CS 241 Homework 1

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Instructions

- The learning objective for this assignment is to ensure that you understand the underlying material, and to provide you with practice in solving problems of this kind.
- Only a few of these problems will be graded. You do not know beforehand which ones these are; hence, you should provide solutions to all the problems.
- Make your solutions concise and formal.
- Please type the assignment if your handwriting is difficult to read. Otherwise scan to pdf
- You are encouraged to work on problems in groups. List the people you worked in groups with please. If you used an online resource i.e. Math-Stack Exchange, link the question asked or resource such that I can check you understand rather then brain-off copying
- Note that you must write your solutions by yourself, in your own words. Individual submissions
- **Remember that proving a statement is false counts as proving the statement. To prove a statement you do not need to prove it true**

Problems

Extra Credit: All assignments must be uploaded to Canvas as a pdf. Should you type up your homework in Latex, I will give you +2 extra credit points (equivalent to 10%). Template file will be provided if you want

Problem 1.1. *On January 22nd 2020, I turned 22 years old. Prove that for any person, there is* ***exactly*** *one year in which they turn x years old on the x day of a month.*

Problem 1.2. *Clearly the following proof must be incorrect, where and what is the error?*

Theorem 1.1. $1 = 2$

Proof. Let x be a positive integer

$$x^2 = \underbrace{x + x + x + \ldots + x}_{x \text{ times}} \tag{1}$$

$$\frac{d}{dx}\left[x^2\right] = \frac{d}{dx}\left[\underbrace{x + x + x + \ldots + x}_{x \text{ times}}\right] \tag{2}$$

$$2x = \underbrace{1 + 1 + 1 + \ldots + 1}_{x \text{ times}} \tag{3}$$

$$2x = x \tag{4}$$

$$2 = 1 \tag{5}$$

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