Operating System

Unit - 1

Solution of Last five Year
Questions asked in AKTU.

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Solution of last 5 year question asked in AKTU, external examination.

Q.1 Describe the difference between symmetric and asymmetric multiprocessing. [2014-15] [5 marks.]

Sol⁽ⁿ⁾.

Symmetric Multiprocessing	Asymmetric Multiprocessing
• All the processors are treated equally	• The processors are not treated equally
• Task of the operating system are done in dividual processor	• Task of the operating system are done by master processor
• All processer communicate with another processor by a shared memory	• No communication between processors as they are controlled by the master processor
• It isnot cheaper as compaire to asymmetric multiprocessing.	• It is cheaper as compare to symmetric multiprocessing
• It is complex to design.	• It is easier to design.

Q.2. Discuss the various Operating system Components. [2014-15] [5 marks] [2017-18] [7 marks]

Sol^(n) Operating System have the following components –

1- Process Management
2- Main memory management
3- file management
4- Secondary memory management
5- I/O system management
6- Networking
7- Protection system
8- Command interpreter system

All the above mentioned is a important component of operating system. Process management is concern about process execution or synchronization where as main memory management is all about RAM management and secondary storage management is all about Disk management.
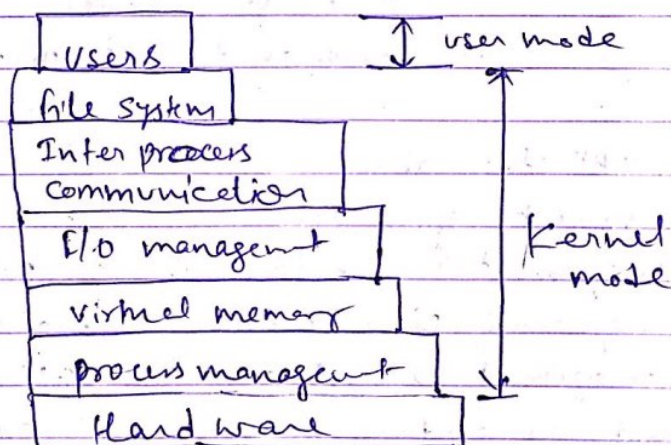
Q.3. Explain the layered architecture of Operating System also explain the advantage and disadvantage of layered design. [2014-15] [5 Marks] [2017-18] [7 marks]

Sol^(n). This approach (layered) breaks up the operating system into different layers.

• This allows implementers to change the

inner working, and increases modularity.

- As long as the external interface of the routines don't change, developers have more freedom to change the inner working of the routines.

- With the layed approach, the bottom layer is the hardware, while the highest layer is the user interface.

```
          ┌─────────┐          ↑ user mode
          │ Users   │          ↕
          ├─────────┤
          │ file System │
          ├───────────────┤
          │ Inter process │
          │ Communication │
          ├─────────────────┤       Kernel
          │ f/o managent   │        mode
          ├───────────────────┤
          │ virtual memory  │
          ├─────────────────────┤
          │ process managent │      ↕
          ├───────────────────────┤
          │ Hardware         │
          └───────────────────────┘
```

[fig: layered approach of O.S.]

- The main advantage — simplicity of construction and debugging

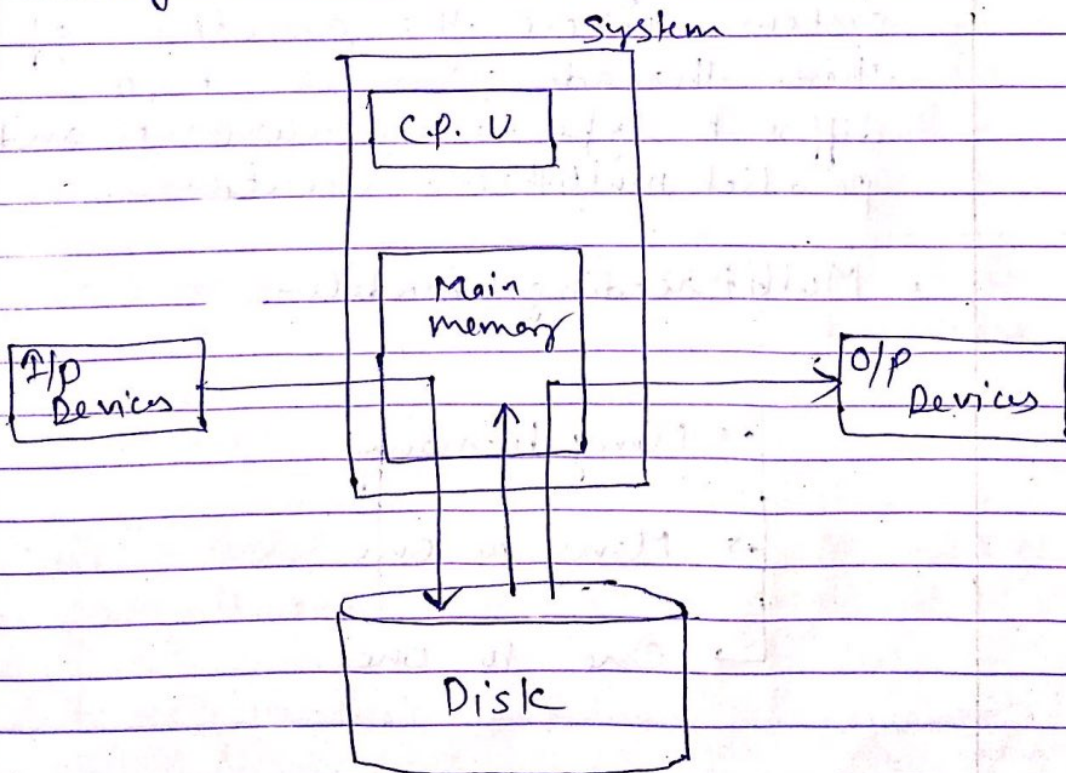- The main disadvantage — O.S. tends to be less efficient than other implementation.

Q. 4. What is spooling ... [2014-15] [5marks] [2015-16] [2 marks]

Sol⁽ⁿ⁾:

Spooling: Spooling stands for "Simultaneous Peripheral Operations Online."

• so, in a spooling, more than one I/O operations can be performed simultaneously i.e. at the time when C.P.U. is executing some process then more than one I/O operations can also be done at the same time.

• The following diagram image will helps us in understanding the concept in a better way —

System

```
          ┌─────────────────┐
          │   ┌─────────┐   │
          │   │  C.P. U │   │
          │   └─────────┘   │
          │                 │
┌───────┐ │   ┌─────────┐   │ ┌───────┐
│ I/p   │ │   │  Main   │   │ │ O/p   │
│Devices│─┼──→│ memory  │──→┼→│Devices│
└───────┘ │   └─────────┘   │ └───────┘
          └─────────────────┘
               │     ↑
               ↓     │
            ╭─────────────╮
            │    Disk     │
            ╰─────────────╯
```

[fig: Spooling]

Q.5. Write a brief multiprocessor scheduling.
[2015-16] [2 marks]

Sol⁽ⁿ⁾.

In the multiprocessor schedling, there are multiple CPU's which share the load so that various process run simultaneously. In general, the multiprocessor scheduling is complex as compared to single processor scheduling.

Q.6. Define multithreading.   [2015-16] [2 marks]

Sol⁽ⁿ⁾.
- Multithreading is the phenomenon of executing more thread in the system, where the execution of these threads can be two different types, as concurrent and parallel multithread executions.

- Multithreading models—

    → Many to many

    → Many to one

    → One to one

Q. 7. What do you mean by kernel, Describe monolithic and microkernel structure of operating system.

[2016-17] [10 Marks] [2015-16] [2 Marks] [2018-19] [7 marks]

80/⊕.

__Kernel__ : A kernel is the central part of an Operating System. It manages the operations of the computer and the hardware, most notably memory and C.P.U.
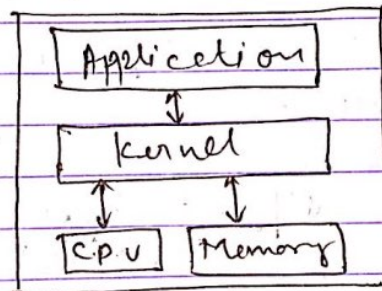
[fig: Kernel]

Monolithic Kernel	Micro kernel
• It is larger than micro kernel	• Microkernel is smaller in size
• fast execution	• Slow execution
• If the service crashes, the whole system crashes	• If the service crashes, it does not effect whole system.
• To write monolithic kernel less code is required	• To write microkernel, more code is required.

Q. 8. Explain thread. [2016-17] [2 marks]

Sol⁰

Thread :- Thread is the smallest unit of executable code that performs a particular task.

- An application can be divided into multiple task and each task can be assigned to a thread.

- It is also define as light weight process.
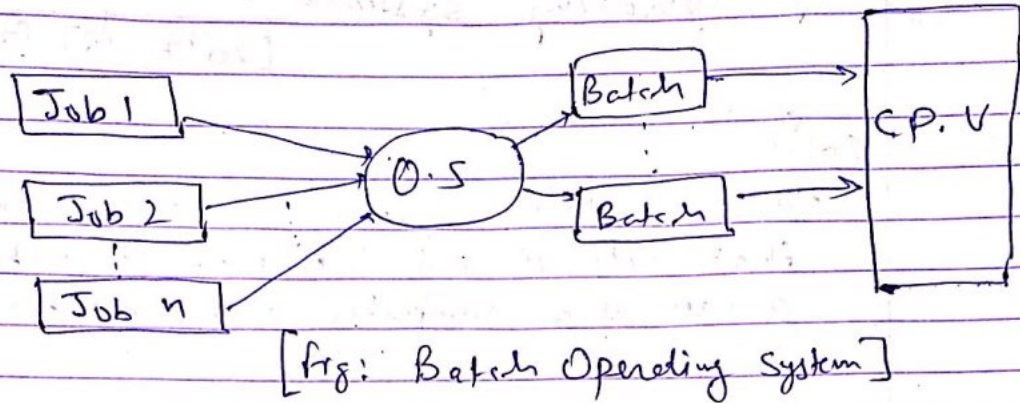
Q. 9. Write down different types of operating System. [2016-17] [10 Marks]

Sol⁰. There are many types of Operating system —

→ Batch Operating System

→ Multiprogrammed Operating System

→ Multitasking Operating System

→ Multiprocessing Operating system
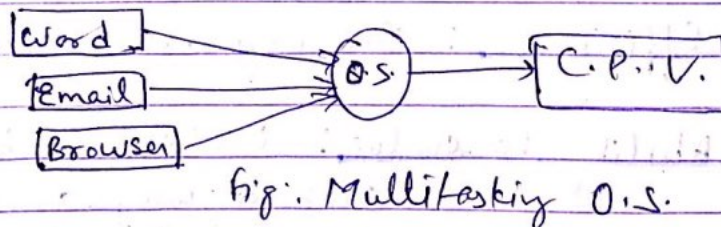
↳ Real time Operating system.
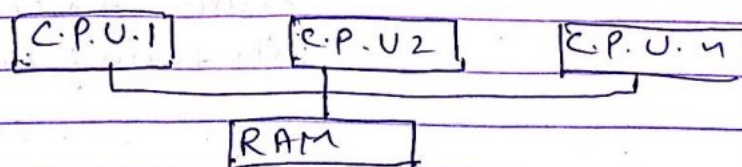
Batch Operating System:

[fig: Batch Operating System]

Multiprogram Operating System:

RAM

[fig: Multiprogram O.S.]
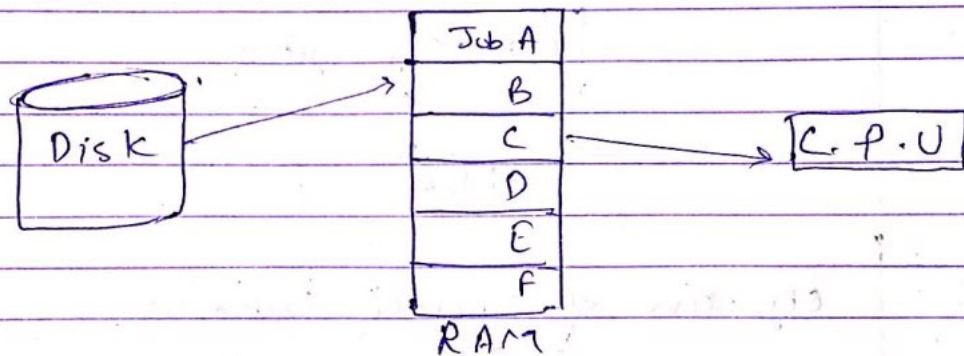
Multitasking Operating System:

fig: Multitasking O.S.

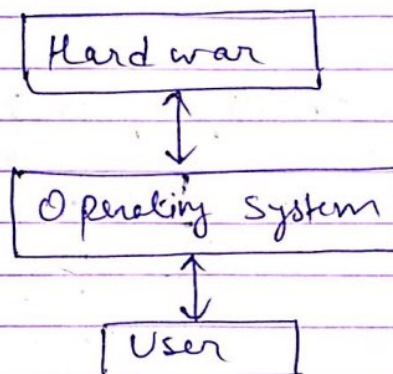## Multiprocessing Operating System:

| C.P.U.1 | C.P.U2 | C.P.U.n |

RAM

Q. 10. Define Operating System. list the objective of Operating system.

Sol⁰.

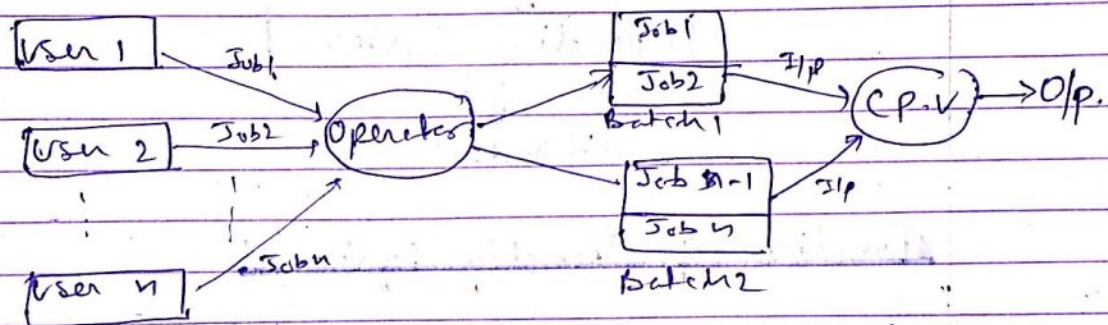- An operating system is a program that acts as an intermediate between a user of a computer and computer hardware.

```
┌─────────────────┐
│   Hard war      │
└─────────────────┘
        ↕
┌─────────────────┐
│ Operating System│
└─────────────────┘
        ↕
┌─────────────────┐
│   User          │
└─────────────────┘
```

Objective of Operatiy System —

1. **Convenience** : OS make computer more easy to use.

2. **Efficieny** : O.s. uses all resources efficiently.

3. **Ability to evolve** : O.s. should be constructed such a way as to permit the effective development, testing, and introduction of new system functions without interfering with services.

8.11 Explain the Batch Operating System with example.   [2018-19] [7 marks]

Sol^(n).

Batch Operating System : This type of O.S does not interact with the computer directly. There is an operator which takes similar jobs having same requirement and group them into batches.

[Fig: Batch Operating System]

Advantages of Batch O.S. :

* Multiple users can share the Batch system
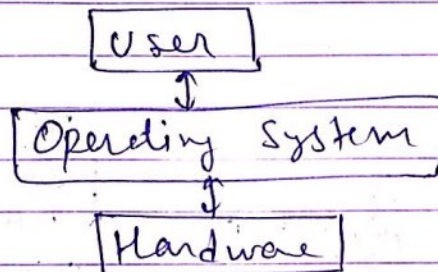* The idle time for Batch system is very less.

Disadvantages of Batch O.S. :

* Batch system are hard to debug
* It is sometime costly

Q.12 Define Operating System. Describe the Operating System functions.

[2018-19] [7 marks]

Sol⁽ᵐ⁾

- An operating system is program that act as an intermediate between a user of a computer and computer hardware.

```
        ┌──────────┐
        │   User   │
        └──────────┘
             ↕
   ┌────────────────────┐
   │ Operating System   │
   └────────────────────┘
             ↕
      ┌────────────┐
      │ Hardware   │
      └────────────┘
```

function of Operating System :

Operating System have following functions —

→ Resource Management

→ Memory Management

→ I/p, O/p Management

→ File Management

→ Security Management

→ Command Interpreter