15110 Summer 2018
Problem Set 1

Name: _____

Andrew ID: _____

Reading Assignment
Read Chapter 1 of the book Blown To Bits .
Instructions
- Type or neatly write the answers to the following problems.
- Save or scan this file as a pdf and submit to Gradescope

Exercises (10 points total)
1. (1 pt) Why is the Analytical Engine of Babbage considered by many to be the first "true" computer system?

2. (2 pts) Moore's Law states that the processing power of a computer doubles approximately every 2 years. We can interpret "doubling of power" as "doubling of the number of transistors on a chip".
    a. According to Moore's Law, approximately how many transistors will a chip contain 10 years from now? You can assume that a typical chip today contains 1 billion transistors.

    b. How many years will it take to have a computer that is approximately 1000 times more powerful than today's computer?

3. (2 pts) Suppose you have an electronic device that has 256 GB of memory.
    a. How many files of size 2KB can you fit into its memory?

    b. Suppose that you clear the device's memory and then connect it to a communication port that receives data at a rate of 64Mbps. How long will it take to fill up the memory of this device as you continuously receive data from the port? Note the lower case b in 64Mbps. It means 64 mega-*bits* (not *Bytes*) per second.

4. (1 pt) How did the invention of integrated circuits and microprocessors revolutionize the field of computing? Hint: Think of the size of older computers.

5. (3 pts) Based on your reading of Chapter 1 of *Blown To Bits*, answer the following questions. For each answer cite the numbers of the pages that include the information on which your answer is based.
   a. Once digital data about you is stored by a third party, can you be sure that it could be completely expunged upon your request? Why or why not?

   b. Explain what it means for something to grow exponentially and why it is important as a measure of rate of change. Give an example from the book about a type of exponential growth that had great impact on computing. (HINT: Think what happened to the speed of processors since the 60s.)

   c. Suppose you have created a work of art that is stored digitally, that is, using bits. What makes possessing those bits different from possessing other types of property such as a painting that you hang on your wall?

6. (1 pt) This question concerns the course syllabus and organization course web page.
   a. Can you turn in an assignment after its due date? What grade would you get in that case?

   b. Write the dates for the 2 written exams and the 2 lab exams.