Use any programming language you're comfortable with for the following questions.

1) Describe the process by which typing http://www.yahoo.com in the address bar of your browser results in the Yahoo! homepage rendering. Please go into as much detail as possible.

2) What is the difference between latency and throughput?

a. What kind of application is particularly affected by throughput? How?

b. What kind of application is particularly affected by latency? How?

3) What is a deadlock?

a. What are some ways of preventing deadlocks?

4) In the context of a relational database, what is the difference between a clustered and a non-clustered index?

5) What does it mean for an application to be I/O bound vs CPU bound?

6) Write a method to calculate the maximum possible profit I could have made by buying low and selling high, given an array of mutual fund NAVs (end of day prices) for every day in a time interval. For example, for the array [7,24,8,15,2,20], the maximum profit would have been 18, by buying at 2 on day 5 and selling at 20 on day 6.

a) What is the run time complexity of your solution (Big-O notation)?

7) Write a program to simulate picking a marble out of a bag of colored marbles without replacement (marbles are not added back to the bag after selecting them). Assume we have 3 colors: red, green, and blue. Your program should print out the color of each marble selected until the bag is empty.

a) What is the runtime complexity of your selectMarble method?

b) What is the runtime complexity of your entire program, from initialization, until the last marble is picked?

b) How would you change your program, if at all, if you had thousands of marbles?

c) How would you change your program, if at all, if you had thousands of colors?

8) Given a dictionary with 1,000 words (the words are in alphabetical order given it's a dictionary), write a program that prints all anagrams found. For example, using the following dictionary as input: ["ACT", "ANTS", "ART", "BAT", "BAR", "CAT", "DOOR", "RAT", "TAB", "TAR"] should print ACT: CAT, ART: RAT, TAR, BAT: TAB.

9) How would you design the game Battleship?

a) What classes would you need?

b) What would the fire method look like?

i. How would I know if I hit or miss?

c) How would you determine whether a ship has been sunk?

d) Design a program that "plays" Battleship. What would its strategy be? Note: Use the fact that a computer is great a running **calculations** quickly

You should be able to complete this within two hours.