Distributed Computer systems
Chapter 1

* what's Digital computer system ?

- A digital computer (traditional von Neumann sequential computer) is a computing machine consists of a processor unit, associated memory, I/O interfaces and various buses connecting these devices.
- The digital computer is designed to be used by a single person, so it's called a personal computer (PC).
- The processor in this model is the single unit that responsible for processing or computing the different functions on the PC.

* what is operating systems?

- The operating system is a software program that manage hardware recourses of a single computer to perform specific process.

* what is the principle of processing in PC ?

- The principle of processing in the traditional computer is basically bassed on sequential processing / execution of the instructions by statements that solve the given problem

- The Processor handles all the functionalities through fetching, decoding, and executing a program's instructions sequentially.

- The Processor solves the instructions sequentially as written in the program, an instruction at a time

* What is limitations or problems in the Processing strategy of traditional Computer ?

- The Processing time for completing a job is relatively Proportional with the size of the Problem.

- As the problem size increases, as the Processing time to finish the job increases.

- At a time the PC will not sufficient to perform a large application

* Solution of limitation of Problems ?

- To increase the Processing Power and satisfying the discribed needs use:
- Computers with more speeds.
- Multi Core Processor system.
- Multi Processor / Multi Computer system (Parallel Computer).
- Distributed Computer systems.

[3]

How to increase Computer speed ?

- The processing power of computers is usually measured by speed, one way to increase it is to use faster electronic component
- This solution is limited because the computer speed is limited by the speed of electron

what is multicore ?

- The execution unit of the CPU is called the core and when a CPU has more than one core, it's called a multicore

- CPU with two cores is called dual-core processor
- ~ ~ four cores ~ ~ quad-core ~

The main advantages of multicore ?

- It's capable of processing multiple instructions simultaneously on separate cores
- It increases the overall speed and implements parallel computing
- Reduce power consumption
- More reliable than uniprocessor

what is Parallel Computer system ?

- A common way of satisfying the processing needs is to use parallel computer (multiprocessor or multicomputer) system
- It consists of two or more processing units which are operating more or less independently in parallel
- These systems excute multiple instructions at the same time and increases throughput, so multiprocessors are more reliable than multicore system

4

* How Parallel Computer increase Processing Power?
- A problem can be devided into n sub-problems where n is the number of available processing units
- Each one of the problem will be solved by one of the processing units concurrently

* What is the difference between multicore and multiprocessor

multi core	multiprocessor
A single CPU with multiple excution units	A system that has two or more CPUs
Excutes a single program faster	Excutes a multiple program faster
Have less traffic because all cores are integrated into a single chip	more reliable than multicore systems

* what are the relationship between multicore and multiprocessor
- Latest Parallel Computers have multiple CPUs each with multiple cores to read and excute several instructions at a time

* what is Parallel Processing / Computing?
- The general idea for Parallel Processing is to distribute computation among processors or split the job into tasks and excute these tasks concurrently on different processors.

5

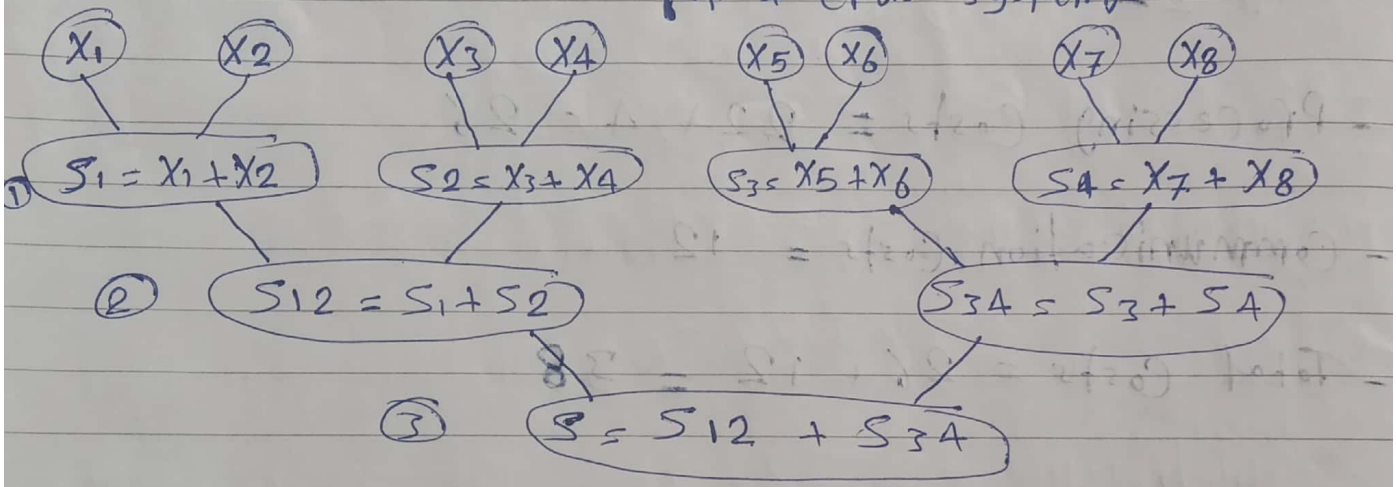
☆ Discrib how parallel processing may be done ?

EX: $S = X_1 + X_2 + X_3 + X_4 + X_5 + X_6 + X_7 + X_8$

- For uniprocessor system it takes 7 steps

① $S = X_1 + X_2$ ② $S = S + X_3$ ③ $S = S + X_4$
④ $S = S + X_5$ ⑤ $S = S + X_6$ ⑦ $S = S + X_7$ ⑧ $S = S + X_8$

- For multiple processing system it takes 3 steps (if 4 CPUs system)



3 steps

☆ what is distributed system ?

- A collection of independent computers interconnected by a communication network, coordinate their actions only by message passing and apear to its users as a single coherent system

☆ what is distributed processing ?

- The exution of processes across the distributed system to collaboratively achieve a common goal

6

* What are Phases for Computing a job on an distributed system
- Phase I : The master initially investigates the resource status of the slaves, devides the job into a number of tasks and distribute the tasks onto the slaves according to the resources availability

- Phase II: Each Computer excutes processes allocated by master

- Phase III: The master Computer collects partial results from the slaves and computes the final result

* What is Popularity of distributed Computing systems ?
- Information sharing among users
- Resource sharing
- Better price-berformence Ratio
- Better response time and throughput
- Better flexibility in meeting users' need
- Higher reliability

* What is drawbacks of distributed computing systems?
- Software shortage and ~~complexability~~ complexity
- More complicated failure diagnosis
- Security weaknesses
- Loss of flexibility
- Data incompatibility
- Dependency on network reliability and performance