

Department of Computer Science

Gujarat University



Certificate

Roll No: 12

Seat No:

This is to certify that Mr./Ms. Aneri H. Khadodara student of MCA Semester – III has duly completed his/her term work for the semester ending in December 2020, in the subject of Operating System(OS) towards partial fulfillment of his/her Degree of Masters in Computer Applications.

Date of Submission
10 - December - 2020

Internal Faculty

Head of Department

Department Of Computer Science Rollwala Computer Centre Gujarat University

MCA - III

Subject: - Operating Systems (OS)

Name: - Aneri H. Khadodara

Roll No.: - 12 **Exam Seat No.: -** _____

OS Assignment

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* Access method

The method that is used to find a file, a record or a set of records.

* Address Space

The range of address available to a computer program.

* Application Programming Interface (API)

A standardised library of programming tools used by software developers to write applications that are compatible with a specific operating system or graphical user interface.

* Asynchronous operation

An operation that occurs without a regular or predictable time relationship to a specified event, for example, the calling of an error diagnostic routine that may receive control at any time during the execution of a computer program.

* Base address

An address that is used as the origin in the calculation of address in the

extension of a computer program.

* Batch Processing

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

* Binary Semaphore

A semaphore that test on only the values 0 and 1. A Binary semaphore allows only one process or thread to have access to a shared critical resource at a time.

* Block

(1) A collection of continuous rewards that over recorded as a unit, the unit over are separated by interblock gaps.

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

* B-tree

A technique of organising in clerces 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 and deleted. Thus all nodes always have a similar number of keys.

* Busy waiting

the repeated execution a loop of code for an event to occur.

* cache memory

a memory that is smaller and faster than main memory and that is positioned between Processor and main memory. The cache acts as a buffer for recently used memory locations.

* central processing unit (CPU)

that portion of a computer that performs and executes instructions it consists of an arithmetic and logic unit (ALU), a control unit and registers often simply referred to as a processor.

* client

A process that requests services by sending message to server process

* cluster

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

* communications architecture

The hardware and software structure that implements communications function.

* concurrent

Pertaining to the processes or threads take place within a common interval of time during which they may have to alternately share common resource.

* consumable resource

A resource can be produced and destroyed (consumed). When a resource is consumed by a process, the resource ceases to exist. Examples of consumable resource are interrupts, signals, messages and information in I/O

before

* Databases

a collection of interrelated data offer with controlled redundancy, organised according to a scheme to serve one or more applications, the data are stored so that they can be used by different programs without concern for the data structure or organisation. A common approach is used to add new data and to modify and retrieve existing data.

* Deadlock

(1) An impasse that occurs when multiple processes are waiting for the availability of a resource that will not become available 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.

* deadlock Avoidance

A dynamic technique that examines each new resource request for deadlock. If the new request could lead to a deadlock, than the request is denied.

* Deadlock Detection.

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

* Deadlock Prevention

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

* Demand Paging

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

* Device Driver

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

* Direct Access

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

* Direct Memory Access (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 transfers a block of data to the DMA module and is interrupted only after the entire block has been transferred.

* Disable Interrupt.

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

* Disk Allocation Table.

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

* Disk cache.

A buffer, usually kept in main memory that functions as a cache of disk blocks between disk memory and the rest of main memory.

* Dispatch

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

* Distributed operating system

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

* 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.

* Enable Interrupt

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

* Encryption

The conversion of plain text or data into intelligible form by means of a reversible mathematical operation.

* External fragmentation

occurs when memory is divided into variable size partitions corresponding to blocks of data assigned to the memory. As segments are moved into and out of the memory, gaps will occur between the occupied portions of memory.

* 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, a pointer, or a link.

* file

A set of related records treated as a unit.

* file allocation table (FAT)

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.

* file management system

A set of system software that provides services to users and applications in the use of files, including file access, directory maintenance, and access control.

* file organization

The physical order of records in a file, as determined by the access method used to store and retrieve them.

* first in first out (FIFO)

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

* frame

Inpaged virtual storage, a fixed length block of main memory that is used to hold one page of virtual memory.

* Croning Scheduling

The scheduling of a set of related threads to run on a set of processor at the same time, on a one-to-one basis.

* 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.

* Hashing

The selection of a 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.

* Hit Ratio

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

* Indexed access

Pertaining to the organisation and accessary of the records of a storage structure through a separate index.

The locations of the stored records.

* 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.

* Indexed sequential access.

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

* 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 logical catalog to quickly research the identity of a desired record.

* 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.

* Internal fragmentation.

occurs when memory is divided into fixed size partitions e.g. page frames in main memory, physical blocks on disk. If a block of data is assigned to one or more partitions then there may be wasted space in the last partition. This will occur in the last partition if data is smaller than the last partition.

* 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.

* Interrupt Handler

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

* Job

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

* Job control language (JCL)

A problem oriented language that is designed to express statements in a job that are used to identify the job that are used to identify system.

* Kernel

A portion of the operating system 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 and responds to calls from processes and interrupts.

from devices.

* 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 of unprivileged processes executing in a less-privileged mode, and also enables execution of certain machine instruction that are restricted to the kernel mode also referred mode as Privileged mode.

* Last in first out (LIFO)

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

* lightweight process.

A thread

* livelock.

A condition in which two or more processes continuously change their state in response to changes in the other process without solving and

useful work. This is similar to deadlock in that progress is made, but it differs in that neither process is blocked or waiting for something.

* Locality of Reference.

The tendency of a process to access the same set of memory locations repetitively over a short period of time.

* Logical address.

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

* Logical Record.

A record independent of the physical environment. Positions of one logical record may be located in different physical records. Several logical records may be located in one physical record.

* macro kernel

A large operating system core that provides a whole range of services.

* mailbox

A data structure shared among a number of processes that is used as a queue for messages sent to the mailbox or received from mailbox rather than passing directly sends to receiver.

* main memory

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

* malicious software

Any software designed to cause damage to or use up the resources of a target computer. Malicious software (malicious) is frequently concealed within or masquerades as legitimate software. In some cases it spreads itself on other computers via emails or

Infected disks. types of malicious software includes viruses, trojan horse, worms and hidden software for launching denial-of-service attacks.

* 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.

* memory Partitioning

The subdividing of storage into independent sections

* message

A block of information that may be exchanged between processes as a means of communication.

* micro kernel

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

* mode switch

A hardware operation that occurs that causes the processor to execute in a different mode (kernel / process). When the mode switches from process to kernel, the program counter, processor, states word, and other registers are saved. When the mode switches from kernel to process, this information is restored.

* monolithic kernel

A large kernel containing virtually the complete operating system, including scheduling, file system, device drivers, memory management. All the functional components of the kernel have access to all of its internal data structures and routines.

Jypilahy, a monolithic kernel is implemented as a single process with all elements sharing the same address space.

* monitor

A programming language construct that encapsulates variables, access procedures and initialization code within an abstract data type. The monitors variable only be accessed via its access procedures and only one process may be actively accessing the monitor at any one time. One access procedure are with critical sections. A monitor may have a queue of processes that are wishing to access it.

* multilevel security

A capability that enforces access control across multiple levels of classification of data.

* multiprocessing

A mode of operation that provides parallel processing by two or more processes of a program.

* multiprocessor

A computer that has two or more processes that have common access to a main storage.

* multiprogramming

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.

* multi multiprogramming level.

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

* multitasking

a mode of operation that provides for the concurrent performance of interleaved execution of three or more computer tasks the same as multiprogramming, using different terminology.

* mutex

Similar to a binary semaphore. A key difference between the two is that the process that locks the mutex (sets the value to 1) must be the one to unlock it (sets the value to 0). In contrast, it is possible for one process to lock a binary semaphore and for another to unlock it.

* mutual exclusion

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

* NON-privileged state

An execution context that doesn't allow sensitive hardware instructions to be executed such as the halt instruction and I/O instructions.

* nonuniform memory access (NUMA) multiprocessor

A shared memory multiprocessor in which the access time from a given process to a word in

memory varies with the location of the memory word.

* Object Request Broker

An entity in an object oriented system that acts as an intermediary for requests sent from a client to a server.

* Operating System,

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

* Page

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

* page fault

Occurs when the page containing a reference word is not in main memory this causes an interrupt and requires that the proper page be brought into main memory.

* Page frame

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

* Paging

The transfer of pages between main memory's secondary memory's

* Physical address

The absolute location of a unit of data in memory (eg. word) by byte in main memory, block block on secondary memory)

* Pipe

A circular buffer allowing two process to communicate on the producer-consummer model. Two it is a first in first out queue, written by one process and read by another. In some systems, the pipe is generated by allowing any item in the queue to be selected for consumption.

* Premption

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

* Preparing

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

* Priority Inversion

A circumstance in which the operating system forces a higher priority task to wait for a lower priority task.

* Privileged Instruction

An instruction that can be executed only in a special mode usually by a supervisor program.

* Process

A program in execution. A process is controlled and scheduled by the operating system.

* Process control Block

The manifestation of a process in an operating system. It is a data structure containing information

about the characteristics and state of the process.

* Process Description

Some as Process control Block.

* Process Image

All the ingredients of a process, including program, data, stack and process control block.

* Process migration

The transfer of a sufficient almost of a state of a process from one machine to another for the process to execute on the target machine.

* Process Spawning

The creation of a new process by another process.

* Process State

All of the information that the operating system needs to manage a process and that the processor needs to properly execute the process, processor registers such as the program counter and data registers.

It also includes information of use to the operating system, such as the priority of the process and whether the process is waiting for the completion of a particular I/O event. sum as extension context.

* Process Switch

an operation that switches the processor from one process to another, by saving all the process control block, register and other information for the first and replacing them with the process information for the second.

* Processor

In a computer, a functional unit that interprets and executes instruction. A processor consists of at least an instruction control unit and an arithmetic unit.

* Program control counter

Instruction address Register.

* Program status word

A register or set of registers that contains conditions codes.

extension mode and other states information that reflects the state of a process.

* Programmed I/O

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

* Race condition

situation in which multiple processes access and manipulate shared data with the outcome dependent on the relative timing of the processes.

* real address

A physical address in the main memory.

* Real time system,

an operating system that must schedule and manage real time tasks.

* Real time task

a task that is executed in conjunction with some process or function or

set of events external to the computer system and that must make one or more clock lines to interact effectively and correctly with the external environment.

* Record

a group of data elements treated as a unit

* Reentrant Procedure

A routine that may be entered before the completion of a prior execution of the same operation and execute correctly.

* Registers:

High speed memory internal to the CPU. Some registers are user visible i.e. accessible to the programmer via the machine instruction set. Other registers are used only by the CPU, or controlled by programs.

* Relative address.

An address calculated as a displacement from a base address.

* Remote Procedure call (RPC)

A technique by which two programs on different machines interact using procedure call/return syntax and semantics. Both the called and calling program behave as if the partner program were running on the same machine.

* Remainder.

In message passing, a condition in which both the sender and receiver of a message are blocked until the message is delivered.

* Pesident set

The portion of a process that is actually in main memory at a given time.

* Response time

In a data system, the elapsed time between the end of transmission

of an enquiry message and the beginning of the receipt of a response message, measured at the enquiry terminal.

* Reusable Resource

A resource that can be safely used by only one process at time and is not duplicated by that use. Process obtain reusable resource units. They later release for by other process. Example of reusable resources include Processor, I/O, channels main and secondary memory, devices & structures such as files, database and semaphores.

* Round Robin

A scheduling algorithm in which processes are activated in a fixed cyclic order that is all process are in circular queue a process that cannot proceed because it is waiting for some event

* Scheduling

Select jobs or tasks that are to be dispatched in some operating systems other units of work such as I/O operations may also be.

* secondary memory.

memory located outside the computer system item i.e. it cannot be processed directly by the processor it must first be copied into main memory examples include CD types.

* Segment

In virtual memory a block that has a virtual address, the blocks of a program may be of unequal length even be dynamically reusing.

* Segmentation

In division of a program or operation into segments as part of a virtual memory scheme.

* Semaphore

An integer value used for signaling among processes. There operations may be performed on a semaphore, all of which are atomic initialize command and increment operation may result in the blocking of a process and the increment operation may result in no the unblocking of a process. also known as counting.

* Sequential Access.

The capability to enter data into a storage device or a data medium in the same sequence as the data are ordered, as to obtain data in the same order as they were entered.

* Sortation file.

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

* Server.

- (1) A process that responds to request from clients via messages
- (2) In a network, a data function that provides localities to other stations. For example, a file server, a print server or mail server

* Session

A collection of one or more processes that represents a single interactive user application or operating system function. All keyboard and mouse input is directed to the foreground session and all output from the foreground session is directed to the display screen.

* Shell

The portion of the operating system that interprets interactive user commands and job control language in functions as an interface between the user and the operating system.

* Spin lock

mutual exclusion mechanism in which a process executes in an infinite loop waiting for the value of a lock variable to indicate availability.

* Spooling

The use of secondary memory as buffer storage to reduce processing always when transferring data between peripheral equipment and the processes of a computer.

* Stack

An ordered list in which items are appended to and deleted from the same end of the list known as top and the next item to be removed from the list is the item that has been in the list shortest time.

* Starvation

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

* Strong Semaphore

A semaphore in which all processes waiting on the same semaphore are held and will eventually proceed in the same order as that entered the wait (P) operations (FIFO order).

* Swapping

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

* Symmetric multiprocessing (SMP)

A form of multiprocesssing that allows the operating system to execute on any available processor or on several available processors simultaneously.

* Synchronous operation

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

authors process, for example, the scaling of an input output routine that receives control at a pre-coded location in a computer program.

* Synchronization

situation in which two or more processes coordinate their activity based on a condition,

* System Bus

A bus used to inter connect major computer components (CPU, memory, I/O)

* System mode

some as kernel mode,

* Task

some as Process.

* Thrashing

A phenomenon in virtual memory schemes in which the processor spends most of its time swapping pieces rather than executing instructions.

* thread

A dispatchable unit work. It includes a processor centered (which includes the program counter and Stack Pointer) and its own data area for a stack (to enable sub routine branching). A thread executes sequentially and is interrupted by also that the processor can turn to another thread. A process may consist of multiple threads.

* Thread switch

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

* time sharing

The concurrent use of a device by a number of users

* time slice.

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

* Time Slicing

mode of operation in which two or more processes are assigned quanta of time at the same processor.

* trace

A sequence of instructions that are executed when process is running.

* translation look-Aside Buffer (TLB)

A high speed cache used to hold recently referred page. The TLB reduces the frequency of access to main memory to retrieve page table entries.

* Trap

An unprogrammed conditional jump to a specific address that is automatically activated by the hardware mode is recorded.

* trap door

Secret undocumented entry point into a program, used in grant access without normal methods of access authentication.

* frozen house

Secret undocumented routines end within a useful program execution or the program results in execution of the secret routine

* trusted system.

A computer and operating system that can a given security policy.

* user mode

The least privileged mode for execution certain regions of main memory and certain machine instruction cannot be used in this mode

* virtual address.

The address of a storage location in virtual memory

* virtual memory

The storage space that may be regarded as addressable main storage by the use of a computer. In which virtual addresses are mapped into real addresses. the size of virtual storage is locations.

* viruses

Secret undetected routine embedded within in a useful program.

* weak semaphores

A semaphore in which all processes waiting on the same semaphore proceed in an unspecified order

* word

An ordered set of bytes/bits that is the normal unit to which information may be started transmitted or operated on within a given computer, typically a process has a fi.

* working set

The working set with Parameter A
for a process at virtual time t , $w(t, A)$
 $\{$, the set of pages of that process
that have been referenced in the last
 A time units.

* worm

Program that can travel from
computer to computer across network
connections. may contain a viruses or
bacteria.

Assignment - 2

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Banerjee's Algorithm

Process	Allocation			(work) (max -)		
	A	B	C	A B C	A B C	Available Need
P ₀	0	1	0	7 5 3	3 3 2	
P ₁	2	0	0	3 2 2		
P ₂	3	0	2	9 0 2		
P ₃	2	1	1	2 2 2		
P _U	0	0	2	4 3 3		

Process	Allocation			max Available Need		
	A	B	C	A B C	A B C	A B C
P ₀	0	1	0	7 5 3	3 3 2	7 4 3
P ₁	2	0	0	3 2 2		1 2 2
P ₂	3	0	2	9 0 2		6 0 0
P ₃	2	1	1	2 2 2		0 1 1
P _U	0	0	2	4 3 3		4 3 1

$$-4 \quad \text{Need} \leq \text{work} = 4 \quad \text{work} = \text{work} + \text{allocation}$$

P₀ 743 \leq 332 + x condition fails

P₁ 1220 \leq 332 condition true

new = work allocation

$$= 332 + 200$$

$$= 532$$

P₂ need \leq work

600 \leq 532 condition false

P₃ need \leq work condition true

$$015 \leq 532$$

$$\begin{aligned} w_1 &= w_0 + \text{allocation} \\ &= 532 + 211 \\ &= 743 \end{aligned}$$

$$\begin{aligned} \text{Need } \leq \text{work} &\Rightarrow w_1 = w_0 + \text{allocation} \\ \rightarrow P_4 \text{ uses } &743 \\ &= 743 + 002 \\ &= 745 \end{aligned}$$

$$\begin{aligned} \Rightarrow P_0 \text{ Need } \leq \text{work} &\Rightarrow \text{work} - \text{work} + \text{fals} \\ 743 \leq 745 &= 745 + 010 \\ &= 755 \end{aligned}$$

$$\begin{aligned} \Rightarrow P_2 \text{ Need } \leq \text{work} &\Rightarrow \text{work} = \text{work} + \text{allocation} \\ 600 \leq 755 &= 755 + 302 \\ &= 1057 \end{aligned}$$

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

* FIFO

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

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

0 3 0 3 2 4

4

2

3

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

Page fault = 15 no of frames = 3

* LRU

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

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

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

0	1	1	0
1		1	
0		0	
2		1	

no of frames = 3

page fault = 12

* optional

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

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

2	3	0	3	0	3	2
		2				
		0				

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

need frames = 3
page default = 9

= 6 FIFO

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

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

Page fault = 6 no of frames = 3

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=> optional

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	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	1	1	1	1	1	1	1	1	1	1	1	1
	2	2	2	2	2	2	2	2	2	2	2	2	2

Page fault = 6

No of frames = 4

**DEPARTMENT OF COMPUTER SCIENCE
ROLLWALA COMPUTER CENTRE
GUJARAT UNIVERSITY
M.C.A. - III**

R O L L N O : 12

N A M E : Aneri H. Khadodara

S U B J E C T : Operating Systems (OS)

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16	Menu Driven Interface		10-Dec-20	
17	Arithmetic Calculator		10-Dec-20	
18	Factorial		10-Dec-20	
19	Fibonacci		10-Dec-20	
20	Power of y raised to x		10-Dec-20	
21	Similar to Head/Tail Commands		10-Dec-20	
22	Files > 1000		10-Dec-20	
23	--- Cancelled ---			
24	Prime numbers 1-2=300		10-Dec-20	
25	Combinations of 1, 2, 3		10-Dec-20	
26	Rename each file with extension .PID		10-Dec-20	

**DEPARTMENT OF COMPUTER SCIENCE
ROLLWALA COMPUTER CENTRE
GUJARAT UNIVERSITY
M.C.A. - III**

R O L L N O : 12

N A M E : Aneri H. Khadodara

S U B J E C T : Operating Systems (OS)

27	Occurrence of each word in file		10-Dec-20	
28	Delete lines with word “unix”		10-Dec-20	
29	Stop at the first file that encounter word “unix”		10-Dec-20	
30	Copy even files		10-Dec-20	
31	All files in current directory with read, write & execute permissions		10-Dec-20	
32	File or Directory?		10-Dec-20	
33	File exists or not? If not create in mydir		10-Dec-20	
34	Calculate Percentage & Grades		10-Dec-20	
35	Armstrong numbers between 1 to 500		10-Dec-20	
36	Acute / Right / Obtuse Angle		10-Dec-20	
37	Numbers divisible by 7 in 1-100		10-Dec-20	
38	Smallest & Largest of 3 numbers		10-Dec-20	
39	HCF & LCM		10-Dec-20	
40	Dates falling on Sunday of current month		10-Dec-20	