17-Week Bridge Practice Exam 4

We've compiled some extensive exercises covering *networking* and *operating systems* topics, so that you may work on building your competence around these topics before your exam.

Exercises are not at all reflective of the exam. Both the precise topics covered and the way questions are presented will be different than below. Also, please remember that you are expected to remain familiar with topics covered in previous exams. The below questions primarily serve as exercises to get you going while you study networking and operating systems.

This practice test is light on object oriented material. Make sure to review those sections before your test. There will almost certainly be a class-design problem on your exam.

0.) In computer networking, what are the seven layers of the OSI model? Why is it useful to employ a conceptual model such as the OSI model when developing or describing communications systems?

1.) In the transport layer of the OSI model, both connection-oriented transmissions and connectionless transmissions are supported. Name a protocol that is used for each.

2.) What is a subnet mask? How is it calculated?

3.) What happens when you enter the command `traceroute 127.0.0.1`? What happens when you enter the command `traceroute nyu.edu`? (Replace `traceroute` with `tracert` in Windows.)

4.) How does a web cache work? What advantage does it provide?

5.) What is a socket?

6.) Identify four application-layer protocols and give an example of an application that each protocol services.

7.) What are LANs, MANs, and WANs? Provide an example of each.

8.) When would it provide an advantage to use a persistent HTTP connection, rather than a non-persistent HTTP connection?

9.) What is data encapsulation?

10.) What can happen when the physical layer consists of cables that are longer than the prescribed length for that physical medium?

11.) What are routers? At which OSI layer do routers operate?

12.) How do cookies work?

13.) What is the difference between a program and a process?

14.) How is switching between threads in the same process different from switching between threads in different processes?

15.) Your boss is worried about mutual exclusion. What could you present as a solution ?

16.) What are the properties of an ideal process scheduler? Does this ideal process scheduler exist in the real world?

17.) What is the principle of locality and why is it important?

18.) When does a page fault occur?

19.) You are designing a compiler. You want to implement a feature that checks for mismatched or missing brackets. What data structure might be useful here?

20.) Where are red-black trees used in the real world? Hint: think operating systems.

21.) MS-DOS allowed all user processes to access the kernel directly, without OS control and supervision. Why is this **not** allowed by more modern, widespread operating systems?

22.) What are the three strategies for resolving deadlocks? Describe each one.

23.) What is a critical section? Why are critical sections important?

24.) How is a thread different than a process?

25.) Give an example of an event that would cause a process to:

  a. Go from blocked state to ready state
  b. Go from running state to ready state
  c. Go from ready state to running state

26.) Why does an operating system need a scheduler?

27.) What is preemption? Why is it significant? When does it occur?

28.) What is a context switch?