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Grizzly Steppe (APT28 + APT29) ——— Anonymous
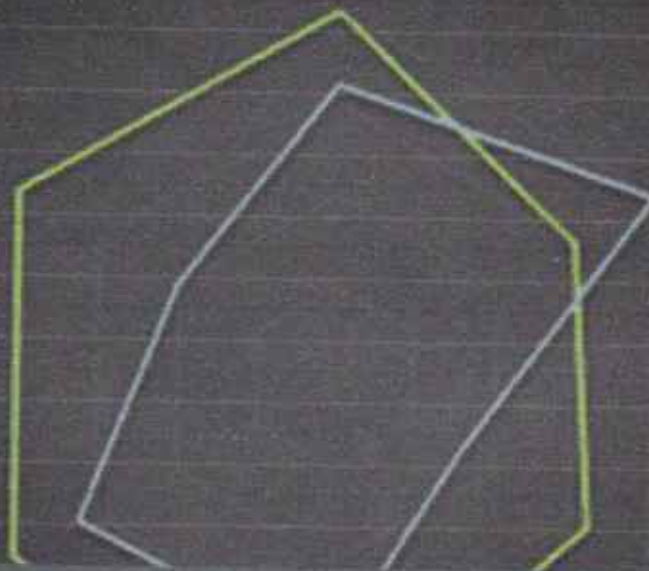
Transport Layer Protocols

10   13. In class, we discussed two different examples of Transport Layer protocols in the Internet protocol stack, namely TCP and UDP.

(a) (2 marks) What do the acronyms "UDP" and "TCP" stand for?

```
UDP: User Datagram Protocol
TCP: Transmission Control Protocol
```

(b) (2 marks) Give **two** examples of similarities between TCP and UDP.

```
- both are transport-layer protocols
- both use 16-bit port numbers in headers for TL multiplexing
- both use 16-bit Internet checksum in headers for error detection
- both allow variable size segments (up to 64 KB)
```

(c) (3 marks) Give **three** distinct examples of differences between TCP and UDP.

```
- TCP is connection-oriented (stateful); UDP is connection-less (stateless)
- TCP uses 3-way handshake for connection setup; UDP does not
- TCP does flow control; UDP does not
- TCP does congestion control; UDP does not
- TCP has sequence numbers and ACKs; UDP does not
- TCP does timeouts and retransmissions; UDP does not
```

(c) (3 marks) Give **three** specific examples of state variables within a TCP Control Block (i.e., Connection State Record) that would not be present in the case of UDP, and indicate what each of these state variables is used for.

```
- sequence number: numerical value associated outgoing data being sent
- expected: numerical value associated with incoming data being received
- send window: flow control window size for sender
- receive window: flow control window size for receiver
- RTT: Round Trip Time estimate
- RTO: Retransmission TimeOut value used when a segment is lost
- cwnd: congestion window for dynamic congestion control
- ssthresh: slow start threshold for TCP congestion control algorithm
...
```

*** THE END ***