Homework 1 [Due at lecture on Wed, Jan 25]

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- You must do this homework alone.
- Please staple multiple pages together.
- Write your Name and netid at the starting of the HW submission sheet, write your initials on every page.

Problem 1 (4 points)

a. List the web address of the course home page. (i.e. http://...)
b. List the date, time, and location of all exams for this course.
c. Do you have a conflict with any of the exams? If so, have you informed your instructor about the conflict?
d. Do you have a final exam for this course? If so, what is its date, time, and location.

Problem 2 (4 points)

(This question has no wrong answers.)

a. What is your expected major(s)?
b. Please list all computer science courses you have taken in the past, if any.
c. Please list all computer science courses you plan on taking concurrently, if any.
d. Why are you taking this course? What do you hope to get out of this course?

Problem 3 (4 points)

a. List at least one advantage of programming in high-level languages compared to low-level languages. List one disadvantage.
b. Explain the difference between a compiler and an assembler.

Problem 4 (5 points)

a. List at least two things specified by an ISA.
b. The ISA specifies the logic devices which can be used to implement a microarchitecture. True/False?
c. Briefly explain the difference between microarchitecture and ISA.
d. Can there be more than one logic circuit implementation for a microarchitecture?

Problem 5 (4 points)

Consider the following statement: "Tomorrow will be colder."

a. What property does the statement demonstrate that makes it unacceptable in a program?
b. The above statement is used as a step in an algorithm. Does this step have "definiteness"? Why/Why not?
Problem 6 (4 points)

Assume that we have two "black boxes", shown in Figure (a) and (b). Black box shown in Figure (a) takes two numbers as input and outputs their sum. Black box shown in Figure (b) takes two numbers as input, and multiplies them together. As an example, Figure (c) shows how we can connect these boxes together to compute $p \times (m + n)$.

(a) \hspace{2cm} (b) \hspace{2cm} (c)

\[ \begin{array}{c}
\text{m} \\
\downarrow \\
+ \\
\downarrow \\
\text{m + n}
\end{array} \hspace{2cm} \begin{array}{c}
\text{m} \\
\downarrow \\
* \\
\downarrow \\
\text{m * n}
\end{array} \hspace{2cm} \begin{array}{c}
\text{m} \\
\downarrow \\
\downarrow \\
\downarrow \\
p \times (m + n)
\end{array} \]

Show how to connect these boxes together to compute:

a. $m^2 + n^2$ (Use at most 3 black boxes)

b. $(m+n)^4$ (Use at most 3 black boxes)