CSE 331

Computer Organizations

Homework 1

Due Date 04/11/2022 Friday 17:00

1. A compiler designer wants to improve the performance of a machine for one specific program. The program has the following properties:

	R-type ($x10^6$)	I-Type ($x10^6$)	J-Type ($x10^6$)
Program instructions	50	30	20

	R-type	I-Type	J-Type
Required Cycles	2	4	3

Assume you can improve only one type with 50%. Which type do you prefer for improvement and how many times can you improve the whole program in the end?

CPI: 0.5 x 2 + 0.3 x 4 + 0.2 x 3 = 1 + 1.2 + 0.6 = 2.8

Most efficient improvement is I-type with %50. Because total cycle number of I-Type more than other types.

After improvement: 1 + 0.6 + 0.6 = 2.2 --------> (2.8 - 2.2) / 2.8 = %21 faster.