Q1. What is Amadahl's Law? Does it can be used to find the maximum expected improvement of an overall system when only part of the system is improved?

Ans. Amadahl's law is used to find the maximum expected improvement to an overall system when only part of the system is parallelized. That is, the speedup of a program using multiple processors in parallel computing is limited by the ~~size~~ time needed for the sequential fraction of the program.

Amadahl's law states that if P is the proportion of a program that can be made parallel and (1-P) is the proportion that cannot be parallelized then the maximum speedup that can be achieved by using N processors is:

$$\text{SpeedUp}(P, N) = \frac{1}{(1-P) + \frac{P}{N}}$$

As N tends to infinity, the maximum speedup tends to $1/(1-P)$

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Q2. Total execution time of the program is be 50 seconds, 40 second consume to perform multiply operation. It is required to make the program run 5 times faster. By how much must the speed of the multiplier be improved?

Ans. We know that, Speed is inversely proportional to time $S \rightarrow \frac{1}{t}$

Execution time of the program → 50 sec
Time consumed for multiplication operation → 40s
Time consumed by other operation → (50 − 40) sec
= 10 sec

Now, to make it 5 time faster, time will decrease when speed increases.

So, time will be $\frac{1}{5}$ th of the original time, i.e. 20 sec

Therefore, time for Multiplication operation = (20 − 10)
= 10 sec

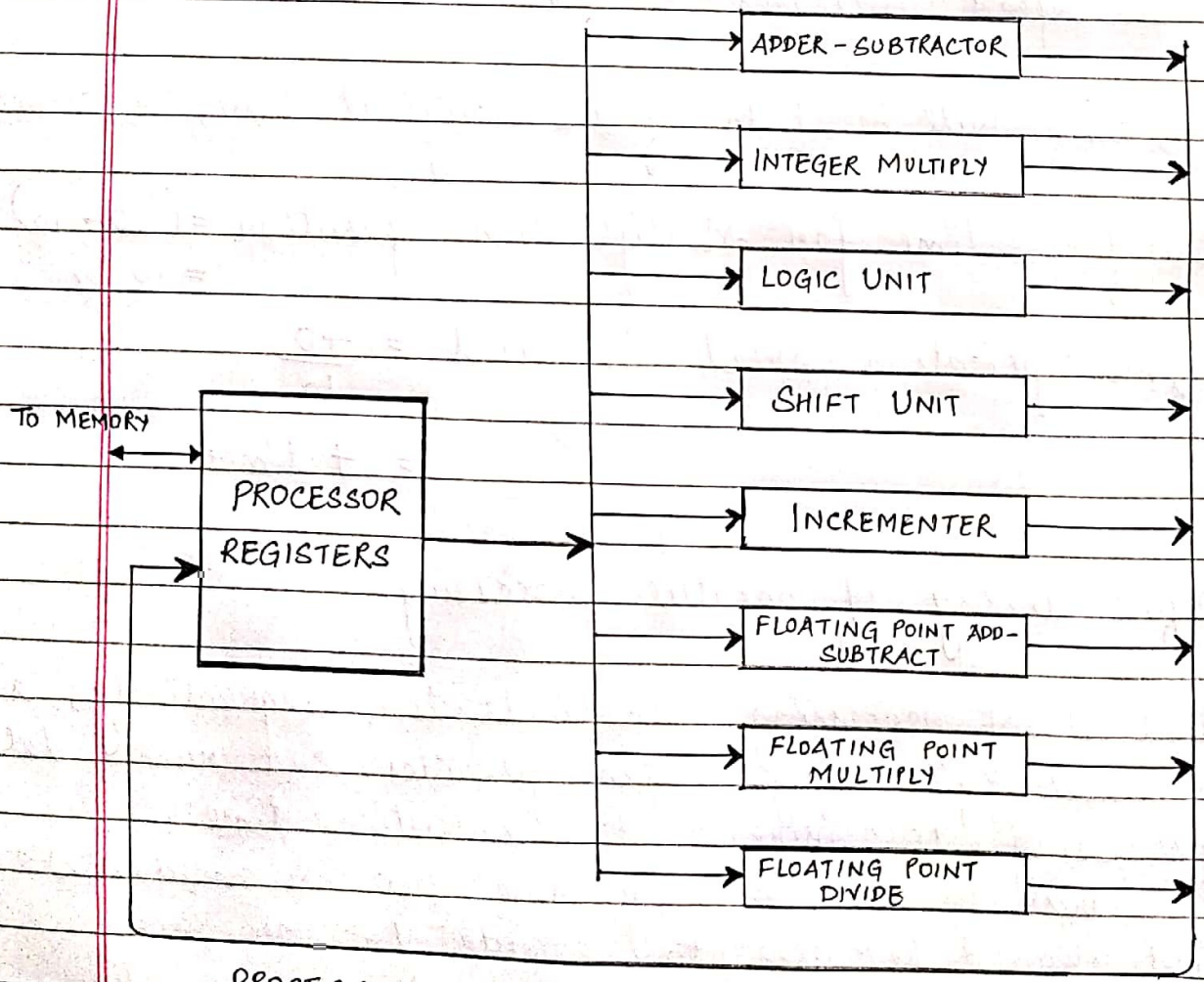
So, multiplication speed increased = $\frac{40}{10}$
= 4 times

Q3. Define theory of parallel processing.

Ans. Instead of processing each instruction sequentially, a parallel processing system provides concurrent data processing to increase the execution time. In this the system may have two or more ALU's and should be able to execute two or more instructions at the same time. The purpose of

parallel processing is to speed up the computer processing capability and increase its throughput.

Parallel processing can be viewed from various levels of complexity. At the lowest level, we distinguish between parallel and serial operations by the type of registers used. At the higher level of complexity, At the lowest level we distinguish between parallel and serial operations by the type of registers used. At the higher level of complexity, parallel processing can be achieved by using multiple functional units that perform many operations simultaneously.



PROCESSOR WITH MULTIPLE FUNCTIONAL UNITS