

Every assignment will be due at the beginning of class.

Print this document, and complete Homework 0 on the printout.

The purpose of this first homework is to get to know a little bit about you, and to get a rough feeling of your current mathematical background. This Homework 0 is mandatory, but your grade will be either 100 (if you put a descent effort in either answering the questions, or explaining what background you think you are missing in the case where you cannot answer a particular question or questions), or zero (if you do not hand in the homework, or if you clearly put no time or effort). Only for this particular homework, please asnwer it without collaborating with others, and use as few external references or other resources as possible. In any case, if you use external references or other resources, please do list them. Try to complete the entire homework in no more than 2 hours. In any case, please write how long it took you to complete the homework.

1st Set of Questions

1. Print Your Name:
2. Indicate Your Major: CS, CM, DISCRETE MATH, OTHER (specify)
3. What year are you in: FRESHMAN, SOPHOMORE, JUNIOR, SENIOR, OTHER (specify)
4. List all other courses that you are taking this semester, with name, catalog number and instructor.

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5. If you are a CS major, indicate the threads you are considering to persue. If you are undecided, you may indicate more or fewer than two threads. Recall, the 8 threads are:

1. INFORMATION-INTERNETWORKS
2. PLATFORMS
3. INTELLIGENCE
4. DEVICES
5. MEDIA
6. PEOPLE
7. THEORY
8. MODELING AND SIMULATION

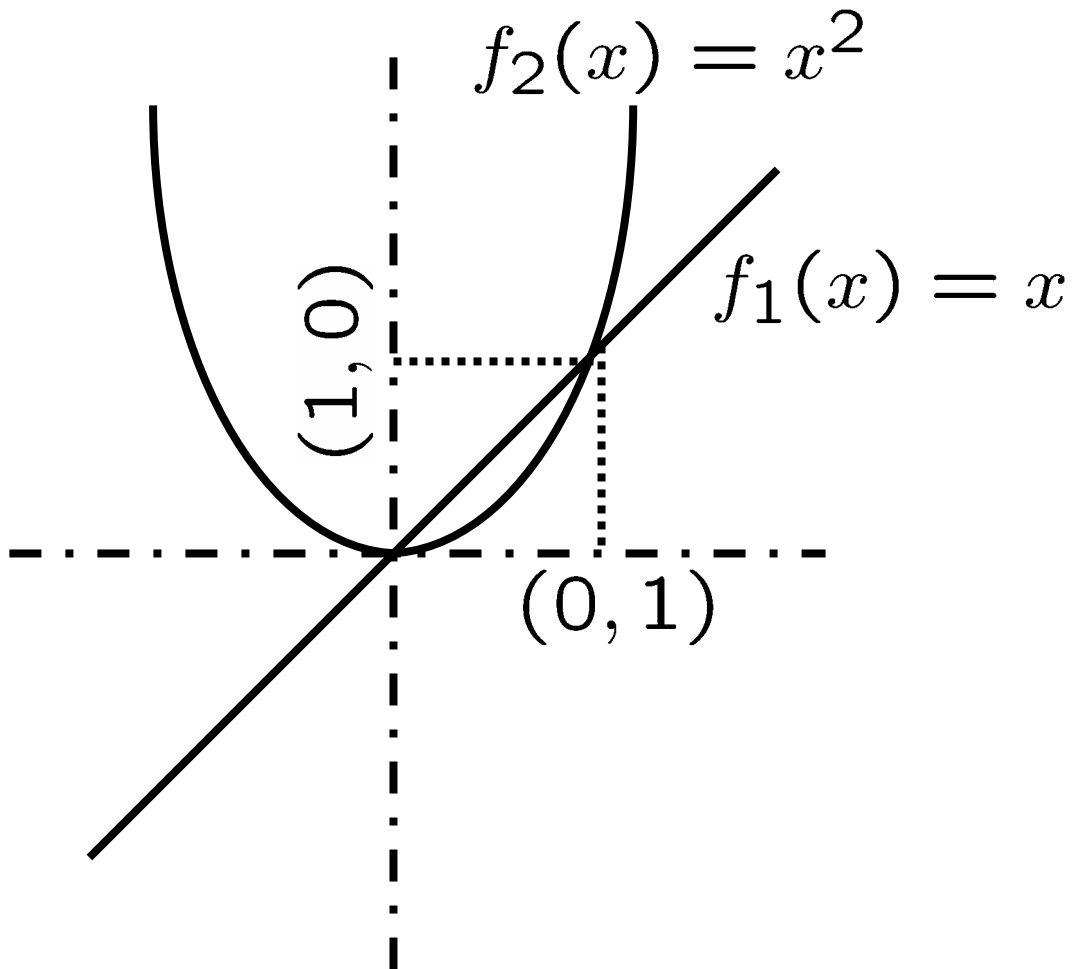
2nd Set of Questions

1. What is your favorite topic in computer science? Have you had any particular experience (a job, a project, a reading, an activity) related to computers, computing, computer science, and/or mathematics that you want to share?

2. What are your initial thoughts about CS 1050? What do you expect to learn (or not learn) from this class? What have you heard about it? You can be as frank as you want.

3. Is this the first time that you are taking CS 1050?

3rd Set of Questions



In the figure above we have indicated the functions
 $f_1(x) = x$ and $f_2(x) = x^2$.

In the same figure, indicate clearly the functions
 $f_3(x) = 2x$ and $f_4(x) = x^3$.

4th Set of Questions

(a) $\log_{10} 100 = ?$

Explain.

(b) $\log_2 16 = ?$

Explain.

(a) $\log_2 \frac{1}{2} = ?$

Explain.

5th Set of Questions

(a) Give the definition of a prime number.

(b) How many prime numbers are there?

(c) 140 is a composite number. Give its factorization in terms of prime numbers.

6th Set of Questions

We have a population of 1000 people. We are told that the average income per person is 10K.

(a) Is it possible that the income of each one of the 1000 people of the population is 5K? Explain.

(b) Is it possible that there is a person in the population whose income is 20M?

7th Set of Questions

You toss a fair coin 1000 times and count the number of heads.

(a) Would you be willing to bet that the number of counted heads is between 350 and 650, under the following condition: If the number of heads is indeed between 350 and 650, then you will win \$100. If the number of heads is smaller than 350 or larger than 650, then you will lose \$100. Explain, intuitively, if it is reasonable to accept this bet.

(b) Would you be willing to bet that the number of counted heads is larger than 900, under the following condition: If the number of heads is indeed larger than 900, then you will win \$100. If the number of heads is smaller than 900 then you will lose \$1. Explain, intuitively, if it is reasonable to accept this bet.

8th Question

Three tourists rented a room for \$30. The next morning, the manager realized that the room was only \$25, so he sent his dishonest son to deliver the \$5 difference. But the son only gave each of the three in the room \$1, keeping \$2 for himself. This means that each tourist only paid \$9 each for the room, rather than \$10. But 3 times \$9 is \$27, and the dishonest son only kept \$2, making only \$29 all together, not \$30. Where did the remaining dollar go?

9th Set of Questions

A computer program produces correct output on 40% of the possible inputs, dumps core on 40% of the possible inputs, and produces incorrect output on 20% of the possible inputs. Which of the following statements are true and which are false?

- (a) The program produces correct output on at least one input.
- (b) There exists an input for which the program does not produce correct output.
- (c) The program produces correct output for the majority of all possible inputs.
- (d) The program does not produce correct output for the majority of all possible inputs.

10th Set of Questions

Let x and y below denote arbitrary positive integers. Which of the following statements are true and which are false?

(a) $\forall x \exists y : y > x$.

(b) $x > y , \forall x \forall y$.

(c) $(x \neq y) \longrightarrow ((x > y) \vee (y > x)) , \forall x \forall y$.

(d) Write in English proposition (c) above.