

NDIIT

NEW DELHI INSTITUTE FOR INFORMATION
TECHNOLOGY AND MANAGEMENT

ASSIGNMENT: OPERATING SYSTEM

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Operating system overview

QUES.1-How Buffering can improve the performance of a Computer system?

ANSWER-

- 1) While data is being moved from one place to another, Data buffer comes into play as it holds the data and stores it in the physical memory for short amount out time
- 2) Buffers are often used in conjunction with disk drives, networks or in speaker which enables the most efficient access to the data and also improves the performance.
- 3) Video cards send images to a buffer before they are displayed on the screen which is also called as Screen Buffer.
- 4) Computer programs also make use of buffer while running the code

QUES.2-What are the primary differences between Network Operating System and Distributed Operating System?

ANSWER-

The difference between “Network Operating System” and “Distributed Operating System” is being divided into three parts: -

- Objectives
- Communication
- Ease of use

The following difference is being shown below:

Basis	Network Operating system	Distributed Operating system
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Objective	To provide the local services to remote client.	To manage the hardware resources.
Communication	Communication takes place on the basis of files.	Communication takes place on the basis of messages and shared memory.
Ease	Implementation is high	implementation is less.

QUES.3-What inconveniences that a user can face while interacting with a computer system, which is without an operating system?

ANSWER-

- 1) Operating system is just like the soul of the computer beings, a being without its soul is a dead being.
- 2) Just a bit of a difference that a computer being runs through programs and is a live being with a brain that only understands the machine language, which is for us is next to impossible to learn and work on it.

Operating systems Process

QUES.-1-What is the Difference between a Job and a Process?

ANSWER-

The difference between “Job” and “Process” is being divided into three parts: -

- Meaning
- Existence
- Work

The following difference is being shown below: -

Basis	Job	Process
Meaning	Set of processes	It's an Instance of the program which is being executed.
Existence	It's a concept commonly used by shell.	An Instance of an application at execution.
work	It is usually associated with batch systems.	Its process consists of one or more threads, which are the unit of scheduling, and consist of some subset of a process.

QUES.2-What are the advantages of multiprogramming?

ANSWER-

Advantages of Multiprogramming are shown as below: -

- 1) It increases CPU utilization.
- 2) It maximizes the total job throughput of a computer.
- 3) more than one Job residential in main memory.
- 4) It has ability to execute more than one process on a single processor.
- 5) It decreases total read time needed to execute a job. 6) More reliable.
- 7) Multiple users can work.
- 8) Less expensive.

QUES.3-What are the advantages of Multiprocessing or Parallel System?

ANSWER-

Advantages of Multiprocessing are shown as below: -

- 1) **Increased Throughput** – By increasing the number of processors, more work can be completed in a unit time.
- 2) **Increased Reliability** – In this system, as the workload is distributed among several processors which results in increased reliability.
 - If one processor fails then its failure may slightly slow down the speed of the system but system will work smoothly

3) **Cost Saving** – Parallel system shares the memory, buses, peripherals etc.

- Multiprocessor system thus saves money as compared to multiple single systems.
- Also, if a number of programs are to operate on the same data, it is cheaper to store that data on one single disk and shared by all processors instead of using many copies of the same data.

Operating systems Types

QUES.1-What are the differences between Batch processing system and Real Time Processing System?

ANSWER-

The difference between “Batch processing system” and “Real Time Processing System” is being divided into three parts: -

- Meaning
- Cost
- Sorting
- Transactions
- Timing

The following difference is being shown below: -

Basis	Batch processing system	Real Time Processing System
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Meaning	Jobs with similar requirements are batched together and run through the computer as a group	In this system, events mostly external to computer system are accepted and processed within certain deadlines.
Cost	It provides most economical and simplest processing method for business applications.	Complex and costly processing requires unique hardware and software to handle complex operating system programs.

Basis	Batch processing system	Real Time Processing System
Sorting	In this system sorting is performed before processing.	No sorting is required.
Transactions	Transactions are batch processed and periodically.	Transactions are processed as and when they occur.
Timing	Transactions are batch processed and periodically.	Transactions are processed as and when they occur.

QUES.2-What are the differences between Real Time System and Timesharing System?

ANSWER-

The difference between “Real Time System” and “Timesharing System” is being divided into three parts: -

- Meaning
- Applications
- Permissions
- Time Limit
- Context Switching

The following difference is being shown below: -

Basis	Batch processing system	Real Time Processing System
Meaning	In this system, events mostly external to computer system are accepted and processed within certain deadlines.	In this system, many users are allowed to simultaneously share the computer resources.
Applications	Real time processing is mainly devoted to one application.	Time sharing processing deals with many different applications.

Permissions	User can make inquiry only and cannot write or modify programs.	Users can write and modify programs.
Time Limit	User must get a response within the specified time limit; otherwise it may result in a disaster.	User should get a response within fractions of seconds but if not, the results are not disastrous.

Basis	Batch processing system	Real Time Processing System
Context Switching	No context switching takes place in this system.	The CPU switches from one process to another as a time slice expires or a process terminates.

QUES.3-What are the differences between Multiprocessing and Multiprogramming?

ANSWER-

The difference between “Multiprocessing” and “Multiprogramming” is being divided into three parts: -

- Meaning
- CPU Utilisation
- Process

- Time
- Efficiency
- Cost

The following difference is being shown below: -

Basis	Multiprocessing	Multiprogramming
Meaning	Multiprocessing refers to processing of multiple processes at same time by multiple CPUs.	Multiprogramming keeps several programs in main memory at the same time and execute them concurrently utilizing single CPU.
CPU Utilisation	It utilizes multiple CPUs.	It utilizes single CPU.
Process	It permits parallel processing.	Context switching takes place.
Time	Less time taken to process the jobs.	More Time taken to process the jobs.

Efficiency	It facilitates much efficient utilization of devices of the computer system.	Less efficient than multiprocessing.
Cost	Usually more expensive.	Such systems are less expensive.

Operating systems Process

Scheduling

QUES.1-What is Shortest Remaining Time (SRT) scheduling?

ANSWER-

- 1) Shortest remaining time, also known as shortest remaining time first (SRTF), is a scheduling method that is a pre-emptive version of shortest job next scheduling.
- 2) In this scheduling algorithm, the process with the smallest amount of time remaining until completion is selected to execute.

QUES.2-What is Highest Response Ratio Next (HRN) Scheduling?

ANSWER-

- 1) Given “n” processes with their Arrival times and Burst times, the task is to find average waiting time and average turn around time using HRRN scheduling algorithm.
- 2) The name itself states that we need to find the response ratio of all available processes and select the one with the highest Response Ratio.
- 3) A process once selected will run till completion.
- 4) Performance of HRRN –
 - Shorter Processes are favoured.
 - Aging without service increases ratio, longer jobs can get past shorter jobs.

QUES.3-What are the different principles which must be considered while selection of a scheduling algorithm?

ANSWER-

The principle which should be kept in view while selecting a scheduling policy are the following –

- 1) Fairness – All processes should be treated the same. No process should suffer indefinite postponement.
- 2) Maximize throughput – Attain maximum throughput. The largest possible number of processes per unit time should be serviced.
- 3) Predictability – A given job should run in about the same predictable amount of time and at about the same cost irrespective of the load on the system.

- 4) Maximum resource usage – The system resources should be kept busy. Indefinite postponement should be avoided by enforcing priorities.
- 5) Controlled Time – There should be control over the different times
- 6) Response time
- 7) Turnaround time
- 8) Waiting time

Operating Systems Memory

Allocation

QUES.1-What are the differences between Paging and Segmentation?

ANSWER-

The difference between “Paging” and “Segmentation” is being divided into three parts: -

- Meaning
- Speed
- Memory Size
- Accountability
- Logical Address
- Data Storage

The following difference is being shown below: -

Basis	Paging	Segmentation
Meaning	Paging is a memory management technique in which process address space is broken into blocks of the same size called pages	Segmentation is a memory management technique in which each job is divided into several segments of different sizes, one for each module that contains pieces that perform related functions.
Basis	Paging	Segmentation
Speed	Paging technique is faster in terms of memory access.	Segmentation is slower than paging.
Memory Size	In Paging, a process address space is broken into fixed sized blocks called pages.	In Segmentation, a process address space is broken in varying sized blocks called sections.
Accountability	Operating System divides the memory into pages.	Compiler is responsible to calculate the segment size, the virtual address and actual address.
Logical Address	During paging, a logical address is divided into page number and page offset.	During segmentation, a logical address is divided into section number and section offset.

Data Storage	Page table stores the page data.	Segmentation table stores the segmentation data.
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QUES.2-Explain various allocation algorithms?

ANSWER-

Various allocation algorithms are: -

- First Fit
 - * In the first fit approach is to allocate the first free partition or hole large enough which can accommodate the process. It finishes after finding the first suitable free partition.
- Best Fit
 - * The best fit deals with allocating the smallest free partition which meets the requirement of the requesting process. This algorithm first searches the entire list of free partitions and considers the smallest hole that is adequate. It then tries to find a hole which is close to actual process size needed.
- Worst Fit
 - * In worst fit approach is to locate largest available free portion so that the portion left will be big enough to be useful. It is the reverse of best fit.
- Next Fit

- * Next fit is a modified version of first fit. It begins as first fit to find a free partition. When called next time it starts searching from where it left off, not from the beginning.

Algorithms	Advantages	Disadvantages
First Fit	Fastest algorithm because it searches as little as possible.	The remaining unused memory areas left after allocation become waste if it is too smaller. Thus request for larger memory requirement cannot be accomplished.
Best Fit	Memory utilization is much better than first fit as it searches the smallest free partition first available.	It is slower and may even tend to fill up memory with tiny useless holes.
Worst Fit	It is slower and may even tend to fill up memory with tiny useless holes.	If a process requiring larger memory arrives at a later stage then it cannot be accommodated as the largest hole is already split and occupied.

QUES.3-When does a page fault occur? Explain various page replacement strategies/algorithms?

ANSWER-

- 1) A page fault occurs when a page referenced by the CPU is not found in the main memory.
- 2) The required page has to be brought from the secondary memory into the main memory.
- 3) A page has to be replaced if all the frames of main memory are already occupied.
- 4) Page replacement is required when-
 - * All the frames of main memory are already occupied.
 - * Thus, a page has to be replaced to create a room for the required page.

Page Replacement Algorithms-

Page replacement algorithms help to decide which page must be swapped out from the main memory to create a room for the incoming page.

Various page replacement algorithms are-

1) FIFO Page Replacement Algorithm

- * As the name suggests, this algorithm works on the principle of "First in First out".
- * It replaces the oldest page that has been present in the main memory for the longest time.
- * It is implemented by keeping track of all the pages in a queue.

2) LIFO Page Replacement Algorithm

- * As the name suggests, this algorithm works on the principle of "Last in First out".

- * It replaces the newest page that arrived at last in the main memory.
- * It is implemented by keeping track of all the pages in a stack.

3) LRU Page Replacement Algorithm

- * As the name suggests, this algorithm works on the principle of "Least Recently Used".
- * It replaces the page that has not been referred by the CPU for the longest time.

4) Optimal Page Replacement Algorithm

- * This algorithm replaces the page that will not be referred by the CPU in future for the longest time. It is practically impossible to implement this algorithm.
- * This is because the pages that will not be used in future for the longest time cannot be predicted. However, it is the best known algorithm and gives the least number of page faults.
- * Hence, it is used as a performance measure criterion for other algorithms.

5) Random Page Replacement Algorithm

- * As the name suggests, this algorithm randomly replaces any page.
- * So, this algorithm may behave like any other algorithm like FIFO, LIFO, LRU, Optimal etc.

