CSCI 246: Test 1 (10 points)

Your Name:

This is an open-book, open-notes test. Any personal help is a **plagiarism**. Tentatively, this test starts at 4pm and ends at 5:15pm. If you are doing it on-line, after you finish, scan a pdf file on D2L under "Assignments/Test_1".

Problem 1

Let $S = \{a, b, 1, 2\}$. List the power set (set of all the subsets) of S.

Problem 2

Write the negation, contrapositive, converse, and inverse for the following statement.

If x is divisible by 18, then x is divisible by 9 and x is divisible by 2.

(2.1) Negation

(2.2) Contrapositive

(2.3) Converse

(2.4) Inverse

Problem 3

Use universal modus tollens to fill in a valid conclusion for the following argument.

If a computer program is correct, then compilation of the program does not produce error messages.

Compilation of this program produces error messages.

∴ _____.

Problem 4

The logician Raymond Smullyan describes an island containing two types of people: knights who always tell the truth and knaves who always lie. You are visiting the island and have the following encounters with natives.

Two natives A and B address you as follows.

> A says: B is a knave.
> B says: A and I are of the same type (i.e., both are knaves or both are knights).

What are A and B?

Problem 5

(5.1) Write a negation for the statement:
$\exists$ integer d, if $\frac{18}{d}$ is an integer then $d = 3$.

(5.2) Is the statement in (5.1) correct? Explain the reason.