

To compare performance of two or more processors ①

- set of standard programs are executed
 ↳ measure the execution time
- These programs are called benchmarks.

Some early metrics used:

i) MIPS (millions instructions per seconds)

$$MIPS = \frac{IC}{ET \times 10^6} \quad \dots (1)$$

$$ET = IC \times CPI \times \left(\frac{1}{f} \right) \quad \dots (2)$$

← clock rate

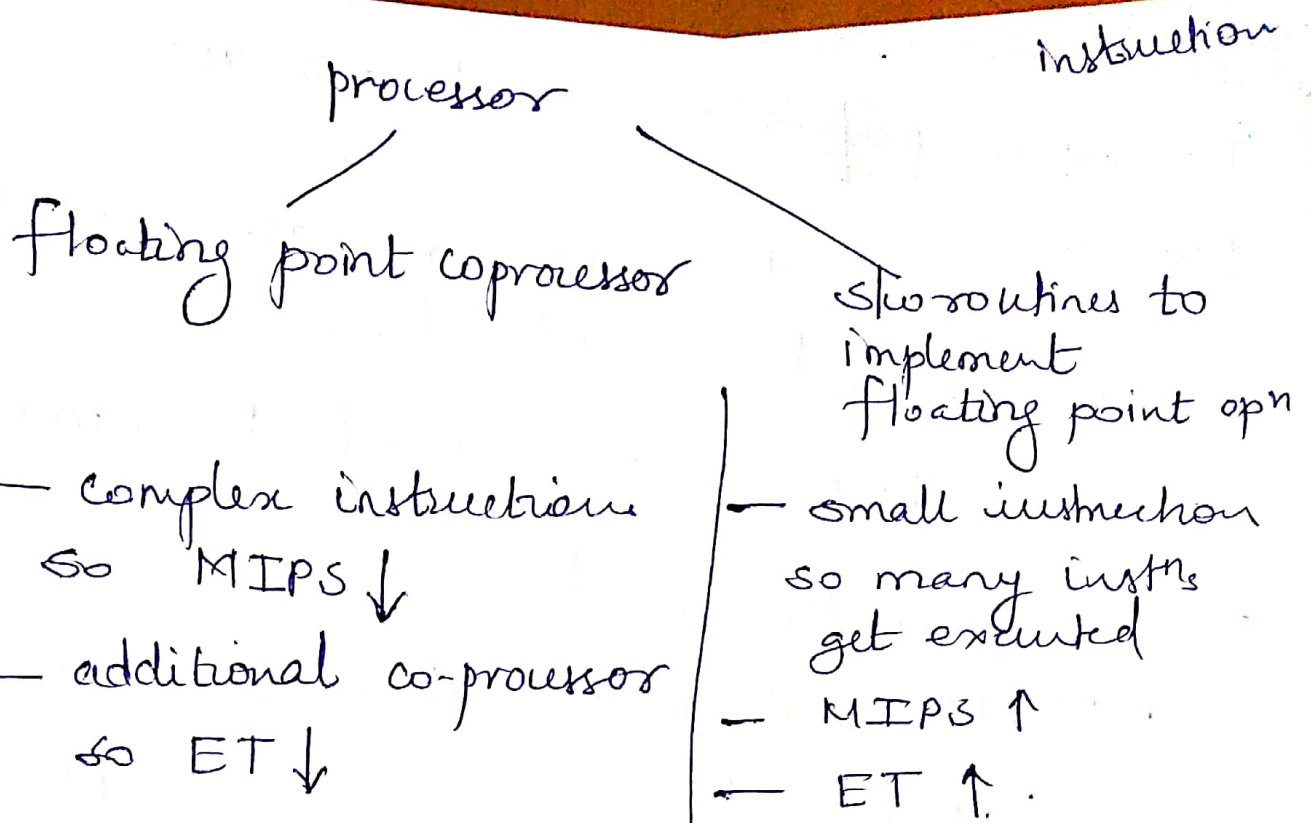
$$MIPS = \frac{\text{clock rate}}{CPI \times 10^6}$$

MIPS ↑ performance ↑

Not a good measure:

— It is dependent on the instruction set of the CPU, so it is difficult to compare, the MIPS ratings of processors with different instruction set.

— MIPS can vary inversely to performance.



⇒ MFLOPS (million floating point operations / second)

- No. of floating point operations executed per second
- More suitable for applications that involve lot of floating point computation.

Not suitable

- different rule implement different floating point operations.
- different floating point operations take different times.

eg Consider a processor with three instruction classes A, B and C with corresponding CPI values being 1, 2 & 3 respectively. The processor runs at a clock rate of 1GHz. For a given program written in C, two compiler produce the following executed instruction counts

	Instruction Count (in million)		
	I_{CA}	I_{CB}	I_{CC}
Compiler 1	7	2	1
Compiler 2	12	7	1

Compute the MIPS rating & the CPU time for the two program version.