

**UNIT-III**  
**Two Mark Questions**

**1. Write down the definition of data structures?**

**NOV DEC 2012**

A data structure is a mathematical or logical way of organizing data in the memory that consider not only the items stored but also the relationship to each other and also it is characterized by accessing functions.

**2. Binary Heap NOV DEC 2012 ,APRIL MAY 2009**

The implementation we will use is known as a binary heap. Its use is so common for priority queue implementations that when the word heap is used without a qualifier

**Structure Property**

A heap is a binary tree that is completely filled, with the possible exception of the bottom level, which is filled from left to right. Such a tree is known as a complete binary tree

**3. Define Algorithm?**

Algorithm is a solution to a problem independent of programming language. It consist of set of finite steps which, when carried out for a given set of inputs, produce the corresponding output and terminate in a finite time.

**4. What are the features of an efficient algorithm?**

- Free of ambiguity
- Efficient in execution time
- Concise and compact
- Completeness
- Definiteness
- Finiteness

**5. List down any four applications of data structures?**

Compiler design

Operating System

Database Management system

Network analysis

**6. What is meant by an abstract data type (ADT)?**

An ADT is a set of operation. A useful tool for specifying the logical properties of a datatype is the abstract data type. ADT refers to the basic mathematical concept that defines the datatype. Eg. Objects such as list, set and graph along their operations can be viewed as ADT's.

**7. What are the operations of ADT?**

Union, Intersection, size, complement and find are the various operations of ADT.

**8. What is meant by list ADT?**

List ADT is a sequential storage structure. General list of the form  $a_1, a_2, a_3, \dots, a_n$  and the size of the list is 'n'. Any element in the list at the position  $i$  is defined to be  $a_i$ ,  $a_{i+1}$  the successor of  $a_i$  and  $a_{i-1}$  is the predecessor of  $a_i$ .

**9. What are the two parts of ADT?**

- Value definition
- Operator definition

### **10. What is a Sequence?**

A sequence is simply an ordered set of elements. A sequence S is sometimes written as the enumeration of its elements, such as

S = If S contains n elements, then length of S is n.

### **11. Define len(S), first(S), last(S), nilseq ?**

len(S) is the length of the sequence S.

first(S) returns the value of the first element of S

last(S) returns the value of the last element of S

nilseq : Sequence of length 0 is nilseq .ie., contains no element.

### **12. What are the two basic operations that access an array?**

Extraction:

Extraction operation is a function that accepts an array, a , an index, i, and returns an element of the array.

Storing:

Storing operation accepts an array, a , an index i , and an element x.

### **13. Define Structure?**

A Structure is a group of items in which each item is identified by its own identifier , each of which is known as a member of the structure.

### **14. Define Union ?**

Union is collection of Structures , which permits a variable to be interpreted in several different ways.

### **15. Define Automatic and External variables?**

Automatic variables are variables that are allocated storage when the function is invoked.

External variables are variables that are declared outside any function and are allocated storage at the point at which they are first encountered for the remainder of the program's execution.

### **16. What is a Stack?**

**NOV DEC 2008**

A Stack is an ordered collection of items into which new items may be inserted and from which items may be deleted at one end, called the top of the stack. The other name of stack is Last-in - First-out list.

### **17. What are the two operations of Stack?**

- \_ PUSH
- \_ POP

### **18. What is a Queue?**

A Queue is an ordered collection of items from which items may be deleted one end called the front of the queue and into which items may be inserted at the other end called rear of the queue. Queue is called as First-in-First-Out (FIFO).

### **19. What is a Priority Queue? NOV DEC 2010**

Priority queue is a data structure in which the intrinsic ordering of the elements does determine the results of its basic operations. Ascending and Descending priority queue are the two types of Priority queue.

### **20. What is a linked list?**

Linked list is a kind of series of data structures, which are not necessarily adjacent in memory. Each structure contains the element and a pointer to a record containing its successor.

### **21. What is a doubly linked list?**

In a simple linked list, there will be one pointer named as 'NEXT POINTER' to point the next element, whereas in a doubly linked list, there will be two pointers one to point the next element and the other to point the previous element location.

### **22. Define double circularly linked list?**

In a doubly linked list, if the last node or pointer of the list, points to the first element of the list, then it is a circularly linked list.

### **23. What is a circular queue?**

The queue, which wraps around upon reaching the end of the array is called as circular queue.

### **24. Define max and min heap?**

A heap in which the parent has a larger key than the child's is called a max heap.

A heap in which the parent has a smaller key than the child is called a min heap.

## **16 Mark Questions**

1. Explain Linked list of list ADT with suitable example.
2. Explain Array based implementation of list with an example program.
3. Formulate an algorithm to add and subtract two polynomials P1 and P2.
4. Explain the implementation stack using linked list.
5. Write the ADT operation for insertion and deletion routine in stack using array implementation.
6. i) Explain the process of postfix valuation with an example.  
ii) Explain balancing symbols with example.
7. Give a procedure to convert an infix expression  $a+b*c+(d*e+f)*g$  to postfix notation.
8. What is a queue? Explain the array implementation of queue with example.

9. Explain the process of conversion from infix expression to postfix using stack.
10. Write the Queue ADT operation for insertion and deletion routine in linked lists.