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Homework 1

CS/ECE 252 Section-2 (MWF 11:00)

Assigned on September 4th
Due on September 11th at the beginning of class (11 AM)
Read each question carefully. There are 2 pages. Question 6 continues on the next page.

1. What are the two major questions this course strives to answer? **(2)**

2. What is the difference between a fixed-program device and a stored-program device? **(2)**

3. What is abstraction, and what are its benefits? **(2)**

4. State true or false: **(2)**
   a. If I plan to use a different programming language, I would have to develop a new ISA.

   b. If I disallow some instructions from my ISA, some Python instructions may stop working.

5. What is an algorithm? What are the two properties an algorithm must satisfy? **(2)**

6. Design a list of steps similar to the square root algorithm that computes A*B and stores the result in C, where A and B are positive integers. Assume that the only steps allowed are adding, comparing (>, <, >=, <=, =), and storing. You are allowed to create a temporary variable, overwrite A, or overwrite B.
   (2)

Now verify that your algorithm works by testing the values A=2 and B=3. Iterate through the steps until completion. Keep track of all (A, B, C, and any temporary variable) values by writing them down at the end of each step. **(2)**

7. Explain algorithmic complexity and how trade-offs are involved in choosing an algorithm. **(2)**

8. Programming is usually done using high-level languages as that is much easier than using ISA instructions directly. But, what is a benefit in programming using ISA instructions directly? **(1)**

9. In some programming language, to display the natural logarithm of any number *n*, this is what we need to write: *print (log(n))* **(2)**
   A group of students were assigned to display log(5).Three different students wrote:
   a. print (log(5))
   b. print (log((5)
   c. print (log(55))
   d. print log(5)
   Which student got the right answer? What were the type of errors experienced by the other three students?

10. What does Turing Completeness mean?
    (1)