

1. Two main measures for the efficiency of an algorithm are

- a. Processor and memory
 - b. Complexity and capacity
 - c. Time and space
 - d. Data and space
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2. The time factor when determining the efficiency of algorithm is measured by

- a. Counting microseconds
 - b. Counting the number of key operations
 - c. Counting the number of statements
 - d. Counting the kilobytes of algorithm
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3. The space factor when determining the efficiency of algorithm is measured by

- a. Counting the maximum memory needed by the algorithm
 - b. Counting the minimum memory needed by the algorithm
 - c. Counting the average memory needed by the algorithm
 - d. Counting the maximum disk space needed by the algorithm
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4. Which of the following case does not exist in complexity theory

- a. Best case
 - b. Worst case
 - c. Average case
 - d. Null case
-

5. The Worst case occur in linear search algorithm when

- a. Item is somewhere in the middle of the array
 - b. Item is not in the array at all
 - c. Item is the last element in the array
 - d. Item is the last element in the array or is not there at all
-

6. The Average case occur in linear search algorithm

- a. When Item is somewhere in the middle of the array
 - b. When Item is not in the array at all
 - c. When Item is the last element in the array
 - d. When Item is the last element in the array or is not there at all
-

7. The complexity of the average case of an algorithm is

- a. Much more complicated to analyze than that of worst case
 - b. Much more simpler to analyze than that of worst case
 - c. Sometimes more complicated and some other times simpler than that of worst case
 - d. None or above
-

8. The complexity of linear search algorithm is

- a. $O(n)$
 - b. $O(\log n)$
 - c. $O(n^2)$
 - d. $O(n \log n)$
-

9. The complexity of Binary search algorithm is

- a. $O(n)$
- b. $O(\log)$
- c. $O(n^2)$

d. $O(n \log n)$

10. The complexity of Bubble sort algorithm is

- a. $O(n)$
 - b. $O(\log n)$
 - c. $O(n^2)$
 - d. $O(n \log n)$
-

11. The complexity of merge sort algorithm is

- a. $O(n)$
 - b. $O(\log n)$
 - c. $O(n^2)$
 - d. $O(n \log n)$
-

12. The indirect change of the values of a variable in one module by another module is called

- a. internal change
 - b. inter-module change
 - c. side effect
 - d. side-module update
-

13. Which of the following data structure is not linear data structure?

- a. Arrays
 - b. Linked lists
 - c. Both of above
 - d. None of above
-

14. Which of the following data structure is linear data structure?

- a. Trees
 - b. Graphs
 - c. Arrays
 - d. None of above
-

15. The operation of processing each element in the list is known as

- a. Sorting
 - b. Merging
 - c. Inserting
 - d. Traversal
-

16. Finding the location of the element with a given value is:

- a. Traversal
 - b. Search
 - c. Sort
 - d. None of above
-

17. Arrays are best data structures

- a. for relatively permanent collections of data
 - b. for the size of the structure and the data in the structure are constantly changing
 - c. for both of above situation
 - d. for none of above situation
-

18. Linked lists are best suited

- a. for relatively permanent collections of data
- b. for the size of the structure and the data in the structure are constantly changing

- c. for both of above situation
- d. for none of above situation

19. Each array declaration need not give, implicitly or explicitly, the information about

- a. the name of array
- b. the data type of array
- c. the first data from the set to be stored
- d. the index set of the array

20. The elements of an array are stored successively in memory cells because

- a. by this way computer can keep track only the address of the first element and the addresses of other elements can be calculated
 - b. the architecture of computer memory does not allow arrays to store other than serially
 - c. both of above
 - d. none of above
-
-

Answers

- 1. c. Time and space
- 2. b. Counting the number of key operations
- 3. a. Counting the maximum memory needed by the algorithm
- 4. d. Null case
- 5. d. Item is the last element in the array or is not there at all
- 6. a. When Item is somewhere in the middle of the array
- 7. a. Much more complicated to analyze than that of worst case
- 8. a. $O(n)$
- 9. b. $O(\log n)$
- 10. c. $O(n^2)$
- 11. d. $O(n \log n)$
- 12. c. side effect
- 13. d. None of above
- 14. c. Arrays
- 15. d. Traversal
- 16. b. Search
- 17. a. for relatively permanent collections of data
- 18. b. for the size of the structure and the data in the structure are constantly changing
- 19. c. the first data from the set to be stored
- 20. a. by this way computer can keep track only the address of the first element and the addresses of other elements can be calculated

Set - 2

1. The memory address of the first element of an array is called

- a. floor address
 - b. foundation address
 - c. first address
 - d. base address
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2. The memory address of fifth element of an array can be calculated by the formula

- a. $LOC(Array[5]) = Base(Array) + w(5 - \text{lower bound})$, where w is the number of words per memory cell for the array
 - b. $LOC(Array[5]) = Base(Array[5]) + (5 - \text{lower bound})$, where w is the number of words per memory cell for the array
 - c. $LOC(Array[5]) = Base(Array[4]) + (5 - \text{Upper bound})$, where w is the number of words per memory cell for the array
 - d. None of above
-

3. Which of the following data structures are indexed structures?

- a. linear arrays
 - b. linked lists
 - c. both of above
 - d. none of above
-

4. Which of the following is not the required condition for binary search algorithm?

- a. The list must be sorted
 - b. there should be the direct access to the middle element in any sublist
 - c. There must be mechanism to delete and/or insert elements in list
 - d. none of above
-

5. Which of the following is not a limitation of binary search algorithm?

- a. must use a sorted array
 - b. requirement of sorted array is expensive when a lot of insertion and deletions are needed
 - c. there must be a mechanism to access middle element directly
 - d. binary search algorithm is not efficient when the data elements are more than 1000.
-

6. Two dimensional arrays are also called

- a. tables arrays
 - b. matrix arrays
 - c. both of above
 - d. none of above
-

7. A variable P is called pointer if

- a. P contains the address of an element in DATA.
 - b. P points to the address of first element in DATA
 - c. P can store only memory addresses
 - d. P contain the DATA and the address of DATA
-

8. Which of the following data structure can't store the non-homogeneous data elements?

- a. Arrays
 - b. Records
 - c. Pointers
 - d. None
-

9. Which of the following data structure store the homogeneous data elements?

- a. Arrays
 - b. Records
 - c. Pointers
 - d. None
-

10. Each data item in a record may be a group item composed of sub-items; those items which are indecomposable are called

- a. elementary items
 - b. atoms
 - c. scalars
 - d. all of above
-

11. The difference between linear array and a record is

- a. An array is suitable for homogeneous data but the data items in a record may have different data type
 - b. In a record, there may not be a natural ordering in opposed to linear array.
 - c. A record form a hierarchical structure but a linear array does not
 - d. All of above
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12. Which of the following statement is false?

- a. Arrays are dense lists and static data structure
 - b. data elements in linked list need not be stored in adjacent space in memory
 - c. pointers store the next data element of a list
 - d. linked lists are collection of the nodes that contain information part and next pointer
-

13. Binary search algorithm can not be applied to

- a. sorted linked list
 - b. sorted binary trees
 - c. sorted linear array
 - d. pointer array
-

14. When new data are to be inserted into a data structure, but there is no available space; this situation is usually called

- a. underflow
 - b. overflow
 - c. housefull
 - d. saturated
-

15. The situation when in a linked list $START=NULL$ is

- a. underflow
 - b. overflow
 - c. housefull
 - d. saturated
-

16. Which of the following is two way list?

- a. grounded header list
 - b. circular header list
 - c. linked list with header and trailer nodes
 - d. none of above
-

17. Which of the following name does not relate to stacks?

- a. FIFO lists
- b. LIFO list

- c. Piles
- d. Push-down lists

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18. The term "push" and "pop" is related to the
- a. array
 - b. lists
 - c. stacks
 - d. all of above

-
19. A data structure where elements can be added or removed at either end but not in the middle
- a. Linked lists
 - b. Stacks
 - c. Queues
 - d. Deque

-
20. When inorder traversing a tree resulted E A C K F H D B G; the preorder traversal would return
- a. FAEKADBHG
 - b. FAEKCDHGB
 - c. EAFKHDCBG
 - d. FEAKDCHBG

Answers

- 1. d. base address
- 2. a. $LOC(Array[5]) = Base(Array) + w(5 - \text{lower bound})$, where w is the number of words per memory cell for the array
- 3. a. linear arrays
- 4. c. There must be mechanism to delete and/or insert elements in list
- 5. d. binary search algorithm is not efficient when the data elements are more than 1000.
- 6. c. both of above
- 7. a. P contains the address of an element in DATA.
- 8. a. Arrays
- 9. b. Records
- 10. d. all of above
- 11. d. All of above
- 12. c. pointers store the next data element of a list
- 13. a. sorted linked list
- 14. b. overflow
- 15. a. underflow
- 16. d. none of above
- 17. a. FIFO lists
- 18. c. stacks
- 19. d. Deque
- 20. b. FAEKCDHGB

Set - 3

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1. Which data structure allows deleting data elements from front and inserting at rear?
- Stacks
 - Queues
 - Deque
 - Binary search tree
-
2. Identify the data structure which allows deletions at both ends of the list but insertion at only one end.
- Input-restricted deque
 - Output-restricted deque
 - Priority queues
 - None of above
-
3. Which of the following data structure is non-linear type?
- Strings
 - Lists
 - Stacks
 - None of above
-
4. Which of the following data structure is linear type?
- Strings
 - Lists
 - Queues
 - All of above
-
5. To represent hierarchical relationship between elements, which data structure is suitable?
- Deque
 - Priority
 - Tree
 - All of above
-
6. A binary tree whose every node has either zero or two children is called
- Complete binary tree
 - Binary search tree
 - Extended binary tree
 - None of above
-
7. The depth of a complete binary tree is given by
- $D_n = n \log_2 n$
 - $D_n = n \log_2 n + 1$
 - $D_n = \log_2 n$
 - $D_n = \log_2 n + 1$
-
8. When representing any algebraic expression E which uses only binary operations in a 2-tree,
- the variable in E will appear as external nodes and operations in internal nodes
 - the operations in E will appear as external nodes and variables in internal nodes
 - the variables and operations in E will appear only in internal nodes
 - the variables and operations in E will appear only in external nodes
-
9. A binary tree can easily be converted into q 2-tree

- a. by replacing each empty sub tree by a new internal node
 - b. by inserting an internal nodes for non-empty node
 - c. by inserting an external nodes for non-empty node
 - d. by replacing each empty sub tree by a new external node
-

10. When converting binary tree into extended binary tree, all the original nodes in binary tree are
- a. internal nodes on extended tree
 - b. external nodes on extended tree
 - c. vanished on extended tree
 - d. None of above
-

11. The post order traversal of a binary tree is DEBFCA. Find out the pre order traversal
- a. ABFCDE
 - b. ADBFEC
 - c. ABDECF
 - d. ABDCEF
-

12. Which of the following sorting algorithm is of divide-and-conquer type?
- a. Bubble sort
 - b. Insertion sort
 - c. Quick sort
 - d. All of above
-

13. An algorithm that calls itself directly or indirectly is known as
- a. Sub algorithm
 - b. Recursion
 - c. Polish notation
 - d. Traversal algorithm
-

14. In a binary tree, certain null entries are replaced by special pointers which point to nodes higher in the tree for efficiency. These special pointers are called
- a. Leaf
 - b. branch
 - c. path
 - d. thread
-

15. The in order traversal of tree will yield a sorted listing of elements of tree in
- a. Binary trees
 - b. Binary search trees
 - c. Heaps
 - d. None of above
-

16. In a Heap tree
- a. Values in a node is greater than every value in left sub tree and smaller than right sub tree
 - b. Values in a node is greater than every value in children of it
 - c. Both of above conditions applies
 - d. None of above conditions applies
-

17. In a graph if $e=[u, v]$, Then u and v are called
- a. endpoints of e
 - b. adjacent nodes
 - c. neighbors
 - d. all of above

18. A connected graph T without any cycles is called

- a. a tree graph
 - b. free tree
 - c. a tree
 - d. All of above
-

19. In a graph if $e=(u, v)$ means

- a. u is adjacent to v but v is not adjacent to u
 - b. e begins at u and ends at v
 - c. u is processor and v is successor
 - d. both b and c
-

20. If every node u in G is adjacent to every other node v in G, A graph is said to be

- a. isolated
 - b. complete
 - c. finite
 - d. strongly connected
-
-

Answers:

- 1. b. Queues
- 2. a. Input-restricted deque
- 3. d. None of above
- 4. d. All of above
- 5. c. Tree
- 6. c. Extended binary tree
- 7. d. $D_n = \log_2 n + 1$
- 8. a. the variable in E will appear as external nodes and operations in internal nodes
- 9. d. by replacing each empty sub tree by a new external node
- 10. a. internal nodes on extended tree
- 11. c. ABDECF
- 12. c. Quick sort
- 13. b. Recursion
- 14. d. thread
- 15. b. Binary search trees
- 16. b. Values in a node is greater than every value in children of it
- 17. d. all of above
- 18. d. All of above
- 19. d. both b and c
- 20. b. complete