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 (x$10^6$) | I-Type (x$10^6$) | J-Type (x$10^6$) |
|---|---|---|---|
| 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?

Total number of cycles (x$10^6$):
R-type: 50 * 2 = 100
I-type: 30 * 4 = 120
J-type: 20 * 3 = 60

Since the most costly one is I-type it should be improved.

Old total cycle count: 100 + 120 + 60 = 280
New total cycle count: 100 + 120 * 0.5 + 60 = 220

So the improvement done is 100*(280-220)/280 = 21.4%