

**MIZORAM PUBLIC SERVICE COMMISSION**

**TECHNICAL COMPETITIVE EXAMINATIONS FOR RECRUITMENT TO THE POST OF  
INSPECTOR OF LEGAL METROLOGY  
UNDER FOOD, CIVIL SUPPLIES & CONSUMER AFFAIRS, GOVT. OF MIZORAM  
NOVEMBER, 2023**

**COMPUTER SCIENCE & ENGINEERING  
PAPER-II**

Time Allowed : 2 hours

Full Marks : 200

*All questions carry equal marks of 2 each.*

*Attempt all questions.*

1. Which type of OS handles multiple tasks one at a time and finishes each task before moving to the next one?
  - (a) Interactive OS
  - (b) Real-time OS
  - (c) Batch OS
  - (d) Time-sharing OS
2. What is the primary function of protection mechanisms in an OS?
  - (a) Enhancing the security of CPU
  - (b) Ensuring data privacy
  - (c) Managing hardware resources
  - (d) Do not allow processes to communicate
3. What is a critical section in the context of concurrent processes?
  - (a) A part of memory with restricted access
  - (b) A section of code that must be executed atomically
  - (c) A process with high priority
  - (d) A part of the hard disk with critical data
4. Which scheduling algorithm aims to minimize the turn around time of processes?
  - (a) Round Robin
  - (b) First-Come, First-Served
  - (c) Shortest Job Next
  - (d) Priority Scheduling
5. What is a common method for deadlock detection in OS?
  - (a) Hold and Wait
  - (b) Resource allocation graph
  - (c) Increasing resource allocation
  - (d) Mutual exclusion
6. What is the purpose of virtual memory in an OS?
  - (a) Reducing disk space usage
  - (b) Expanding address space
  - (c) Enhancing physical memory performance
  - (d) Increasing disk space usage
7. Which page replacement algorithm aims to minimize page faults in OS?
  - (a) FIFO
  - (b) LRU
  - (c) LIFO
  - (d) Random
8. Which file organization method allows for direct access to any record based on a key?
  - (a) Sequential
  - (b) Indexed
  - (c) Hashed
  - (d) Linked

9. Which type of OS is designed to respond to external events within a specified time frame?
  - (a) Batch OS
  - (b) Real-time OS
  - (c) Interactive OS
  - (d) Time-sharing OS
10. What is the purpose of demand paging in virtual memory management?
  - (a) Expanding physical RAM
  - (b) Reducing page faults
  - (c) Decrease virtual memory
  - (d) Preventing access to main memory
11. What is the primary advantage of multiprogramming with fixed partitions?
  - (a) Efficient memory utilization
  - (b) Faster CPU processing
  - (c) Simplicity of implementation
  - (d) Better disk I/O performance
12. What is the primary role of a semaphore in synchronization?
  - (a) Preventing mutual exclusion
  - (b) Avoiding synchronization
  - (c) Ensuring mutual exclusion
  - (d) Handling memory operations
13. Which scheduling algorithm is known for its fairness in allocating CPU time among processes?
  - (a) Shortest Job Next
  - (b) First-Come, First-Served
  - (c) Round Robin
  - (d) Priority Scheduling
14. What does the term "deadlock" refer to in the context of operating systems?
  - (a) A process that is stuck in an infinite loop
  - (b) A process waiting for I/O
  - (c) A situation where processes are unable to proceed due to resource conflicts
  - (d) A process with a higher priority waiting for process with lower priority
15. In the context of CPU scheduling, what is "priority inversion"?
  - (a) A low-priority process preempting a high-priority process
  - (b) A change in priority of the processes
  - (c) A high-priority process waiting for a low-priority process
  - (d) The priority of a process reaching the maximum
16. What is the main advantage of multiprogramming with variable partitions over fixed partitions?
  - (a) Simpler memory management
  - (b) Efficient memory utilization
  - (c) Better I/O performance
  - (d) Faster process execution
17. In virtual memory management, what is "working set"?
  - (a) The portion of memory containing OS code
  - (b) A set of pages that are actively used by a process
  - (c) The total memory space allocated to a process
  - (d) A cache for file data
18. What is the primary purpose of I/O buffering in an operating system?
  - (a) Increase the speed of I/O
  - (b) Storing I/O requests temporarily to synchronize operation
  - (c) Decrease the speed of I/O
  - (d) Managing hardware resources
19. Which disk scheduling algorithm aims to minimize the seek time of the disk arm?
  - (a) SCAN
  - (b) C-SCAN
  - (c) LOOK
  - (d) SSTF

20. What is "process migration" in a multiprocessor environment?
  - (a) Terminating processes that exceed CPU time limits
  - (b) Moving processes to different memory partitions and CPUs
  - (c) Distributing processes across CPUs for load balancing
  - (d) Moving one process to another process
21. Which scheduling algorithm uses time quantum or time slice for CPU allocation?
  - (a) Shortest Job Next
  - (b) Priority Scheduling
  - (c) Round Robin
  - (d) First-Come, First-Served
22. In the context of concurrent processes, what is a "race condition"?
  - (a) A condition where processes compete for CPU to finish execution
  - (b) A condition where two processes try to access shared data simultaneously, leading to unpredictable results
  - (c) A condition where processes execute one after the other
  - (d) A condition where a process waits indefinitely for a resource
23. In memory management, what is "compaction"?
  - (a) Reducing the size of a process
  - (b) Reallocating memory segments to different processes
  - (c) Combining fragmented free memory blocks into a contiguous block
  - (d) Decreasing the size of a page table
24. What is "page thrashing" in the context of virtual memory management?
  - (a) A condition that frequently causes page faults
  - (b) Frequent page replacement, causing a drop in performance
  - (c) A page that consumes excessive CPU time
  - (d) A process stuck in a deadlock
25. In the context of disk scheduling, what is "elevator algorithm"?
  - (a) A method for sorting disk files alphabetically
  - (b) A method for scheduling disk I/O requests using a round-robin approach
  - (c) A method for optimizing seek time by moving the disk arm in one direction
  - (d) A method for scheduling disk I/O requests one after the other
26. In the context of process scheduling, what is a "ready queue"?
  - (a) A queue for terminated processes
  - (b) A queue for processes waiting for I/O operations
  - (c) A queue for processes waiting to be executed
  - (d) A queue for processes that have completed execution
27. What does "context switching" refer to in the context of process scheduling?
  - (a) Moving a process to a different CPU
  - (b) Allocating CPU time to different processes
  - (c) Switching the CPU from one process to another
  - (d) Switching the context of a process by changing its data
28. What is the primary goal of "segmentation" in memory management?
  - (a) Dividing memory into equal-sized parts
  - (b) Dividing memory into variable-sized parts
  - (c) Minimizing page faults
  - (d) Minimizing the number of processes in the main memory

29. What does “system call interposition” refer to in operating system design?
- (a) System call to perform memory allocation
  - (b) Terminating processes by performing system call
  - (c) Intercepting system calls to add or modify functionality
  - (d) Intercepting system calls to nullify the operation
30. What is “cache coherence” in cache memory organization?
- (a) Storing frequently accessed data in cache
  - (b) Ensuring that data in different cache levels is synchronized
  - (c) Maintaining coherence between cache, memory and CPU
  - (d) Synchronizing the cache and main memory
31. What is the primary purpose of a “device driver” in an operating system?
- (a) Allocating CPU time to device operations
  - (b) Managing external hardware device resources
  - (c) Handling device-specific operations and communication
  - (d) Detecting available devices
32. What is “cache associativity” in cache memory organization?
- (a) The number of cache levels and their association in a system
  - (b) The way cache lines are mapped to specific locations in memory
  - (c) The amount of data stored in different cache levels
  - (d) The speed at which cache operates
33. In the context of process scheduling, what is “preemption”?
- (a) The termination of processes to avoid deadlock
  - (b) The voluntary release of CPU by a process
  - (c) The forced interruption of a running process to allow other processes to execute
  - (d) The allocation of CPU time based on process priority
34. In the context of process scheduling, what is “starvation”?
- (a) A condition where processes compete for resources
  - (b) A condition where a process is waiting for CPU indefinitely
  - (c) A condition where processes are unable to proceed due to resource conflicts
  - (d) A condition where a process receives very less CPU time allocations
35. In the context of file systems, what is a “cluster” in file organization?
- (a) A data structure that stores file metadata
  - (b) A table of file access permissions
  - (c) The smallest unit of disk space allocated to a file
  - (d) A cache for file data
36. \_\_\_\_\_ is unique to each process operating on the file and therefore must be kept separate from the on-disk file attributes.
- (a) File pointer
  - (b) File ID and File-open count
  - (c) Disk location of the file
  - (d) Access rights
37. An \_\_\_\_\_ behaves like a writer lock; only one process at a time can acquire such a lock.
- (a) Shared file lock
  - (b) Exclusive file lock
  - (c) Inclusive file lock
  - (d) Mandatory file lock

38. The system uses the \_\_\_\_\_ to indicate the type of the file and the type of operations that can be done on that file
- (a) Size
  - (b) Location
  - (c) Date Time
  - (d) Extension
39. Which of the following techniques always reads or write a large block of data, which contains several file records, from or to the I/O medium?
- (a) Buffer of records
  - (b) Blocking of records
  - (c) Buffering and blocking of records
  - (d) None of the above
40. In Deadlock Prevention Scheme, to ensure that the hold-and-wait condition never occurs in the system if:
- (a) At least one resource must be non-sharable
  - (b) At least one resource must be sharable
  - (c) Whenever a process requests a resource, it does not hold any other resources
  - (d) Whenever a process requests a resource, it always hold another resource
41. In OOP, what is the purpose of encapsulation?
- (a) To create objects that are encapsulated by other objects
  - (b) To hide the implementation details of a class
  - (c) To define operators that are hidden
  - (d) To declare variables and functions
42. What is the purpose of the "this" pointer with regards to class and object?
- (a) To access the global variables of a class
  - (b) To reference the current object
  - (c) To declare static member functions of a class
  - (d) To reference the current class
43. Which type of operators cannot be overloaded in C++?
- (a) Arithmetic operators (e.g., +, -, \*, /)
  - (b) Scope Resolution Operator (::)
  - (c) Comparison operators (e.g., <<, >>) scop
  - (d) Logical operators (e.g., &&, ||)
44. What is a pure virtual function in C++?
- (a) A function with an empty body
  - (b) A function that cannot be inherited
  - (c) A function that must be overridden in derived classes
  - (d) A function that cannot have parameters
45. In OOP, what does the term "polymorphism" refer to?
- (a) The ability of a class to have multiple constructors
  - (b) The ability of a class to have multiple destructors
  - (c) The ability of an object to take on multiple forms
  - (d) The ability to create multiple objects from a class
46. What is the order of destruction of objects when they go out of scope?
- (a) In the order of their creation
  - (b) In reverse order of their creation
  - (c) In random order
  - (d) It depends on the compiler
47. Which of the following is NOT a benefit of using OOP concepts?
- (a) Code reusability
  - (b) Improved code organization
  - (c) Increased program execution speed
  - (d) Enhanced code maintenance

48. What is the purpose of the “new” keyword ?
- (a) To define a new class in the program
  - (b) To allocate memory for an object on the heap
  - (c) To create a new function
  - (d) To define new constructor
49. What is the difference between a shallow copy and a deep copy of an object?
- (a) Shallow copy copies the object’s data, while deep copy copies the object’s address
  - (b) Shallow copy copies the object’s address, while deep copy copies the object’s data
  - (c) Shallow copy copies object’s data only once, while deep copy copies the object’s data more than once
  - (d) Shallow copy and deep copy are the same thing
50. Which of the following statements about constructors is true?
- (a) A class can have multiple constructors with the same parameter list
  - (b) A constructor can have a return type
  - (c) A constructor is automatically called when an object is created
  - (d) Constructors cannot have parameters
51. Which of the following is NOT an example of a unary operator?
- (a) ++
  - (b) -
  - (c) \*
  - (d) /
52. What is the purpose of the “protected” access specifier in C++?
- (a) To make a class member inaccessible from outside the class
  - (b) To specify that a member should be accessible only within the same file
  - (c) To declare a member as static
  - (d) To allow derived classes to access the member
53. What is a default constructor?
- (a) A constructor that is automatically generated by the compiler
  - (b) A constructor that takes no parameters
  - (c) A constructor that creates objects with random values
  - (d) A constructor that is used to initialize objects
54. In OOP, what is “composition”?
- (a) A technique for defining classes with only static members
  - (b) A design approach where a class contains objects of other classes as members
  - (c) A method for creating multiple objects from a single class
  - (d) A way to create objects with shared data members
55. Which type of inheritance allows a class to inherit from several base classes?
- (a) Single inheritance
  - (b) Multiple inheritance
  - (c) Multilevel inheritance
  - (d) Hierarchical inheritance
56. A non-member function cannot access which data of the class?
- (a) Private data
  - (b) Public data
  - (c) Protected data
  - (d) All of the above
57. \_\_\_\_\_ member variables are initialized to zero when the first object of its class is created.
- (a) Local
  - (b) Static
  - (c) Global
  - (d) External

58. The \_\_\_\_\_ constructor is invoked when an object is passed by value to a function.
- (a) Parameterized Constructor
  - (b) Default Constructors
  - (c) Copy Constructor
  - (d) Constructor of the function
59. In which type of inheritance does one class act as a superclass for more than one sub-class?
- (a) Hybrid inheritance
  - (b) Multiple inheritances
  - (c) Hierarchical inheritance
  - (d) Multilevel inheritance
60. The default visibility mode in inheritance is \_\_\_\_\_.
- (a) Protected
  - (b) Public
  - (c) Private
  - (d) There is no default mode
61. This is the type of inheritance in which the implementation of a superclass is incomplete.
- (a) Partial inheritance
  - (b) Multiple inheritances
  - (c) Virtual inheritance
  - (d) Hybrid inheritance
62. Which feature of OOP helps in code reusability?
- (a) Abstraction
  - (b) Polymorphism
  - (c) Encapsulation
  - (d) Inheritance
63. What happens when an object is passed by reference?
- (a) Destructor is called at end of function
  - (b) Destructor is called when called explicitly
  - (c) Destructor is not called
  - (d) Destructor is called when function is out of scope
64. Instance of which type of class can't be created?
- (a) Parent class
  - (b) Abstract class
  - (c) Anonymous class
  - (d) Nested class
65. Multiple catch blocks \_\_\_\_\_
- (a) Are mandatory for each try block
  - (b) Can be combined into a single catch block
  - (c) Are not possible for a try block
  - (d) Can never be associated with a single try block
66. Which features of OOP are extensively used in implementing inheritance?
- (a) Dynamic binding
  - (b) Abstraction
  - (c) Operator overloading
  - (d) Polymorphism
67. A \_\_\_\_\_ object which exists for a particular period.
- (a) Static objects
  - (b) Dynamic objects
  - (c) External objects
  - (d) Automatic objects
68. A \_\_\_\_\_ object is an object which has the scope of an automatic object but the lifetime of an external object.
- (a) Static objects
  - (b) Dynamic objects
  - (c) External objects
  - (d) Automatic objects
69. Which one of the following is not the characteristic of a constructor?
- (a) Constructors can be virtual
  - (b) Constructors cannot be referred by their address
  - (c) Constructors cannot be inherited
  - (d) Constructors are called automatically
70. \_\_\_\_\_ is associated with polymorphism and inheritance.
- (a) Message parsing
  - (b) Abstraction
  - (c) Dynamic Binding
  - (d) Encapsulation

71. The primary purpose of Back-face Removal Algorithms in 3-D computer graphics is
- (a) To remove hidden lines from the scene
  - (b) To remove surfaces that are facing away from the viewer
  - (c) To remove surfaces that are facing towards the viewer
  - (d) To remove surfaces that are partially visible
72. In computer graphics, what does the term "clipping" refer to?
- (a) The process of removing hidden lines
  - (b) The process of removing surfaces that are not visible to the viewer
  - (c) The process of determining the illumination of a 3-D scene
  - (d) The process of removing parts of an object that are outside the view pane
73. The primary purpose of illumination and rendering in computer graphics is
- (a) To highlight and remove hidden lines
  - (b) To determine the visibility and lighting of surfaces
  - (c) To determine the color and shading of objects in a scene
  - (d) To perform 3-D transformations
74. What are the key benefits of using Hidden Line Removal in 3D computer graphics?
- (a) Improved rendering efficiency and realism
  - (b) Enhanced color mapping
  - (c) Faster CPU processing
  - (d) Increased polygon count
75. Which curve generation algorithm provides greater control over the shape of the curve by using control points?
- (a) Hermite
  - (b) Hidden line method
  - (c) B-spline
  - (d) Projection
76. In 3-D computer graphics, what does the term "rendering" refer to?
- (a) Displaying a 2-D scene on a 3-D screen
  - (b) Creating a 3-D model
  - (c) Displaying a 3-D scene on a 2-D screen
  - (d) Transforming objects in 3-D space
77. Which of the following is an example of a 3-D primitive?
- (a) Line
  - (b) Point
  - (c) Sphere
  - (d) Triangle
78. In the context of 3-D computer graphics, what is the primary purpose of the "projection" step?
- (a) Determining hidden lines
  - (b) Changing the orientation of objects
  - (c) Converting 3-D coordinates to 2-D coordinates
  - (d) Illuminating the scene
79. Which of the following is NOT a common hidden surface removal algorithm?
- (a) Z-buffering
  - (b) Scan Line
  - (c) Bezier algorithm
  - (d) Painter's algorithm
80. Which type of curve generation algorithm is known for its ease of use, ability to create smooth and continuous curves between control points?
- (a) Hermite
  - (b) Hidden line method
  - (c) Bezier
  - (d) Clipping
81. Which of the following is a 3-D transformation that involves changing the position of an object without changing its orientation or shape?
- (a) Scaling
  - (b) Translation
  - (c) Rotation
  - (d) Clipping



82. The primary purpose of the "rendering pipeline"
- (a) To remove hidden lines
  - (b) To determine the orientation of objects
  - (c) To process and display 3-D scenes
  - (d) To create 3-D primitives
83. Which illumination model simulates the interaction of light with surfaces by considering factors such as diffuse and specular reflection?
- (a) Flat shading
  - (b) Gouraud shading
  - (c) Phong shading
  - (d) Orthographic shading
84. The number of points displayed on a CRT is referred to as:
- (a) Resolutions
  - (b) Pixels
  - (c) Shadow-mask
  - (d) Colors
85. Picture definition in Raster-Scan is stored in:
- (a) Image buffer
  - (b) Frame buffer
  - (c) Pixel buffer
  - (d) Bitmap
86. Which is NOT an advantage of Bresenham's Line Algorithm?
- (a) Simplicity
  - (b) Avoids duplicate points generation
  - (c) Does not involve floating point calculations
  - (d) Draw smooth lines
87. Data structure that is used to store a pattern and duplicate it to many places on the image or on the screen.
- (a) Pixels
  - (b) Bitmap
  - (c) Frame buffer
  - (d) Image buffer
88. Why is Boundary-fill algorithm better than Flood-fill algorithm?
- (a) It is simple
  - (b) Can process image containing more than one boundary colours
  - (c) Memory consumption is less
  - (d) Complexity is less
89. A transformation where an object is moved to a different position on the screen.
- (a) Mapping
  - (b) Translation
  - (c) Scaling
  - (d) Rotating
90. Multiplying the original coordinates by the transformation factors to either expand or compress the dimensions of an object is performed in
- (a) Rotation
  - (b) Scaling
  - (c) Mapping
  - (d) Translation
91. A transformation that slants the shape of an object is called
- (a) Scaling
  - (b) Rotation
  - (c) Reflection
  - (d) Shear
92. Which of the following is True?
- (a) Matrix multiplication is always commutative
  - (b) Matrix addition is not commutative
  - (c) Matrix multiplication may not be commutative
  - (d) Matrices cannot be added or multiplied
93. If we translate a shape with 2 successive translation vectors:  $(t_{x1}, t_{y1})$  and  $(t_{x2}, t_{y2})$ , it is equal to
- (a) a single translation of  $(t_{x2}, t_{y2})$
  - (b) a single translation of  $(t_{x1} + t_{x2}, t_{y1} + t_{y2})$
  - (c) a single translation of  $(t_{y2}, t_{x2})$
  - (d) a single translation of  $(t_{x1} + t_{y1}, t_{x2} + t_{y2})$

94. What is true with regards to Scaling?
- (a) 2 successive scaling w.r.t. the origin is additive
  - (b) 2 successive scaling w.r.t. the origin gives you the original co-ordinates
  - (c) 2 successive scaling w.r.t. the origin is multiplicative
  - (d) 2 successive scaling w.r.t. the origin is additive and multiplicative
95. The section of the screen where the images encompassed by the window on the world coordinate system will be drawn
- (a) Window screen
  - (b) Pixel
  - (c) Viewport
  - (d) Bitmap
96. Which line clipping algorithm considers only whether its endpoints lie entirely inside or outside the window for clipping?
- (a) Liang-Barsky algorithm
  - (b) Cyrus-Beck algorithm
  - (c) Sutherland-Hodgman algorithm
  - (d) Cohen-Sutherland algorithm
97. How many types of edges does Sutherland-Hodgman algorithm encounters to perform clipping?
- (a) 2
  - (b) 5
  - (c) 4
  - (d) 1
98. Which method is used to represent simple Euclidean objects?
- (a) Procedural methods
  - (b) Polygon and Quadric surfaces
  - (c) Spline surfaces
  - (d) Octree Encoding
99. The following projection produces realistic views but does not preserve relative proportions.
- (a) Parallel projection
  - (b) Perspective projection
  - (c) True projection
  - (d) Both Parallel and Perspective projection
100. Which of the following is true with regards to Projection?
- (a) Perspective Transformation = Perspective Projection + Parallel Projection
  - (b) Perspective Projection = Perspective Transformation + Parallel Projection
  - (c) Perspective Transformation = Parallel Projection + Perspective Projection
  - (d) Perspective Projection = Parallel Projection + Perspective Transformation

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