Programme : Bachelor of Science (Second Year)
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Paper Title : Computer Organization & Operating Systems
Unit V : Introduction to Operating systems
Module Name : Types of Operating System – Operating Systems for Personal Computers and
Workstations, Process Control & Real Time Systems
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<u>Notes</u>

✓ **<u>Operating Systems for Personal Computers and Workstations</u>**

➢ The PC operating system is designed for maximizing user convenience and responsiveness.

➢ This system is neither multi-user nor multitasking.

➢ Personal computer operating systems are widely used for word processing, spreadsheets and Internet access.

➢ Some personal computer operating system has been ported to more advanced hardware, and now includes new features such as virtual memory and multitasking.

✓ **<u>Personal Computers Systems & Workstations : Advantages</u>**

▪ Multitasking

▪ Speed

▪ Stores huge data

▪ Accuracy

▪ Data Security

▪ Communication

▪ Reduces work load

▪ Reliability

✓ **<u>Personal Computers Systems & Workstations : Disadvantages</u>**

▪ Virus and hacking attacks

▪ High cost

▪ Complexity

- If the process needs more space than it was allocated, it will cause insufficient storage space (Fragmentation)

✓ Real-Time Operating Systems

➢ A real-time operating system is a multitasking operating system intended for applications with fixed deadlines (real-time computing).

➢ Such applications include some small embedded systems, automobile engine controllers, industrial robots, spacecraft, industrial control, and some large-scale computing systems.

➢ Used when there are rigid time requirements on the operation of a processor or flow of data & thus used as a control device in a dedicated application.

➢ It is considered to function correctly only if it returns correct result within any time constraints.

➢ The real time operating system can be classified into two categories:

1. Hard real time system

• A hard real-time system guarantees that critical tasks be completed on time.

• This goal requires that all delays in the system be bounded, from the retrieval of stored data to the time that it takes the operating system to finish any request made of it.

• Such time constraints dictate the facilities that are available in hard real-time systems.

2. Soft real time system

➢ A soft real-time system is a less restrictive type of real-time system.

➢ Here, a critical real-time task gets priority over other tasks and retains that priority until it completes.

➢ Soft real time system can be mixed with other types of systems.

➢ Due to less restriction, they are risky to use for industrial control and robotics.

✓ Real-Time Operating Systems : Advantages

- Run time facilities i.e. provision of kernel services

- Task scheduling and shifting

- Deterministic behaviour

- Inter-task communication

- Maximum Consumption

- Error Free

- Task can have priority

- Scalable

- Portable

- Provision for interrupts

✓ **Real-Time Operating Systems : Disadvantages**

- License

- Supplier stability/ longevity

- Sometimes cost is more

- Availability of Development tools

- Low support for variety of peripheral devices

- Low Protection and Security mechanisms

- Low multi-tasking

- Limited Tasks

- Multiple Users

- Multiple Modes

- Not easy to program