

① Making the common case fast, the program can be enhanced in terms of performance better than rare case. So, to choose the I-type instruction to make improvement is sensible idea.

ex. Suppose our cpu runs at 1mhz clock rate.

$$\text{Execution Time} = \frac{\text{ICPI} \times \text{Instruction Count}}{\text{Clock Cycle}} = \frac{(50 \times 10^6 \times 2) + (30 \times 10^6 \times 4) + (20 \times 10^6 \times 3)}{10^6} = 280 \text{ s}$$

Before the improvement, I-type requires 120 sn, after the improvement, it takes 60 sn. So total execution time will be 220 s.

$$= \frac{280 - 220}{220} \times 100 = 27.27\% \text{ improvement.}$$

$$\text{Cycle Time} = \sum_{i=1}^n (C_i) \times 25$$