

Department Of Computer Science  
Rollwala Computer Centre  
Gujarat University

MCA - III

**Subject: - Operating System (OS)**

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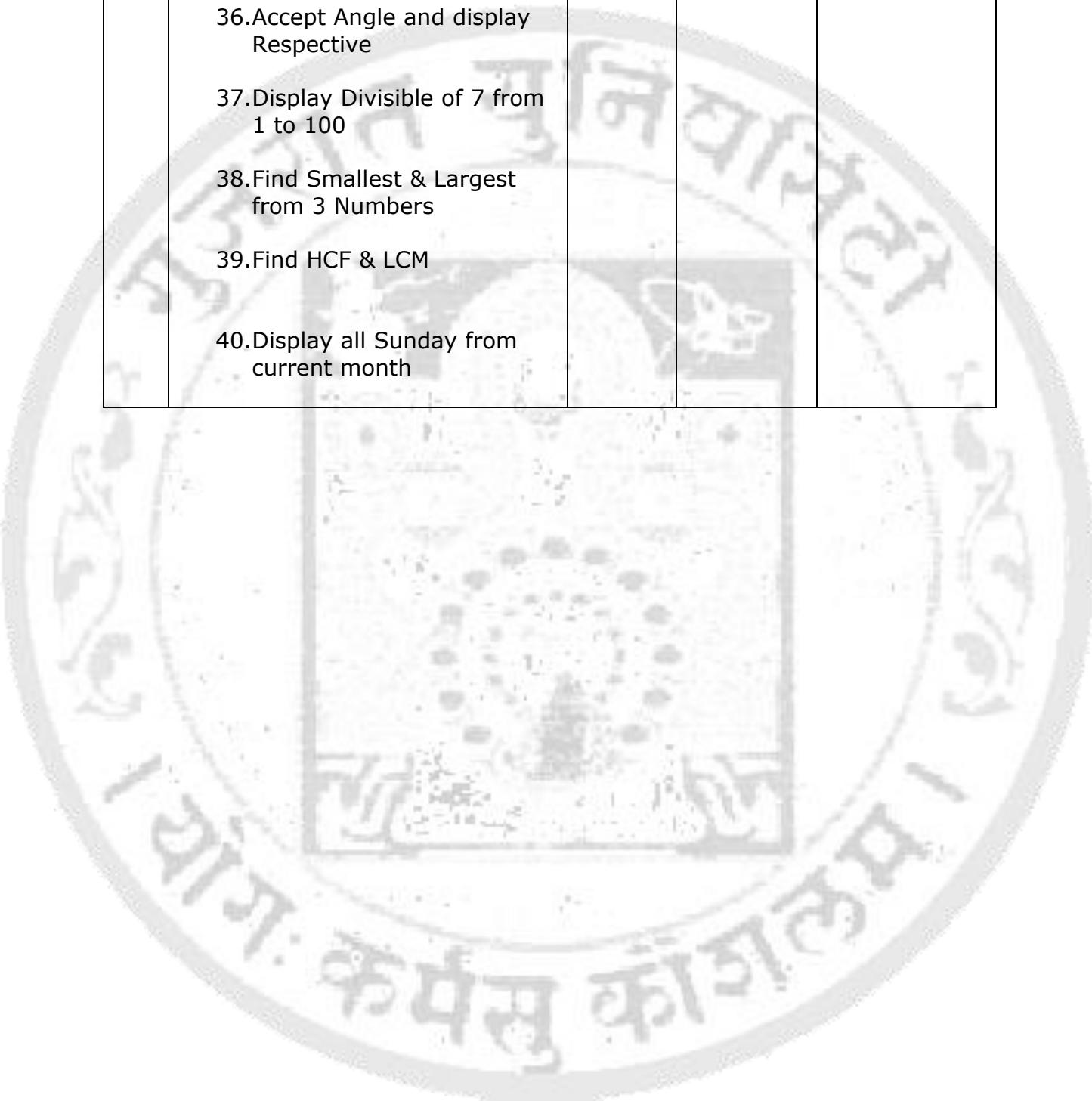
**Roll No.: - 27**

**Exam Seat No.: - \_\_\_\_\_**

Sr. No.	Contents	Pg. No	Date	Signature
1	Glossary(Assignment-1)	1	10-12-20	
2	Numericals(Assignment-2)	29	10-12-20	
3	Shell Scripts 1. Salary counter 2. Distance Finder 3. Area & perimeter 4. Calculate Digit Sum 5. Get information from /etc/passwd 6. Check File details 7. Get Profit or Loss 8. Odd or Even 9. Prime or Not 10. Leap Year or Not 11. Check 2 file are same or Not 12. ----Canceled--- 13. ----Canceled--- 14. Date Format 15. Display the Appropriate Message like Good Morning/Good Evening		10-12-20	

	<p>16.Display menu Driven Interface</p> <p>17.Menu Driven Calculator</p> <p>18.Factorials</p> <p>19.Fibonacci Series</p> <p>20.Input 2 number, find power using both numbers as base and exponent</p> <p>21.Use Similar to Head and Tail</p> <p>22.Display file name and size in descending order</p> <p>23. ---Cancelled---</p> <p>24.Prime number from 1 to 300</p> <p>25.Display combination of 1,2 &amp; 3</p> <p>26.Rename file with shell PID as extension</p> <p>27.Find Occurrence of words from first file in rest of the files.</p> <p>28.Script delete occurrence of word "UNIX"</p> <p>29.Find Occurrence of "unix" word from every file.</p> <p>30.Script Receive file name as argument and copy file content such that file-1 copy to file-2, file-3 copy on file-4 so on.</p> <p>31.Display file which has execute permission</p> <p>32.Check if it's a file or directory</p> <p>33.Check the file name is exist if not then check</p>		
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	<p>"mydir" is exists or not.</p> <p>34.Calculate Percentage &amp; Grade</p> <p>35.Armstrong Numbers</p> <p>36.Accept Angle and display Respective</p> <p>37.Display Divisible of 7 from 1 to 100</p> <p>38.Find Smallest &amp; Largest from 3 Numbers</p> <p>39.Find HCF &amp; LCM</p> <p>40.Display all Sunday from current month</p>		
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Name : Viraj Patel

Roll No : 27

Subject : Operating System

Class : MCA - 3

Assignment : 1 (Glossary)

## OS Assignment 2

(1)

Base Address

- An address that is used as the origin in the calculation of addresses in execution of computer program.

(2)

Batch processing

Pertaining to the technique of executing a set of computer programs such that each is completed before the next program of the set is started.

(3)

Binary semaphore

- A semaphore that takes on only the values 0 & 1. A binary semaphore allows only one process or thread to have access to a shared critical resource at a time.

(4)

Block

(1) A collection of contiguous records that are recorded as a unit; the units are separated by interblock gaps.

(2) A group of bits that are transmitted as a unit.

### ⑤ B-tree

A technique for organizing indexes. In order to keep access time to a minimum it stores the data keys in a balanced hierarchy that continually realigns itself as items are inserted & deleted. Thus all nodes always have a similar number of keys.

### ⑥ busy waiting

- The repeated execution of a loop of code while waiting for an event to occur.

### ⑦ cache memory

- A memory that is smaller & faster than main memory and that is interposed b/w the processor & main memory. The cache acts as a buffer for recently used memory locations.

### ⑧ CPU

That portion of a computer that fetches & executes instructions. It consists of an ALU, a control unit and registers often simply referred to as a processor.

### 9. cluster

- A group of interconnected, whole computer working together as a unified computing resource that can create the illusion of being one machine - The term whole/computer means a system that can run on its own, a part from the cluster.

### ⑩ Concurrent .

- Pertaining to process or threads that take place within a common interval of time during which they may have to alternately share common resources

### ⑪ Consumable Resource

A resource that can be created & destroyed when a resource is acquired by a process, the resource ceases to exist. Eg of consumable resources are interrupts, signals messages, & information in I/O buffers

### ② Database

A collection of interrelated data, often with controlled redundancy, organized according to schema to serve one or more applications. The data are stored so that they can be used in different programs without concern for the data structures or organization. A common approach is used to add new data & to modify & retrieve existing data.

### ③ Dead lock

① An impasse that occurs when multiple processes are waiting for the availability because it is being held by another process that is in a similar wait state.

② An impasse that occurs when multiple processes are waiting for an action by or a response from another process that is in a similar wait state.

### ④ Dead lock avoidance

A dynamic technique that examines each new resource request for deadlock. If the new request causes deadlock, it

new request could lead to a deadlock, then the request is denied.

### (15) Deadlock detection

A technique in which requested resources are always granted when available periodically, the operating system tests for deadlock.

### (16) Deadlock Prevention

- A technique that guarantees that deadlock will not occur; prevention is achieved by assuring that one of the necessary condition for deadlock is not met.

### (17) Demand Paging

The transfer of a page from secondary memory to main memory storage at the moment of need compare prepaging.

### (18) Device driver

An operating system module that deals directly with a device or I/O module.

## ⑨ Direct access

The capability to obtain data from a storage device or to enter data into a storage device in a sequence independent of their relative position by means of address that indicate the physical location of the data.

## ⑩ DMA

A form of I/O in which a special module, called a DMA module, controls the exchange of data between main memory and an I/O device. The processor sends a request for the transfer of a block of data to the DMA module and is interrupted only after the entire block has been transferred.

## ⑪ Disabled Interrupt.

A condition, usually created by the OS, during which the processor will ignore interrupt request signals of a specified class.

## ⑫ Disk allocation table

A table that indicates which block on secondary storage are free and available for allocation to files.

(23)

## Dispatch

To allocate time on a processor to jobs or tasks that are ready for exec

(24)

## Distributed Operating System

A common operating system shared by network of computers. The distributed provides support for interprocess communication, process migration, mutual exclusion, and the prevention or detection of deadlock.

(25)

## Dynamic Relocation

A process that assigns new absolute addresses to a computer program during execution so that the program may be executed from a different area of main storage.

(26)

## Enabled interrupt

A condition, usually created by the OS, during which the processor will respond to interrupt requests signals of a specified class.

## ⑦ External fragmentation.

Occurs when memory is divided into variable-size partitions corresponding to the blocks of data assigned to the memory. As segments are moved into & out of the memory, gaps will b/w the occupied portions of memory.

## ⑧ field.

- ① Defined logical data that are part of a record.
- ② The elementary unit of a record that may contain a data item, a data aggregate, or pointer, or a link.

## ⑨ file

A set of related records treated as a unit.

## ⑩ File allocation table

A table that indicates the physical location on secondary storage of the space allocated to a file. There is one file allocation table for each file.

(31)

## file organization

The physical order of records in a file is determined by the method used to store & retrieve them.

(32)

### FCFS, FIFO

- A queuing technique in which the next item to be retrieved is the item that has been in the queue for the longest time.

(33)

### hash file

A file in which records are accessed according to the values of a key field hashing is used to locate a record on the basis of its key value.

(34)

### hashing

The selection of storage location for an item of data by calculating the address as a function of the contents of the data. This technique complicates the storage allocation function but results in rapid random retrieval.

### (35) Hit ratio

In a two-level memory, the fraction of all memory accesses that are found in the faster memory

### (36) Indexed access

Pertaining to the organization and accessing of the records of a storage structure through a separate index to the locations of the stored records

### (37) Indexed file

A file in which records are accessed according to the value of key fields. An index is required that indicates the location of each record on the basis of each key value.

### (38) Indexed sequential access

Pertaining to the organization and accessing of the records of a storage structure through an index of the keys that are stored in arbitrarily partitioned sequential files.

### (39) Indexed sequential file

A file in which records are ordered according to the values of a key field. The main file is supplemented with an index file that contains a partial list of key values; the index provides a lookup capability to quickly reach the vicinity of desired record.

### (40) Instruction cycle

The time period during which one instruction is fetched from memory and executed when a computer is given an instruction in machine language.

### (41) Internal fragmentation

Occurs when memory is divided into fixed size partitions. If a block of data assigned to one or more partitions there may be wasted space in the last partition. This will occur if that ~~partition~~ portion of data is smaller than the last portion.

(12) Interrupt

A suspension of a process such as the execution of a computer program, caused by an event external to that process and performed in such a way that the process can be resumed.

(13) Interrupt handler

A routine, generally part of the OS. When an interrupt occurs, control is transferred to corresponding interrupt handler which takes some action in response to the condition that caused the interrupt.

(14) Job

A set of computational steps packaged to run as a unit.

(15) kernel

A portion of OS that includes the most heavily used portions of software. Generally the kernel is maintained permanently in main memory. The kernel runs in a privileged mode & responds to calls from processes or interrupts from devices.

## (h6) Kernel mode

A privileged mode of execution reserved for the kernel of the operating system. Typically, kernel mode allows access to regions of main memory that are unavailable to process executing in a less-privileged mode, and also enables execution of certain machine instructions that are restricted to the kernel mode. Also referred to as system mode or privileged mode.

## (h7) LIFO

A queuing technique in which the next item to be retrieved is the item most recently placed in the queue.

## (h8) Live lock

A condition in which two or more processes continuously change their state in response to changes in the other processes without doing any useful work. This is similar to deadlock in that no progress is made, but it differs in that neither process is blocked or waiting for anything.

## (h) logical address

A reference to a memory location independent of the current assigned of data to memory. A translation must be made to a physical address before the memory access can be achieved.

## (i) logical record

A record independent of its physical environment, portions of one logical record may be located in different physical records or several logical records or parts of logical records may be located in one physical records.

## (j) Main Memory

Memory that is internal to the computer system, is program addressable, and can be loaded into registers for subsequent execution or processing.

## (k) Malicious software

Any software designed to cause damage or use up the resources of a target computer. Malicious software is frequently

Concealed within or masquerades as legitimate software.

(53)

### Memory cycle time

The time it takes to read one word from or write one word to memory. This is the inverse of the rate at which words can be read from or written to memory.

(54)

### Memory Partitioning

The subdividing of storage into independent sections.

(55)

### Micro kernel

A small privileged operating system core that provides process scheduling, memory management, and communication services and relies on other processes to perform some of the functions traditionally associated with operating system kernel.

(56)

## Multi Processing

A mode of operation that provides for parallel processing by two or more processors of a multiprocessor.

(57)

## Multi Programming

A mode of operation that provides for the interleaved execution of two or more computer programs by a single processor. The same as multitasking, using different terminology.

(58)

## Multi programming level.

The number of processor that are partially or fully resident in memory.

(59)

## Multi tasking

A mode of operation that provides for the concurrent performance or interleaved execution of two or more computer tasks. The same as multiprogramming using different terminology.

(60)

## Mutual exclusion

A condition in which there is set of processes only one of which is able to access a given resource or perform a given function at any time. so a critical section.

(61)

## Operating System:

Software that controls the execution of programs & that provides services such as resource allocation, scheduling, input/output control & data management.

(62)

## Page

In virtual storage, a fixed length block that has a virtual address & that is transferred as a unit between main memory & secondary memory.

(63)

## Page fault

Occurs when the page containing referenced word is not in main memory.

This causes an interrupt & requires that the proper page be brought into main memory.

### (6) Page frame

A fixed size contiguous block of main memory used to hold pages.

### (65) Paging

The transfer of pages between main memory & secondary memory

### (66) Physical address

The absolute location of a unit of data in memory

### (67) Pipe

A circular buffer allowing two processes to communicate on the producer-consumer model. Thus, it is a first in first out queue written by one process & read by another. In some systems, the pipe is generalized to allow any item in the queue to be selected for consumption.

(68)

## Preemption

Reclaiming a resource from a process before the process has finished using it.

(69)

## Pre paging

The retrieval of pages other than the one demanded by a page fault. The hope is that the additional pages will be needed in the near future conserving disk I/O, compare demand paging.

(70)

## Process

A program in execution - A process is controlled & scheduled by the OS same as task

(71)

## PCB

The manifestation of a process in an OS. It is a data structure containing information about the characteristics & state of the process.

## (72) Process State

All of the information that the OS needs to manage a process & that the process needs to properly execute the process. The process state includes the contents of the various processor registers such as the program counter & data registers.

## (73) Processor

In a computer, a functional unit that interprets & executes instructions. A processor consists of a least one instruction control unit & one arithmetic unit.

## (74) Program Counter

Instruction address register

## (75) Programmed I/O

A form of I/O in which the CPU issues an I/O command to an I/O module and must then wait for the operation to be complete before proceeding.

(26)

## Real time System

An OS that must schedule & manage real-time tasks

(27)

## Real time task

A task that is executed in connection with some process or function or set of events external to the computer system & that must meet one or more deadlines to interact effectively and correctly with the external environment.

(28)

## Registers

High speed memory internal to the CPU some registers are user visible - that is available to the programmer via the machine instruction set other registers are used only by the CPU, for control purposes.

(79)

## Relative address

An address calculated as a displacement from a base address.

(80)

## Response time

In a data system, the elapsed time between the end of transmission of an enquiry message & the beginning after the receipt of a response message measured at the enquiry terminal.

(81)

## Round Robin

A scheduling algorithm in which ~~processes~~ processes are activated in a fixed cyclic order, that is all are activated in a circular queue - A process that cannot proceed because it's waiting for some event returns controls to the scheduler.

(82)

## Scheduling

To select jobs or tasks that are to be dispatched - In some OS, other waits of work, such as I/O operations, may also be scheduled.

(83)

## Secondary memory

Memory located outside the computer system itself; that is it cannot be processed directly by the processor. It must be processed copied into main <sup>mem</sup> Example include disk & tape.

(84)

## Segment

In virtual memory, a block that has a virtual address. The blocks of a program may be of unequal length & may even be of dynamic varying lengths.

(85)

## Segmentation

The division of a program or application into segments as part of a virtual memory ~~sys~~ scheme.

(86)

## Semaphores

An integer value used for signalling among processes. Only three operations may be performed on a semaphore, all of which are atomic: initialize, decrement & increment. Depending

on the exact definition of semaphore, the decrement operation may result in the blocking of a process, and the increment operation may result in the Unblocking of a process - Also known as a COUNTING SEMAPHORE or a general SEMAPHORE.

### (87) Sequential file

A file in which records are ordered according to the value of the key fields and processed in the same sequence from the beginning of the file.

### (88) Shell

The portion of the OS that interprets interactive user commands. Its function is an interface between the user and the OS.

### (89) Stack

An ordered list in which items are appended to & deleted from the some end of the list, known as the top - That is the next item

appended to the list is put at the top & the next item to be removed from the list is the item that has been in the list the shortest time. This method is characterized as last in first out.

(q1)

starvation

A condition in which a process is indefinitely delayed because other processes are always given preference.

(q2)

Strong semaphore:

A semaphore in which all process waiting on the same semaphore queue and will eventually proceed in the same order as they execute the wait (P) operations.

(q3)

swapping

@

A process that interchanges the contents of an area of main storage with the contents of an area in secondary memory.

### (93) SMP

- A form of multiprocessing that allows the OS to execute on any available processor or on several available processors simultaneously.

### (94) Synchronous Operations

An operation that occurs regularly or predictably with respect to the occurrence of a specified event in another process.

### (95) Synchronization

Situation in which two or more processes coordinate their activities based on a condition.

### (96) System bus

A bus used to interconnect major computer components.

(97)

## Thread

A dispatchable unit of work. It includes a processor context & its own data area for a stack. A thread executes sequentially and it's interruptible so that the processor can turn to another thread. A process may consist of multiple threads.

(98)

## Thread switch

The act of switching process control from one thread to another within the same process.

(99)

## Time sharing

The concurrent use of a device by a number of users.

(100)

## Time slice

The maximum amount of time that a process can execute before being interrupted.

Name: Vraj Patel

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Assignment : 2 (Numerical)

# Assignment - 2

## Bancker's Algorithm

Date \_\_\_\_\_

Page \_\_\_\_\_

process	Allocation			max	Available	Need
	A	B	C			
P <sub>0</sub>	0	1	0	7 5 3	3 3 2	7 4 3
P <sub>1</sub>	2	0	0	3 2 2	1 2 2	1 2 2
P <sub>2</sub>	3	0	2	9 0 2	6 0 0	6 0 0
P <sub>3</sub>	2	1	1	2 2 2	0 1 1	0 1 1
P <sub>4</sub>	0	0	2	4 3 3	4 3 1	4 3 1

-> process	Allocation			max	Available	Need
P <sub>0</sub>	0	1	0	7 5 3	3 3 2	7 4 3
P <sub>1</sub>	2	0	0	3 2 2	1 2 2	1 2 2
P <sub>2</sub>	3	0	2	9 0 2	6 0 0	6 0 0
P <sub>3</sub>	2	1	1	2 2 2	0 1 1	0 1 1
P <sub>4</sub>	0	0	2	4 3 3	4 3 1	4 3 1

$$\text{need} \leq \text{work} \Rightarrow \text{work} = \text{work} + \text{Allocation}$$

P<sub>0</sub> 7 4 3 ≤ 3 3 2 ← x condition fails

$$\begin{aligned} P_1 & 1 2 2 \leq 3 3 2 \quad \text{condition true} \\ w &= 3 3 2 + 2 0 0 \\ &= 5 3 2 \end{aligned}$$

P<sub>2</sub> Need 5 work  
6 0 0 ≤ 3 2 2. condition false

P<sub>3</sub> Need ≤ work

$$011 \leq 532$$

condition time

$$w = 532 + 211 \\ w = 743$$

P<sub>4</sub> Need ≤ work

$$243 \leq 743$$

$$\Rightarrow w = 743 + 002 \\ w = 745$$

P<sub>0</sub> Need ≤ work

$$743 \leq 745$$

$$\Rightarrow w = 745 + 010 \\ w = 755$$

P<sub>2</sub>

Need ≤ work

$$600 \leq 755$$

$$\Rightarrow w = 755 + 302 \\ w = 1057$$

Safe sequence is  $\rightarrow (P_1, P_3, P_4, P_0, P_2)$

\* FIFO

7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 0  
3, 2, 1, 2, 0, 1, 2, 0, 1, 2, 0, 1

7	0	1	2	0	3	0	4	2	3	0
7	7	7	2		2	2	4	4	4	0
0	0	0			3	3	3	2	2	2
1	1				1	0	0	0	3	

3	0	0	3	2	1	2	0	1	7	0	1
					0	0			7	7	7
					1	1			1	0	0
							3	2		2	2

no. of page fault = 15 no. of frames = 3

\* LRU

7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 5, 0, 3, 0, 3, 2, 1, 2, 0, 1  
 7, 0, 1

7	0	1	2	0	3	0	4	2	3	0	3	0	3
7	7	7	2	2	2	3	4	4	1	0			
0	0	0	8	0	0	0	0	3	3				
1	1			3		3	2	2	2				

2	1	2	0	1	7	0	1
				1	1		
				0	0		
				2	7		

no. of frames = 3

page fault = 12

n

\* Optimal

7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 0, 3, 2, 1, 2, 0,  
7, 0, 1

7	0	1	2	0	3	0	4	2	3	0	3	0	1
7	2	7	2		2		2					2	
0	0	0		0		4				0			
1	1		3		3		3			3			

2 1 2 0 1 7 0 1  
2  
0  
1

no of frames = 3

page fault = 9

\* FIFO

1, 3, 0, 3, 5, 6, 3

1	3	0	3	5	6	3	page fault = 6
1	1	1		5	5	5	
3	3		3	6	6		
0		0	0	0	3		no. of faults = 3

$\Rightarrow$  Optimal

7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 3

7	0	1	2	0	3	0	4	2	3	0	3	2	3
7	7	7	7		3		3						
0	0	0			0		0						
1	1				1		4						
2					2		2						

page fault = 6  
no of frames = 4