

Department of Computer Science

Gujarat University



Certificate

Roll No: 21

Seat No: _____

This is to certify that Mr. NAMJOSHI SHUBHAM SUNILBHAI student of MCA Semester – III has duly completed his term work for the semester ending in December 2020, in the subject of OPERATING SYSTEM towards partial fulfillment of her Degree of Masters in Computer Applications.

10/12/2020
Date of Submission

Internal Faculty

Head of Department

Department Of Computer Science
Rollwala Computer Centre
Gujarat University

MCA -III

Subject: - OPERATING SYSTEM

Name :- NAMJOSHI SHUBAHM SUNILBHAI

Roll No.: - 21

Exam Seat No.: -

Definitions

1. Base address

Ans.

An address that is used as the origin in the calculations of addresses in the execution of a 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 and 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 and 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 and faster than main memory and that is interposed between the processor and main memory. The cache acts as a buffer for recently used memory locations.

8. Central Processing Unit (CPU)

- That portion of a computer that fetches and executes instructions. It consists of an Arithmetic and Logic Unit (ALU), a control unit, and registers. Often simply referred to as a processor.

9. 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 computer means a system that can run on its own, apart from the cluster.

10. concurrent

- Pertaining to processes 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 page resource that can be created (produced) and destroyed (consumed). When a resource is acquired by a process, the resource ceases to exist. Examples of consumable resources are interrupts, signals, messages, and information in I/O buffers.

12. Database

- A collection of interrelated data, often with controlled redundancy, organized according to a schema 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 organization. A common approach is used to add new data and to modify and retrieve existing data.

13. 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 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.

14. Deadlock avoidance

→ A dynamic technique that examines each new resource request for deadlock. If the 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 a deadlock will not occur. Prevention is achieved by ensuring that one of the necessary conditions for deadlock is not met.

17. Demand Paging

→ The transfer ~~to~~ of a page from secondary memory to main memory storage at the moment of need. (Computer Page Pilling)

18. Device driver

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

19. 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 addresses that indicate the physical location of the data.

20. 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 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.

21. Disabled interrupt

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

22. Disk allocation table

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

23. 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 deadlocks.

24. Dynamic relocation.

→ A process that assigns new absolute addresses to a computer program during execution from a different area of main storage.

25. Enabled interrupt

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

26. 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 and out of the memory, gaps will occur between the occupied portions of memory.

27. 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.

28. file

→ A set of related records treated as a unit.

29. 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.

30. File organization.

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

31. FCFS

→ First come first served is same as FIFO.

32. FIFO

→ First in first out, 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 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.

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 location of the stored records.

37. Indexed Files

- 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 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 the partial list of key values; the index provides a lookup capability to quickly reach the vicinity of desired record.

39. 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.

40. Internal fragmentation.

→ occurs when memory is divided into fixed sized partitions. 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 if the last portion of data is smaller than the last partition.

41. 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.

42. 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.

43. Job

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

43. 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.

44. Kernel mode

→ A Privileged mode of execution reserved for the kernel of the operating system. Typically, a kernel mode allows access to regions of main memory that are unavailable to processes 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.

45. LIFO

→ Last In First Out, a queuing technique in which the next item to be retrieved is the item most recently placed in queue.

46. Livelock

→ 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.

47. Logical address

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

48. 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 record.

49. Main memory

→ Memory that is internal to the Computer System, is Program addressable, and can be loaded into registers for subsequent execution or processing.

50. Malicious Software

→ Any Software designed to cause damage to or use up the resources of a target computer. Malicious Software (malware) is frequently concealed within or masquerades

as legitimate software. In some cases, it spreads itself to other computers via email or infected disks. Types of malicious software include viruses, Trojan horses, worms, and hidden software for launching denial-of-service attacks.

51 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.

52 Memory Partitioning

→ The subdividing of storage into independent sections.

53 Microkernel

→ 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 the operating system kernel.

54. MultiProcessing

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

55. 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.

56. Multitasking

→ 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.

57. 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.

58. Operating System

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

59. 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.

60. Page Fault

→ occurs when the page containing a referenced word is not in main memory. This causes an interrupt and requires that the proper page be brought into memory.

61. Paging

→ A fixed size contiguous block of main memory used to hold a page.

62.

Physical address

- The absolute location of a unit of data in memory.

63.

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 and read by another. In some systems, the pipe is generalized to allow any item in the queue to be selected for consumption.

64.

Preemption

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

65.

Prefetching

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

Q6. Process

→ A program in execution - It Process is controlled and scheduled by the operating system.

Q7. 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.

Q8. 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. The process state includes the contents of the various 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. Some

69.

Processor

- In a Computer, a functional unit that interprets and executes instructions Control unit and an arithmetic unit.

70.

Program Counter.

- Instruction address register.

71.

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.

72.

Real-time System

- An operating system that must schedule and manage real time tasks.

73.

Real-time task

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

7h 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.

7f. Relative address

→ An address calculated as a displacement from a base address.

7e Response time

→ In 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.

7f. Round robin

→ A scheduling algorithm in which processes are activated in a fixed cyclic order; that is, all processes are in a circular queue. A process that can not proceed because it is awaiting for some event.

78. Scheduling

→ To Select jobs or tasks that are to be dispatched. In some operating systems, other units of work, such as input/output operations, may also be scheduled.

79. Secondary memory

→ Memory located outside the computer system itself; that is it cannot be processed directly by the processor. It must first be copied into main memory.

80. Segment

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

81. Segmentation

→ The division of Program or application into segments as part of a virtual memory scheme.

82.

Semaphore



An integer value used for signalling among processes. Only three operations may be performed on a Semaphore, all of which are atomic; initialize, decrement and increment. Depending on the exact definition of the 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.

83.

Sequential File



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

84.

Shell



The portion of the operating system that interprets interactive user commands. It functions as an interface between the user and the operating system.

85. Stack

- An ordered list in which items are appended to and deleted from the same end of the list, known as the top. That is, the next item appended to the list is put on the top and 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 LIFO.

86. Starvation

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

87. Strong Semaphore

- A semaphore in which all processes waiting on the same semaphore are queued and will eventually proceed in the same order as they executed the wait operations (FIFO) order.

88. Scapping



A Process that interchanges the Content of an area of main Storage with the Contents of an area in secondary memory.

89. SMP



Symmetric multiprocessing (SMP), a form of multiprocesssing that allows the operating system to execute on any available processor or on several available processors simultaneously.

90

Synchronous operation



An operation that occurs regularly or predictably with respect to the occurrence of a specified event in another process, for example the calling of an input/output routine that receives control at a preordred preloaded location in a computer program.

91

Synchronization



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

g2 System bus

→ A bus used to interconnect major computer components (CPU, memory, I/O)

g3 Thread

→ A dispatchable unit of work. It includes a Processor Context (which includes a Program Counter and Stack Pointer) and its own dedicated area of a stack - A thread executes sequentially and is interruptible so that the processor can turn to another thread. A process may consist of multiple threads.

g4 Thread Switch

→ The act of switching Processor Control from one thread to another within the same Process.

g5 Time Sharing

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

96. Trap

→ An unprogrammed conditional jump to a specified address that is automatically activated by hardware; the location from which the jump was made is recorded.

97. Trojan horse

→ Secret undocumented routine embedded within a useful program. Execution of the program results in execution of the secret routine.

98. User mode

→ The least-privileged mode of execution. Certain regions of main memory and certain ~~regular~~ machine instructions cannot be used in this mode.

99. Virtual Address

→ The address of a storage location in virtual memory.

100.

Virtual memory

→

The storage space that may be regarded as addressable main storage by the user of a computer system in which virtual addresses are mapped into real addresses. The size of virtual storage is limited by the addressing scheme of the computer system and by the amount of secondary memory available and not by the actual number of main storage locations.

101.

Virus

→

Secret undocumented routine, embedded within a useful program. Execution of the program results in execution of secret routine.

102.

Weak Semaphore

→

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

103

Word

→

An ordered set of bytes or bits that is the normal unit in which information may be stored, transmitted, or operated on within a given computer. Typically, if a processor

has a fixed length instruction set, then the instruction length equals the word length.

104. Worm

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

105. Working Set.

→ The working set with parameter Δ for a process at virtual time t , $W(t, \Delta)$ is the set of pages of that process that have been referenced in the last Δ time units.

106. Access method

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

107. Address Space

→ The range of addresses available to a computer program.

108. Address translator

→ A functional unit that transforms virtual addresses to real addresses.

109. API

→ Application Programming Interface (API), A standardized library of programming tools used by software developers to write applications that are compatible with a specific operating system or graphic user interface.

110. 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.

III

Beowulf



Defines a class of Clustered Computing that focuses on minimizing the Price to Performance ratio of the overall system without compromising its capability to perform the computation work for which it is being built. Most Beowulf systems are implemented on Linux computers.

II2

Chained List



A list in which data items may be dispersed but in which each item contains an identifier for locating the next item.

II3.

Compaction



A technique used when memory is divided into variable size partitions. From time to time, the operating system shifts the partitions so that they are contiguous and so that all of the free memory is together in one block.

114. Critical Section

→ In an asynchronous Procedure of a Computer Program, a Part that cannot be executed simultaneously with an associated Critical Section of another asynchronous Procedure.

115. 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.

116. Dispatch

→ To allocate time on a Processor, to jobs or tasks that are ready for execution.

117. Crong scheduling

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

118. Job control language (JCL)

→ A problem oriented language that is designed to express statements in a job that are used to identify the job or to describe its requirements to an operating system.

119. Locality of reference

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

120. Macrokernel

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

121. Mailbox

→ A data structure shared among a number of processes that is used as a queue for messages. Messages are sent to the mailbox and retrieved from the mailbox rather than passing directly from sender to receiver.

122.

Message



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

123.

Mode switch



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

124.

Monitor.



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

125. Monolithic Kernel

→ A large kernel containing virtually the complete operating system, including scheduling, file system, device driver, and memory management. All the functional components of the kernel have access to all of its internal data structures and routines. Typically, a monolithic kernel is implemented as a single process, with all implemented as a single process, with all elements sharing the same address space.

126. Multilevel security

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

127. Multiprocessor.

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

(Q.1,

BanKer's Algorithm

Process	Allocation			max			Available		
	A	B	C	A	B	C	A	B	C
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 ₄	0	0	2	4	3	3			

Ans. Need = max - Allocation

Process	Allocation			Need			Available		
	A	B	C	A	B	C	A	B	C
P ₀	0	1	0	7	4	3	3	3	2
P ₁	2	0	0	1	2	2			
P ₂	3	0	2	6	0	0			
P ₃	2	1	1	0	1	1			
P ₄	0	0	2	4	3	1			

Consider

→ P₀, for need ≤ Available,
 $743 \leq 332$

→ P₁, $122 \leq 332$

$$\text{So new Available} = \text{Available} + \text{Allocation of } P_1 \\ = 332 + 200$$

$$\text{Available} = \underline{\underline{532}}$$

$$\rightarrow \text{For } P_2, \text{ need} = 600 \leq 532$$

$$\rightarrow \text{For } P_3, 011 \leq 532$$

$$\text{New Available} = \text{Available} + \text{Allocation of } P_3 \\ = 532 + 211$$

$$\text{Available} = \underline{\underline{743}}$$

$$\rightarrow \text{For } P_4, 0431 \leq 743$$

$$\text{New Available} = 743 + 002$$

$$\text{Available} = \underline{\underline{745}}$$

$$\rightarrow \text{For } P_0, 743 \leq 745$$

$$\text{New Available} = 745 + 010 \\ = \underline{\underline{755}}$$

$$\rightarrow \text{for } P_2, 600 \leq 755$$

$$\text{new Available} = 755 + 302 = 1057$$

The System is in Safe State.

Safe Sequence = $\langle P_1, P_3, P_4, P_0, P_2 \rangle$

Q2.

FIFO

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

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

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

→ Page faults = 15

Q.3. LRU

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

An.

7	0	1	2	0	3	0
7	7	7	2	9	2	0
0	0	0	0	1	0	.
1	1	1	1	1	3	.
1	1	1	1	1	1	.

→

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

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

→ no. of page fault = 12

Q.6. Optimal

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

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

7	0	1
4		
0		
1		

→ Page faults = 9

Q.S. FIFO

7, 3, 0, 3, 5, 6, 3

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

Page Faults = 6

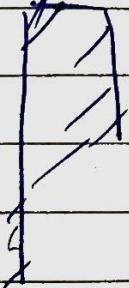
Q.6. Optimal

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

Ans.

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

→ 2 3 0 3 2 3



Page Faults = 6

**DEPARTMENT OF COMPUTER SCIENCE
ROLLWALA COMPUTER CENTRE
GUJARAT UNIVERSITY
M.C.A. -3**

ROLL NO : 21

NAME : NAMJOSHI SHUBHAM SUNILBHAI

SUBJECT : OPERATING SYSTEM

NO.	TITLE	PAGE NO.	DATE	SIGN
1	Basic salary of a person is input through the keyboard. His dearness allowance is 40% of basic salary and house rent is 20% of basic salary. Write a program to calculate the gross pay.	1	10/12/2020	
2	The distance between two cities is input through the keyboard. (in km). Write a program to convert this distance into metres, feet, inches and centimeters and display the results.	2	10/12/2020	
3	The length and breadth of a rectangle and radius of a circle are entered through the keyboard, calculate the perimeter and area of rectangle and area and circumference of the circle.	3	10/12/2020	
4	If a five digit number is entered through the keyboard, calculate the sum of its digits.	4	10/12/2020	
5	The file /etc/passwd contains info about all users. Write a program which would receive the logname during execution, obtain information about it from the file and display the information on screen in some appropriate format. (Hint : use cut) eg. Logname : , UID : , GID : , Default working directory : , Default working shell :	5	10/12/2020	
6	The script will receive the filename or filename with its full path, the script should obtain information about this file as given by "ls -l" and display it in proper format. eg. Filename : , File access permissions : , Number of links : , Owner of the file : , Group to which belongs : Size of file : , File modification date : , File modification time :	6	10/12/2020	
7	If cost price and selling price of an item are entered through the keyboard, write a program to determine whether the seller has made profit or loss. Also determine how much profit/loss is made.	7	10/12/2020	
8	Check whether the entered no. is odd or even.	8	10/12/2020	
9	Check whether the entered no. is prime or not.	9	10/12/2020	

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SUBJECT : OPERATING SYSTEM

10	Check whether the entered year is a leap year or not.	10	10/12/2020	
11	The script receives two file names as arguments, the script must check whether the files are same or not, if they are similar then delete the second file.	11	10/12/2020	
14	Write a shell script to display the date with the format :- 25th October 2005 is a Tuesday.	12	10/12/2020	
15	Write a shell script to display the appropriate message like : Good Morning / Good Afternoon / Good Evening	13	10/12/2020	
16	Write a shell script to display the menu driven interface :- 1) list all files of the current directory 2) print the current directory 3) print the date 4) print the users otherwise display "Invalid Option".	14	10/12/2020	
17	Create a menu driven calculator which asks for two integers and perform basic arithmetic operations.	15	10/12/2020	
18	Find the factorial of any number.	16	10/12/2020	
19	Display the fibonacci series upto some number.	17	10/12/2020	
20	Two numbers are entered through the keyboard, find the power, one number raised to another.	18	10/12/2020	
21	Write a script which has the functionality similar to head and tail commands.	19	10/12/2020	
22	Write a script which reports name and size of all files in a directory. whose sizes exceed 1000. The filenames should be printed in the descending order of their sizes. The total no. of files must be reported.	20	10/12/2020	
24	Print the prime nos. from 1 to 300.	21	10/12/2020	
25	Program must display all the combinations of 1, 2, and 3.	22	10/12/2020	
26	Write a script for renaming each file in the directory such that it will have the current shell PID as an extension. The shell script should ensure that the directories do not get renamed.	23	10/12/2020	
27	A file called wordfile consists of several words. Write a shell script which will receive a list of filenames, the first of which would be wordfile. The shell script should report all occurrences of each word in wordfile in the rest of the files supplied as arguments.	24	10/12/2020	
28	Write a shell script which deletes all the lines containing the word "unix" in the files supplied as arguments to it.	25	10/12/2020	
29	The word "unix" is present in only some of the files supplied as arguments to the shell script. You script should search each	26	10/12/2020	

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	of these files in turn and stop at the first file that it encounters containing the word unix. The filename should be displayed on the screen.			
30	The word "unix" is present in only some of the files supplied as arguments to the shell script. You script should search each of these files in turn and stop at the first file that it encounters containing the word unix. The filename should be displayed on the screen.	27	10/12/2020	
31	The script displays a list of all files in the current directory to which you have read, write and execute permissions.	28	10/12/2020	
32	The script receives any number of filenames as arguments. It should check whether every argument supplied is a file or directory. If it is a directory it should be reported. If it is a filename then name of the file as well as the number of lines present in it should be reported.	29	10/12/2020	
33	A script will receive any number of filenames as arguments. It should check whether such files already exist. If they do, then it should be reported, if not then check if a subdirectory "mydir" exists or not in the current directory, if it doesn't exist then it should be created and in it the files supplied as arguments should be created.	30	10/12/2020	
34	Accept the marks of 5 subjects and calculate the percentage and grade.	31	10/12/2020	
35	Print armstrog nos. from 1 to 500.	32	10/12/2020	
36	Accept the measure (angles) of a triangle and display the type of triangle. (eg. acute, right, obtuse)	33	10/12/2020	
37	Display all the numbers from 1 to 100 which are divisible by 7.	34	10/12/2020	
38	Find the largest and smallest of 3 different numbers.	35	10/12/2020	
39	Find HCF and LCM of a given no.	36	10/12/2020	
40	Display the dates falling on Sundays of the current month.	37	10/12/2020	
41	Write a shell script to list the students according to their choice of games ... Eg. Cricket : Aamir Football : Ajay Tennis : Sharukh, Salman	38	10/12/2020	
42	Write a shell script to generate summary from the sales.dat file. Sales made by 3 salesman by selling 3 products are entered in a file. Add atleast 10 records. The format is as shown below: Salesman:Product1:Product2:Product3	39	10/12/2020	

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	<p>Sample data: Mr. Abhishek Sharma:21:29:12 Mr. Akash Srivastava:11:15:28 Mr. Abhilash Dwivedi:31:04:13</p> <p>Calculate the followings :</p> <ul style="list-style-type: none"> • Total sales of the company • Highest sold product • Best salesman (who sold the most) • Worst salesman (who sold the least) 																										
43	<p>Create a file “medals.dat” which contains the details of medals won by each country in Olympics. The data in the file may be as given below :</p> <p>(Country name is Primary key.)</p> <table border="0"> <tr> <th>Country</th> <th>Gold</th> <th>Silver</th> <th>Bronze</th> </tr> <tr> <td>India</td> <td>21</td> <td>12</td> <td>15</td> </tr> <tr> <td>Pakistan</td> <td>12</td> <td>10</td> <td>08</td> </tr> <tr> <td>USA</td> <td>10</td> <td>14</td> <td>19</td> </tr> <tr> <td>Srilanka</td> <td>00</td> <td>09</td> <td>07</td> </tr> <tr> <td>.....and so on.....</td> <td></td> <td></td> <td></td> </tr> </table> <ul style="list-style-type: none"> • Write a shell script which will ask the user to enter the Country name, further modify the no. of medals for that country. • Delete all the countries who get zero Gold medals. • Calculate the total no. of medals won by each country. • Find the country with highest Gold medals. 	Country	Gold	Silver	Bronze	India	21	12	15	Pakistan	12	10	08	USA	10	14	19	Srilanka	00	09	07and so on.....				40	10/12/2020
Country	Gold	Silver	Bronze																								
India	21	12	15																								
Pakistan	12	10	08																								
USA	10	14	19																								
Srilanka	00	09	07																								
.....and so on.....																											
44	<p>Write a shell script to generate summary from a file : “student.dat” with following format :</p> <p>Student_no : student_name : gender : marks1 : marks2 :marks3</p> <p>Each field must be separated by a delimiter ‘-‘</p> <p>Process the following queries:</p> <ul style="list-style-type: none"> • Calculate the total marks of each student • Calculate the percentage of marks for each student • Count the total number of male and female students • Count the total number of students who pass and those who fail. 	41	10/12/2020																								
45	<p>A reputed MCA institute of Gujarat has students from various states. A sample file “students.dat” is shown as under :</p>	42	10/12/2020																								

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State	M	F
Gujarat	18	12
Maharashtra	12	04
M.P.	08	04
U.P.	05	00
Rajasthan	07	00

Total Male candidates are 50 and Female are 20. Write a shell script to generate a Statewise Candidate Distribution Report as under :

STATEWISE CANDIDATES LISTING

%FEMALE	STATE TOTAL	%MALE
30	GUJARAT	36
16	MAHARASHTRA	24

..... and so on.....

46	Write a Shell script to generate summary from a file "books.dat" which contains the following details :	43	10/12/2020												
	<table border="1"> <thead> <tr> <th>Field</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>No</td> <td>Numeric (4) – uniquely identifies each book.</td> </tr> <tr> <td>Title</td> <td>Alphanumeric(30) – title of the book</td> </tr> <tr> <td>Author</td> <td>Character(20) – Author of the book</td> </tr> <tr> <td>Publisher</td> <td>Character(20) – Publisher (PHI , TMH,BPB...)</td> </tr> <tr> <td>Edition</td> <td>Numeric (2)</td> </tr> </tbody> </table> <p>Sample Data:</p> <p>b1001 Programming in Java Balaguruswamy TMH Second</p> <p>b1002 Computer Networks Tanenbaum Pearson Fifth</p> <p>b1003 Operating Systems Chaudhari Jaico First</p> <p>After creating the file do the followings :</p>	Field	Description	No	Numeric (4) – uniquely identifies each book.	Title	Alphanumeric(30) – title of the book	Author	Character(20) – Author of the book	Publisher	Character(20) – Publisher (PHI , TMH,BPB...)	Edition	Numeric (2)		
Field	Description														
No	Numeric (4) – uniquely identifies each book.														
Title	Alphanumeric(30) – title of the book														
Author	Character(20) – Author of the book														
Publisher	Character(20) – Publisher (PHI , TMH,BPB...)														
Edition	Numeric (2)														

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	<ul style="list-style-type: none"> • Your script must replace all the BPB publisher with TMH. • List the titles with the name ‘Java’. • List the books written ‘Balaguruswamy • List the books which are not the first edition 															
47	<p>Create a file “election.dat” which contains the Election details for a specific city.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding-bottom: 5px;">Field</th><th style="text-align: left; padding-bottom: 5px;">Description</th></tr> </thead> <tbody> <tr> <td>Idno</td><td>Numeric - Unique</td></tr> <tr> <td>Name</td><td>Character – Voter’s Name</td></tr> <tr> <td>Sex</td><td>Character – M / F</td></tr> <tr> <td>Age</td><td>Numeric</td></tr> <tr> <td>Ward</td><td>Numeric – Ward no. / Division no. of the city.</td></tr> </tbody> </table> <p>Sample data:</p> <p style="margin-left: 40px;">e101 - abhishek - M - 35 - 44 e102 - ashutosh - M - 97 - 14 e103 - anamika - F - 21 - 50</p> <p>Suppose the same file is to be modified after 4 years. Write a shell script to simulate this process.</p> <p>Your program must update the age of all People (Add 4 years to age). In case if the age exceeds 99 then delete the record from the file, assuming that the person is dead.</p> <p>Display the election.dat and final output of your program.</p>	Field	Description	Idno	Numeric - Unique	Name	Character – Voter’s Name	Sex	Character – M / F	Age	Numeric	Ward	Numeric – Ward no. / Division no. of the city.	44	10/12/2020	
Field	Description															
Idno	Numeric - Unique															
Name	Character – Voter’s Name															
Sex	Character – M / F															
Age	Numeric															
Ward	Numeric – Ward no. / Division no. of the city.															
48	<p>In a college, students are allowed to select any one elective subject during his studies. Create two files by entering the data as mentioned below (you may skip the heading line if required) :</p> <p>File : elective.dat</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding-bottom: 5px;">Code</th><th style="text-align: left; padding-bottom: 5px;">Game</th></tr> </thead> <tbody> <tr> <td>101</td><td>AI</td></tr> <tr> <td>102</td><td>Computer Graphics</td></tr> <tr> <td>103</td><td>Parallel Processing</td></tr> </tbody> </table>	Code	Game	101	AI	102	Computer Graphics	103	Parallel Processing	45	10/12/2020					
Code	Game															
101	AI															
102	Computer Graphics															
103	Parallel Processing															

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SUBJECT : OPERATING SYSTEM

104 Data Mining

File : students.dat

RollNo. Name Code

1	Sonal	101
2	Madhu	101
3	Mahim	103
4	Esha	104

Write a shell script to list the students according to their choice of electives ...

Eg. AI :- Sonal, Madhu

Computer Graphics: -

Parallel Processing :- Mahim

Data Mining :- Esha

49	<p>Create two files: subjects.dat and students.dat containing the subject details and the student details.</p> <p>Sample data is as shown below:</p> <p>subjects.dat</p> <p>Course_id-Semester_id-Subject_id-Subject_name</p> <p>CS-1-1-FCO</p> <p>CS-1-2-FOP</p> <p>CS-1-3-SL</p> <p>CS-2-1-DS</p> <p>CS-2-2-DBMS</p> <p>CS-3-1-OS</p> <p>CS-3-2-JAVA</p> <p>faculty.dat</p> <p>Faculty_id:Semester_id:Subject_id</p> <p>F1-2-1</p> <p>F2-3-2</p> <p>F3-1-3</p> <p>F1-1-1</p> <p>Write a shell script to list the faculties and their respective subjects. Sample Output will be :</p>	46	10/12/2020	
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	F1 : FCO, DS F2 : JAVA F3 : SL			
50	<p>Create two files employee.dat and departments.dat and add atleast 10 records in the following format :</p> <p>employee.dat</p> <p>emp_id:department_id:birthdate</p> <p>e101:M1:11-01-1960 e102:C1:21-03-1973 e103:M2:21-03-1973 e104:C1:21-03-1973 e105:B1:08-10-1965 e101:M1:11-11-1964</p> <p>departments.dat</p> <p>departmend_id:department_name</p> <p>B1:Botany C1:Chemistry M1:Mathematics M2:Management</p> <p>Write a shell script to do the followings:</p> <p>1) List all the employee_ids department-wise 2) List the employee_ids born after 1970 3) List the employee_ids according to birthdate in sorted order</p>	47	10/12/2020	