Problem no. 1

When a CPU operates at a clock frequency of 1000MHz, requires an average of 5 CPI for executing one instruction, what is the performance (in MIPS) of the CPU?

Average executing time

= CPI \* Clock time

= 5 clocks/instruction \* (1sec/1000 000 000 clocks)

=5/1000000000

=0.000000005 seconds/instruction.

Number of instruction that can be executed in 1 sec=

= 1/0.000000005

=200 000 000 instruction

200 MIPS

Problem 2.

When the instruction mix of a CPU in the values that are shown in the table below:

1. What is the average executing time of one instruction
2. What is the performance of CPU

|  |  |  |
| --- | --- | --- |
| Instruction type | Instruction execution time | Occurrence rate |
| Register to register operation | 0.3 microsecond | 30% |
| Register to /from memory operation | 0.5 microsecond | 50% |
| Unconditional branch | 0.2 microsecond | 20% |

Average execution time of one instruction

=∑(instruction execution time \* Occurrence rate)

=0.3\*0.30 + 0.5\*0.5 + 0.2 \* 0.2

= 0.38 microsecond

CPU performance = 1/Average instruction execution time

=1/0.38

=100/38

=2.6315 MIPS