S.K.Chaudhary Educational Trust's

Shankara Institute Of Technology

Subject : Operating system

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Assignment

Operating Systems Overview

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

Ans- A buffer contains data that is stored for a short amount of time, typically in the computer's memory (RAM). The purpose of a buffer is to hold data right before it is used.

Buffering is used to improve several other areas of computer performance as well. Most hard disks use a buffer to enable more efficient access to the data on the disk. Video cards send images to a buffer before they are displayed on the screen (known as a screen buffer).
Computer programs use buffers to store data while they are running.

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

Ans- Difference between Network Operating System and Distributed Operating System

Basis	***Network Operating system***	***Distributed Operating system***
Objective	*1.Network Operating System's main objective is to provide the local services to remote client.*	*Distributed Operating System's main objective is to manage the hardware resources.*
Communication	*In Network Operating System, Communication takes place on the basis of files.*	*In Distributed Operating System, Communication takes place on the basis of messages and shared memory.*
Ease	*Ease of implementation in Network Operating System is also high.*	*Distributed Operating System Ease of implementation is less.*

3. What inconveniences that a user can face while interacting with a computer system,

which is without an operating system?

Ans- Operating system is a required component of the computer system.

Without an operating system computer hardware is only an inactive electronic machine, which is inconvenient to user for execution of programs.As the computer hardware or machine understands only the machine language. It is difficult to develop each and every program in machine language in order to execute it.

Thus without operating system execution of user program or to solve user problems is extremely difficult.

Operating Systems Process

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

Ans-

Basis	Job	Process
Meaning	A "job" often means a set of processes	a process is an instance of a program that is being executed
Existance	A job is a concept used by the shell	Process is an instance of an application in execution .
work	A job is a unit of work that has been submitted by user.It is usually associated with batch systems.	process consists of one or more threads, which are the unit of scheduling, and consist of some subset of a process .

2.What are the advantages of multiprogramming?

Ans- Advantages of multiprogramming operating system:-

i)It increases CPU utilization.

ii)It decreases total read time needed to execute a job.

iii)It maximizes the total job throughput of a computer.

iv)It has ability to execute more than one process on a single processor. v)more than one Job residential in main memory.

vi)Multiple users can work. vii)less expensive. viii)More reliable

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

Ans- Answer: Multiprocessing operating system or the parallel system support the use of more than one processor in close communication.

The advantages of the multiprocessing system are:

1. Increased Throughput − By increasing the number of processors, more work can be completed in a unit time.

2. 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.

3. 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.

Operating Systems Types

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

Ans- Difference between Batch processing operating system and Real Time operating system are:

Basis	Batch processing operating system	Real Time operating system
Meaning	In batch processing processor only needs to busy when work is assigned to it.	In real time processing processor needs to very responsive and active all the time.
Timing	Completion time is not critical in batch processing.	Time to complete the task is very critical in real-time
Complexity	It provides most economical and simplest processing method for business applications.	Complex and costly processing requires unique hardware and software to handle complex operating
Limit	In this processing there is no time limit.	It has to handle a process within the specified time limit otherwise the system fails.
Example	Examples of batch processing are transactions of credit cards, generation of bills,etc.	Examples of real-time processing are bank ATM transactions, customer services,etc.

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

Ans-Difference between Real Time System and Time sharing system are:-

Basis	Real Time System	Time sharing system
Events	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.

Dealing	Real time processing is mainly devoted to one application.	Time sharing processing deals with many different applications.
Modification	User can make inquiry only and cannot write or modify programs.	Users can write and modify programs.
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.

3. **What are the differences between multiprocessing and multiprogramming?**

Ans- Difference between multiprocessing and multiprogramming are:-

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
Uses of processor	Multiprocessing is the use of two or more CPUs (processors) within a single Computer system. The term also refers to the ability of a system to support more than one processor within a single computer system.	In a non multi programmed system, As soon as one job leaves the CPU and goes for some other task the CPU becomes idle. The CPU keeps waiting and waiting until this job comes back and resumes its execution with the CPU.
Requirement	It utilizes multiple CPUs.	It utilizes single CPU.
Feature	A computer using more than one CPU at a time.	A Computer running more than one program at a time (like running Excel and Firefox simultaneously
Time consume	Less time taken to process the jobs.	More Time taken to process the jobs.

Operating Systems Process Scheduling

1. What is Shortest Remaining Time, SRT scheduling?

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

1.calcurate Average Turnaround and Average eating time

Process id	Arrival Time	Burst Time
p1	0	7
p2	1	5
p3	2	3
p4	3	1
p5	4	2
p6	5	1

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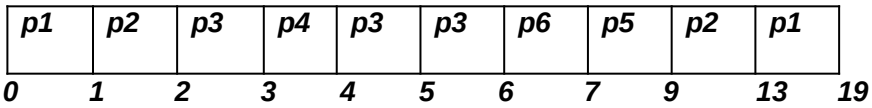
Process id	Arrival Time	Bursto Time	Completion Time	(Completion Time - Arrival time) Average Turnar ound Time
p1	0	7	19	19
p2	1	5	13	12
p3	2	3	6	4
p4	3	1	4	1

p5	**4**	**2**	**9**	**5**
p6	5	1	7	2
total			58	7.16

Ghantt chart:-



Q2 What is Highest Response Ratio Next (HRN) Scheduling?

***A*ns- 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.**

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. A process once selected will run till completion.

Performance of HRRN –

1.Shorter Processes are favoured.

2.Aging without service increases ratio, longer jobs can get past shorter jobs.

***Q3* What are the different principles which must be considered while selection of a scheduling algorithm?**

Ans- 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 Allocator

1. **What are the differences between paging and segmentation?**

Ans- Difference between paging and segmentation are:-

Basis	paging	Segmentation
Defination	Paging is a memory management technique in which process address space is broken into blocks of the same size called pages . Similarly, main memory is divided into small fixed-sized blocks of (physical) memory called frames .	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.
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.
Size	Page size is determined by available memory.	Section size is determined by the user.
Speed	Paging technique is faster in terms of memory access.	Segmentation is slower than paging.

Fragmentation	Paging can cause internal fragmentation as some pages may go underutilized.	Segmentation can cause external fragmentation as some memory block may not be used at all.
Data storage	Page table stores the page data.	Segmentation table stores the segmentation data.

2.Explain various allocation algorithms.

Ans- Various allocation algorithms are:-

1.First Fit 3.Worst fit

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2.Best fit 4.worst fir

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.

Advantage:-

Fastest algorithm because it searches as little as

possible. Disadvantage:-

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

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.

Advantage:-

Memory utilization is much better than first fit as it searches the smallest free partition first available.

Disadvantage:-

It is slower and may even tend to fill up memory with tiny useless holes.

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.

Advantage:-

Reduces the rate of production of small gaps.

Disadvantage:-

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.

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.

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

*Ans- * A page fault occurs when a page referenced by the CPU is not found in the main memory.*

* *The required page has to be brought from the secondary memory into the main memory.*
* *A page has to be replaced if all the frames of main memory are already occupied.*

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-

FIFO Page Replacement Algorithm

LIFO Page Replacement Algorithm

LRU Page Replacement Algorithm

Optimal Page Replacement Algorithm

..... Random Page Replacement Algorithm

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.

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.

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.

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 can not 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.

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.

Thankyou