Random**	**ROM(Read Only**

	Access Memory) is an example of volatile memory.	**Memory)** is an example of non-volatile memory.
5.	In volatile memory, data can be easily transferred in comparison to non-volatile memory.	In non-volatile memory, data can not be easily transferred in comparison to volatile memory.
6.	In Volatile memory, process can read and write.	In Non-volatile memory, process can only read.
7.	Volatile memory generally has less storage capacity.	Non-volatile memory generally has more storage capacity than volatile memory.
8.	In volatile memory, the program's data are stored which are currently in process by the CPU.	In non-volatile memory, any kind of data which has to be saved permanently are stored.
9.	Volatile memory is more costly per unit	Non-volatile memory is less

	size.	costly per unit size.
10.	Volatile memory has a huge impact on the system's performance.	Non-volatile memory has a huge impact on a system's storage capacity.

Q5: Distinguish among system software, application software and open source software on the basis of their features.

Ans-Difference between System software and Application software.

Software/CodingSoftware EngineeringComputer Programming

As we know that software is a set of instructions or programs instructing a computer

to do specific tasks. Software is basically a generic term used to describe computer programs. In general Scripts, applications, programs and a set of instructions are all terms often used to describe software.

Now the basis of language in which software is developed and platform which is required for its execution we can classified software as in two divisions which are System software and Application software. Following are some basic differences between System software and Application software.

Sr. No. KeySystem Software. Application Software.

1 Definition System Software is the type of software which is the interface between application software and system. On other hand Application Software is the type of software which runs as per user request. It runs on the platform which is provide by system software.

2 Development Language In general System software are developed in low level language which is more compatible with the system hardware in order to interact with. While in case of Application software high level language is used for their development as they are developed as some specific purpose software.

3 Usage System software is used for operating computer hardware. On other hand Application software is used by user to perform specific task.

4 Installation System software are installed on the computer when operating system is installed. On other hand Application software are installed according to user's requirements.

5 User interaction As mentioned in above points system software are specific to system hardware so less or no user interaction available in case of system software. On other hand in application software user can interacts with it as user interface is available in this case.

6 Dependency System software can run independently. It provides platform for running application software. On other hand in application software can't run independently. They can't run without the presence of system software..

7 Examples Some examples of system software's are compiler, assembler, debugger,

driver, etc. On other hand some examples of application software's are word processor, web browser, media player, etc

Q6. a) Create a file in MS-word to insert a paragraph about yourself and save it with file name

"yourself". Describe all steps involved in it.

Ans- Every Word project you create—whether it's a personal letter, a TV sitcom script, or a thesis in microbiology—begins and ends the same way. You start by creating a document, and you end by saving your work. Sounds simple, but to manage your Word documents effectively, you need to know these basics and beyond. This chapter shows you all the different ways to create a new Word document—like starting from an existing document or adding text to a predesigned

template—and how to choose the best one for your particular project.

You'll also learn how to work faster and smarter by changing your view of your document. If you want, you can use Word's Outline view when you're brainstorming, and then switch to Print view when you're ready for hard copy. This chapter gets you up and running with these fundamental tools so you can focus on the important stuff—your words.

TIP

If you've used Word before, then you're probably familiar with opening and saving documents. Still, you may want to skim this chapter to catch up on the differences between

this version of Word and the ghosts of Word past. You'll grasp some of the big changes just by examining the figures. For more detail, check out the gray boxes and the notes and tips—like this one!

Launching Word

The first time you launch Word after installation, the program asks you to confirm your name and initials. This isn't Microsoft's nefarious plan to pin you down: Word uses this information to identify documents that you create and modify. Word uses your initials to mark your edits when you review and add comments to Word documents that other people send to you (Section 16.3).

You have three primary ways to fire up Word, so use whichever method you find quickest:

Start menu. The Start button in the lower-left corner of your screen gives you access to all programs on your PC—Word included. To start Word, choose Start → All Programs → Microsoft Office → Microsoft Office Word.

Quick Launch toolbar. The Quick Launch toolbar at the bottom of your screen (just to the right of the Start menu) is a great place to start programs you use frequently. Microsoft modestly assumes that you'll be using Word a lot, so it usually installs the Word icon in the Quick Launch toolbar. To start using Word, just click the W icon, and voilá!

TIP

When you don’t see the Quick Launch toolbar, here’s how to display it: On the bar at the bottom of your screen, right-click an empty spot. From the menu that pops up, choose Toolbars → Quick Launch. When you’re done, icons for some of your programs appear in the bottom bar. A single click fires up the program.

Opening a Word document. Once you’ve created some Word documents, this method is fastest of all, since you don’t have to start Word as a separate step. Just open an existing Word document, and Word starts itself. Try going to Start → My Recent Documents, and then, from the list of files, choose a Word document. You can also double-click the

document’s icon on the desktop or wherever it lives on your PC.

TIP

If you need to get familiar with the Start menu, Quick Launch toolbar, and other Windows features, then pick up a copy of Windows XP: The Missing Manual, Second Edition or Windows Vista: The Missing Manual.

So, what happens once you’ve got Word’s motor running? If you’re a newcomer, you’re probably just staring with curiosity. If you’re familiar with previous versions of Word, though, you may be doing a double take (Figure 1-1). In Word 2007, Microsoft combined all the old menus and toolbars into a new feature

called the ribbon. Click one of the tabs above the ribbon, and you see the command buttons change below. The ribbon commands are organized into groups, with the name of each group listed at the bottom. (See Figure 1-1 for more detail on the ribbon.)

Creating a New Document

When you start Word without opening an existing document, the program gives you an empty one to work in. If you're eager to put words to page, then type away. Sooner or later, though, you'll want to start another new document. Word gives you three ways to do so:

When you start Word 2007 for the first time, it may look a little top-heavy. The ribbon takes up

more real estate than the old menus and toolbars. This change may not matter if you have a nice big monitor. But if you want to reclaim some of that space, you can hide the ribbon by double-clicking the active tab. Later, when you need to see the ribbon commands, just click a tab.

Figure 1-1. When you start Word 2007 for the first time, it may look a little top-heavy. The ribbon takes up more real estate than the old menus and toolbars. This change may not matter if you have a nice big monitor. But if you want to reclaim some of that space, you can hide the ribbon by double-clicking the active tab. Later, when you need to see the ribbon commands, just click a tab.

Creating a new blank document. When you're preparing a simple document—like a two-page

essay, a note for the babysitter, or a press release—a plain, unadorned page is fine. Or, when you're just brainstorming and you're not sure what you want the final document to look like, you probably want to start with a blank slate or use one of Word's templates (more on that in a moment) to provide structure for your text.

Creating a document from an existing document. For letters, resumes, and other documents that require more formatting, why reinvent the wheel? You can save time by using an existing document as a starting point (Section 1.2.2). When you have a letter format that you like, you can use it over and over by editing the contents.

Creating a document from a template (Section 1.2.3). Use a template when you need a professional design for a complex document, like a newsletter, a contract, or meeting minutes. Templates are a lot like forms—the margins, formatting, and graphics are already in place. All you do is fill in your text.

TIP

Microsoft provides a mind-boggling number of templates with Word, but they're not the only source. You can find loads more on the Internet, as described in Section 5.2.1. Your employer may even provide official templates for company documents.

To start your document in any of the above ways, click the Windows logo in the upper-left corner of the screen. That's Office 2007's new Office button. Click it, and a drop-down menu opens, revealing commands for creating, opening, and saving documents. Next to these commands, you see a list of your Word documents. This list includes documents that are open, as well as those that you've recently opened.

The Office button is also where you go to print and email your documents (Figure 1-2).

The phrase most frequently uttered by experienced Word fans the first time they start Word 2007 is, "Okay, where's my File menu?" Never fear, the equivalent of the File menu is

still there—it's just camouflaged a bit. Clicking the Office button (the one that looks like a Windows logo) reveals the commands you use to create, open, and save Word documents.

Figure 1-2. The phrase most frequently uttered by experienced Word fans the first time they start Word 2007 is, "Okay, where's my File menu?" Never fear, the equivalent of the File menu is still there—it's just camouflaged a bit. Clicking the Office button (the one that looks like a Windows logo) reveals the commands you use to create, open, and save Word documents.

Creating a New Blank Document

Say you want a new blank document, just like the one Word shows you when you start the program. No problem—here are the steps:

Choose Office button → New.

The New Document dialog box appears.

In the upper-left corner of the large “Create a new Word document” panel, click “Blank document” (Figure 1-3).

The New Document box presents a seemingly endless number of options, but don’t panic. The “Blank document” option you want is on the left side of the first line.

At the bottom of the New Document dialog box, click Create.

The dialog box disappears, and you're gazing at the blank page of a new Word document.

Better get to work.

Open the New Document box (Office button → New, or Alt+F, N), and Word gives you several ways to create a new document. Click "Blank document" to open an empty document, similar to the one Word shows when you first start the program. Or you can click "New from existing" to open a document that you previously created under a new name.

Figure 1-3. Open the New Document box (Office button → New, or Alt+F, N), and Word gives you several ways to create a new document. Click "Blank document" to open an

empty document, similar to the one Word shows when you first start the program. Or you can click “New from existing” to open a document that you previously created under a new name.

Creating a New Document from an Existing Document

A blank Word document is sort of like a shapeless lump of clay. With some work, you can mold it to become just about anything. Often, however, you can save time by opening an existing document that’s similar to the one you want to create. Imagine that you write the minutes for the monthly meetings of the Chief Executive Officer’s Surfing Association (CEOSA). When it’s time to write up the June minutes, it’s a lot faster to open the minutes from May. You keep the boilerplate text and all the

formatting, but you delete the text that's specific to the previous month. Now all you have to do is enter the text for June and save the document with a new name: JuneMinutes.docx.

NOTE

The .docx extension on the end of the filename is Word 2007's new version of .doc. The switch from three-letter to four-letter filename extensions indicates a change in the way Word stores documents. (If you need to share documents with folks using earlier versions of Word, choose Office button → Save As → Word 97-2003 document when you save the file. See the box in Section 1.2.3 for details.)

Word gives you a “New from existing” document-creation option to satisfy your desire to spend more time surfing and less time writing meeting minutes. Here’s how to create a new document from an existing document:

Choose Office button → New (Alt+F, N) to open the New Document window. Then click “New from existing…” (it sits directly below the “Blank document” button).

The three dots at the end of the button’s title tell you that there’s another dialog box to come. And sure enough, when you click “New from existing…”, it opens another box, appropriately titled New from Existing Document (Figure 1-4). This box looks—and works—like a standard Windows Open File box.

It lets you navigate to a specific folder and open a file.

On your computer, find the existing document you're using for a model.

You can use the bar on the left to change the folder view. Word starts you in your My Documents folder, but you can switch to your desktop or your My Computer icon by clicking the icons on the left. Double-click folder icons in the large window to open them and see their contents.

Click to select the file, and then click Create New (in the lower-right corner). (Alternatively,

just double-click the file's icon to open it. This trick works in all Open File boxes.)

Instead of the usual Open button at the bottom of the box, the button in the New from Existing Document box reads Create New—your clue that this box behaves differently in one important respect: Instead of opening an existing file, you're making a copy of an existing file. Once open, the file's name is something like Document2.docx instead of the original name. This way, when you save the file, you don't overwrite the original document. (Still, it's best to save it with a new descriptive name right away.)

Use the New from Existing Document box to find an existing Word document that you'd like

to open as a model for your new document. When you click Create New at bottom-right, Word opens a new copy of the document, leaving the original untouched. You can modify the copy to your heart's content and save it under a different file name.

Figure 1-4. Use the New from Existing Document box to find an existing Word document that you'd like to open as a model for your new document. When you click Create New at bottom-right, Word opens a new copy of the document, leaving the original untouched. You can modify the copy to your heart's content and save it under a different file name.

TIP

Windows' Open File boxes, like New from Existing Document, let you do a lot more than

just find files. In fact, they let you do just about anything you can do in Windows Explorer. Using keyboard shortcuts, you can cut (Ctrl+X), copy (Ctrl+C), and paste (Ctrl+V) files. A right-click displays a shortcut menu with even more commands, letting you rename files, view Properties dialog boxes, and much more. You can even drag and drop to move files and folders.

POWER USERS' CLINIC: WORD'S NEW FILE FORMATS: .DOCX AND .DOCM

With Office 2007, Microsoft took the drastic step of changing its file formats in hopes of improving your computer's security. Malicious programmers were using Office's macros to do nasty things to unsuspecting computers. The .docx format, the new standard for Word files,

doesn’t permit macros, making it safe from those threats. The .docm format indicates that a document contains macros or other bits of programming code. When opening one of these files, play it safe: If you don’t know who created the .docm file, then don’t open it.

The downside of the new file formats is that older versions of Word don’t know how to open these .docx and .docm documents. To open Word 2007 files with an older version (even Word 2003), you need to install the Microsoft Office Compatibility Pack.

This software fix gives pre-2007 versions of Word the power to open documents in the new formats. Even then, you may not be able to use or edit parts of the file that use new Word

features (like themes, equations, and content controls). To download the free compatibility pack, go to www.office.microsoft.com and type office 2007 compatibility into the search box at the top of the page.

Also, if you're preparing a Word document for someone who's using an older Word version, then you have to save it in a compatible format, as described in the tip in Section 1.2.2. (Fortunately, the compatibility issue doesn't go both ways: Word 2007 can open old .doc docs just fine.)

Creating a New Document from a Template

Say you're creating meeting minutes for the first time. You don't have an existing document

to give you a leg up, but you do want to end up with handsome, properly formatted minutes. Word is at your service—with templates. Microsoft provides dozens upon dozens of prebuilt templates for everything from newsletters to postcards. Remember all the busy stuff in the New Document box in Figure 1-3? About 90 percent of the items in there are templates.

In the previous example, where you use an existing document to create the meeting minutes for the Chief Executive Officer's Surfing Association (CEOSA), each month you open the minutes from the previous month. You delete the information that pertains to the previous month and enter the current month's minutes. A template works pretty much the same way,

except it’s a generic document, designed to be adaptable to lots of different situations. You just open it and add your text. The structure, formatting, graphics, colors, and other doodads are already in place.

NOTE

The subject of Word templates is a lengthy one, especially when it comes to creating your own, so there’s a whole chapter devoted to that topic—Chapter 20.

Here’s how to get some help from one of Microsoft’s templates for meeting minutes:

Choose Office button → New (Alt+F, N) to open the New Document window.

On the left of the New Document box is a Template Categories list. The top entry on this list is Installed Templates—the ones Word has installed on your computer.

You could use any of these, but you also have a world of choice waiting for you online. On its Web site, Microsoft offers hundreds of templates for all sorts of documents, and you can access them right from the New Document box. If you have a fast Internet connection, then it's just as quick and easy to use an online template as it is using the ones stored on your computer. In fact, you'll use an online template for this example.

NOTE

If you can’t connect to the Internet right now, then simply choose one of the installed templates instead. Click Create, and then skip to step 4.

Scroll down the Template Categories list to the Microsoft Office Online heading. Under this heading, select Minutes.

In the center pane, you’ll see all different types of minutes templates, from PTA minutes to Annual shareholder’s meeting minutes (Figure 1-5). When you click a template’s icon, a preview appears in the pane on the right.

The New Document box lists prebuilt templates that live at Microsoft Office Online in categories like Agendas, Brochures, Calendars, and Minutes. Below the thumbnail you see an estimate of how long it takes to download the template from the Microsoft Office Online Web site. A rating, from 0 to 5 stars, tells you what other people think of the template (the rating system is kind of like the one at Amazon.com).

Figure 1-5. The New Document box lists prebuilt templates that live at Microsoft Office Online in categories like Agendas, Brochures, Calendars, and Minutes. Below the thumbnail you see an estimate of how long it takes to download the template from the Microsoft Office Online Web site. A rating, from 0 to 5 stars, tells you what other people think of the template (the rating system is kind of like the one at Amazon.com).

When you’re done perusing the various styles, click the Formal Meeting Minutes icon. (After all, CEOSA is a very formal organization.) Then click Download.

Word downloads and opens the document.

Start writing up the minutes for the CEO Surfers.

To follow the template’s structure, replace all the words in square brackets ([ ]) with text relevant to CEOSA.

TIP

If you'd rather not download the Formal Meeting Minutes template every time you use it, then you can save the file on your computer as a Word template. The steps for saving files are just around the corner in Section 1.5.

Q6 b) Write steps regarding followings

- To change the font style
- To change the font size
- To change the font color
- To highlight (in yellow) the line that reads need to get IMS s address .

Ans-Changing font style, size and color

The tag is used to change the style, size and color of text. It is also a container tag. It is generally used for changing the appearance of a short segment of text. Before using , you should have the knowledge about fonts.

A font is a named set of certain style of character and number. Each font looks different from other fonts. Generally some fonts are used for specific purpose. For example, Times New Roman is a style of font usually used for preparing office documents. Arial is another font style which is used for publishing work. Variety of fonts available in internet at free of cost.

Generally, a browser shows the contents as default system font setting. Every system has different font setting with another system.

The general form of tag with attributes:

Text to be displayed

- The face is an attribute to set different font style. The name of a font has multiple

words it should be specified within double quote.

- The size attribute is used to set size of the text. The size can have an absolute value from 1 to 7. These predefined sizes are known as virtual size. Each virtual size is successively 20% larger than the previous one.

The color attribute is used to set the color to the text. As you leant earlier color name or color code in hexadecimal may be used.

Illustration 11.8 HTML code to change font properties

```
<html>

<head>

    <title> Changing Font Properties </title>

</head>

<body>

    <font face="Arial Black" size=1 color=red> Font Size 1 </font> <br>
```

 Font Size 2

 Font Size 3

 Font Size 4

 Font Size 5

 Font Size 6

```
        <font face="Arial Black" size=7 color=blue>
Font Size 7 </font> <br>


</body>


</html>
```

The output will be:

Note: The tag is not supported by HTML5.

Multiple fonts with face attribute:

As you learnt already, the face attribute of font tag is used to change font style of a segment of text. In face attribute, you can assign more than one font-name at a time within double quotes with comma. For example,

Welcome to HTML

Browser first tries to find out whether the font-name in the list is supported or not. If the first

font is not supported by the browser, then it displays the text in second font, otherwise it will display next one. If no font in the list is supported, then the browser display the in the default font.

In the above code, consider the font names “Bookman old style1” and “Broadway1” are not supported by any browser. (Because, the names has been changed). So, the text “Welcome to HTML” will be displayed in “Forte” style. If your browser not supported “Forte” font, the text will be displayed in “Arial” font, otherwise the browser shows the text as in default font setting. In the case of Internet explorer, the “Times New Roman” is the default font to display the contents.

Q7. Create a file in MS-Word for the following document and save it with file name ‘ms_word’. Describe

all steps involved in it.

Ans- Every Word project you create—whether it’s a personal letter, a TV sitcom script, or a thesis in microbiology—begins and ends the same way. You start by creating a document, and you end by saving your work. Sounds simple, but to manage your Word documents effectively, you need to know these basics and beyond. This chapter shows you all the different ways to create a new Word document—like starting from an existing document or adding text to a predesigned template—and how to choose the best one for your particular project.

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TIP

When you don’t see the Quick Launch toolbar, here’s how to display it: On the bar at the bottom of your screen, right-click an empty spot. From the menu that pops up, choose Toolbars → Quick Launch. When you’re done, icons for some of your programs appear in the bottom bar. A single click fires up the program.

Opening a Word document. Once you’ve created some Word documents, this method is fastest of all, since you don’t have to start Word as a separate step. Just open an existing Word document, and Word starts itself. Try going to Start → My Recent Documents, and then, from the list of files, choose a Word document. You can also double-click the document’s icon on the desktop or wherever it lives on your PC.

TIP

If you need to get familiar with the Start menu, Quick Launch toolbar, and other Windows features, then pick up a copy of Windows XP: The Missing Manual, Second Edition or Windows Vista: The Missing Manual.

So, what happens once you've got Word's motor running? If you're a newcomer, you're probably just staring with curiosity. If you're familiar with previous versions of Word, though, you may be doing a double take (Figure 1-1). In Word 2007, Microsoft combined all the old menus and toolbars into a new feature called the ribbon. Click one of the tabs above the ribbon, and you see the command buttons change below. The ribbon commands are

organized into groups, with the name of each group listed at the bottom. (See Figure 1-1 for more detail on the ribbon.)

Creating a New Document

When you start Word without opening an existing document, the program gives you an empty one to work in. If you're eager to put words to page, then type away. Sooner or later, though, you'll want to start another new document. Word gives you three ways to do so:

When you start Word 2007 for the first time, it may look a little top-heavy. The ribbon takes up more real estate than the old menus and toolbars. This change may not matter if you have a nice big monitor. But if you want to

reclaim some of that space, you can hide the ribbon by double-clicking the active tab. Later, when you need to see the ribbon commands, just click a tab.

Figure 1-1. When you start Word 2007 for the first time, it may look a little top-heavy. The ribbon takes up more real estate than the old menus and toolbars. This change may not matter if you have a nice big monitor. But if you want to reclaim some of that space, you can hide the ribbon by double-clicking the active tab. Later, when you need to see the ribbon commands, just click a tab.

Creating a new blank document. When you're preparing a simple document—like a two-page essay, a note for the babysitter, or a press release—a plain, unadorned page is fine. Or, when you're just brainstorming and you're not

sure what you want the final document to look like, you probably want to start with a blank slate or use one of Word's templates (more on that in a moment) to provide structure for your text.

Creating a document from an existing document. For letters, resumes, and other documents that require more formatting, why reinvent the wheel? You can save time by using an existing document as a starting point (Section 1.2.2). When you have a letter format that you like, you can use it over and over by editing the contents.

Creating a document from a template (Section 1.2.3). Use a template when you need a professional design for a complex document,

like a newsletter, a contract, or meeting minutes. Templates are a lot like forms—the margins, formatting, and graphics are already in place. All you do is fill in your text.

TIP

Microsoft provides a mind-boggling number of templates with Word, but they're not the only source. You can find loads more on the Internet, as described in Section 5.2.1. Your employer may even provide official templates for company documents.

To start your document in any of the above ways, click the Windows logo in the upper-left corner of the screen. That's Office 2007's new Office button. Click it, and a drop-down menu

opens, revealing commands for creating, opening, and saving documents. Next to these commands, you see a list of your Word documents. This list includes documents that are open, as well as those that you've recently opened.

The Office button is also where you go to print and email your documents (Figure 1-2).

The phrase most frequently uttered by experienced Word fans the first time they start Word 2007 is, "Okay, where's my File menu?" Never fear, the equivalent of the File menu is still there—it's just camouflaged a bit. Clicking the Office button (the one that looks like a Windows logo) reveals the commands you use to create, open, and save Word documents.

Figure 1-2. The phrase most frequently uttered by experienced Word fans the first time they start Word 2007 is, “Okay, where’s my File menu?” Never fear, the equivalent of the File menu is still there—it’s just camouflaged a bit. Clicking the Office button (the one that looks like a Windows logo) reveals the commands you use to create, open, and save Word documents.

Creating a New Blank Document

Say you want a new blank document, just like the one Word shows you when you start the program. No problem—here are the steps:

Choose Office button → New.

The New Document dialog box appears.

In the upper-left corner of the large “Create a new Word document” panel, click “Blank document” (Figure 1-3).

The New Document box presents a seemingly endless number of options, but don’t panic. The “Blank document” option you want is on the left side of the first line.

At the bottom of the New Document dialog box, click Create.

The dialog box disappears, and you’re gazing at the blank page of a new Word document.

Better get to work.

Open the New Document box (Office button → New, or Alt+F, N), and Word gives you several ways to create a new document. Click “Blank document” to open an empty document, similar to the one Word shows when you first start the program. Or you can click “New from existing” to open a document that you previously created under a new name.

Figure 1-3. Open the New Document box (Office button → New, or Alt+F, N), and Word gives you several ways to create a new document. Click “Blank document” to open an empty document, similar to the one Word shows when you first start the program. Or you can click “New from existing” to open a

document that you previously created under a new name.

Creating a New Document from an Existing Document

A blank Word document is sort of like a shapeless lump of clay. With some work, you can mold it to become just about anything. Often, however, you can save time by opening an existing document that's similar to the one you want to create. Imagine that you write the minutes for the monthly meetings of the Chief Executive Officer's Surfing Association (CEOSA). When it's time to write up the June minutes, it's a lot faster to open the minutes from May. You keep the boilerplate text and all the formatting, but you delete the text that's specific to the previous month. Now all you have to do is enter the text for June and save

the document with a new name: JuneMinutes.docx.

NOTE

The .docx extension on the end of the filename is Word 2007's new version of .doc. The switch from three-letter to four-letter filename extensions indicates a change in the way Word stores documents. (If you need to share documents with folks using earlier versions of Word, choose Office button → Save As → Word 97-2003 document when you save the file. See the box in Section 1.2.3 for details.)

Word gives you a "New from existing" document-creation option to satisfy your desire to spend more time surfing and less time

writing meeting minutes. Here's how to create a new document from an existing document:

Choose Office button → New (Alt+F, N) to open the New Document window. Then click "New from existing…" (it sits directly below the "Blank document" button).

The three dots at the end of the button's title tell you that there's another dialog box to come. And sure enough, when you click "New from existing…", it opens another box, appropriately titled New from Existing Document (Figure 1-4). This box looks—and works—like a standard Windows Open File box. It lets you navigate to a specific folder and open a file.

On your computer, find the existing document you're using for a model.

You can use the bar on the left to change the folder view. Word starts you in your My Documents folder, but you can switch to your desktop or your My Computer icon by clicking the icons on the left. Double-click folder icons in the large window to open them and see their contents.

Click to select the file, and then click Create New (in the lower-right corner). (Alternatively, just double-click the file's icon to open it. This trick works in all Open File boxes.)

Instead of the usual Open button at the bottom of the box, the button in the New from Existing Document box reads Create New—your clue that this box behaves differently in one important respect: Instead of opening an existing file, you're making a copy of an existing file. Once open, the file's name is something like Document2.docx instead of the original name. This way, when you save the file, you don't overwrite the original document. (Still, it's best to save it with a new descriptive name right away.)

Use the New from Existing Document box to find an existing Word document that you'd like to open as a model for your new document. When you click Create New at bottom-right, Word opens a new copy of the document,

leaving the original untouched. You can modify the copy to your heart's content and save it under a different file name.

Figure 1-4. Use the New from Existing Document box to find an existing Word document that you'd like to open as a model for your new document. When you click Create New at bottom-right, Word opens a new copy of the document, leaving the original untouched. You can modify the copy to your heart's content and save it under a different file name.

TIP

Windows' Open File boxes, like New from Existing Document, let you do a lot more than just find files. In fact, they let you do just about anything you can do in Windows Explorer. Using keyboard shortcuts, you can cut (Ctrl+X),

copy (Ctrl+C), and paste (Ctrl+V) files. A right-click displays a shortcut menu with even more commands, letting you rename files, view Properties dialog boxes, and much more. You can even drag and drop to move files and folders.

POWER USERS' CLINIC: WORD'S NEW FILE FORMATS: .DOCX AND .DOCM

With Office 2007, Microsoft took the drastic step of changing its file formats in hopes of improving your computer's security. Malicious programmers were using Office's macros to do nasty things to unsuspecting computers. The .docx format, the new standard for Word files, doesn't permit macros, making it safe from those threats. The .docm format indicates that a document contains macros or other bits of

programming code. When opening one of these files, play it safe: If you don't know who created the .docm file, then don't open it.

The downside of the new file formats is that older versions of Word don't know how to open these .docx and .docm documents. To open Word 2007 files with an older version (even Word 2003), you need to install the Microsoft Office Compatibility Pack.

This software fix gives pre-2007 versions of Word the power to open documents in the new formats. Even then, you may not be able to use or edit parts of the file that use new Word features (like themes, equations, and content controls). To download the free compatibility pack, go to www.office.microsoft.com and type

office 2007 compatibility into the search box at the top of the page.

Also, if you're preparing a Word document for someone who's using an older Word version, then you have to save it in a compatible format, as described in the tip in Section 1.2.2. (Fortunately, the compatibility issue doesn't go both ways: Word 2007 can open old .doc docs just fine.)

Creating a New Document from a Template

Say you're creating meeting minutes for the first time. You don't have an existing document to give you a leg up, but you do want to end up with handsome, properly formatted minutes. Word is at your service—with templates.

Microsoft provides dozens upon dozens of prebuilt templates for everything from newsletters to postcards. Remember all the busy stuff in the New Document box in Figure 1-3? About 90 percent of the items in there are templates.

In the previous example, where you use an existing document to create the meeting minutes for the Chief Executive Officer's Surfing Association (CEOSA), each month you open the minutes from the previous month. You delete the information that pertains to the previous month and enter the current month's minutes. A template works pretty much the same way, except it's a generic document, designed to be adaptable to lots of different situations. You just open it and add your text. The structure,

formatting, graphics, colors, and other doodads are already in place.

NOTE

The subject of Word templates is a lengthy one, especially when it comes to creating your own, so there's a whole chapter devoted to that topic—Chapter 20.

Here's how to get some help from one of Microsoft's templates for meeting minutes:

Q8. Create a file in MS-word for the following document and save it with file name 'equations'. Describe

all steps involved in it.

Ans-Open an OpenDocument Text file in Word

Click the File tab.

Click Open.

Click Browse,

To see only the files saved in the OpenDocument format, click the list of file types next to the File name box, and then click OpenDocument Text.

Click the file you want to open, and then click Open.

Tip: To open the file, you can also double-click it after you find it.

Note: When you open an OpenDocument Text file in Word, it might not have the same formatting as it did in the original application it was created in. This is because of the differences between applications that use the OpenDocument Format.

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Save a Word document in OpenDocument Text format

Important: If you want to keep a Word version of your file, you must first save the file as a Word document, for example, in .docx file format, and then save it again in the OpenDocument Text (.odt) format.

Click the File tab.

Click Save As.

Click Browse, and then select the location where you want to save your file.

In the Save as type list, click OpenDocument Text.

Give your file a name, and then save it.

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Learn more about the OpenDocument Format

When you open or save documents in the OpenDocument Text (.odt) format, some formatting might be lost. This is because of the different features and options, such as formatting, that OpenDocument Text applications and Word support. For more information about the differences between the OpenDocument Text format and the Word format, see Differences between the OpenDocument Text (.odt) format and the Word (.docx) format.

Tips

Before sending a file to someone else, you might want to close the file and open it again to see what it looks like in OpenDocument Text (.odt) format.

When you collaborate on a document shared between Word and another word processing application, such as Google Docs or OpenOffice.org Writer, think of writing (the words) and formatting (the look) as different tasks. Complete as much of the writing as possible without applying formatting to the text and save the formatting until the end. This allows you to focus on the writing while minimizing the loss of formatting as you switch between the OpenDocument Text format and Word format.

Q9. Create a file in MS-word that convert existing highlight text to table as shown below and save it as

file name ‘text_to_table’. Describe all steps involved in it

Ans- With Word on your PC, Mac, or mobile device, you can:

Create documents from scratch, or a template.

Add text, images, art, and videos.

Research a topic and find credible sources.

Access your documents from a computer, tablet, or phone with OneDrive.

Share your documents, and work with others.

Track and review changes.

Create a document

On the File tab, click New.

In the Search for online templates box, enter the type of document you want to create and press ENTER.

Tip: To start from scratch, select Blank document. Or, for practice using Word features, try a learning

guide like Welcome to Word, Insert your first table of contents, and more.

Online templates in Word

Add and format text

Place the cursor and type some text.

To format, select the text and then select an option: Bold, Italic, Bullets, Numbering, and more.

Add and format text in Word

Add Pictures, Shapes, SmartArt, Chart, and more

Select the Insert tab.

Select what you want to add:

Tables - select Tables, hover over the size you want, and select it.

Pictures - select Pictures, browse for the picture you want, and select Insert.

Online Pictures - select Online Pictures, search and choose the picture you want, and select Insert.

Shapes - select Shapes, and then select a shape from the drop-down.

Icons - select Icons, choose the one you want, and select Insert.

3D Models - select 3D Models, choose from a file or online source, go to the image you want, and select Insert.

SmartArt - select SmartArt, choose a SmartArt Graphic, and select OK.

Chart - select Chart, select the chart you want, and select OK.

Screenshot - select Screenshot and select one from the drop-down.

Q10. Create a file in MS-Word to insert a table in the document. Describe all steps involved in it.

Ans- The basic steps for creating a standard table in Microsoft Word (2013) are:

1. Open a blank Word document

2. In the top ribbon, press Insert

3. Click on the Table button

4. Either use the diagram to select the number of columns and rows you need, or click Insert Table and a dialog box will appear where you can specify the number of columns and rows.

5. The blank table will now appear on the page. Alter it as necessary. Standard features like bold, italics, and underline are still available! These items may be helpful for creating headings or calling out certain items in the table.

6. Follow these instructions for ensuring your table meets APA formatting guidelines.

Need additional help? The tutoring service has self-paced table and chart lessons/tutorials within SkillSurfer. Follow these steps to access:

1. Log into the tutoring service (click on the blue hyperlink to the left to login!)

2. Click on SkillSurfer

3. Click on Computers and Technology

4. Click on Intermediate underneath Microsoft Word

5. Select Creating Tables and Charts

6. Choose the exact item(s) you wish to learn about (likely Creating Tables from Scratch).

Q11. Create a following worksheet in MS-excel and save it with name ‘book1’.

Ans- The world’s most popular spreadsheet program is now more powerful than ever, but it’s also more complex. That’s where this Missing Manual comes in. With crystal-clear explanations and hands-on examples, Excel 2013: The Missing Manual shows you how to master Excel so you can easily track, analyze, and chart your data. You’ll be using new features like PowerPivot and Flash Fill in no time.

The important stuff you need to know:

Go from novice to ace. Learn how to analyze your data, from writing your first formula tocharting your results.

Illustrate trends. Discover the clearest way to present your data using Excel's new Quick Analysis feature.

Broaden your analysis. Use pivot tables, slicers, and timelines to examine your data from different perspectives.

Import data. Pull data from a variety of sources, including website data feeds and corporate databases.

Work from the Web. Launch and manage your workbooks on the road, using the new Excel Web App.

Share your worksheets. Store Excel files on SkyDrive and collaborate with colleagues on Facebook, Twitter, and LinkedIn.

Master the new data model. Use PowerPivot to work with millions of rows of data.

Make calculations. Review financial data, use math and scientific formulas, and perform statistical analyses.

Q12. Calculate the following things of a range (C2:C11) of data in the worksheet created in question no

10.

- the sum of the marks using AutoSum in a range of cells (C2:C11)
- average of the marks in a range of cells (C2:C11)
- highest marks in a range of cells (C2:C11)
- minimum marks in a range of cells (C2:C11)

Ans- You can use a simple formula to sum numbers in a range (a group of cells), but the

SUM function is easier to use when you're working with more than a few numbers. For example =SUM(A2:A6) is less likely to have typing errors than =A2+A3+A4+A5+A6.

Using SUM with two ranges of numbers

Here's a formula that uses two cell ranges: =SUM(A2:A4,C2:C3) sums the numbers in ranges A2:A4 and C2:C3. You'd press Enter to get the total of 39787.

To create the formula:

Type =SUM in a cell, followed by an opening parenthesis (.

To enter the first formula range, which is called an argument (a piece of data the formula needs to run), type A2:A4 (or select cell A2 and drag through cell A6).

Type a comma (,) to separate the first argument from the next.

Type the second argument, C2:C3 (or drag to select the cells).

Type a closing parenthesis), and then press Enter.

Each argument can be a range, a number, or single cell references, all separated by commas.

=SUM(A2:A4,2429,10482)

=SUM(4823,A3:A4,C2:C3)

=SUM(4823,12335,9718,C2:C3)

=SUM(A2,A3,A4,2429,10482)

Tip: If you need to sum columns or rows of numbers next to each other, use AutoSum to sum numbers.

Give it a try

If you want to play around with our sample data, here's some data to use.

You can see how the SUM function works by copying the following table into a worksheet and pasting it into cell A1.

Data
-5
15
30

'5

TRUE

Formula

Description

Result

=SUM(3, 2)

Adds 3 and 2.

5

=SUM("5", 15, TRUE)

Adds 5, 15 and 1. The text value "5" is first translated into a number, and the logical value TRUE is first translated into the number 1.

21

=SUM(A2:A4)

Adds the values in cells A2 through A4.

40

=SUM(A2:A4, 15)

Adds the values in cells A2 through A4, and then adds 15 to that result.

55

=SUM(A5,A6, 2)

Adds the values in cells A5 and A6, and then adds 2 to that result. Because non-numeric values in references are not translated — the value in cell A5 ('5) and the value in cell A6 (TRUE) are both treated as text — the values in those cells are ignored. -2

Q13 a) Describe various steps involved in the following

- To modify column width of a worksheet
- To modify the row height of a worksheet
- To delete rows and columns of a worksheet

Ans-To modify column width:

In our example below, column C is too narrow to display all of the content in these cells. We can make all of this content visible by changing the width of column C.

Position the mouse over the column line in the column heading so the cursor becomes a double arrow.

positioning the mouse over the column line

Click and drag the mouse to increase or decrease the column width.

increasing the column width

Release the mouse. The column width will be changed.

the resized column

With numerical data, the cell will display pound signs (#######) if the column is too narrow. Simply increase the column width to make the data visible.

To AutoFit column width:

The AutoFit feature will allow you to set a column's width to fit its content automatically.

Position the mouse over the column line in the column heading so the cursor becomes a double arrow.

autofitting the column width

Double-click the mouse. The column width will be changed automatically to fit the content.

the autofit column width

You can also AutoFit the width for several columns at the same time. Simply select the columns you want to AutoFit, then select the AutoFit Column Width command from the Format drop-down menu on the Home tab. This method can also be used for row height.

autofitting column width for multiple columns

To modify row height:

Position the cursor over the row line so the cursor becomes a double arrow.

hovering over a row line

Click and drag the mouse to increase or decrease the row height.

decreasing the row height

Release the mouse. The height of the selected row will be changed.

the new row height

To modify all rows or columns:

Instead of resizing rows and columns individually, you can modify the height and width of every row and column at the same time. This method allows you to set a uniform size for every row and column in your worksheet. In our example, we will set a uniform row height.

Locate and click the Select All button just below the name box to select every cell in the worksheet.

selecting all cells in a worksheet

Position the mouse over a row line so the cursor becomes a double arrow.

Click and drag the mouse to increase or decrease the row height, then release the mouse when you are satisfied. The row height will be changed for the entire worksheet.

the new, uniform row height

Inserting, deleting, moving, and hiding

After you've been working with a workbook for a while, you may find that you want to insert new columns or rows, delete certain rows or columns, move them to a different location in the worksheet, or even hide them.

To insert rows:

Select the row heading below where you want the new row to appear. In this example, we

want to insert a row between rows 4 and 5, so we'll select row 5.

selecting row 5

Click the Insert command on the Home tab.

clicking the Insert command

The new row will appear above the selected row.

the newly inserted row

When inserting new rows, columns, or cells, you will see a paintbrush icon next to the inserted cells. This button allows you to choose how Excel formats these cells. By default, Excel formats inserted rows with the same formatting as the cells in the row above. To access more options, hover your mouse over the icon, then click the drop-down arrow.

choosing more insert formatting options

To insert columns:

Select the column heading to the right of where you want the new column to appear. For example, if you want to insert a column between columns D and E, select column E.

selecting column E

Click the Insert command on the Home tab.

clicking the Insert command

The new column will appear to the left of the selected column.

the newly inserted column

When inserting rows and columns, make sure you select the entire row or column by clicking the heading. If you select only a cell in the row or column, the Insert command will only insert a new cell.

To delete a row or column:

It's easy to delete a row or column that you no longer need. In our example we'll delete a row, but you can delete a column the same way.

Select the row you want to delete. In our example, we'll select row 9.

selecting row 9

Click the Delete command on the Home tab.

clicking the delete command

The selected row will be deleted, and those around it will shift. In our example, row 10 has moved up, so it's now row 9.

the shifted rows after deleting

It's important to understand the difference between deleting a row or column and simply clearing its contents. If you want to remove the

content from a row or column without causing others to shift, right-click a heading, then select Clear Contents from the drop-down menu.

clearing the contents of a row instead of deleting

To move a row or column:

Sometimes you may want to move a column or row to rearrange the content of your worksheet. In our example we'll move a column, but you can move a row in the same way.

Select the desired column heading for the column you want to move.

selecting a column to move

Click the Cut command on the Home tab, or press Ctrl+X on your keyboard.

selecting the Cut command

Select the column heading to the right of where you want to move the column. For example, if you want to move a column between columns E and F, select column F.

selecting an adjacent column to insert the cut cells

Click the Insert command on the Home tab, then select Insert Cut Cells from the drop-down menu.

inserting the cut cells

The column will be moved to the selected location, and the columns around it will shift.

the moved column in its new location

You can also access the Cut and Insert commands by right-clicking the mouse and selecting the desired commands from the drop-down menu.

accessing commands from the right-click menu

To hide and unhide a row or column:

At times, you may want to compare certain rows or columns without changing the organization of your worksheet. To do this, Excel allows you to hide rows and columns as needed. In our example we'll hide a few columns, but you can hide rows in the same way.

Select the columns you want to hide, right-click the mouse, then select Hide from the formatting menu. In our example, we'll hide columns C, D, and E.

selecting the hide columns command

The columns will be hidden. The green column line indicates the location of the hidden columns.

the hidden columns

To unhide the columns, select the columns on both sides of the hidden columns. In our example, we'll select columns B and F. Then right-click the mouse and select Unhide from the formatting menu.

selecting the columns adjacent to the hidden columns

The hidden columns will reappear.

the unhidden columns

Wrapping text and merging cells

Whenever you have too much cell content to be displayed in a single cell, you may decide to wrap the text or merge the cell rather than resize a column. Wrapping the text will automatically modify a cell's row height, allowing cell contents to be displayed on

multiple lines. Merging allows you to combine a cell with adjacent empty cells to create one large cell.

To wrap text in cells:

Select the cells you want to wrap. In this example, we'll select the cells in column C.

Click the Wrap Text command on the Home tab.

clicking the Wrap text command on the Home tab

The text in the selected cells will be wrapped.

the text wrapped within column C

Click the Wrap Text command again to unwrap the text.

To merge cells using the Merge & Center command:

Select the cell range you want to merge. In our example, we'll select A1:F1.

Click the Merge & Center command on the Home tab. In our example, we'll select the cell range A1:F1.

selecting cells to merge

The selected cells will be merged, and the text will be centered.

the newly merged cells

To access more merge options:

If you click the drop-down arrow next to the Merge & Center command on the Home tab, the Merge drop-down menu will appear.

other cell merge options

From here, you can choose to:

Merge & Center: merges the selected cells into one cell and centers the text

Merge Across: merges the selected cells into larger cells while keeping each row separate

Merge Cells: merges the selected cells into one cell but does not center the text

Unmerge Cells: unmerges selected cells

You'll want to be careful when using this feature. If you merge multiple cells that all contain data, Excel will keep only the contents of the upper-left cell and discard everything else.

To center across selection:

Merging can be useful for organizing your data, but it can also create problems later on. For example, it can be difficult to move, copy, and paste content from merged cells. A good

alternative to merging is Center Across Selection, which creates a similar effect without actually combining cells.

Watch the video below to learn why you should use Center Across Selection instead of merging cells.

Q13 b) Describe following terms in the worksheet

- Absolute reference and relative reference in formula
- Cell address

Ans- Relative references

By default, all cell references are relative references. When copied across multiple cells, they change based on the relative position of rows and columns. For example, if you copy the formula =A1+B1 from row 1 to row 2, the

formula will become =A2+B2. Relative references are especially convenient whenever you need to repeat the same calculation across multiple rows or columns.

To create and copy a formula using relative references:

In the following example, we want to create a formula that will multiply each item's price by the quantity. Rather than create a new formula for each row, we can create a single formula in cell D2 and then copy it to the other rows. We'll use relative references so the formula correctly calculates the total for each item.

Select the cell that will contain the formula. In our example, we'll select cell D2.

Screenshot of Excel 2013

Enter the formula to calculate the desired value. In our example, we'll type =B2*C2.

Screenshot of Excel 2013

Press Enter on your keyboard. The formula will be calculated, and the result will be displayed in the cell.

Locate the fill handle in the lower-right corner of the desired cell. In our example, we'll locate the fill handle for cell D2.

Screenshot of Excel 2013

Click, hold, and drag the fill handle over the cells you wish to fill. In our example, we'll select cells D3:D12.

Screenshot of Excel 2013

Release the mouse. The formula will be copied to the selected cells with relative references and the values will be calculated in each cell.

Screenshot of Excel 2013

You can double-click the filled cells to check their formulas for accuracy. The relative cell references should be different for each cell, depending on its row.

Screenshot of Excel 2013

Q14. a) What tools are available to customize our PowerPoint presentation?

Ans - Changing page setup options

Presentations are created mainly to project either on a projector or more and more frequently to a plasma or TV screen. There are times when a presentation can be created for delivery in different formats.

- On-screen show (4:3)

- Letter Paper (8.5 x 11 in)
- Ledger Paper (11 x 17 in)
- A3 Paper (297 x 420 mm)
- A4 Paper (210 x 297 mm)
- B4 (ISO) Paper (250 x 353 mm)
- B5 (ISO) Paper (176 x 250 mm)
- 35mm Slides
- Overhead
- Banner
- On-screen Show (16:9)
- On-screen Show (16:10)
- Widescreen
- Custom view11

To select a slide size other than the standard one:

In Slide Master View

Click on Slide Size

Select from one of the two options

For more choices, click Custom

Select one of the options

view1

Figure 89- standard or widescreen

view2

Figure 90 – other options

If you change the orientation to Portrait for the presentation it will apply to all the slides.

Changing to view in color/grayscale

Why change to view the presentation in grayscale? You might want to print the presentation and to print in colour is more expensive than printing to greyscale, so you need to see what the presentation looks like in grayscale before you print.

view3

Figure 91- colour/grayscale options

On the View Ribbon, click on the option you want, Colour, Grayscale or Black and White.

Then from the Grayscale Ribbon select the option you want to see:

view4

Figure 92- grayscale options

To get back to the colour view, click Back to Colour View.

Navigating using presentation views

There are several different views in PowerPoint as we saw earlier and you can navigate through the presentation in each in different ways.

In Normal View

Click on the thumbnail of the slide you want to see

Use the Vertical Scrollbar to move between slides

Use the up and down arrow keys on the keyboard to move one slide backwards or forwards

In Slide Sorter View

Click on the slide you want to select

Use the arrow keys to move up, down, left and right

In Reading View

Use the next and back icons in the status bar to move back or forwards or use the menu which is accessed from the icon in the middle

view5

Figure 93- reading view

Pick from the menu – you can use Go to Slide to pick the slide number

view6

Figure 94 – icons

Back and Next icons move between slides.

In Slide Show view

When presenting you can use the mouse or the arrows on the keyboard to move through the presentation one slide at a time.

You can also type the number of the slide you want to see and press Enter.

When you hover the mouse over the bottom left corner of the slide on display you will notice some faint icons, there is a back arrow and forward arrow which move you through one slide at a time.

view7

Figure 95- slide show icons

Use the fourth icon along to show the slides in a presentation view of Slide Sorter View. This lays the slides on the screen and you can click on the one you want to see

view8

Figure 96- Slide Sorter in presentation view

Use the back arrow at the top left to get back to the slide you started from.

To end the slide show, press the Escape Key on the keyboard – this takes you back to PowerPoint in the edit mode which means that

your audience will see the back end of your presentation.

You can also use the End Presentation option which is on the small ellipse icon on the bottom left of the slide when you hover the mouse.

view9

Figure 97- end show and stay in presentation mode

We hope you enjoyed this article!

PowerPoint 2013 has a lot more exciting features. All you have to do is to explore it.

Aren’t you excited to discover and use these features such as how to track changes in PowerPoint 2013?

Good luck with your next presentation and don’t forget to have a look at the other blog articles for more tips:

PowerPoint Presentations: 2 Ways to Make Them More Appealing

3 Simple Ways to Make a Creative Design in PowerPoint

How to use SmartArt graphics in PowerPoint 2013

How to use PowerPoint AND engage your audience

How to present a PowerPoint presentation online

How to use masters in Power Point 2013

How to format text in PowerPoint

How to use PowerPoint AND engage your audience

Q14 b) Write the steps for the following action for creation of power point presentation

- Open a Blank presentation
- Save the presentation as Lab1.pptx

Ans- To create a new presentation:

When beginning a new project in PowerPoint, you'll often want to start with a new blank presentation.

Select the File tab to go to Backstage view.

Clicking the File tab

Select New on the left side of the window, then click Blank Presentation.

Creating a new presentation

A new presentation will appear.

To create a new presentation from a template:

A template is a predesigned presentation you can use to create a new slide show quickly. Templates often include custom formatting and designs, so they can save you a lot of time and effort when starting a new project.

Click the File tab to access Backstage view, then select New.

You can click a suggested search to find templates or use the search bar to find

something more specific. In our example, we'll search for the keyword chalkboard.

Searching for templates

Select a template to review it.

Selecting a template

A preview of the template will appear, along with additional information on how the template can be used.

Click Create to use the selected template.

Creating a new presentation with a template

A new presentation will appear with the selected template.

It's important to note that not all templates are created by Microsoft. Many are created by third-party providers and even individual users,

so some templates may work better than others.

To open an existing presentation:

In addition to creating new presentations, you'll often need to open a presentation that was previously saved. To learn more about saving presentations, visit our lesson on Saving Presentations.

Select the File tab to go to Backstage view, then click Open.

Clicking Open

Click Browse. Alternatively, you can choose OneDrive to open files stored on your OneDrive.

Clicking Browse

The Open dialog box will appear. Locate and select your presentation, then click Open.

Opening a presentation

Most features in Microsoft Office, including PowerPoint, are geared toward saving and sharing documents online. This is done with OneDrive, which is an online storage space for your documents and files. If you want to use OneDrive, make sure you're signed in to PowerPoint with your Microsoft account. Review our lesson on Understanding OneDrive to learn more.

To pin a presentation:

If you frequently work with the same presentation, you can pin it to Backstage view for easy access.

Select the File tab to go to Backstage view, then click Open. Your Recent Presentations will appear.

Hover the mouse over the presentation you want to pin, then click the pushpin icon.

Pinning a presentation

The presentation will stay in the Recent presentations list until it is unpinned. To unpin a presentation, click the pushpin icon again.

The pinned presentation

Compatibility Mode

Sometimes you may need to work with presentations that were created in earlier versions of PowerPoint, like PowerPoint 2003 or PowerPoint 2000. When you open these types of presentations, they will appear in Compatibility Mode.

Compatibility Mode disables certain features, so you'll only be able to access commands found in the program that was used to create the presentation. For example, if you open a presentation created in PowerPoint 2003, you can only use tabs and commands found in PowerPoint 2003.

In the image below, you can see at the top of the window that the presentation is in Compatibility Mode. This will disable some

PowerPoint 2016 features, including newer types of slide transitions.

Compatibility mode

To exit Compatibility Mode, you'll need to convert the presentation to the current version type. However, if you're collaborating with others who only have access to an earlier version of PowerPoint, it's best to leave the presentation in Compatibility Mode so the format will not change.

You can review this support page from Microsoft to learn more about which features are disabled in Compatibility Mode.

To convert a presentation:

If you want access to all PowerPoint 2016 features, you can convert the presentation to the 2016 file format.

Note that converting a file may cause some changes to the original layout of the presentation.

Click the File tab to access Backstage view.

Clicking the File tab

Locate and select the Convert command.

Converting the presentation to the newest file type

The Save As dialog box will appear. Select the location where you want to save the presentation, enter a file name, and click Save.

Saving a new version of the workbook

The presentation will be converted to the newest file type.

Challenge!

Open our practice presentation.

Notice that the presentation opens in Compatibility Mode. Convert it to the 2016 file format. If a dialog box appears asking if you would like to close and reopen the file in order to see the new features, choose Yes.

In Backstage view, pin a file or folder.

Q15. Write steps for creation of a set of PowerPoint slides that demonstrates your skill to use

the tools of PowerPoint. It should include the following things

- Title slide &bullet list
- Inserting Excel Sheet
- Clip art and Text
- Slide show effects

Ans- When you open PowerPoint, you'll see some built-in themes and templates. A theme is a slide design that contains matching colors, fonts, and special effects like shadows, reflections, and more.

On the File tab of the Ribbon, select New, and then choose a theme.

PowerPoint shows you a preview of the theme, with four color variations to choose from on the right side.

Click Create, or pick a color variation and then click Create.

Shows the Create New presentation from Theme dialog in PowerPoint

Read more: Use or create themes in PowerPoint

Insert a new slide

On the Home tab, click the bottom half of New Slide, and pick a slide layout.

Shows New Slide button on Home tab of the ribbon in PowerPoint

Read more: Add, rearrange, and delete slides.

Save your presentation

On the File tab, choose Save.

Pick or browse to a folder.

In the File name box, type a name for your presentation, and then choose Save.

Note: If you frequently save files to a certain folder, you can ‘pin’ the path so that it is always available (as shown below).

Save your PowerPoint presentation

Tip: Save your work as you go. Press Ctrl+S often.

Read more: Save your presentation file

Add text

Select a text placeholder, and begin typing.

Shows adding text to a text field in PowerPoint

Format your text

Select the text.

Under Drawing Tools, choose Format.

Shows the Drawing Tools tab on the ribbon in PowerPoint

Do one of the following:

To change the color of your text, choose Text Fill, and then choose a color.

To change the outline color of your text, choose Text Outline, and then choose a color.

To apply a shadow, reflection, glow, bevel, 3-D rotation, a transform, choose Text Effects, and then choose the effect you want.

Read more:

Change the fonts

Change the color of text on a slide

Add bullets or numbers to text

Format text as superscript or subscript

Add pictures

On the Insert tab, do one of the following:

To insert a picture that is saved on your local drive or an internal server, choose Pictures, browse for the picture, and then choose Insert.

To insert a picture from the web, choose Online Pictures, and use the search box to find a picture.

Insert Pictures dialog in PowerPoint

Choose a picture, and then click Insert.

Add shapes

You can add shapes to illustrate your slide.

On the Insert tab, select Shapes, and then select a shape from the menu that appears.

In the slide area, click and drag to draw the shape.

Select the Format or Shape Format tab on the ribbon. Open the Shape Styles gallery to quickly add a color and style (including shading) to the selected shape.

Shape Styles group

Add speaker notes

Slides are best when you don’t cram in too much information. You can put helpful facts

and notes in the speaker notes, and refer to them as you present.

To open the notes pane, at the bottom of the window, click Notes notes button in PowerPoint .

Click inside the Notes pane below the slide, and begin typing your notes.

Shows the speaker Notes pane in PowerPoint

Read more:

Add speaker notes to your slides

Print slides with or without speaker notes

Give your presentation

On the Slide Show tab, do one of the following:

To start the presentation at the first slide, in the Start Slide Show group, click From Beginning.

Shows the Slide Show tab on the ribbon in PowerPoint

If you're not at the first slide and want to start from where you are, click From Current Slide.

If you need to present to people who are not where you are, click Present Online to set up a presentation on the web, and then choose one of the following options:

Broadcast your PowerPoint presentation online to a remote audience

View your speaker notes as you deliver your slide show.

Get out of Slide Show view

To get out of Slide Show view at any time, on the keyboard, press Esc.

Tips for creating an effective presentation

Consider the following tips to keep your audience interested.

Minimize the number of slides

To maintain a clear message and to keep your audience attentive and interested, keep the number of slides in your presentation to a minimum.

Choose an audience-friendly font size

The audience must be able to read your slides from a distance. Generally speaking, a font size smaller than 30 might be too difficult for the audience to see.

Keep your slide text simple

You want your audience to listen to you present your information, instead of reading the screen. Use bullets or short sentences, and try to keep each item to one line.

Some projectors crop slides at the edges, so that long sentences might be cropped.

Use visuals to help express your message

Pictures, charts, graphs, and SmartArt graphics provide visual cues for your audience to remember. Add meaningful art to complement the text and messaging on your slides.

As with text, however, avoid including too many visual aids on your slide.

Make labels for charts and graphs understandable

Use only enough text to make label elements in a chart or graph comprehensible.

Apply subtle, consistent slide backgrounds

Choose an appealing, consistent template or theme that is not too eye-catching. You don't

want the background or design to detract from your message.

However, you also want to provide a contrast between the background color and text color. The built-in themes in PowerPoint set the contrast between a light background with dark colored text or dark background with light colored text.

For more information about how to use themes, see Apply a theme to add color and style to your presentation.

Check the spelling and grammar

To earn and maintain the respect of your audience, always check the spelling and grammar in your presentation.

Top of Page

Windows 7 support has ended. Get all the features you know and love in Windows 10.

Upgrade Now

Part -2

Q16. What is the difference between Machine Language and High Level Language?

Ans- Machine language, or machine code, consists of binary code and is the only language that is directly understood by the computer. ... Both machine code and assembly languages are hardware specific. A high-level language is a programming language that uses English and mathematical symbols in its instructions.Machine language, or machine code, is the only language that is directly understood by the computer, and it does not need to be translated. All instructions use binary notation and are written as a string of 1s

and 0s. A program instruction in machine language may look something like this:

10010101100101001111101010011011100101

A high-level language is a programming language that uses English and mathematical symbols, like +, -, % and many others, in its instructions. When using the term 'programming languages,' most people are actually referring to high-level languages. High-level languages are the languages most often used by programmers to write programs. Examples of high-level languages are C++, Fortran, Java and Python.

To get a flavor of what a high-level language actually looks like, consider an ATM machine where someone wants to make a withdrawal of $100. This amount needs to be compared to the account balance to make sure there are

enough funds. The instruction in a high-level computer language would look something like this:

```
x = 100

if balance x:

print 'Insufficient balance'

else:

print 'Please take your money'
```

This is not exactly how real people communicate, but it is much easier to follow than a series of 1s and 0s in binary code.

There are a number of advantages to high-level languages.

The first advantage is that high-level languages are much closer to the logic of a human language.

The second advantage is that the code of most high-level languages is portable and the same code can run on different hardware

Q17. Discuss about different data types of C programming Language.

Ans- To use any language in communication (to write/to speak), we need to understand it's grammar first. In the case of a programming language like C, the scenario is same as in the case of a communication language. We need to understand the grammar of C programming language first. So here begins:-

In this article we explain Data Types and Constants

The basic grammar of C can be explained through:-

Data Types

Constants

Variables and Keywords

Operators and Operands

Control structures (branching and looping)

Functions

Arrays

Strings

Pointers

Structures

Files

Data Types

There are 4 data types in C language. They are:-

int – This data type is used to define an integer number (-….-3,-2,-1,0,1,2,3….). A single integer occupies 2 bytes.

char – Used to define characters. A single character occupy 1 byte.

float – Used to define floating point numbers (single precision). Occupies 4 bytes.

double – Used for double precision floating point numbers(double precision). Occupies 8 bytes.

Note:- Single precision and Double precision basically differs in the number of digits represented after the decimal point. Double precision number will represent more digits

after the decimal point than a single precision number. Example:- Single precision – 32.75 and double precision – 32.7543

Data Types can also be classified as shown in the image below – Primitive, Derived and User Defined.

C Data Types- C programming tutorial

Image Courtesy

Primitive data types are the first form – the basic data types (int,char,float,double).

Derived data types are a derivative of primitive data types known as arrays, pointer and function.

User defined data types are those data types which are defined by the user/programmer himself.

Note: We will learn about Derived and user defined data types in coming chapters.

Data Type Qualifiers

Each of these data type has got qualifiers. The purpose of a qualifier is to manipulate the range of a particular data type or its size. The 4 qualifiers in C are long,short,signed and unsigned.First two long and short are called size

qualifiers and the other two signed and unsigned are called sign qualifiers.

Example: int – when declared normally is of 2 bytes. If it is declared as unsigned int – then its range is from 0 to 65535. In other case, if it is declared as signed int – then its range is from (-32767 to 32768). In the case of signed int, one bit (MSB) is used to store the sign of the integer +/-. This basically means the programmer will not be able to display/store a number higher than 65535 using unsigned int. Similarly it is not possible to manipulate a number beyond -32767 or +327678 using signed int.

The qualifiers long and short are used to increase storage size of the data type.

Example: Integer data type int is normally 2 byte. If you declare it as long int – then its size will increase from 2 bytes to 4 bytes. Similarly if you declare it as short int – its size will reduce from 2 bytes to 1 byte.

The table below describes all data types and the most commonly used qualifier combinations – with its size,range and format specifier. Note: You will learn more about the use of format specifiers in coming chapters.

Keyword

Format Specifier

Size

Date Range

char

%c

1 byte

-128 to +127

int

%d

2 bytes

0 to 255

float

%f

4 bytes

-3.4e38 to +3.4e38

double

%lf

8 bytes

-1.7e38 to +1.7e38

long int

%ld

4 bytes

-231 to +231

unsigned int

%u

2 bytes

0 to 65535

long double

%Lf

16 bytes

-3.4e38 to +3.4e38

Unsigned char

%c

1 byte

0 to 255

Constants

There are 4 types of constants in C.

Integer constants

Character constants

Real/Floating point constants

String constants

C programming tutorialImage Courtesy

By definition, a constant is a quantity that does not change throughout the execution of a program.

Integer Constants

An integer constant is an integer quantity which contains a sequence of digits.It should not have a decimal point. Blanks and commas are not allowed within an integer constant.An integer constant can be either +ve or -ve. The constant must lie within the range of the declared data type (including qualifiers long,short etc.).

Example of valid integer constants:- 976 8987 5 -25 etc.

Example of invalid integer constants:- 78.43 7-8 89,76 etc.

An integer constant can be either Decimal, Hexa Decimal or Octal. See the table below to understand how these 3 different constants are defined in C.

Integer Type

Prefix

Suffix

Example

Hexa Decimal

Ox

OxA7B

Octal

O

O54

Long Hexa Decimal

Ox

I or L

OxA7BL

Unsigned Long Hexa Decimal

Ox

UI or UL

OxA7FUI

Long Octal

O

I or L

O54L

A decimal constant can contain any combination of integers from 0 through 9. Ex: 189 0 75 87

A hexa decimal constant should begin with 0X or 0x. Ex: 0x65F or 0X7A

An octal constant should begin with digit 0. It can take any digits from 0 through 7.

Note:- There is no binary integer constant in C by default. This means, you cant give a binary number directly to program by writing sth like:- 0b11001011 – which is meaningless and result in an error. How ever, programmer can add a preprocessor (which we will learn later) to accept binary numbers in a program.

Floating Point Constants

They are also known as real constants. A real constant contains a decimal point or an exponent. It can be either +ve or -ve. Commas and blank space are not allowed within a real constant.

Examples:– 254.175, -16.47 -0.5e-7 +4.1e8

Character Constant

A character constant is a character which is enclosed in single quotes. A character constant is of size 1byte and can contain only 1 character. A character can be an alphabet like a,b,A,C etc or a special character like &,^, $, #,@ etc or a single digit from 0 through 9. It can also be an escape sequence character like space ‘ ‘ or a null character ‘\o’ or a new line ‘\n’ etc.

Example: ‘A’ ‘a’ ‘ b’ ‘8’ ‘#’ etc.

Each character has a corresponding ASCII value. ASCII value is the numeric code of a particular character and is stored inside the machine's character set.

Note:- It is good that you read more about ASCII. There are basically two types of ASCII characters known as control characters and printable characters. Control characters are usually used to control a device using the program or to manipulate some logic inside a program. Control characters are not usually printed to an output device. Printable characters are usually printed to a display device or a printer.

String Constants

A string constant is a collection of characters enclosed in double quotations “”

It may contain alphabets, digits, special characters and blank space.

Example: “Circuits Today123”

Q18. Find the output of the following expressions

a) X=20/5*2+30-5 b) Y=30 – (40/10+6) +10 c) Z= 40*2/10-2+10

Ans- Solutions for Part 1: Introduction

1Find these angles in degrees: (a) π/6; (b) 2π; (c) 1 (that’s right, radian angles aren’t necessarily fractions or multiples of π).

Solutions:

(a) $(\pi/6) \times (180°/\pi) = 30°$

(b) $2\pi \times (180°/\pi) = 360°$

(c) $1 \times (180°/\pi) = (180/\pi)° \approx 57.3°$

2Which is the correct definition of an acute angle, in interval notation?

(a) $(0°, 90°)$ (b) $[0°, 90°]$

Answer: $(0°, 90°)$ is 0 to 90 degrees excluding 0° and 90°; $[0°, 90°]$ is 0 to 90 degrees including 0° and 90°. Acute angles are between 0° and 90° exclusive, so the answer is (a) $(0°, 90°)$.

3Two angles of a triangle are 80° and 40°. Fine the third angle.

Solution: The inside angles of a triangle must always add to 180°. 80° + 40° = 120°, so to make the full 180° the third angle must be 60°.

4A triangle has an angle of 90°. The two short sides (next to that angle) are 5 and 12. Find the third side.

Solution: Cue the Pythagorean Theorem!

$c^2 = a^2 + b^2$

$c^2 = 5^2 + 12^2$

$c^2 = 25 + 144 = 169$

$c = \sqrt{169} = 13$

5Find these angles in radian measure: (a) 60° (b) 126°; (c) 45°.

Where possible, give an exact answer rather than a decimal approximation.

Solutions:

(a) $60° + (\pi/180°) = \pi/3$.

(b) $126° \times (\pi/180°) \approx 2.20$

(c) $45° \times (\pi/180°) = \pi/4$

Notice that you don’t have to say “radians” when giving an angle in radian measure, though it wouldn’t be wrong. In this book, angles in degrees have the degree mark (°), so I’ll only say “radians” when it’s necessary to avoid confusion.

6Who said, “The sum of the square roots of any two sides of an isosceles triangle is equal to the square root of the remaining side”? Is that correct?

Answer: It was the Scarecrow, in the movie The Wizard of Oz (1939). And no, it sounds mathy but it’s bosh. It can’t possibly be true for any triangle, isosceles or not. (Can you see why?)

7On a circular clock face, which numbers are the boundaries of each quadrant?

Answers: Quadrant I: 12 and 3; Quadrant II: 9 and 12; Quadrant III: 6 and 9; Quadrant IV: 3 and 6.

Solutions for Part 2: The Six Functions

130-60-90 degree triangle. Hypotenuse is 2 units long, and short side is 1 unit long.Find all six functions of the angle 30°. Find sine, cosine, and tangent of 60°.

30-60-90 degree triangle. Hypotenuse is 2 units long, and short side is 1 unit long.Solution: First off, you need the length of the horizontal side. You remember the theorem of Pythagoras: $1^2 + b^2 = 2^2$, from which you get $b = \sqrt{3}$. After that, it's just a matter of remembering the

definitions. If you need a refresher, you'll find sine and cosine at equation 1, tangent at equation 4, and the others at equation 5.

$\sin 30° = 1/2$

$\cos 30° = \sqrt{3}/2$

$\tan 30° = 1/\sqrt{3}$ or $\sqrt{3}/3$

$\cot 30° = 1/(1/\sqrt{3}) = \sqrt{3}$

$\sec 30° = 1/(\sqrt{3}/2) = 2/\sqrt{3}$ or $(2\sqrt{3})/3$

$\csc 30° = 1/(1/2) = 2$

$\sin 60° = \sqrt{3}/2$

$\cos 60° = 1/2$

$\tan 60° = \sqrt{3}/1 = \sqrt{3}$

Since $60° = 90° - 30°$, notice that $\sin 60° = \cos 30°$, $\cos 60° = \sin 30°$, and $\tan 60° = \cot 30°$.

23-4-5 triangle. Angle A between the 4 and 5 sides, angle B between the 3 ad 5 sides, 90° between the 3 and 4 sidesFind sin A, sin B, tan A, and tan B.

Solution:

sin A = 3/5 or 0.6

sin B = 4/5 or 0.8

tan A = 3/4 or 0.75

tan B = 4/3 ≈ 1.33

Incidentally, A ≈ 36.87°, and B ≈ 53.13°.

3triangle with base of 5, angle A to left, then side 3, unmarked angle (90°), side 4, and angle BA ≈ 53.13°. Find the approximate area of the triangle. Hint: the area of a triangle is base × height/2.

Solution: You have the base (5), so you just need the height. But sin A = h/3, so h = 3 × sin A. The area therefore is (5 × 3 × sin A)/2 ≈ 5.99999.

Solutions for Part 3: Functions of Special Angles

1(a) Sketch a 45-45-90° triangle with hypotenuse of 1. Label the size of each angle and the exact length of each side, not a calculator approximation. (Hint: Since the two acute angles are equal, the two short sides must be equal. That and the Theorem of Pythagoras is enough to let you find them.)

(b) Draw a triangle with all sides equal to 1. If all sides are equal, all angles must be equal. Knowing that they add to 180°, fill in the value of each angle. Now drop a perpendicular from the top of the triangle to the middle of the

opposite side. You now have two 30-60-90° triangles with hypotenuse of 1. Fill in the exact lengths of the short sides of those two triangles.

For the rest of these problems, refer to these sketches if you need to. Give exact answers, not decimal approximations.

Solution: Check your sketches against the ones in the chapter.

2Find tan 45°, cos 45°, sin 90°, cos 30°, sin 30°, cos 90°.

Answers: tan 45° = 1; cos 45° = 1/√2 or √2/2; sin 90° = 1; cos 30° = √3/2; sin 30° = 1/2; cos 90° = 0.

3Find $\sin(\pi/4)$, $\cos(\pi/6)$, $\tan(\pi/3)$.

Answers: $\sin(\pi/4) = \sqrt{2}/2$ or $1/\sqrt{2}$; $\cos(\pi/6) = \sqrt{3}/2$; $\tan(\pi/3) = \sqrt{3}$

4Find each of the following angles from the clues, assuming all the angles are between 0 and $\pi/2$ (0° and 90°) inclusive. Give each answer in degrees and radians. $\sin A = 0$; $\cos B = \sqrt{3}/2$; $\sin C = 1/2$; $\sin D = 1$; $\tan E = 1$; $\cos F = 1/2$; $\tan G = 0$; $\tan H = \sqrt{3}$; $\cos I = 1$; $\cos J = 0$.

Answers:

$\sin A = 0 \Rightarrow A = 0°$ or 0 [radians]

$\cos B = \sqrt{3}/2 \Rightarrow B = 30°$ or $\pi/6$

$\sin C = 1/2 \Rightarrow C = 30° \text{ or } \pi/6$

$\sin D = 1 \Rightarrow D = 90° \text{ or } \pi/2$

$\tan E = 1 \Rightarrow E = 45° \text{ or } \pi/4$

$\cos F = 1/2 \Rightarrow F = 60° \text{ or } \pi/3$

$\tan G = 0 \Rightarrow G = 0° \text{ or } 0 \text{ [radians]}$

$\tan H = \sqrt{3} \Rightarrow H = 60° \text{ or } \pi/3$

$\cos I = 1 \Rightarrow I = 0° \text{ or } 0 \text{ [radians]}$

$\cos J = 0 \Rightarrow J = 90° \text{ or } \pi/2$

5Find sec 60° and cot 30°. Hint: Remember how the secant and cotangent are defined in terms of the “big three” functions sine, cosine, and tangent.

Solutions: $\sec 60° = 1/(\cos 60°) = 1/(1/2) \Rightarrow \sec 60° = 2$

$\cot 30° = 1/(\tan 30°) = 1/(\sqrt{3}/3) = 3/\sqrt{3} = \sqrt{3} \Rightarrow \cot 30° = \sqrt{3}$

You could also do the second one using equation 6:

$\cot 30° = \tan(90° - 30°) = \tan 60° = \sqrt{3}$

6Find sin 120°, cos 120°, and tan 120°.

Solution:

sin 120° = sin(180° − 120°) = √3/2.

cos 120° = −cos(180° − 120°) = −1/2.

What about the tangent? You don’t have a supplement rule for it, but you have another way to find the answer:

tan 120° = sin 120° / cos 120° = (√3/2) / (−1/2) = −√3

7Even though you can always get the tangent of a supplementary angle from the sine and cosine, it's a time-saver to have a rule for the supplement of a tangent. The last problem's solution suggested what that rule might be.

Prove: $\tan(180° - A) = -\tan A$.

Proof:

$\tan(180° - A) = \sin(180° - A) / \cos(180° - A)$

$\tan(180° - A) = \sin A / (-\cos A)$

$\tan(180° - A) = -\sin A / \cos A$

$\tan(180° - A) = -\tan A$ QED

8Find tan 150°.

Solution: tan 150° = −tan(180° − 150°) = −tan 30° = −√3/3

Solutions for Part 4: Solving Triangles

1triangle with angles A and B unknown, C=90°, sides a=37, b=66, c unknownYou have a right triangle (C = 90°) with short sides a = 88 and b = 37. Solve the triangle.

Always start with a sketch. From the sketch, you can see right away that this is the SAS case, or side-angle-side. To get the third side, you need the Law of Cosines, equation 31.

$c^2 = a^2 + b^2 - 2ab \times \cos C$

$c^2 = 37^2 + 88^2 - 2 \times 37 \times 88 \times \cos 90°$

Notice that when the included angle C is 90°, cos C = 0 and you've just got the Pythagorean Theorem.

$c^2 = 37^2 + 88^2$

$c = \sqrt{37^2 + 88^2}$

$c \approx 95.5$

To find the two angles, you could use the Law of Sines, but why not take advantage of the right angle and use the tangent?

$\tan A = 37/88 \Rightarrow A \approx 22.8°$

Of course $\tan B = 88/37$, but you also know that

$A + B = 90° \Rightarrow B = 90° - A \Rightarrow B \approx 67.2°$

2(Sketch this problem as you read through it.) In a state park, a river flows virtually straight for 1800 m. You want to build a monorail from A, one end of this stretch, to a point C on the far shore. You also want to build a foot bridge from B, at the other end of this stretch of the river, to the same point C on the far shore. At A, the angle between your sight lines to B and C is 67°. At B, the angle between your sight lines to A and C is 38°.

How long must the monorail and the foot bridge be?

Bonus question: If the river has the same width all along the stretch from A to B, how wide is it?

triangle as described in problemIn the sketch, b is the monorail, a is the foot bridge, and w is the width of the river. Since you know two angles and the included side, this is the ASA case. Although you don't really care about angle C, you have to find it so that you can use the Law of Sines to get sides a and b:

$C = 180° - 67° - 38° = 75°$

Obviously, when I eyeballed the angles A and B I didn't estimate them very well! But that's okay—the sketch is close enough to be useful.

How long is the foot bridge? From the Law of Sines,

$a/\sin A = c/\sin C \Rightarrow a = c \sin A/\sin C$

$a = 1800 \times \sin 67°/\sin 75°$

Foot bridge: $a \approx 1715$ m

How long is the monorail? From the Law of Sines,

$b/\sin B = c/\sin C \Rightarrow b = c \sin B/\sin C$

$b = 1800 \times \sin 38°/\sin 75°$

Monorail: $b \approx 1147$ m

How wide is the river?

$w = b \sin A$

$w \approx 1147 \sin 67°$

River width: $w \approx 1056$ m

3Find the other elements of a triangle with B = 117°, a = 16 cm, and b = 25 cm.

triangle as described in problem statementThis is the SSA (or ASS) case; refer to the table of possibilities for SSA. This problem belongs in row 1, column 2: the opposite side is longer than the adjacent side, and the known angle is > 90°. So there is one and only one solution.

You can use the Law of Sines to find angle A:

$$(\sin A)/a = (\sin B)/b$$

$$\sin A = (a/b) \sin B$$

$$\sin A = (16/25) \sin 117° \approx 0.57024$$

$A \approx 34.8°$

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Find the third angle by subtracting:

$C = 180° - A - B$

$C \approx 180° - 34.8° - 117°$

$C \approx 28.2°$

Finally, use the Law of Sines to find side c:

$c/\sin C = b/\sin B$

$c = b \sin C/\sin B$

$c \approx 25 \sin 28.2°/\sin 117°$

$c \approx 13.3$ cm

4A very modern-looking trivet is a triangular shape with sides of 6″, 9″, and 12″. What are the three angles?

triangle with sides a=6, b=9, c=12This is the SSS case. First, use the Law of Cosines to find angle A:

$\cos A = (b^2 + c^2 - a^2) / 2bc$

$\cos A = (9^2 + 12^2 - 6^2)/(2 \times 9 \times 12) = 0.875$

$A \approx 29.0°$

Next, use the Law of Sines to find angle B:

$(\sin B)/b = (\sin A)/a \Rightarrow \sin B = (b/a) \sin A$

$\sin B \approx (9/6) \sin 29.0° \approx 0.72618$

$B \approx 46.6°$

Finally, subtract the two angles from 180° to find the third angle:

$C = 180° - A - B$

$C \approx 180° - 29.0° - 46.6°$

$C \approx 104.5°$

That's not a typo, by the way. A and B both happened to round up, but I used the unrounded values to find C. You should never use rounded numbers in further calculations.

5After you've painted your bedroom, you have enough paint left to cover 25 ft^2. You decide to paint a triangle on the wall of another room, as an accent. Two of the angles should be 30° and

40°. Find the third angle, and the lengths of the three sides.

triangle with A=30°, B=40°, C=110°The third angle is 180° − 30° − 40°, so C = 110°. Make your sketch using those three angles. (I did this one without measuring the angles, so it's not perfect. But sketches don't need to be perfect, just reasonably close.)

Find side c by using equation 32:

$$c = \sqrt{2}\ \text{area} \times \sin C/(\sin A \sin B)$$

$$c = \sqrt{2} \times 25 \times \sin 110°/(\sin 30° \sin 40°)$$

$$c \approx 12.1\ \text{ft}$$

Then the Law of Sines gets you the other two sides:

$a = c \sin A / \sin C$

$a \approx 12.1 \sin 30° / \sin 110°$

$a \approx 6.4$ ft

And

$b = c \sin B / \sin C$

$b \approx 12.1 \sin 40° / \sin 110°$

$b \approx 8.3$ ft

6You drive 6.0 miles along a straight highway, then take an exit. It's a right turn, but you don't notice the angle.

You're now driving along a straight side road. At the end of 9.8 miles on the side road, you turn 135° to the right, on a third road. (If you're visualizing this from above, the 135° change of direction corresponds to an angle of 180° – 135° = 45° in the triangle.)

Assuming that road continues in the same direction, how far must you drive to reach your starting point?

no solution because first side is too shortThis is a difficult sketch to draw, because you don't know the angle of the first turn. But the description gives you two sides and a non-included angle; this is the problematic SSA case. You don't know exactly where side c will meet side a. To be more precise, you don't even know if they will meet.

Is it possible for them to meet? Referring back to the table of possibilities within SSA, we see that we're in the third row, first column: the adjacent side (9.8) is longer than the opposite side (6.0), and the known angle (45°) is < 90°. Compute

$h = b \sin A$

$h = 9.8 \sin 45° \approx 6.9$ miles

What's the significance of this? The shortest distance from point C to side c is the segment that meets side c in a right angle. In other words, to get from point C to side c, the shortest possible distance is 6.9 miles. But side a is only 6.0 miles long, so it can never meet side c.

This problem has no solution.

7You're laying out a triangular bed for your garden. Two sides are 40 m and 60 m, and the angle between them is 22°. How long is the third side, and what are the other two angles?

triangle with angle A=22&*deg;, adjacent sides c=40 and b=60You know two sides and the angle between them. You can use the Law of Cosines to get the third side:

$$a^2 = b^2 + c^2 - 2bc \times \cos A$$

$$a^2 = 60^2 + 40^2 - 2 \times 60 \times 40 \times \cos 22^\circ$$

$$c^2 \approx \sqrt{749.52} \Rightarrow c \approx 27.4 \text{ m}$$

Next, for angle B you can use the Law of Sines:

$$(\sin B)/b = (\sin A)/a \Rightarrow \sin B = (b/a) \sin A$$

$\sin B \approx (60/27.4) \sin 22° \approx 0.82099$

Your calculator gives about 55.2° as the angle whose sine is 0.82099, but that looks wrong from the sketch. Clearly B needs to be an obtuse angle, so you remember that $\sin(180° - x) = \sin x$, and you subtract $180° - 55.2°$ to get

$B \approx 124.8°$

See how important a sketch is? Of course your sketch probably isn't perfectly accurate, so you treat it as a device to point out that something might be wrong, but then you look for a way to confirm it. In this case, you have two ways to confirm it:

You can use the Law of Cosines, which automatically accounts for obtuse angles:

$\cos B = (a^2 + c^2 - b^2)/(2ac)$

$\cos B \approx (27.4^2 + 40^2 - 60^2)/(2 \times 27.4 \times 40)$

$\cos B \approx -0.57095 \Rightarrow B \approx 124.8°$

Or, you can compute angle C (below) and then recall that angle C must be < B because side c is < b. If you made C obtuse, 180° − 33.2° = 146.8°, it would be > B whether B is acute or obtuse. So C must be < 90° and B must be > 90°.

Now turn to angle C:

$(\sin C)/c = (\sin A)/a \Rightarrow \sin C = (c/a) \sin A$

$\sin C \approx (40/27.4) \sin 22° \approx 0.54732$

$C \approx 33.2°$

Solutions for Part 5: Functions of Any Angle

1In which quadrant does the angle −868° occur? What about 42 radians? What are the signs of their sines, cosines, and tangents?

Solution: Your task always is to cast out multiples of ±360° or ±2π, so that you're left with a positive angle between 0° and 360° (0 and 2π).

−868° = −1080° + 212°. And 212° is between 180° and 270°, so −868° occurs in Q III.

42 radians is about 13.37π, or 12π + 1.37π. 1.37π is obviously between π and 3π/2 (1.5π), so 42 (radians) is in Q III.

In Q III, x and y are both negative. Therefore In Q III, sine and cosine are negative and tangent is positive.

2Rewrite using the smallest possible positive angle of the same trig function: (a) sin 700° (b) tan 780° (c) cos(−390.5) (That's radians, since there's no degree mark, but be careful! The angle is −390.5, not −390.5π.)

Solution: (a) 700° = 360° + 340°, so sin 700° = sin 340°. 340° is in Q IV, where y is negative;

therefore the sine is negative. The reference angle is 20°, so sin 700° = −sin 20°.

(b) 780° = 720° + 60°, so tan 780° = tan 60°.

(c) −390.5 ≈ −124.3π, or −126π + 1.7π; therefore cos(−390.5) ≈ cos 1.7π. The angle 1.7π radians is between 1.5π and 2π, so it's in Q IV, where x is positive and therefore the cosine is positive. The reference angle is about 2π − 1.7π ≈ 0.3π or 0.94, so cos(−390.5) ≈ cos 0.94.

3Rewrite as a function of just A: (a) cos(720° − A) (b) sin(43π + A)

Solution: (a) 720° is a multiple of 360°, so cos(720° − A) = cos(−A). But cos(−A) = cos A, and therefore cos(720° − A) = cos A.

(b) $\sin(43\pi + A) = \sin(42\pi + \pi + A) = \sin(\pi + A)$.
$\sin(\pi + A) = -\sin A$, so $\sin(43\pi + A) = -\sin A$.

Solutions for Part 6: The “Squared” Identities

1If $\sin A = 3/4$, find $\cos A$.

Solution:

$\sin^2 A + \cos^2 A = 1$

$\cos^2 A = 1 - \sin^2 A = 1 - (3/4)^2 = 1 - 9/16$

$\cos^2 A = 7/16$

$\cos A = \pm\sqrt{7}/16 \Rightarrow \cos A = \sqrt{7}/4$ or $-\sqrt{7}/4$

Did you remember the ± sign? Just as $x^2 = 9$ has two solutions, 3 and −3, so any equation in $\cos^2 A$ has two solutions.

This makes sense in terms of the functions. There are two angles in the interval $[0, 2\pi)$ or $[0°, 360°)$ where $\sin A = 3/4$, one acute and one obtuse. The acute one has a positive cosine, and the obtuse one has a negative cosine.

$2\tan B = -2\sqrt{2}$. Find $\sec B$.

Solution: Since this chapter is about the "squared" identities, you can be pretty sure that one exists that connects tan x and sec x. But suppose you met this problem in a different context?

Well, you know two identities involving the tangent function. The definition, tan B = (sin B)/cos B, doesn't do you a lot of good because it's got sine and cosine mixed together. You have a dim memory of a squared identity (if you're like me, it's dim), but you also know you can re-create it easily, from the one squared identity that you can't possibly forget:

$\sin^2 B + \cos^2 B = 1$

You have $\sin^2 B$, which will become $\tan^2 B$ if you divide both sides by $\cos^2 B$.

$(\sin^2 B)/\cos^2 B + (\cos^2 B)/\cos^2 B = 1/\cos^2 B$

$\tan^2 B + 1 = \sec^2 B$

Success! You have an identity that connects the tangent and secant functions. Now you can proceed to solve the problem.

$(-2\sqrt{2})^2 + 1 = \sec^2 B$

$\sec^2 B = (4 \times 2) + 1 = 9$

$\sec B = \pm 3$

You need the ± sign because both $(x)^2$ and $(-x)^2$ are x^2. But does it make sense in terms of trig? Yes, because the tangent is negative in Q II and

Q IV, while the secant—which has the same sign as the cosine, being 1 over the cosine—is positive in Q IV but negative in Q II.

3tan C = √15. Find cos C.

Solution: Wait, what? You don't have an identity connecting tangent and cosine. But you do have one connecting tangent and secant, and you know that the secant is 1 over the cosine, so you can do this one too.

Start with the squared identity from the previous problem:

$\tan^2 C + 1 = \sec^2 C$

$(\sqrt{15})^2 + 1 = 15 + 1 = 16 \Rightarrow \sec^2 C = 16$

$\sec C = \pm 4 \Rightarrow \cos C = 1/4$

$4\tan D = \sqrt{15}$, Find $\sin D$.

Solution: Okay, in the previous problem you got from tangent to cosine. But you already know how to get from cosine to sine, so you just have one more link in the chain.

$\tan^2 D + 1 = \sec^2 D$

$\sec^2 D = (\sqrt{15})^2 + 1 = 16$

$\sec D = 4 \Rightarrow \cos D = \pm 1/4$

$\sin^2 D + \cos^2 D = 1$

$\sin^2 D = 1 - \cos^2 D = 1 - (\pm 1/4)^2 = 1 - 1/16 = 15/16$

$\sin D = \pm \sqrt{15}/4$

5Prove: $\sin^2 x = \tan^2 x / (\tan^2 x + 1)$

This assumes that $x \neq \pi/2 + k\pi$, for integer k—or $90° + 180k°$, if you prefer—because the tangent is undefined for those angles.

Proof:

$\tan x = \tan x$

$\tan x \cos x = \tan x \cos x$

$\sin x = \tan x / \sec x$

$\sin^2 x = \tan^2 x / \sec^2 x$

But $\tan^2 x + 1 = \sec^2 x$, so substituting you have

$\sin^2 x = \tan^2 x / (\tan^2 x + 1)$ QED

Many other proofs are possible. For example, you could replace $\tan^2 x$ with $\sin^2 x / \cos^2 x$ in the identity you were asked to prove, and then simplify the fraction. As long as every step in

your proof is valid both backwards and forwards, your proof is fine.

If your proof starts with an obvious identity and then works forward to the identity you we asked to prove, as the above proof did, then it only matters that all the steps are valid in that forward direction.

Solutions for Part 7: Sum and Difference Formulas

1Find $\sin(-15°)$ exactly.

Solution: Start with $-15° = 30° - 45°$

$\sin(-15°) = \sin(30°-45°)$

$$\sin(-15°) = \sin 30° \cos 45° - \cos 30° \sin 45°$$

$$\sin(-15°) = (1/2)(\sqrt{2}/2) - (\sqrt{3}/2)(\sqrt{2}/2) = \sqrt{2}/4 - \sqrt{6}/4$$

$$\sin(-15°) = (\sqrt{2} - \sqrt{6})/4$$

Alternative solution: You could also do this using 45°−60°:

$$\sin(-15°) = \sin(45°-60°)$$

$$\sin(-15°) = \sin 45° \cos 60° - \cos 45° \sin 60°$$

$\sin(-15°) = (\sqrt{2}/2)(1/2) - (\sqrt{2}/2)(\sqrt{3}/2) = \sqrt{2}/4 - \sqrt{6}/4 = (\sqrt{2} - \sqrt{6})/4$

2Find tan 105° exactly.

Solution: 105° = 60° + 45°

$\tan 105° = \tan(60° + 45°)$

$\tan 105° = (\tan 60° + \tan 45°)/(1 - \tan 60° \tan 45°)$

$\tan 105° = (\sqrt{3} + 1)/(1 - (\sqrt{3})(1)) = (\sqrt{3} + 1)/(1 - \sqrt{3})$

Multiply top and bottom by $1 + \sqrt{3}$ to rationalize the denominator:

$\tan 105° = (\sqrt{3} + 1)^2/((1 - \sqrt{3})(1 + \sqrt{3}))$

$\tan 105° = (3 + 2\sqrt{3} + 1)/(1 - 3) = (4 + 2\sqrt{3})/(-2) = -2 - \sqrt{3}$

3Prove: $\cos 2A = 2\cos^2 A - 1$. (Hint: $2A = A + A$.)

Proof:

$\cos 2A = \cos(A + A)$

$\cos 2A = \cos A \cos A - \sin A \sin A$

$\cos 2A = \cos^2 A - \sin^2 A$

But $\sin^2 A = 1 - \cos^2 A$

$\cos 2A = \cos^2 A - (1 - \cos^2 A) = \cos^2 A - 1 + \cos^2 A$

$\cos 2A = 2\cos^2 A - 1$ QED

4Prove these formulas from equation 22, by using the formulas for functions of sum and difference.

(a) $\cos(-A) = \cos A$ (I've done the first step for you.)

$\cos(-A) = \cos(0 - A)$

$\cos(-A) = \cos 0 \cos A + \sin 0 \sin A$

$$\cos(-A) = 1 \cos A + 0 \sin A$$

$$\cos(-A) = \cos A \text{ QED}$$

(b) $\tan(\pi + A) = \tan A$

$$\tan(\pi + A) = (\tan \pi + \tan A) / (1 - \tan \pi \tan A)$$

$$\tan(\pi + A) = (0 + \tan A) / (1 - 0 \tan A)$$

$$\tan(\pi + A) = (\tan A) / 1$$

$$\tan(\pi + A) = \tan A \text{ QED}$$

(c) $\sin(\pi - A) = \sin A$

$\sin(\pi - A) = \sin \pi \cos A - \cos \pi \sin A$

$\sin(\pi - A) = 0 \cos A - (-1) \sin A$

$\sin(\pi - A) = \sin A$ QED

Solutions for Part 8: Double Angle and Half Angle Formulas

1Use the half-angle formulas to find sin 90° and cos 90°. Of course you already know those; this problem is just for practice in working with the formulas and easy numbers.

Solution: : 90° is half of 180°. The sine and cosine are positive or zero at 90°, so the ± signs in the formulas can be treated as positive.

$\sin(180°/2) = \sqrt{(1 - \cos 180°)/2} = \sqrt{(1 - (-1))/2} = \sqrt{2}/2$

$\sin 90° = 1$

$\cos(180°/2) = \sqrt{(1 + \cos 180°)/2} = \sqrt{(1 + (-1))/2} = \sqrt{0}/2$

$\cos 90° = 0$

Why didn't I ask you to do the same for tan 90°?

2Use the double-angle formulas to find sin 120°, cos 120°, and tan 120° exactly. Again, you already know these; you're just getting comfortable with the formulas.

Solution: 120° is double 60°. sin 60° = √3/2, cos 60° = 1/2, and tan 60° = √3.

$\sin(2\times60°) = 2 \sin 60° \cos 60° = 2\,(\sqrt{3}/2)\,(1/2)$

$\sin 120° = (\sqrt{3})/2$

$\cos(2\times60°) = 2\cos^2 60° - 1 = 2 \times (1/2)^2 - 1 = (1/2) - 1$

$\cos 120° = -1/2$

$\tan(2\times60°) = 2\tan 60° / (1 - \tan^2 60°) = 2\sqrt{3} / (1 - (\sqrt{3})^2) = 2\sqrt{3} / (1 - 3) = 2\sqrt{3} / (-2)$

$\tan 120° = -\sqrt{3}$

Alternative solution: You could also divide:

$\tan 120° = \sin 120° / \cos 120° = (\sqrt{3}/2) / (-1/2) = -\sqrt{3}$

33A = 2A + A. Use the double-angle formulas along with the formulas for sine or cosine of a sum to find formulas for sin 3A in terms of sin A only, and cos 3A in terms of cos A only.

(This is actually done, in a later section, by using a different method.)

Solution: First the sine:

$$\sin(2A + A) = \sin 2A \cos A + \cos 2A \sin A$$

$$\sin 3A = (2 \sin A \cos A) \cos A + (1 - 2 \sin^2 A) \sin A$$

$$\sin 3A = 2 \sin A \cos^2 A + \sin A - 2 \sin^3 A$$

$$\sin 3A = 2 \sin A (1 - \sin^2 A) + \sin A - 2 \sin^3 A$$

$$\sin 3A = 2 \sin A - 2 \sin^3 A + \sin A - 2 \sin^3 A$$

$\sin 3A = 3 \sin A - 4 \sin^3 A$, or $(3 - 4 \sin^2 A) \sin A$

Now the cosine:

$\cos(2A + A) = \cos 2A \cos A - \sin 2A \sin A$

$\cos 3A = (2 \cos^2 A - 1) \cos A - (2 \sin A \cos A) \sin A$

$\cos 3A = 2 \cos^3 A - \cos A - 2 \sin^2 A \cos A$

$\cos 3A = 2 \cos^3 A - \cos A - 2 (1 - \cos^2 A) \cos A$

$\cos 3A = 2 \cos^3 A - \cos A - 2 \cos A + 2 \cos^3 A$

$\cos 3A = 4\cos^3 A - 3\cos A$, or $(4\cos^2 A - 3)\cos A$

4Given $\sin 3A = (3 - 4\sin^2 A)\sin A$ and $\cos 3A = (4\cos^2 A - 3)\cos A$, find $\tan 3A$ in terms of $\tan A$ only. Check yourself by computing $\tan(2A+A)$.

Solution:

$\tan 3A = \sin 3A / \cos 3A$

$\tan 3A = ((3 - 4\sin^2 A)\sin A) / ((4\cos^2 A - 3)\cos A)$

$\tan 3A = (\sin A / \cos A)(3 - 4\sin^2 A) / (4\cos^2 A - 3)$

$\tan 3A = \tan A (3 - 4 \sin^2 A) / (4 \cos^2 A - 3)$

Divide top and bottom by $\cos^2 A$. That at least gets rid of $\sin^2 A$ and $\cos^2 A$, even though it introduces secant functions. (You remember that $1/\cos A = \sec A$, right?)

$\tan 3A = \tan A (3 \sec^2 A - 4 \tan^2 A) / (4 - 3 \sec^2 A)$

This may not look better, but it is—before, you had to get rid of two unwanted functions; now you have only one unwanted function, even though it occurs twice. And it's $\sec^2 A$. Isn't there some sort of Pythagorean identity

involving $\sec^2 A$? Yes, there is! $\sin^2 A + \cos^2 A = 1 \Rightarrow \tan^2 A + 1 = \sec^2 A$.

$$\tan 3A = \tan A \left(3 \left(\tan^2 A + 1\right) - 4 \tan^2 A\right) / \left(4 - 3 \left(\tan^2 A + 1\right)\right)$$

$$\tan 3A = \tan A \left(3 \tan^2 A + 3 - 4 \tan^2 A\right) / \left(4 - 3 \tan^2 A - 3\right)$$

$$\tan 3A = \tan A \left(3 - \tan^2 A\right) / \left(1 - 3 \tan^2 A\right)$$

Check:

$$\tan(2A+A) = (\tan 2A + \tan A) / (1 - \tan 2A \tan A)$$

From equation 60, $\tan 2A = 2 \tan A / (1 - \tan^2 A)$.

$\tan 3A = (2 \tan A/(1 - \tan^2 A) + \tan A) / (1 - (2 \tan A/(1 - \tan^2 A)) \tan A)$

Well, that's a mess! Clean it up by multiplying top and bottom by $(1 - \tan^2 A)$.

$\tan 3A = (2 \tan A + (1 - \tan^2 A) \tan A) / ((1 - \tan^2 A) - 2 \tan A \tan A)$

$\tan 3A = (3 \tan A - \tan^3 A) / (1 - 3 \tan^2 A)$

Factor out tan A from the top of the fraction, and it's the same as what you got with the first method:

$$\tan 3A = \tan A (3 - \tan^2 A) / (1 - 3 \tan^2 A)$$

5Find the sine, cosine, and tangent of π/8, exactly.

Solution: π/8 (22½°) is half of π/4 (45°), so you want the half-angle formulas. And π/8 is in Quadrant I, so all function values will be positive.

$$\sin \pi/8 = \sqrt{(1 - \cos \pi/4)/2}$$

$\sin \pi/8 = \sqrt{(1 - \sqrt{2}/2)/2} = \sqrt{(2 - \sqrt{2})/4} = (\frac{1}{2})\sqrt{2 - \sqrt{2}}$

This expression contains nested radicals. Though some nested radicals can be denested, following the technique in Denesting Radicals (or Unnesting Radicals), this one unfortunately cannot.

$\cos \pi/8 = \sqrt{(1 + \cos \pi/4)/2}$

$\cos \pi/8 = \sqrt{(1 + \sqrt{2}/2)/2} = \sqrt{(2 + \sqrt{2})/4} = (\frac{1}{2})\sqrt{2 + \sqrt{2}}$

Now turn to the tangent. You can use the half-angle formula, or simply divide sine by cosine.

$\tan \pi/8 = (\sin \pi/8) / (\cos \pi/8)$

$\tan \pi/8 = \sqrt{2} - \sqrt{2} / \sqrt{2} + \sqrt{2}$

This one can be denested, if you multiply top and bottom by $\sqrt{2} - \sqrt{2}$. You'd normally do that anyway, to rationalize the denominator, but it's a nice bonus that that happens to clean up the numerator also.

$\tan \pi/8 = \sqrt{(2 - \sqrt{2})} (2 - \sqrt{2}) / \sqrt{(2 + \sqrt{2})} (2 - \sqrt{2})$

$\tan \pi/8 = (2 - \sqrt{2}) / \sqrt{(4 - 2)} = (2 - \sqrt{2}) / \sqrt{2} = \sqrt{2} - 1$

Solutions for Part 9: Inverse Functions

1The possible output values of Arcsin x include $\pm\pi/2$, but the possible output values of Arctan x do not. Why can Arctan x never equal $-\pi/2$ or $\pi/2$?

Solution: Arctan x is an angle whose tangent is x, so the possible values of Arctan x are angles in Q IV and Q I whose tangents can be taken. But tan $-\pi/2$ and tan $\pi/2$ don't exist, so they are not possible values of Arctan x.

2Find sec(Arcsin x). Remember to make a sketch to help you. Pick a value, like x = −0.7, as a test case to check your answer.

right triangle with hypotenuse 1, sides x and sqrt(1 minus x squared), angle A opposite side xSolution: If angle A is Arcsin x, then we can

make x the opposite side and 1 the hypotenuse. By the theorem of Pythagoras, that makes the adjacent side $\sqrt{1 - x^2}$. sec A is therefore $\sec(\text{Arcsin } x) = 1/\sqrt{1 - x^2}$.

There are no odd powers of x in the answer, so we don't have to worry about the sign of x.

Let's check that with $x = -0.7$: $\text{Arcsin } -0.7 \approx -44.43°$, and $\sec -44.3° = 1/\cos -44.3° \approx 1.40$. $1/\sqrt{(1 - 0.7^2)} \approx 1.40$ also, so the formula is right, at least for this test case.

3Find sin(Arccos 1/x). Remember to make a sketch to help you. Pick a value, like x = 1.3, as a test case to check your answer.

right triangle with hypotenuse x, sides 1 and sqrt(x squared minus 1), angle A adjacent to side with length 1Solution: If angle A is Arccos 1/x, we can set the hypotenuse to x and the adjacent side to 1 so that cos A = 1/x as required. The third side is $\sqrt{x^2 - 1}$.

What's sin A? It must be $\sqrt{x^2 - 1} / x$. But that expression has an odd power of x, so we need to check the signs. If x is negative, then Arccos x will be in Q II. The sine function has all positive values in Q II, so we should have a positive answer. But as written, the fraction is negative if x is negative, so it needs an absolute-value sign, just as in Example 3. Our final answer is

$$\sin(\text{Arccos } 1/x) = \sqrt{(x^2 - 1)} / | x |$$

Let’s check that with x = −1.3: Arccos(1/−1.3) ≈ 140.28°, in Q II as expected, and sin 140.28° ≈ 0.64, a positive number like the sines of all angles in Q II. √((−1.3)² − 1) / | −1.3 | ≈ 0.64 also. So the formula is right, at least for this test case — even with negative x, putting the angle in Q II, the formula returns a positive number, as it needs to.

Solutions for Part 10: Fun with Complex Numbers

1Express in a+bi form: (a) 62∠240° (b) 100e1.17i

Solutions: (a) 62(cos(240°) + i sin(240°)) ≈ −31−53.69i

(b) is apparently in radian measure, since there's no degree mark. $100(\cos(1.17) + i \sin(1.17)) \approx 39.02+92.08i$

2Express in polar form, in both degrees and radian measure: (a) $-42+17i$ (b) $100i$ (c) -14.7

Solutions: (a) $r = \sqrt{(-42)^2 + 17^2} \approx 45.31$. $\theta = 2\text{Arctan}(17/(-42+45.31)) \approx 2.76$; multiply by $180°/\pi$ to convert to 157.96°. Answers: 45.31 cis 157.96° or 45.31 cis 2.76. Of course you could use any of the other forms shown in the chapter.

(b) and (c) are "gimmes", since you don't have to compute the radius or the angle.

(b) $100i = 100\angle 90°$ or $100e^{i\pi/2}$

(c) $-14.7 = 14.7\angle 180°$ or $14.7\, e^{i\pi}$

3Find the three cube roots of −i, in a+bi form. You'll be able to give an exact answer, not rounded decimals.

Solution: First, put −i into polar form, which is easy enough since −i is on the negative y axis: −i = 1 cis 3π/2. Then apply the formula, equation 83:

(1 cis 3π/2)1/3 = 11/3 cis (π/2 + 2πk/3) for k = 0, 1, 2

The three angles are π/2, π/2 + 2π/3 = 7π/6, and π/2 + 4π/3 = 11π/6 = 3π/2.

(1 cis 3π/2)1/3 = 1 cis π/2, 1 cis 7π/6, 1 cis 11π/6.

You know exact sines and cosines for any multiple of π/6, so you don't need your calculator to convert back to a+bi form:

Cube roots of −i: i, −(√3/2)−(1/2)i, (√3/2)−(1/2)i.

Incidentally, not only is i a cube root of −i, but −i is a cube root of i. I'll let you find the other two cube roots of i yourself.

4Find (1.04−0.10i)16.

Solution: First, put that number into polar form: $r = \sqrt{1.04^2+0.10^2} \approx 1.044796631$. Then, find θ =

2 Arctan(−0.10/(1.04+1.044796631)) ≈ −0.0958591471. (My calculator happens to be in radian mode, but it doesn't matter because I'll be converting back to rectangular format anyway.) So

$$(1.04-0.10i) \approx 1.04796631 \operatorname{cis} -0.0958591471$$

And therefore

$$(1.04-0.10i)^{16} \approx 1.0479663116 \operatorname{cis} (-16;0.0958591471)$$

$$\approx 2.016082111 \operatorname{cis} (-1.533746354)$$

$$\approx 0.0746787-2.01469853i$$

Q19. Describe the syntax of the following statements

a) If – else statement b) for loop c) while loop d) do-while loop

Ans- A Loop executes the sequence of statements many times until the stated condition becomes false. A loop consists of two parts, a body of a loop and a control statement. The control statement is a combination of some conditions that direct the body of the loop to execute until the specified condition becomes false. The purpose of the loop is to repeat the same code a number of times.

In this tutorial, you will learn-

Types of Loops in C

While Loop in C

Do-While loop in C

For loop in C

Break Statement in C

Continue Statement in C

Which loop to Select?

Types of Loops in C

Depending upon the position of a control statement in a program, looping in C is classified into two types:

1. Entry controlled loop

2. Exit controlled loop

In an entry controlled loop, a condition is checked before executing the body of a loop. It is also called as a pre-checking loop.

In an exit controlled loop, a condition is checked after executing the body of a loop. It is also called as a post-checking loop.

Sample Loop

The control conditions must be well defined and specified otherwise the loop will execute an infinite number of times. The loop that does not stop executing and processes the

statements number of times is called as an infinite loop. An infinite loop is also called as an "Endless loop." Following are some characteristics of an infinite loop:

1. No termination condition is specified.

2. The specified conditions never meet.

The specified condition determines whether to execute the loop body or not.

'C' programming language provides us with three types of loop constructs:

1. The while loop

2. The do-while loop

3. The for loop

While Loop in C

A while loop is the most straightforward looping structure. Syntax of while loop in C programming language is as follows:

```
while (condition) {
        statements;
}
```

It is an entry-controlled loop. In while loop, a condition is evaluated before processing a body of the loop. If a condition is true then and only

then the body of a loop is executed. After the body of a loop is executed then control again goes back at the beginning, and the condition is checked if it is true, the same process is executed until the condition becomes false. Once the condition becomes false, the control goes out of the loop.

After exiting the loop, the control goes to the statements which are immediately after the loop. The body of a loop can contain more than one statement. If it contains only one statement, then the curly braces are not compulsory. It is a good practice though to use the curly braces even we have a single statement in the body.

In while loop, if the condition is not true, then the body of a loop will not be executed, not even once. It is different in do while loop which we will see shortly.

Following program illustrates while loop in C programming example:

```
#include<stdio.h>
#include<conio.h>
int main()
{
    int num=1;//initializing the variable
    while(num<=10)    //while loop with condition
    {
```

```
        printf("%d\n",num);
        num++;          //incrementing operation
    }
    return 0;
}
```

Output:

```
1
2
3
4
5
6
7
8
```

9

10

The above program illustrates the use of while loop. In the above program, we have printed series of numbers from 1 to 10 using a while loop.

We have initialized a variable called num with value 1. We are going to print from 1 to 10 hence the variable is initialized with value 1. If you want to print from 0, then assign the value 0 during initialization.

In a while loop, we have provided a condition (num<=10), which means the loop will execute the body until the value of num becomes 10.

After that, the loop will be terminated, and control will fall outside the loop.

In the body of a loop, we have a print function to print our number and an increment operation to increment the value per execution of a loop. An initial value of num is 1, after the execution, it will become 2, and during the next execution, it will become 3. This process will continue until the value becomes 10 and then it will print the series on console and terminate the loop.

\n is used for formatting purposes which means the value will be printed on a new line.

Do-While loop in C

A do...while loop in C is similar to the while loop except that the condition is always executed

after the body of a loop. It is also called an exit-controlled loop.

Syntax of do...while loop in C programming language is as follows:

```
do {
  statements
} while (expression);
```

As we saw in a while loop, the body is executed if and only if the condition is true. In some cases, we have to execute a body of the loop at least once even if the condition is false. This type of operation can be achieved by using a do-while loop.

In the do-while loop, the body of a loop is always executed at least once. After the body is executed, then it checks the condition. If the condition is true, then it will again execute the body of a loop otherwise control is transferred out of the loop.

Similar to the while loop, once the control goes out of the loop the statements which are immediately after the loop is executed.

The critical difference between the while and do-while loop is that in while loop the while is written at the beginning. In do-while loop, the while condition is written at the end and terminates with a semi-colon (;)

The following loop program in C illustrates the working of a do-while loop:

Below is a do-while loop in C example to print a table of number 2:

```
#include<stdio.h>
#include<conio.h>
int main()
{
    int num=1;//initializing the variable
    do  //do-while loop
    {
        printf("%d\n",2*num);
        num++;          //incrementing operation
```

```
    }while(num<=10);
    return 0;
}
```

Output:

2

4

6

8

10

12

14

16

18

20

In the above example, we have printed multiplication table of 2 using a do-while loop. Let's see how the program was able to print the series.

First, we have initialized a variable 'num' with value 1. Then we have written a do-while loop.

In a loop, we have a print function that will print the series by multiplying the value of num with 2.

After each increment, the value of num will increase by 1, and it will be printed on the screen.

Initially, the value of num is 1. In a body of a loop, the print function will be executed in this

way: 2*num where num=1, then 2*1=2 hence the value two will be printed. This will go on until the value of num becomes 10. After that loop will be terminated and a statement which is immediately after the loop will be executed. In this case return 0.

For loop in C

A for loop is a more efficient loop structure in 'C' programming. The general structure of for loop syntax in C is as follows:

```
for (initial value; condition; incrementation or decrementation )
{
  statements;
}
```

The initial value of the for loop is performed only once.

The condition is a Boolean expression that tests and compares the counter to a fixed value after each iteration, stopping the for loop when false is returned.

The incrementation/decrementation increases (or decreases) the counter by a set value.

Following program illustrates the for loop in C programming example:

```
#include<stdio.h>
int main()
{
    int number;
```

```
    for(number=1;number<=10;number++)
    //for loop to print 1-10 numbers
    {
        printf("%d\n",number);          //to print
the number
    }
    return 0;
}
```

Output:

1

2

3

4

5

6

7

8

9

10

The above program prints the number series from 1-10 using for loop.

We have declared a variable of an int data type to store values.

In for loop, in the initialization part, we have assigned value 1 to the variable number. In the condition part, we have specified our condition and then the increment part.

In the body of a loop, we have a print function to print the numbers on a new line in the console. We have the value one stored in number, after the first iteration the value will be incremented, and it will become 2. Now the variable number has the value 2. The condition will be rechecked and since the condition is true loop will be executed, and it will print two on the screen. This loop will keep on executing until the value of the variable becomes 10. After that, the loop will be terminated, and a series of 1-10 will be printed on the screen.

In C, the for loop can have multiple expressions separated by commas in each part.

For example:

```
for (x = 0, y = num; x < y; i++, y--) {
  statements;
}
```

Also, we can skip the initial value expression, condition and/or increment by adding a semicolon.

For example:

```
int i=0;
int max = 10;
for (; i < max; i++) {
  printf("%d\n", i);
}
```

Notice that loops can also be nested where there is an outer loop and an inner loop. For each iteration of the outer loop, the inner loop repeats its entire cycle.

Consider the following example, that uses nested for loop in C programming to output a multiplication table:

```
#include <stdio.h>
int main() {
int i, j;
int table = 2;
int max = 5;
for (i = 1; i <= table; i++) { // outer loop
```

```
  for (j = 0; j <= max; j++) { // inner loop
    printf("%d x %d = %d\n", i, j, i*j);
  }
  printf("\n"); /* blank line between tables */
}}
```

Output:

```
1 x 0 = 0
1 x 1 = 1
1 x 2 = 2
1 x 3 = 3
1 x 4 = 4
1 x 5 = 5

2 x 0 = 0
```

2 x 1 = 2

2 x 2 = 4

2 x 3 = 6

2 x 4 = 8

2 x 5 = 10

The nesting of for loops can be done up-to any level. The nested loops should be adequately indented to make code readable. In some versions of 'C,' the nesting is limited up to 15 loops, but some provide more.

The nested loops are mostly used in array applications which we will see in further tutorials.

Break Statement in C

The break statement is used mainly in in the switch statement. It is also useful for immediately stopping a loop.

We consider the following program which introduces a break to exit a while loop:

```
#include <stdio.h>
int main() {
int num = 5;
while (num > 0) {
  if (num == 3)
    break;
  printf("%d\n", num);
  num--;
```

}}

Output:

5

4

Continue Statement in C

When you want to skip to the next iteration but remain in the loop, you should use the continue statement.

For example:

```
#include <stdio.h>

int main() {

int nb = 7;
```

```
while (nb > 0) {
  nb--;
  if (nb == 5)
    continue;
 printf("%d\n", nb);
}}
```

Output:

```
6
4
3
2
1
```

So, the value 5 is skipped.

Which loop to Select?

Selection of a loop is always a tough task for a programmer, to select a loop do the following steps:

Analyze the problem and check whether it requires a pre-test or a post-test loop.

If pre-test is required, use a while or for a loop.

If post-test is required, use a do-while loop.

Summary

Looping is one of the key concepts on any programming language.

A block of looping statements in C are executed for number of times until the condition becomes false.

Loops are of 2 types: entry-controlled and exit-controlled.

'C' programming provides us 1) while 2) do-while and 3) for loop.

For and while loop is entry-controlled loops.

Do-while is an exit-controlled loop.

Q20. Find the output of the following program segments

a) b) c)

```
#include <stdio.h>
int main()
{
 int i;
 for (i=1; i<2; i++)
 {
```

```
 printf( "IMS Ghaziabad\n");
 }
}
#include <stdio.h>
int main()
{
 int i = 1;
 while ( i <= 2 )
 {
 printf( "IMS Ghaziabad\n");
 i = i + 1;
 }
}
#include <stdio.h>
void main()
```

```
{
 int a = 10, b=100;
 if( a > b )
 printf( "Largest number is %d\n”, a);
 else
 printf( "Largest number is %d\n”, b);
```

Ans- Output:

20

22

24

26

28