CSE340-Assignment 1
Spring 25
Section:10,11,12
Due Date: 9/3/2025
Total Marks: (3.75*4=15)

1. A program consists of three instruction classes:

- Class A: 40% of instructions, CPI = 1.5

- Class B: 35% of instructions, CPI = 2.8

- Class C: 25% of instructions, CPI = 4.2

- Clock rate: 3.6 GHz

- Total Instructions: 3 billion

a. Compute the average CPI.

b. Compute the execution time for the program.

2. A system improvement speeds up 80% of a program by 4×.

a. Compute the overall speedup using Amdahl's Law.

b. If another enhancement speeds up only the remaining 20% by 3×, what is the final speedup?

3. Compare two optimization approaches:

a. Increasing clock rate from 3.0 GHz → 4.2 GHz, CPI increases 1.8 → 2.2

b. Lower CPI from 1.8 → 1.4, keeping 3.0 GHz clock

4. Given:

- C=3.0 nFC, V=1.5 V

- Initial frequency f1=600

- New frequency f2=1 GHz

- Initial power dissipation P1=0.5 W.

What is the new power dissipation?