Name: Rahul Batra

ID: 23473026

Date: March 2nd, 2021

Homework 1

1.

CPI = instruction type * cycles per instruction

a.

CPI = (0.55 * 1) + (0.45 * 2) = 1.45 CPI

b.

CPI = (0.55 * 1) + (0.45 * 1) = 1 CPI

2.

$$\text{CPU Time} = \frac{\text{instruction count} * \text{CPI}}{\text{clock rate}}$$

a.

$$\text{CPU Time} = \frac{(8 * 10^9) * 1.45}{4 * 10^9} = 2.9 \text{ sec}$$

b.

CPI = (0.5 * 1) + (0.5 * 2) = 1.5 CPI

$$\text{CPU Time} = \frac{(7 * 10^9) * 1.5}{4 * 10^9} = 2.625 \text{ sec}$$

3.

a.

Program B executes faster. 10.5% faster

$$\frac{\text{Execution time}_A}{\text{Execution time}_B} = \frac{2.9 \text{ sec}}{2.625 \text{ sec}} = 1.105 = 10.5\% \text{ faster}$$

b.

Program B CPI on Computer C2 = 1 CPI
Program B CPU Time on Computer C2 = 2.8 sec
Program A CPU Time on Computer C2 = 3.2 sec

Program B executes faster. 14.3% faster

$$\frac{\text{Execution time}_A}{\text{Execution time}_B} = \frac{3.2 \text{ sec}}{2.8 \text{ sec}} = 1.143 = 14.3\% \text{ faster}$$

Name: Rahul Batra

ID: 23473026

Date: March 2nd, 2021

Homework 1