

Ex.1

	Processor	Clock Rate	CPI
a.	P1	3 GHz	1.5
	P2	2.5 GHz	1.0
	P3	4 GHz	2.2
b.	P1	2 GHz	1.2
	P2	3 GHz	0.8
	P3	4 GHz	2.0

Consider three processors P1, P2, P3 with clock rate and CPI in table above.

1. Which one has highest performance?
2. If each processor runs a program and it takes them 10 seconds. Find the number of instructions in that program.
3. Assume that execution time in 2) reduces by 30% (for all processors). However, that also leads to an increase of 20% of CPI. What is the clock rate of each processor?

Ex. 2

	Clock Rate	CPI Class A	CPI Class B	CPI Class C	CPI Class D
P1	2.5 GHz	1	2	3	3
P2	3 GHz	2	2	2	2

P1 and P2 are two different CPUs implementing the same instruction set with 4 types of instruction.

1. Given a program with 10^6 instructions, including 10% of type A, 20% of type B, 50% of type C, and 20% of type D. Which processor is faster?
2. Find CPI of each processor.

Ex. 3

Compiler A		Compiler B	
No. Instructions	Execution Time	No. Instructions	Execution Time
1.00E+09	1.8 s	1.20E+09	1.8 s

A program written in high level has been compiled into machine code for the same CPU by two different compilers. The number of instructions and execution time of each program are given in the table.

1. Find CPI of each program. Given the CPU clock cycle of 1 ns.
2. A new compiler is introduced, which can produce a new program with 600 millions instructions and CPI of 1.1. What is the speed up compared to the original 2 programs?