Assignment 1

CMPT 215
Due: July 13^{th}, 2017

Total: 50 marks

Problem 1.
(8 marks) Define and write the equations for the following metrics in terms of instruction count (I), number of clock cycles (C) and clock cycle time (T).

i Frequency

ii CPI

iii MIPS

iv CPU execution time

Computer System Metrics			
Instruction type	CPI	Frequency	Clock cycle(ns)
A	1	20%	0.5
B	2	40%	0.5
C	3	30%	0.5
D	4	10%	0.5

Problem 2.
(6 marks) Calculate the following performance metrics using the given values in the table above and showing all **steps and units**.

i CPI

ii MIPS

iii CPU execution time for 500 instructions

Problem 3.
(4 marks) Suppose it is possible to third (1/3) the number of type C instructions in the table above, what will be the new CPI value?

Problem 4.
(4 marks) Describe and write the equation for *Ambdals law*.

Problem 5.
(10 marks) Convert the following integers into binary and hexadecimal.

i 27

ii 400

iii 88

iv 10

v 99

Problem 6.
(5 marks) Convert the following binary to their integer values.

i 1001

ii 101110

iii 111001

iv 01100011

v 01110010

Problem 7.
(3 marks) What is the difference between 1's compliment and 2's compliment? When are they used and what applications are they used in?

Problem 8.
(10 marks) Convert the following to 8-bit 1's compliment and 2'compliment.

i 20

ii 0

iii -100

iv 127

v -127

Bonus:

Problem 9.
(3 marks) Name the top three fastest machines in the world and mention which benchmark was used to test their performance.