Operating System – Question Bank for Final Exam – Fall 2018:
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Consider Homework 1 and Homework2 in addition to below questions:

Lecture 1

Q1\ Define Operating System

Q2\ The operating system acts as resource manager for: (list four items)

Q3\ How the operating system acts as control program.

Q4\ List the Computer System Components with brief on each item.

Q5\ Draw the diagram of the Computer System Components

Q6\ Define Kernel, system programs, and application programs.

Q7\ Explain the difference between the System Programs and Application Programs.

Q8\ Draw the diagram for Computer Startup Operation

Q9\ After loading, modern Operating Systems will _____

Q10\ Explain the difference between Hardware Interrupts and Software Interrupts.

Q11\ Why it is not possible to make programs and data to reside in main memory permanently (give two reasons)?

Q12\ Define caching

Q13\ Draw the diagram of Storage Types

Lecture 2

Q14\ Draw the diagram for Operating System Services

Q15\ List the operating System Services (For user and for system)

Q16\ Define Program execution Service.

Q17\ List Four resources that will be allocated by operating system to users and processes.

Q18\ List only the user interface types.

Q19\ What is the OS reaction to errors?

Q20\ Define System Calls, and System Programs.

Q21\ Explain the features of each user interface.type.

Q22\ List Types of System Calls with examples on each type.

Q23\ List Three most common APIs.

Q24\ List the methods used to pass parameters to the OS in a system call with brief explanation

Q25\ Define Background services.

Q26\ List the User goals for the design of operating system

Q27\ List the System goals for the design of operating system

Q28\ Draw the diagram of System Call – OS Relationship

Lecture 3

Q29\ Define "Process" and explain the difference between Process and Program.

Q30\ List process parts in memory with brief description of each.

Q31\ Draw the diagram of the process parts in memory

Q32\ List the process states with brief description of each.

Q33\ Draw the Diagram of Process States

Q34\ List the information items stored in Process Control Block (PCB)

Q35\ Define Process Scheduler, and PID.

Q36\ List the scheduling queues with brief description of each

Q37\ Draw the Diagram of Process Scheduling Queues Diagram

Q38\ List the resource sharing options between parent and child processes.

Q39\ List the Communications Models between processes

Q40\ Draw the Diagram of CPU Switch From Process to Process

Q41\ Draw the diagram of the Communications Models between processes

Q42\ Explain Process Termination

Q43\ Define Thread.

Q44\ Draw the diagram for Multithreaded Server Architecture Example

Q45\ List the benefits of multithreaded programming with brief on each.

Q46\ Explain the difference between parallelism and concurrency.

Q47\ Draw a diagram shows the difference between parallelism and concurrency.

Q48\ Using Amdahl's Law, calculate the speed up factor for moving from single processor to four processors with an algorithm that has %80 parallel part.

Q49\ According to Amdahl's Law, what will happen when the number of processors approaches one or infinite?

Q50\ Explain Implicit Threading.

Q51\ Explain the difference between process switching and thread switching.

Lecture 4

Q52\ Define CPU scheduling, CPU Scheduler, Dispatcher module, and Dispatch latency.

Q53\ List the CPU Scheduling Criteria, with brief on each.

Q54\ As a CPU Scheduling Criteria, explain the difference between Turnaround Time and Waiting Time.

Q55\ Draw the diagram of Scheduling Criteria – in Time Axis

Q56\ The purpose of Scheduling Algorithm is to maximize or minimize the below Optimization Criteria

- _____ CPU utilization
- _____ Throughput
- _____ Turnaround time

- _____ Waiting time
- _____ Response time

Q57\ Explain in brief the difference between pre-emptive and non-preemptive scheduling.

Q58\ List the Six CPU Scheduling Algorithms.

Q59\ In CPU Scheduling _____ has very long average wait times, while _____ has minimum average waiting time.

Q60\ In CPU Scheduling, Shortest-Job-First algorithm will pick the _____ job first, while in Priority Scheduling algorithm will pick the job with _____ priority first.

Q61\ Explain the difference between Internal Priorities and External Priorities.

Q62\ Priority scheduling can suffer from a major problem known as _____, and the solution for this is _____.

Q63\ Round robin scheduling is similar to FCFS scheduling, except that CPU bursts are assigned with _____.

Q64\ For below Processes table, calculate the average waiting time for the algorithms:

- First Come First Serve (FCFS)
- Shortest Job First (SJF) and
- Priority Scheduling

Process	**Burst Time**	**Priority**
P1	10	3
P2	1	1
P3	2	4
P4	1	5
P5	5	2

Q65\ Explain the features of Multilevel Queue Scheduling.

Q66\ Draw the typical diagram for Multilevel Queue Scheduling

Q67\ Explain the difference between “Multilevel Queue Scheduling” and “Multilevel Feedback Queue” Scheduling.

Q68\ List the Implementation parameters for the Multilevel Feedback Queue CPU Scheduling.

Q69\ For Multiple-Processor Systems explain the difference between Asymmetric multiprocessing and Symmetric multiprocessing

Q70\ Explain the difference between soft affinity and hard affinity.

Q71\ For Multiple-Processor Scheduling, explain Load balancing

Q72\ Explain the difference between push migration and pull migration.

Lecture 5

Q73\ Define Deadlock,

Q74\ List and describe Ways for Handling Deadlocks indicating the most common way used in Unix and Windows.

Q75\ When a deadlock occurs the system will gradually _____.

Q76\ List only the four conditions for deadlock?

Q77\ List and describe strategies for handling Deadlock after it occurs.

Q78\ Define Livelock and Zombie Process.

Lecture 6

Q79\ Define Main Memory and Cache Memory

Q80\ List the differences between RAM and ROM.

Q81\ Define Hardware Address Protection and Memory-Management Unit

Q82\ Draw the diagram for the Hardware Address Protection.

Q83\ List only the three Address Binding Schemes of a Process and indicate the one used in modern OSes.

Q84\ Explain the difference between logical address and physical address.

Q85\ Explain the difference between Static Linking and Dynamic Linking.

Q86\ What are the advantages of Dynamic Linking? (List three only).

Q87\ List the four Memory Management Approaches.

Q88\ Define Swapping, Backing store.

Q89\ Is swapping used heavily in current operating systems? What is the swapping procedures that are found on current operating systems?

Q90\ Draw a Schematic View of Swapping.

Q91\ Define Contiguous Allocation.

Q92\ Define External Fragmentation and Internal Fragmentation.

Q93\ Define Compaction and explain why it is used.

Q94\ Define Segmentation, Paging and Page Table.

Q95\ Draw the diagram of paging hardware.

Q96\ Why Page size selection is critical?

Q97\ Assuming that

Page size = 4,096 bytes

Process size = 72,766 bytes

Calculate the number of pages and internal fragmentation?

Q98\ Calculate the page table size for basic paging for below

_ Consider a 24-bit logical address space

_ Page size of 2 KB

_ If each entry is 4 bytes

Q99\ Define Associative Memory

Q100\ List only Types of Page Table Structure

Q101\ Draw the Memory Modules Types Diagram

Q102\ Explain the features of both SRAM and DRAM

Lecture 7

Q103\ Why most real processes do not need all their pages?

Q104\ What are the Benefits of Virtual Memory? (List two only)

Q105\ Draw The General Layout of Virtual Memory.

Q106\ Define Page Fault, and Thrashing.

Q107\ Draw the Steps in Handling a Page Fault.

Q108\ Draw the steps of Page Replacement.

Q109\ In the default Windows configuration, 2 GB of this virtual address space are designated for the _____ use of each process, and the other 2 GB is _____ between all processes and the operating system.

Q110\ What are procedures for improving the performance of applications under Windows?

Q111\ List the Windows monitoring tools to watch the available memory value.

Lecture 8

Q112\ In hard disk, Each working surface is divided into a number of concentric rings called _____.

Q113\ In hard disk, each track is further divided into _____.

Q114\ Define Magnetic Disk, Hot-swappable Hard Disks, Solid-State Drive (SSD), and Magnetic Tape.

Q115\ List Hard Disk interface types.

Q116\ Why SSDs are much faster than magnetic hard disks?

Q117\ SSDs are more _____ than hard drives, not as _____ as hard drives.

Q118\ Explain the difference between Disk Partitioning and Disk Formatting.

Q119\ Define Primary Partition, and Active Partition.

Q120\ There can be up to a maximum of _____ primary partitions on a single hard disk, with only _____ of them set as active.

Q121\ Draw Disk Partitioning and Formatting Diagram

Q122\ List Types of File System Formats

Q123\ How to erase mobile data? List the five steps.

Q124\ Define Storage-Area Network (SAN) and Redundant Array of Independent Disks (RAID) and Disk Bandwidth

Q125\ Draw Typical diagram for Storage-Area Network

Q126\ List only Disk Scheduling Algorithms

Q127\ List only File Attributes.

Q128\ List only File Operations.

Q129\ List only File Types.

Q130\ Explain the difference between file Sequential Access and Direct Access

Q131\ List only Directory Operations.

Q132\ Explain the difference between absolute pathnames and relative pathnames

Q133\ Define Mounting file systems

Q134\ Explain the difference between “System-Wide Open File Table” and “Per-Process Open File Table”.

Q135\ List the three Storage Blocks Allocation Methods.

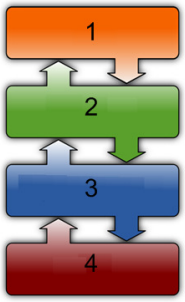
Sample of Multiple Choice Questions from Quiz 1, MidTerm, and Quiz 2:

Q1) An operating system is a program that:

A) manages the computer hardware and provides a basis for application programs
B) manages the application programs and provides a basis for computer hardware
C) manages both application programs and computer hardware
D) It provides an environment within which computer hardware can do work

Q2) In the drawing below of the Computer System Components, select the correct choice:

A) 1. Hardwar 2. OS 3. Applications 4. Users
B) 1. OS 2. Hardware 3. Applications 4. Users
C) 1. Users 2. OS 3. Applications 4. Hardware
C) 1. Users 2. Applications 3. OS 4. Hardware



Q3) _____ are associated with the operating system but not part of the kernel.

A) Application programs
B) System programs
C) Database programs
D) Office Programs

Q4) Ideally we want programs and data to reside in main memory, but it is not possible because (select two):

A) Main memory is too small to store all needed programs and data.
B) Main memory is used to execute application programs
C) Main memory loses its contents when power is turned off
D) Main memory is used to store operating system only.

Q5) Touch Screen devices require:

A) Heavy usage of mouse
B) Physical keyboard attachment
C) Action and selection is based on input command
D) None of the above

Q6) System calls are:

A) Programming interface
B) System Programs
C) Hardware interrupts
D) None of the above

Q7) The system programs that launch at boot time are called:

A) Kernel
B) Boot loader
C) Background services
D) BIOS

Q8) The operating system acts as recourse manager for the following resources

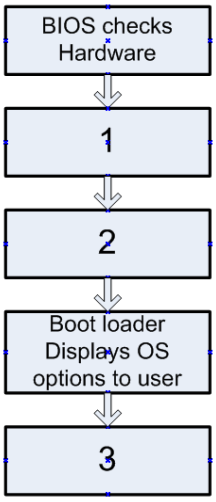
A) Processes, Programs, Applications and Users.
B) CPU time, Memory, File Storage, and I/O devices
C) Power Supply, fan, and case.
D) All the above

Q9) Application programs are:

A) associated with the operating system but not part of the kernel
B) all programs not associated with the operation of the system.
C) operating system core components
D) None of the above

Q10) In the drawing of the Computer Startup Operation, select the correct choice:

A) 1. BIOS Loads boot loader 2. boot loader loads MBR 3. MBR Loads OS
B) 1. BIOS Loads MBR 2. MBR Loads boot loader 3. Boot loader Loads OS
C) 1. BIOS Loads OS 2. OS Loads boot loader 3. boot loader loads MBR
D) 1. MBR Loads BIOS 2. BIOS Loads boot loader 3. Boot loader Loads OS



Q11) Caching is:

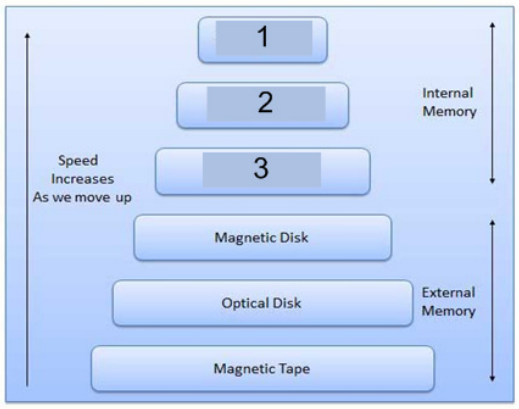
A) copying information into faster storage system permanently
B) copying information into faster storage system temporarily
C) copying information from faster storage system permanently
D) copying information from slower storage system temporarily

Q12) The _____ is the operating system core component that is running at all times on the computer.

A) Kernel
B) System Programs
C) Boot loader
D) CPU

Q13) In the drawing below of the Storage Types, select the correct choice:

A) 1. CPU registers 2. Main Memory3. Cache Memory
B) 1. CPU registers 2. Cache Memory 3. Main Memory
C) 1. Main Memory2. Cache Memory 3. CPU registers
D) 1. Cache Memory 2. CPU registers 3. Main Memory



Q14) Hardware interrupts usually occur by:

A) starting a hardware device
B) sending a signal to the CPU from specified device.
C) executing the last instruction in an application
D) executing a system call from the application program

Q15) For each type of error, OS should:

A) take the appropriate action
B) perform computer restart
C) perform disk formatting
D) kill the process that caused the error

Q16) Three most common APIs are:

A) Windows, Unix, and Android.
B) Kernel, System programs and Application Programs.
C) Win32, POSIX, and Java
D) CPU, Memory and Hard Disk.

Q17) Select the option which is NOT an example of system calls under Process Control:

A) terminate
B) debug
C) get attributes,
D) allocate memory

Q18) When passing parameters from the program to the OS through the stack, parameters are:

A) pushed by OS and popped off by the program
B) loaded into registers by the program
C) stored in a memory block.
D) pushed by the program and popped off by OS

Q19) _____ are associated with the operating system but not part of the kernel.

A) Application programs
B) Database programs
C) System programs
D) Office Programs

Q20) For each type of error, OS should:

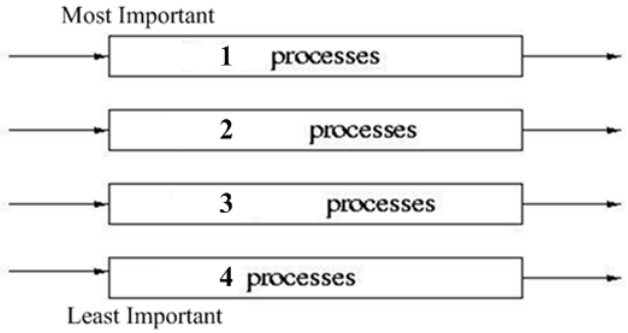
A) kill the process that caused the error
B) perform computer restart
C) perform disk formatting
D) take the appropriate action

Q21) When the process is loaded into memory, the _____section contains the program code:

A) Text
B) Data
C) Stack
D) Heap

Q22) In the diagram below for Multilevel Queue Scheduling, select the correct choice

A) 1. Batch 2. Background 3. Interactive 4. System
B) 1. System 2. Interactive 3. Background 4. Batch
C) 1. System 2. Interactive 3. Batch4. Background
D) 1. Interactive 2. System 3. Background 4. Batch



Q23) Caching is:

A) copying information into faster storage system permanently
B) copying information into faster storage system temporarily
C) copying information from faster storage system permanently
D) copying information from slower storage system temporarily

Q24) Which method is not used to pass parameters to the OS in a system call?

A) A block in memory
B) Registers
C) Flash disk
D) Stack

Q25) The Multi-threading benefit which is important for user interface is

A) Responsiveness
B) Resource Sharing
C) Economy
D) Scalability

Q26)In Priority Scheduling, internal priorities are assigned by

A) CPU
B) System Programs
C) OS
D) Users

Q27)In Symmetric multiprocessing, only one processor accesses the system data structures, while in Asymmetric multiprocessing each processor is self-scheduling

A) True
B) False

Q28) Which point is not considered a System Goal for the design of operating system?

A) cheap
B) easy to design,
C) easy to maintain
D) efficient

Q29) Dispatch latency is the amount of time

A) to execute a particular process
B) to stop one process and start another running
C) a process has been waiting in the ready queue
D) from when a request was submitted until the first response is produced, not output.

Q30) After loading, modern Operating Systems, it _____

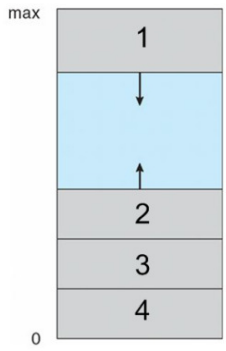
A) will ask the user to input a command
B) will wait for something to happen
C) will ask the user to select from options
D) will ask the user to click an icon

Q31) Touch Screen devices require:

A) Heavy usage of mouse
B) Physical keyboard attachment
C) Action and selection is based on input command
D) None of the above

Q32) In the drawing below of the sections of the Process Parts in Memory, select the correct choice:

A) 1. Stack 2. Heap 3. Data 4. Text
B) 1. Text 2. Stack 3. Data 4. Heap
C) 1. Heap 2. Data 3. Stack 4. Text
D) 1. Text 2. Data 3. Stack 4. Heap



Q33) In _____ scheduling, the ready queue is maintained as a circular queue

A) FCFS
B) SJF
C) Priority Scheduling
D) RR

Q34) The operating system acts as recourse manager for the following resources

A) Processes, Programs, Applications and Users.
B) CPU time, Memory, File Storage, and I/O devices
C) Power Supply, fan, and case.
D) All the above

Q35) Select the item which is not one of the operating-system service that are helpful to the system:

A) Protection and Security
B) Resource allocation
C) Anti-Virus
D) Accounting

Q36) After _____ the process will ask the OS to delete it.

A) exceeding allocated resources
B) running for a long time
C)executing last statement
D) being in ready queue for a short time

Q37)In Multilevel Queue scheduling, (select the most correct choice)

A) multiple separate queues can be established
B) jobs cannot switch from queue to queue –
C) Each queue has its own scheduling algorithm:
D) All the above

Q38)Placingmultiple processors on same physical chip, is called _____.

A) Multicore
B) Multiprogramming
C) Asymmetric multiprocessing
D) Multitasking

Q39) When passing parameters from the program to the OS through the stack, parameters are:

A) pushed by OS and popped off by the program
B) loaded in to registers by the program
C) pushed by the program and popped off by OS
D) stored in a memory block.

Q40) Inpreemptive scheduling

A) the process can not be interrupted in the middle of the execution
B) the CPU is allocated to the process till itterminates
C) there is no flexibility
D) the critical processes are allowed to access CPU as they arrive

Q41) Hardware interrupts usually occur by:

A) starting a hardware device
B) sending a signal to the CPU from specified device.
C) executing the last instruction in an application
D) executing a system call from the application program

Q42) Which item below is not an operating-system service that is helpful to the user?

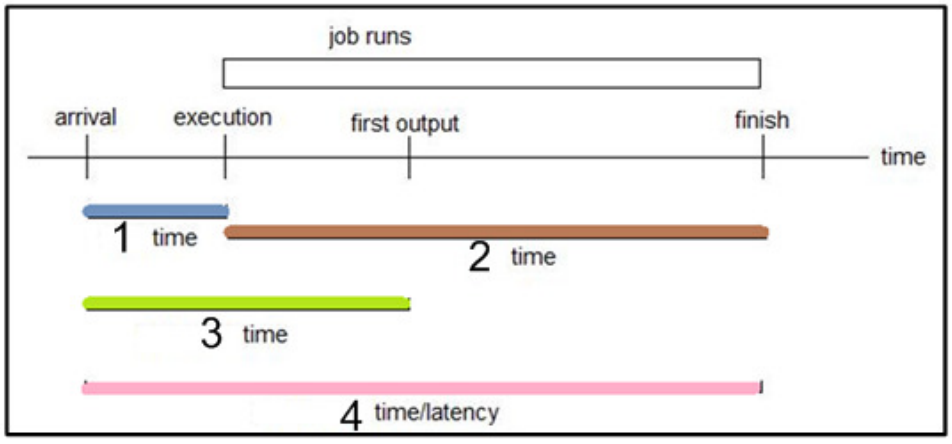
A) User interface.
B) Error Detection.
C) Program Execution.
D) Application Development.

Q43) Processes are identified by

A) IPC
B) API
C) CLI
D) PID

Q44) In the drawing below of the Scheduling Criteria – in Time Axis, select the correct choice:

A) 1. Wait 2. Run 3. Response 4. Turnaround
B) 1. Run 2. Wait 3. Response 4. Turnaround
C) 1. Wait 2. Run 3. Response 4. Turnaround
D) 1. Wait 2. Run 3. Turnaround 4. Response



Q45) Ideally we want programs and data to reside in main memory, but it is not possible because:

A) It is too small and loses its contents when power is turned off
B) It is used to execute application programs
C) It is too big for the Application data
D) It is used to store operating system only.

Q46) The system programs that launch at boot time are called:

A) Kernel
B) Boot loader
C) Background services
D) BIOS

Q47) _____ implies a system can perform more than one task simultaneously on multi-core system

A) Concurrency
B) Parallelism
C) Responsiveness
D) Scalability

Q48) In pre-emptive scheduling, the CPU is allocated to the process till it terminates or switches to waiting state (waiting for I/O).

A) True
B) False

Q49) _____ is when the system attempts to keep processes on the same processor but makes no guarantees

A) Push migration
B) Pull migration
C) Soft affinity
D) Hard affinity

Q50) System calls are:

A) Programming interface
B) System Programs
C) Hardware interrupts
D) None of the above

Q51) In Priority Scheduling, external priorities are assigned by

A) CPU
B) System Programs
C) OS
D) Users

Q52) Which point below is not a way for handling Deadlocks?

A) Prevention
B) Detection and Recovery
C) Transfer
D) Ignore

Q53) Which point below is not a condition for Deadlock?

A) Mutual Exclusion
B) Hold and Wait
C) Full Preemption
D) Circular Wait

Q54) ROM stores information permanently

A) True
B) False

Q55) Logical address is the address generated by the _____.

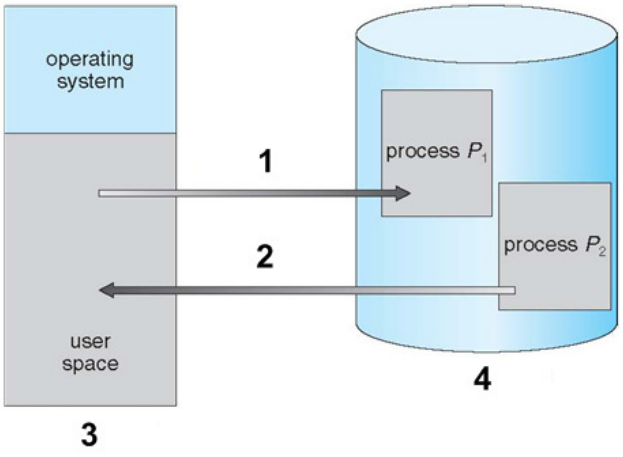
A) CPU
B) MMU
C) Cache Memory
D) I/O

Q56) _____ is a technique in which a process can be swapped temporarily out of memory to Backing Store and then brought back into memory for continued execution

A) Swapping
B) Contiguous Allocation
C) Segmentation
D) Paging

Q57) In the diagram below for Schematic View of Swapping, select the correct choice:

A) 1. Swap out 2. Swap in 3. Backing store 4. Main memory
B) 1. Swap in 2. Swap out 3. Main memory 4. Backing store
C) 1. Swap in 2. Swap out 3. Backing store 4. Main memory
D) 1. Swap out 2. Swap in 3. Main memory 4. Backing store



Group B [7 marks]

Q58) _____ are a set of blocked processes each holding a resource and waiting to acquire a resource held by another process.

A) Preemption
B) DeadLocks
C) Livelock
D) Hard affinity

Q59) Which point below is not a strategy for handling Deadlock?

A) Preemption
B) Rollback
C) Kill one or more processes
D) Circular Wait

Q60) _____ is a small-sized type of volatile computer memory that provides high-speed data access to a processor and stores frequently used computer code and data.

A) HDD
B) SSD
C) Cache Memory
D) CPU

Q61) In modern OSes the user program deals with real physical addresses only.

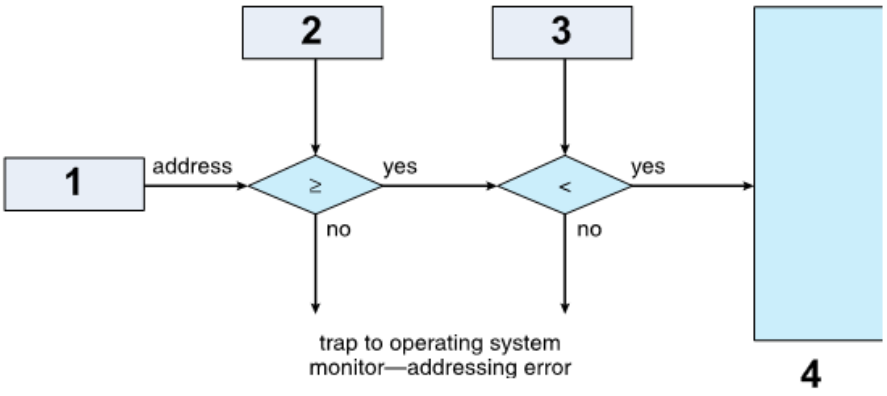
A) True
B) False

Q62) In _____ memory management approach each process should be contained in a single contiguous section of memory:

A) Swapping
B) Contiguous Allocation
C) Segmentation
D) Paging

Q63) In the diagram below for Hardware Address Protection, select the correct choice

A) 1. CPU 2. (base+limit) 3. base 4. memory
B) 1. memory 2. base 3. (base+limit) 4. CPU
C) 1. CPU 2. base 3. (base+limit) 4. memory
D) 1. CPU 2. base 3. limit 4. memory



Q64) Deadlock prevention involves:

A) Not to allow the system to get into a deadlocked state.

B) Abort a process or preempt some resources when deadlocks are detected.

C) Let deadlock happen and reboot when necessary

D) None of the above

Q65) _____ is the approach that both Windows and UNIX take to handle deadlocks.

A) Prevention

B) Detection and Recovery

C) Transfer

D) Ignore

Q66) Some advantages of Dynamic Linking and Shared Libraries are less program loading time and memory space.

A) True

B) False

Q67) In _____ memory management approach each process should be contained in a single contiguous section of memory:

A) Swapping

B) Contiguous Allocation

C) Segmentation

D) Paging

Q68) _____ is the size difference in memory when we divide memory to fixed partitions and the allocated memory may be slightly larger than requested memory.

A) External Fragmentation

B) Compaction

C) Internal Fragmentation

D) Paging

Q69) In the diagram below for Paging Hardware, select the correct choice:

A) 1. Physical address 2. Logical address 3. Page Table 4. Physical Memory

B) 1. Logical address 2. Physical address 3. Physical Memory 4. Page Table

C) 1. Physical address 2. Logical address 3. Physical Memory 4. Page Table

D) 1. Logical address 2. Physical address 3. Page Table 4. Physical Memory