Transport Layer, UDP Protocols and Attacks

N5.1. Why are the port numbers from 0 to 1023 protected? In Linux, only the applications with the root privilege can use the ports in this range.

N5.2. If an application needs to ensure the order of the packets, but UDP does not provide such a guarantee, does the application have to use TCP? Can it still use UDP?

N5.3. Why is UDP in general more suitable for real-time applications than TCP?

N5.4. In the following code snippet, what does the IP address `0.0.0.0` means?

```
udp = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
udp.bind(("0.0.0.0", 9090))
```

N5.5. When spoofing a UDP packet using Scapy, why do we typically set the UDP checksum field to zero?

N5.6. What are the similarities between the Fraggle attack and the Smurf attack?

N5.7. An open-source program has the following behavior: after receiving a message on its UDP port, it immediate sends a response to the client. Alice runs such a program on her machine (`10.8.0.8`), using port 8000. Bob also runs the program on his machine (`192.168.0.7`), using port 7000. (1) Please write a simple Python program to trigger a UDP ping pong between these two machines. (2) Please describe how you can help this open-source program fix this problem (just describing your solution would be sufficient).

N5.8. What type of services are good candidates for the UDP amplification attack?