**Homework 1**
**EET 340**
**Introduction to Computer Organization and Architecture**
**Spring 2022**

INSTRUCTIONS: Show the detailed steps of your calculation. The homework solution can either be typed in word or handwritten. However, convert the word or scanned (handwritten) documents to PDF and submit to Canvas.

1. Write characteristics of the six different classes of computers. (15 Points)

2. What are the three levels of program code? Describe each level. (15 Points)

3. Discuss five components of a computer? Give at least two examples for each component. (10 Points)
4. State Amdahl's law. (5 Points)

5. Consider three different processors P1, P2, and P3 executing the same instruction set. If the processors each execute a program in 10 seconds, find the number of cycles and the number of instructions for each processor? (20 Points)

| | P1 | P2 | P3 |
|---|---|---|---|
| Clock Rate | 3 GHZ | 2.5 GHZ | 4 GHZ |
| CPI | 1.5 | 1 | 2.2 |

6. Consider two different implementations of the same ISA. The instructions can be divided into classes as follows (Classes A, B, C, D): (35 Points)

| Class | A | B | C | D |
|---|---|---|---|---|
| CPI (P1) | 1 | 2 | 3 | 3 |
| CPI (P2) | 2 | 2 | 2 | 2 |

P1 and P2 have clock rate of 2.5 GHZ and 3.0 GHZ, respectively. Given a program of Dynamic Instruction count of 1.0E6 instructions divided into classes as follows: 10% class A, 20% class B, 50%class C and 20% class D.

a. which is faster: P1 or P2?
b. What is the global (average) CPI for each implementation?
c. Find the clock cycles required in both cases.