CEA201-HOMEWORK

Chapter 2:

1. Determine the effective CPI, MIPS rate and execution time for two computers.

The clock rate of both computer is 300MHz with two different computers. The following measurements are recorded on the two computers running a given set of benchmark programs:

|  |  |  |
| --- | --- | --- |
| Instruction type | Instruction Count (millions) | Cycles per Instruction |
| Computer A:   * Arithmetic and logic * Load and store * Branch * Others | 6  3  2  2 | 1  3  4  3 |
| Computer B:   * Arithmetic and logic * Load and store * Branch * Others | 12  9  2  5 | 1  2  4  6 |

* Computer A:

CPI = = = ≈ 2.23

MIPS rate = = = = ≈ 134.48

T = Ic \* CPI \* t = Ic \* CPI \* = (6 + 3 + 2 + 2)\*106 \* \* = ≈ 0.0967

* Computer B:

CPI = = = ≈ 2.43

MIPS rate = = = = ≈ 123.53

T = Ic \* CPI \* t = Ic \* CPI \* = (12 + 9 + 2 + 5)\*106 \* \* = ≈ 0.2267

1. A benchmark is run fast on a 300MHz, and then on 600MHz processor. The executed program consists 100,000 instrunction executions, with the following instruction mix and clock cycle count:

|  |  |  |
| --- | --- | --- |
| Instruction Type | Instruction Count | Cycles per Instruction |
| Integer arithmetic | 50,000 | 1 |
| Data transfer | 20,000 | 3 |
| Floating point | 15,000 | 2 |
| Control transfer | 15,000 | 2 |