Operating Systems– Question Bank for Final Exam:

Lecture 1: Introduction to OS

Q1\ Define Operating System, and Kernel

Q2\ The operating system acts as resource manager for:
1)_____, 2)_____,3)_____,and 4)_____.

Q3\ The OS acts as an intermediary between _____ and _____, and provides an _____ within Applications can do work.

Q4\ How the operating system acts as control program.

Q5\ List the Computer System Components with brief description on each item.

Q6\ Draw the diagram of the Computer System Components

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

Q8\ List the operating System Services with brief description on each of them.

Q9\ Draw the diagram for Operating System Services

Q10\ List the operating System Functions with brief description on each of them.

Q11\ What is the OS reaction to errors?

Q12\ List only the user interface types.

Q13\ CLI allows for _____

Q14\ CLI user interface is implemented by _____ or _____and commands are either _____, or _____.

Q15\ The GUI user interface Usually interacts with _____, _____, and _____.

Q16\ In GUI user interface _____ represent files, programs, and actions.

Q17\ Touchscreen devices require a lot of mouse interaction. (T/F).

Q18\ Touchscreen devices use Virtual keyboard (T/F).

Q19\ Define System Calls, API and DLL.

Q20\ List Three most common APIs.

Q21\ Most details of OS interface hidden from programmer by _____

Q22\ Draw the diagram of System Call – OS Relationship.

Q23\ List the methods used to pass parameters to the OS in a system call with brief explanation

Q24\ In _____ OS Single memory space is used while in _____ OS each task will have its own memory space.

Q25\ In single Task-OS CLI Loads program into memory, overwriting _____

Q26\ Example of Multi-Task OS is MS-DOS (T/F)

Q27\ Draw a typical Single-Task OS Memory Map

Q28\ Draw a typical Multi-Task OS Memory Map

Q29\ Define BIOS, MBR, and boot loader,

Q30\ Explain in brief the computer startup operation.

Q31\ Draw the diagram for Computer Startup Operation

Q32\ After loading, modern Operating Systems will _____

Q33\ Modern OS is _____ driven, so it will wait for something to happen by _____.

Q34\ Explain the difference between Hardware Interrupts and Software Interrupts.

Lecture 2: Processes and Threads

Q1\ Define “Process” and explain the difference between Process and Program.

Q2\ One program can be executed multiple times generating a single process.(T/F)

Q3\ List process parts in memory with brief description of each.

Q4\ Draw the diagram of the process parts in memory

Q5\ List the process states with brief description of each.

Q6\ Draw the Diagram of Process States

Q7\ List the information items stored in Process Control Block (PCB).

Q8\ Define Process Scheduler.

Q9\ List the scheduling queues with brief description of each

Q10\ Draw the Diagram of Process Scheduling Queues Diagram

Q11\ Process is identified and managed via a number called _____

Q12\ List the resource sharing options between parent and child processes.

Q13\ List the Execution options between parent and child processes.

Q14\ While process is terminating, process executes _____ and then asks the operating system to _____ using a _____, after that process resources are _____

Q15\ While process is terminating, process returns _____ from _____ to _____.

Q16\ Why Parent may terminate the execution of children processes?

Q17\ List the inter-processes communications models.

Q18\ Draw the diagram of inter-processes communications models

Q19\ Define Thread, and Implicit Threading.

Q20\ Multiple threads can not exist within one process (T/F).

Q21\ Multiple threads can execute concurrently and share resources (T/F).

Q22\ Most modern applications are single-threaded (T/F).

Q23\ Draw the diagram for Multithreaded Server Architecture Example

Q24\ List the benefits of multithreaded programming with brief on each.

Q25\ Define multi-core processor.

Q26\ Explain the difference between parallelism and concurrency.

Q27\ Draw a diagram shows the difference between parallelism and concurrency.

Q28\ According to Amdahl’s Law, what will happen when the number of processors approaches one or infinite?

Q29\ Using Amdahl’s Law, calculate the speed up factor for moving from single processor to five processors with an algorithm that has %80 parallel part.

Q30\ Using Amdahl’s Law, calculate the speed up factor for moving from single processor to ten processors with an algorithm that has %40 serial part.

Lecture 3: CPU Scheduling

Q1\ Define CPU scheduling.

Q2\ Each process will pass into cycles of _____ burst followed by _____ burst and so on.

Q3\ IO burst distribution is of main concern to the CPU scheduling (T/F).

Q4\ When CPU scheduling decisions may take place?

Q5\ List the CPU Scheduling Criteria, and define each one.

Q6\ As a CPU Scheduling Criteria, explain the difference between Turnaround Time and Waiting Time.

Q7\ Draw the diagram of Scheduling Criteria – in Time Axis

Q8\ The purpose of Scheduling Algorithm is to maximize or minimize the below Optimization Criteria

- _____ CPU utilization
- _____ Throughput
- _____ Turnaround time
- _____ Waiting time
- _____ Response time

Q9\ List the Six CPU Scheduling Algorithms.

Q10\ _____ CPU scheduling algorithm is like customers are waiting in line.

Q11\ In CPU Scheduling _____ has very long average waiting time, while _____ has minimum average waiting time.

Q12\ The difficulty in _____CPU Scheduling is knowing the length of the next CPU request

Q13\ In CPU Scheduling, Shortest-Job-First algorithm will pick the _____ job first, while in Priority Scheduling algorithm will pick the job with _____ priority first.

Q14\ Explain the difference between Internal Priorities and External Priorities.

Q15\ Priority scheduling can suffer from a major problem known as _____, and the solution for this is _____.

Q16\ Define Starvation and Aging

Q17\ Round robin CPU scheduling is similar to FCFS scheduling, except that CPU bursts are assigned with _____.

Q18\ In round robin CPU scheduling, if the process finishes its burst before the time quantum timer expires, then it is _____.

Q19\ In round robin CPU scheduling, if the timer goes off first, then the process is _____.

Q20\ The ready queue in round robin CPU scheduling is maintained as a linear queue (T/F).

Q21\ Explain the Advantages and Drawbacks of Round Robin (RR) CPU scheduling.

Q22\ In round robin CPU scheduling, explain the Good and Bad points in setting short or long Time Quantum Value

Q23\ In RR CPU Scheduling, Time Quantum should be large compared to _____ but not larger than _____

Q24\ 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	4
P2	4	7
P3	7	2
P4	18	6
P5	5	5
P6	4	8
P7	9	1
P8	13	3

Q25\ Explain the features of Multilevel Queue Scheduling.

Q26\ Draw the typical diagram for Multilevel Queue Scheduling

Q27\ Explain the difference between "Multilevel Queue Scheduling" and "Multilevel Feedback Queue" Scheduling.

Q28\ List the Implementation parameters for the Multilevel Feedback Queue CPU Scheduling.

Q29\ For Multiple-Processor Systems explain the difference between Asymmetric multiprocessing and Symmetric multiprocessing

Q30\ What are the versions of Symmetric multiprocessing? Explain the difference.

Q31\ For Multiple-Processor Systems DRAW the diagram for Single Scheduler Multiprocessing and Symmetrical Schedule multiprocessing

Q32\ For Symmetrical Schedule multiprocessing DRAW the diagram for Global Queue and Per CPU Queue.

Q33\ Define Processor affinity and explain the difference between soft affinity and hard affinity.

Q34\ For Multiple-Processor Scheduling, explain Load balancing

Q35\ Explain the difference between push migration and pull migration.

Lecture 4: Memory Management

Q35\ Why the introduction of multi-tasking OSes increases the need for complex memory management?

Q36\ Define Main Memory, Cache Memory, and Hardware Address Protection

Q37\ Hardware Address Protection is implemented using a _____ and _____ for each process.

Q38\ In Hardware Address Protection, CPU must check every _____ to be sure it is between base register and limit registers.

Q39\ Explain the difference between Static Linking and Dynamic Linking.

Q40\ List the three advantages of Dynamic Linking?

Q41\ Draw the Static Linking Diagram

Q42\ List and Define the three Address Binding Schemes of a Process.

Q43\ Define stub.

Q44\ The Address Binding Scheme used in modern OSes is _____.

Q45\ List the five Memory Management Approaches.

Q46\ _____ is one of the most primitive ways of managing memory especially done for the older operating systems.

Q47\ In Single Contiguous Model RAM is occupied by _____.

Q48\ In Single Contiguous Model process memory size is restricted by _____

Q49\ Define Partition with Contiguous Allocation Memory Management? Is it better than Single Contiguous Model?

Q50\ List the two memory parts in Partition with Contiguous Allocation Memory Management

Q51\ In Partition with Contiguous Allocation Memory Management when a process completes execution, _____ and _____.

Q52\ List the Limitations of Partition with Contiguous Allocation

Q53\ Define External Fragmentation, Internal Fragmentation, and Compaction and explain why it is used.

Q54\ Draw simple diagrams for External Fragmentation, Internal Fragmentation, and Compaction.

Q55\ Define Swapping, and Backing store.

Q56\ Is swapping used heavily in modern operating systems?

Q57\ Does the swapped out process need to swap back into same physical addresses? Explain based in addressing scheme used.

Q58\ What is the swapping procedures that are found on current operating systems?

Q59\ Draw a Schematic View of Swapping.

Q60\ Define Segmentation.

Q61\ In Segment Descriptor Table each row refers to _____

Q62\ Draw the diagram of “Address Mapping with Segmentation”.

Q63\ Define Paging, Page Table, Associative Memory, Basic Paging, and Hierarchical Paging.

Q64\ In Paging, physical address space of a process should be contiguous (T/F).

Q65\ Paging eliminates _____ , but it still suffers from _____.

Q66\ In Paging to load a process of size S where (N-1) pages < S < (N) pages, it is required to find _____ free frames to load the process.

Q67\ Why Page size selection is critical?

Q68\ Draw The Basic Paging Diagram

Q69\ Explain the difference between Basic Paging and Hierarchical Paging.

Q70\ In Shared Pages: one copy of _____ code shared pages can be shared among processes, while sharing of _____ pages is useful for inter-process communication.

Q71\ Draw the diagram of Shared Pages Diagram

Q72\ Define Virtual Memory and Memory-Management Unit

Q73\ Since the hard drive is much slower than the RAM, data stored in virtual memory must be _____

Q74\ Why most real processes do not need all their pages?

Q75\ Explain the difference between logical address and physical address.

Q76\ Logical and physical addresses differ in _____ address-binding scheme.

Q77\ The user process deals with _____ addresses.

Q78\ In virtual memory, Logical address space can therefore be much larger than physical address space (T/F).

Q79\ There is a global system-wide page table for all processes. (T/F).

Q80\ What are the Benefits of Virtual Memory?

Q81\ Draw The General Layout of Virtual Memory.

Q82\ Define Page Fault, Page Replacement, Thrashing, and Memory Leak.

Q83\ What are procedures for improving the performance of applications under Windows?

Q84\ List the Windows monitoring tools to watch the available memory value.

Q85\ Describe the steps of defragmenting the Hard Drive containing the paging file.

Lecture 5: Mass Storage and File System

Q1\ Define Magnetic Disk.

Q2\ In hard disk, each platter has _____ working surfaces

Q3\ In hard disk, each working surface is divided into a number of concentric rings called _____.

Q4\ In hard disk, each track is further divided into _____.

Q5\ In hard disk, the data on a hard drive is read by read-write _____.

Q6\ Explain how to calculate the storage capacity of a traditional magnetic disk drive.

Q7\ Hard disks are addressed as large _____ of logical blocks.

Q8\ In hard disk, sector 0 is the _____sector of the _____track on the _____ cylinder

Q9\ Explain the difference between Disk Partitioning and Disk Formatting.

Q10\ Define Primary Partition, Active Partition, Extended Partition, and Logical Partition.

Q11\ In MBR partition table, there can be up to a maximum of _____ primary partitions on a single hard disk, with only _____ of them set as active.

Q12\ Draw Disk Partitioning and Formatting Diagram

Q13\ List and define Types of File System Formats

Q14\ FAT32 is _____ with almost all operating system, but it supports file size of _____ only.

Q15\ How to erase mobile data? List the five steps.

Q16\ Define Disk Bandwidth, File, and Folder.

Q17\ List and define Disk Scheduling Algorithms

Q18\ List only File Attributes.

Q19\ List only File Operations.

Q20\ List only File Types.

Q21\ Explain the difference between file Sequential Access and Direct Access

Q22\ List only Directory Operations.

Q23\ Explain the difference between absolute pathnames and relative pathnames

Q24\ Define Mounting file systems

Q25\ If devices will not automatically mount an SD card or USB Flash after the card is inserted, a mount _____ is used to mount it.

Q26\ Explain the difference between “System-Wide Open File Table” and “Per-Process Open File Table”.

Q27\ When a file is accessed during a program, the FCB will be stored in the _____, and an entry is added to the _____ referencing the _____.

Q28\ When opening a file by the open( ) system call, an index into the per-process table returned by this process is referred by Linux as _____, while in Windows as _____.

Q29\ List, explain, and draw the three Disk Allocation Methods.

Q30\ Define Hot-swappable Hard Disks, and Magnetic Tape.

Q31\ Define Storage-Area Network (SAN) and Redundant Array of Independent Disks (RAID).

Q32\ Draw Typical diagram for Storage-Area Network

Lecture 6: Deadlock

Q1\ Define Deadlock

Q2\ What will happen to the system when deadlock occurs? Explain the reason?

Q3\ Draw the Basic Deadlock Diagram.

Q4\ Deadlocks can be avoided by avoiding _____ of the its conditions

Q5\ List only the four deadlock conditions?

Q6\ As a Deadlock Condition, _____ means only one process at a time can use a resource

Q7\ As a Deadlock Condition, Hold and Wait means a process holding resource is waiting to acquire additional resources held by _____

Q8\ List only the ways for handling Deadlock. Which way is used by modern OS?

Q9\ Deadlock Prevention means _____.

Q10\ Deadlock detection and recovery means _____ or _____ when deadlocks are detected

Q11\ In Resource Allocation Graph, a directed edge from a processes to a resource, Pi->R j, implies that _____.

Q12\ In Resource Allocation Graph, a directed edge from a resource to a process, Rj->Pi, implies that _____.

Q13\ If the Resource Allocation Graph has no cycles, deadlock _____.

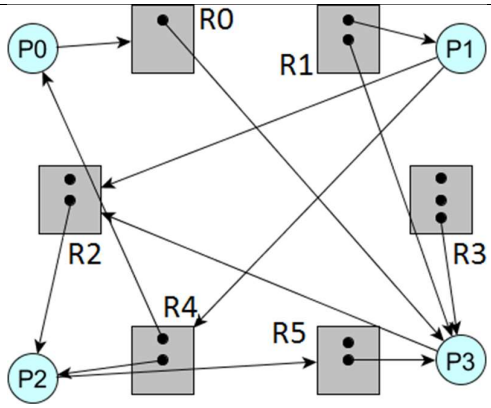
Q14\ If the Resource Allocation Graph has a cycle, deadlock _____.

Q15\ Define Livelock. What is the difference from deadlock?

Q16\ Define Zombie Process

Q17\ If Zombie Processes are accumulating at a very quick rate, then _____

Q18\

Q1\ Which resources are assigned to P0? Q2\ Which resources are requested by P1? Q3\ Which processes are using resource R5? Q3\ Which processes are requesting resource R2?	

Lecture 7: Windows

Q1\ The Windows share from the Desktop OS Market is around _____, while the Windows share from the Server OS Market is around _____.

Q2\ _____ is a non-graphical line-oriented, command driven, single-user, and single-tasking operating system by Microsoft.

Q3\ For Windows 1.0 to 3.0, explain the new feature in each version.

Q4\ Which version of windows introduced the taskbar, and the 'Start' button?

Q5\ The support for mixed-case long filenames had started in MSDOS (T/F).

Q6\ Which version of windows introduced the Standby and Hibernate modes?

Q7\ Which version of windows introduced the System Restore feature?

Q8\ Windows ME was criticized for speed and stability issues (T/F).

Q9\ _____ was the first desktop OS to support active directory.

Q10\ Which version of windows was first with product activation to reduce software piracy?

Q11\ Which version of windows supported virtual hard disks?

Q12\ In _____ user interface has focused on tablets users, including a touch-optimized shell.

Q13\ Which version of windows supported Microsoft's intelligent personal assistant Cortana?

Q14\ Define Windows Server Family.

Q15\ Windows Server's Family includes features and tools for managing and maintaining networks, such as _____ and _____.

Q16\ The minimum requirement for Windows 11 are: a processor speed of _____ and RAM of _____ and a storage of _____ .

Q17\ List only the Security features of Windows 11.

Q18\ If it is required to buy Windows 2022 Server for a small company with 20 users and 30 computers, what is the best edition?

Q19\ If it is required to buy Windows 2022 Server for a large company with 200 users and 300 computers, what is the best edition?

Q20\ If it is required to buy Windows 2022 Server for a highly virtualized environment, what is the best edition?

Q21\ Define CAL.

Q22\ List only three expected future trends in Windows?

Q23\ Define Registry and explain why it is usually attacked by viruses and other malicious software?

Q24\ For the Registry five top level branches below, relate to their usage

Top Level Branch	Usage
HKEY_CLASSES_ROOT	Hardware, software, preferences for all users
HKEY_CURRENT_CONFIG	Contains file types
HKEY_CURRENT-USER	Individual preferences for each user,
HKEY_LOCAL_MACHINE	Links for current hardware
HKEY_USERS	Logged in user name, desktop, start menu

Q25\ Define Active Directory and list three functions of it.

Q26\ List only Six Active Directory Features?

Q27\ AD Physical structure consists of _____ and _____ configured as _____.

Q28\ Define Active Directory Site

Q29\ List Domain Controller responsibilities?

Q30\ Microsoft recommends at least _____ DCs in every domain for fault tolerance and load balancing.

Q31\ Define Organizational Unit, and list the OU objects.

Q32\ In active directory define Domain, Tree, and Forest.

Q33\ Draw the diagram of Active Directory Logical Structure.

Q34\ Small to medium companies usually have _____ domain; larger companies may have _____ domains to separate geographical regions or administrative responsibilities.

Q35\ Relate the type of each organization with typical Active Directory Logical structure

Organization Type	Typical AD Logical Structure
Small to Medium Organizations	a Forest with multiple existing trees
Large Organizations	single domain
Merged Organizations	Tree with several domains

Q36\ Define User account object, computer account object, and Group Object.

Q37\ Windows Domain creates two built-in user accounts: _____ and _____

Q38\ List the security levels of the Active Directory.

Q39\Define GPO and list its functions.

Q40\ Explain the difference between “Default Domain Policy” and “Default Domain Controllers Policy”

Q41\ Define Active Directory Trust Relationship.

Q42\ By default, domains in the same forest are not trusting each other (T/F).

Q43\ Draw the diagram of Active Directory Trust Relationship.

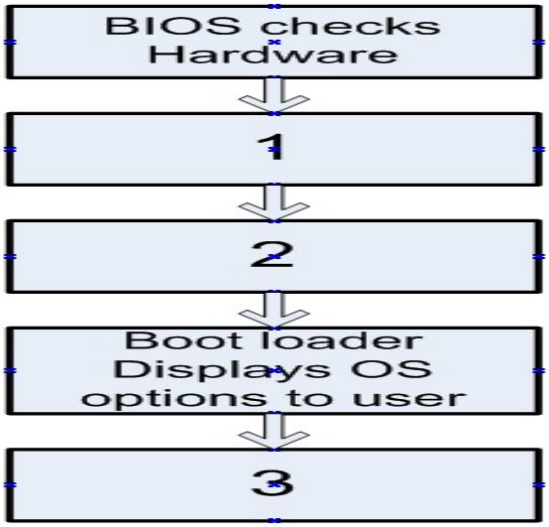
Sample of Questions:

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 of the Computer Startup Operation, select the correct choice: [2 marks]

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



Q3) The System Call Parameter Passing method that limits the number of parameters being passed is_____.