CS101 Homework #4

In your own words, answer each question completely and provide justifications where requested for full credit. Submit your responses as a PDF file to the Blackboard homework assignment. The Blackboard assignment will be available on Fridays and will be due by midnight the following week.

1. You read a newspaper article about a computer program that can answer questions on the Jeopardy TV quiz show. The article says that the program contains of millions of lines of code. Why do programs for complex tasks require so much code? (Hint: what does a programmer need to specify writing a program?)

2. As discussed in class, an algorithm is a method for solving a problem. You also learned that an algorithm can be expressed in English (e.g., the algorithm that instructed a two-year-old how to get dressed). Write an English algorithm that specifies how to reheat leftovers without burning them using an inexpensive microwave oven that only has a timer and doesn't have a fancy "reheat" command.

3. In your algorithm from question 2, how did you combine sequence, repetition, and choice to achieve the outcome? Point out an example of each in your algorithm.

4. When someone uses an app to play a song, they just select the song, and the app plays until the end. Imagine an alternative universe in which apps that play songs require the user to tell exactly how many seconds of music to play. Users complain, but programmers in the alternate universe tell users that there's simply no better way.   What specific algorithmic paradigm did programmers in the alternate universe fail to invent.

5. Consider the algorithm, I use to grade homework assignments
    a. I log onto Blackboard.
    b. I click the button that says "Grade All".
    c. Blackboard displays the first student's paper.
    d. I asses the paper and select a grade accordingly.
    e. Blackboard displays the next paper, which I grade.
    f. The process goes on like this for each student's paper
    g. When all papers have been graded, Blackboard reports that I am finished.
    h. I log off Blackboard and go about my day.

    What paradigm(s) does the algorithm follow? Point out examples of each.

6. Have more than 50 programming languages been created? More than 100? 200? (Hint: To find out, look at the list in Wikipedia.)

7. Bob was using a spreadsheet program in a sales meeting when the program crashed, losing Bob the sale. Later, the vendor announce an update that fixed the problem. Now Bob wants to sure the spreadsheet vendor -- he says the vendor should have built a program without any bugs. "Heck," he says, "they could a written a computer program to solve the problem!" What do you tell Bob?

8. Your friend in computer science is working on a big project in which she has to write a very large program. She tells you that it takes 10 minutes to compile the source code to runnable object code. Later, she calls to say that the reason she is late for your party because she has encountered over half a dozen trivial mistakes -- after she corrects one, another one seems to show up. Why has correcting a few mistakes caused her to be late?

9. You read in the newspaper that computer scientists have developed a new algorithm for video games. Will you be able purchase a copy of an algorithm, load the algorithm into your computer, and make your current video game software perform better? What do you need to purchase if you want to use the new algorithm?

10. Programmers rely on libraries every day so they don't have to rewrite code for common tasks. Can you think of something a non-programmer might do to reuse the work of others in their field.