Quiz01 (15')
Computer Architecture

Given a program with 10^6 instructions divided into classes as follows: 10% class A, 20% class B, 50% class C and 20% class D. The clock rate and CPI for each class are given as follow:

Clock rate	CPI (ClassA)	CPI (Class B)	CPI (Class C)	CPI (Class D)
2.5 GHz	1	2	3	3

Question1: Find the execution time of the program?
Question 2: How much is the Global CPI for the program?
Question 3: Assume that the number of class A instructions increases additionally by 10% and the number of Class C instructions is reduced by10%. Find the new global CPI?

Solution

Question1: The execution time = $\left(\sum_A^D ICi * CPIi\right) / CR$

= $(0.1*1 + 0.2*2 + 0.5*3 + 0.2*3)*10^6/(2.5*10^9)$ = **$1.04*10^{-3}$ s**

Question2: Global CPI = (Execution Time)*(Clock Rate)/IC

= $1.04*10^{-3} * 2.5*1^{09}/10^6$ = **2.6** Cycles per Instruction

Question3: Global CPI = $[[(0.2*1 + 0.2*2 + 0.4*3 + 0.2*3)*\cancel{10^6/2.5*10^9}]*\cancel{2.5*10^9}]/\cancel{10^6}$ = **2.4**