Q0: What is the difference between “naming” and “addressing”? Which problems does DNS solve? Why should we always use trusted DNS servers?

Q1: DNS uses BGP Anycast to distribute the traffic among DNS servers close to the destination according to some metric (e.g. lowest RTT or minimal congestion). Every name resolution request is sent using UDP to the nearest DNS server and in case of a packet loss, the UDP request is resent. Imagine a protocol which creates a TCP + TLS connection to the nearest DNS server provided by BGP Anycast and sends name resolution requests using TCP + TLS packets. What are the benefits and problems of this protocol?

Q2.1: The static “hosts.txt” approach is no longer in use. Explain why by giving at least 3 reasons with motivation.

Q2.2: Given the DNS (caching) architecture explained during lecture, what happens from a user perspective when a hostname DNS record removal is issued? And what if the IP address of a hostname is changed?

Q2.3: Would you employ DNS in the Internet of Things (IoT)? Name an advantage and a disadvantage.

Q2.4: Would you use recursive or iterative DNS querying in IoT?

Q2.5: How can you employ DNS for censorship? What are its limitations?

Q3. URLs

Q3.1: Which of the following URL statements are true, and which are false?

1. The directory_path must map to the underlying file system. (true / false)

2. Port 80 and 443 are the respective default ports for HTTP and HTTPS. (true / false)
3. An IP address is a valid hostname. (true / false)

4. The port numbers enable multiple services to be simultaneously active on the same host. (true / false)

Q3.2: Why are there standard port numbers?

Q4. Critical path analysis
Within a dependency graph, the critical path decides the minimum amount of time it takes to fully load all dependencies. The next couple of questions are in relation to the dependency graph shown in Fig. 1.

Figure 1: Dependency graph

Q4.1: With $A = 4$, $B = 19$: what is the critical path?

Q4.2: With $A = 5$, $B \sim Poisson(7)$: what is the probability FIN-N1-N3-N5-N6 is strictly the critical path?

Q5: Which are the main differences between a GET and a POST request? When should one use GET instead of POST and why?

Q6: What does it mean that HTTP is a stateless protocol? How can we force it to keep a state?