Model Practice Paper for DSA

Q1 : Which of the following is not an application of Stack ?
   a.   Compiler Design
   b.   Garbage collection
   c.   Word Processor undo operations
   d.   **Data Transfer between two asynchronous process**

Q2 : Which of the following is not an inherent application of Stack ?
   a.   Reversing a string
   b.   Evaluation of postfix operation
   c.   Implementation of Recursion
   d.   **Job Scheduling**

Q3 : The Queue data structure allows insertion of elements sequentially, identify the data structure that allows inserting at only one end but deletion at both sides
   a.   **Input - restricted deque**
   b.   Output - restricted deque
   c.   Priority Queues
   d.   Stacks

Q4 : What is the most suitable data structure that can be used to implement priority Queues ?
   a.   Array
   b.   List
   c.   Tree
   d.   **Binary Heap**

Q5 : Recognize the right application of Dequeue ?
   a.   The A-steal job scheduling algorithm
   b.   Can be used as both stack and queue
   c.   **To Avoid collision in hash tables**
   d.   To find the maximum of all subarray of size k

Q6 : The concatenation of 2 lists can be performed in O(1) time. Which of the following variations of linked list can be used ?
   a.   Single linked list
   b.   Doubly linked list
   c.   Array implementation of list
   d.   **Circular doubly linked list**

Q7 : Which among the following data structures is best suited for storing very large numbers ?
   a.   HashMap

Disclaimer : The questions given here are indicative of the format of questions in the MCQ section of the end semester exam, and not exhaustive. The final question paper for your exam will be set by the University and will have a wide range of questions. Please use this model paper in conjunction with your other course materials to prepare well for your exams.

b. Tree
c. Linked list
d. Stack

Q8 : Which of the following applications makes use of a circular linked list ?
a. Allocating CPU to resources
b. Recursive function calls
c. Undo operator in a text editor
d. Implement hash tables

Q9 : To search or to count the number of nodes, tree traversals are required in that context. Which of the following tree traversal is related to LRC?
a. In-order
b. Post-order
c. Pre-order
d. Post and Preorder

Q10 : Which of the following tree traversal holds for CLR?
a. In-order
b. Post-order
c. Pre-order
d. Post and Preorder

Q11 : A binary tree consists of nodes. What is a binary tree's maximum number of child nodes?
a. At most two
b. Only one
c. Only three
d. No nodes

Q12 : Identify the valid statement for the B+ tree.
a. B+ tree allows only the rapid random access
b. B+ tree allows only the rapid sequential access
c. B+ tree allows rapid random access as well as rapid sequential access
d. B+ tree allows rapid random access and slower sequential access

Q13 : Determine the wrong option in the case of trees?
a. A B+ -tree grows downwards
b. A B+ -tree is balanced
c. In a B+ -tree, the sibling pointers allow sequential searching

d. B+ -tree is shallower than B-tree

Q14 : In a multiway tree, how is each node associated?
   a. M children and M-1 key fields
   b. M children and 0 key fields
   c. M+1 children and M key fields
   d. M children and M+1 key fields

Q15 : Identify the wrong option about the trie.
   a. Trie is collision-free
   b. Trie requires less storage space than hashing
   c. Trie allows listing of all the words with the same prefix
   d. Trie is also known as a prefix tree

Q16 : Identify the special type of trie that is used for fast searching of full text.
   a. Curie
   b. Hash Tree
   c. T tree
   d. Suffix Tree

Q17 : Which are the earliest forms of a self-adjustment strategy used in splay trees, skew heaps?
   a. Union by Rank
   b. Equivalence Function
   c. Dynamic Function
   d. Path Compression

Q18 : Recognize the right condition for an equivalence relation, if two cities are related within a country.
   a. The two cities should have a one-way connection
   b. The two cities should be in different countries
   c. The two cities should have a two-way connection
   d. No equivalence relation will exist between two cities

Q19 : Identify the data structure used for implementing heap.
   a. Arrays
   b. Queues
   c. Priority Queues
   d. Circular Queues

Q20 : What type of data structure can be used to create a heap?
   a. It can be used to help assign memory partitions dynamically
   b. It is used in the hierarchical representation of data
   c. It can be used to help assign memory partitions statically
   d. It stores on the hard disk

Q21 : How many different sorts of Heaps are available?
   a. 1
   b. 2
   c. 3
   d. 4

Q22 : If you want to establish a LAN setting in your laboratory, which data structure will be the app test for the setup?
   a. Heaps
   b. Splay trees
   c. Binary search tree
   d. Graphs

Q23 : Identify which is more suitable for decision trees, as with one decision, we need to traverse further to augment the decision.
   a. DFS
   b. BFS
   c. K trees
   d. K-d trees

Q24 : The Address calculation sort uses which function to sort the elements?
   a. Sort
   b. Merge
   c. Search
   d. Hash

Q25 : Which sorting technique allows you to put an element in the appropriate place in a sorted list that yields a larger sorted order list?
   a. Extraction
   b. Insertion
   c. Distribution
   d. Selection

Q26 : Identify the benefit of using a dynamic set in direct addressing.
   a. It saves time
   b. It saves space
   c. It saves both time and space
   d. It increases the space

Q27 : Hashing technique that allocates a fixed number of buckets is classified as:
   a. Dynamic Hashing
   b. Static Hashing
   c. Internal Hashing
   d. External Hashing

Q28 : Which of these are not direct access files?
   a. Using the address, any block can be accessed directly
   b. It does not make use of hashing on the index value
   c. Direct access file is used whenever rapid access and fixed-length records are the need of an application
   d. Usually, records are accessed one at a time

Q29 : Name the file which has a series of bytes that is organized into blocks?
   a. Souce
   b. Executable
   c. Object
   d. DLL

Q30 : Which of these are not indexed sequential access method features?
   a. It has an index to the file to aid random access of records
   b. It has an overflow file
   c. It reduces the time required to access a record as it is easier to access it directly.
   d. Multiple levels of indexing are used to decrease the efficiency in access

Q31 : What is the value of the postfix expression 6 3 2 4 + – *?
   a. -18
   b. 10
   c. 12
   d. 15

Q32 : In order to perform operations in the queue, what are the two different pointers that are used in the queue?
   a. Top and Bottom

b. Rear and Top
c. Front and rear
d. Front and End

Q33 : How can we achieve the solution of the Maze problem?
a. Forward Search
b. Backward tracking
c. Exploration
d. Forward traversing

Q34 : What are the parts of a node to store a polynomial expression?
a. Co-efficient, Power, Front
b. Co-efficient, next, Front
c. Co-efficient, Power, Next
d. Value, Power, Front

Q35 : What is the other name of a doubly linked list?
a. Linked List
b. Right link
c. Two way chain
d. One way chain

Q36 : Which operator is used to allocate memory dynamically?
a. new
b. assign
c. create
d. delete

Q37 : What is the minimum number of child nodes possible in a binary tree ?
a. 0
b. 1
c. 2
d. 3

Q38 : The height of a BST is given as h. Consider the height of the tree as the number of edges in the longest path from root to the leaf. What is the maximum number of nodes possible in the tree?
a. $2^{(h-1)} - 1$
b. $2^{(h+1)} - 1$

c. 2^(h+1) + 1
d. 2^(h-1) + 1

Q39 : In a self balancing tree how can the AVL tree be defined?
   a. A tree which is balanced and is a height balanced tree
   b. A tree which is unbalanced and is a height-balanced tree
   c. A tree with three children
   d. A tree with at most 3 children

Q40 : Which one of the following data structures are preferred in database-system implementation?
   a. AVL Tree
   b. Splay Tree
   c. B+ tree
   d. K-Tree

Q41 : In AVL trees in order to construct a tree, which of the following balance factors has to be satisfied?
   a. -1, 0, 1
   b. 0, 1, 2
   c. 1, 1, 0
   d. 0, 1, 0

Q42 : Which of the following is the most widely used external memory data structure?
   a. Red black tree
   b. AV Tree
   c. B tree
   d. Both AVL and Red black

Q43 : Which of the following is an application of Red-black trees ?
   a. Used to store strings efficiently
   b. Used to store integers efficiently
   c. Can be used in process schedulers, maps, sets
   d. For efficient sorting

Q44 : Which of these is an example of a self balancing tree?
   a. B tree
   b. Splay Tree
   c. Rope Tree

d. Top Tree

Q45 : Which of the following statements for a simple graph is accurate?
a. **Every path is a trail**
b. Every trail is a path
c. Every trail is a path as well as every path is a trail
d. Path and trail have no relation

Q46 : Which algorithm is used to partition the vertices of a graph to disjoint sets?
a. Recursive Algorithm
b. Recursive Algorithm
c. Greedy Algorithm
d. **Kruskal's Algorithm**

Q47 : What is the other name for segment tree?
a. **Statistics tree**
b. B Tree
c. Top Tree
d. Tree

Q48 : A tree can be implemented in different data structures, in heap data structures, what are the two types of heap?
a. Tree and Binary Tree
b. **Min and Max Heap**
c. Joint and Disjoint
d. Directed and Undirected

Q49 : Depth First Search (DFS) uses which form of data structure?
a. **Stacks**
b. Arrays
c. Queues
d. Linked List

Q50 : Which of the following ways can be used to represent a graph?
a. **Adjacency List & Adjacency Matrix**
b. Matrix
c. Adjacency List & Adjacency Graph
d. No way to represent

Q51 : What are different types of Graphs?
   a. **Directed and Undirected Graphs**
   b. Undirected Graph & Directed Graphs
   c. Bidirectional & Undirected
   d. Bidirectional & Unidirected

Q52 : What is the other name for the directed graph?
   a. Directed Graphs
   b. **Digraph**
   c. Dir-graph
   d. Connected Graph

Q53 : What is the number of edges present in a complete graph having n vertices?
   a. (n*(n+1))/2
   b. **(n*(n-1))/2**
   c. n
   d. n*(n-1)

Q54 : To identify cycles in the graph, which operation can be performed in disjoint sets?
   a. **Find and Union**
   b. Sort
   c. Cancel
   d. Drop

Q55 : What is the time complexity for searching a key(word) in a trie?
   a. O(log n)
   b. O(nlog n)
   c. **O(n)**
   d. O(n^2)

Q56 : What is the time complexity of deletion in heap?
   a. O(n)
   b. O(nlog n)
   c. **O(log n)**
   d. O(n^2)

Q57 : Suffix trees allow particularly fast implementations of many important string operations, what is the other term used for Suffix Tree?
   a. Array

b. Stack
c. Priority Queue
d. Postfix

Q58 : Which statement is correct for a suffix tree with a string of length n?
   a. The tree has n leaves
   b. The tree has n roots
   c. Height of the tree is n
   d. Depth of the tree is n

Q59 : Every tree data structure consists of nodes in that context. What is the maximum height of an AVL tree?
   a. 2^(h+1) + 1
   b. 2^(h-1) - 1
   c. 2^(h+1) - 1
   d. 2(h-1) + 1

Q60 : Which of the following statements about binary trees is true?
   a. Every binary tree is either complete or full
   b. Every complete binary tree is also a full binary tree
   c. Every full binary tree is also a complete binary tree
   d. A binary tree cannot be both complete and full