Model Viva Questions for "**Name of the Lab: Data Structure of lab**"

Common to: **CS 4th sem**

Title of the Practical: **Program to search an element of array using linear search.**

Q1 Define searching process?
A1 searching is the process of finding an element within the list of elements stored in any order or randomly.

Q2 How many types of searching are there?
A2 There is basically two types of searching:-linear search and Binary search.

Q3Define: linear search?
A3 In linear search, we access each elements of an array one by one sequentially and see weather it is desired element or not.

Q4 Why binary search method is more efficient then liner search?
A4 It is because less time is taken by linear search to search an element from the sorted list of elements.

Q5 Efficiency of linear search ?
A5 The time taken or the number of comparisons made in searching a record in a search table determines the efficiency of the technique.

Q6 What do you understand by the term "linear search is unsuccessful"?
A6 search will be unsuccessful if all
the elements are accessed and the desired elements are not found.

Q7 What is worse case?
A7 In the worse case, the no. of average case we may have to scan half of the size
of the array (n/2).

Q8 What is the drawback of linear search?
A8 There is no requisite for the linear Search.

Q9 During linear search, when the record is present in first position then how many comparisons are made ?
A9 Only one comparison.

Q10 During linear search, when the record is present in last position then how many comparisons are made?
A10 n comparisons have to be made.

Title of the Practical: **Program to reverse the element of array.**
Insertion and deletion on array at specified position.

Q1 What is an array & how many types of arrays represented in memory?
A1 An array is a structured datatype made up of a finite, fixed size, collection of homogeneous ordered elements.
Types of array: One-Dimentional array, Two-Dimentional array, Multi-Dimentional array.

Q2 How can be declared an array?
A2 data_type var_name[Expression];

Q3 How can be insert an element in an array?
A3 Insertion of a new element in an array can be done in two ways:
* Insertion at the end of array.
* Insertion at required position.

Q4 How can be delete an element in an array?
A4- Deleting an element at the end of an array presents no difficulties, but deleting element somewhere in the middle of the array.

Q5 How many types of implementation of a two-dimentional array?
A5 * Row-major implementation
* Column-major implementation

Q6 What is array of pointers?
A6 Array of pointer refers to homogeneous collection of pointer that is collection of pointer of same datatype.

Q7 What are limitations of array?
A7 * These are static structures.
* It is very time consuming.

Q8 Where the elements of the array are stored respectively in successive?
A8 Memory locations.

Q9 How can merge two arrays?
A9 Simplest way of merging two arrays is that first copy all elements of one array into a third empty array and the copy all the elements of other array into third array.

Q10 What is the operations of array?
A10 Insertion, Deletion, Traversing, Merging.

Title of the Practical: **Program based on structure union**

Q1 What are structures?
A1 Structures are used to store different types.

Q2 What are arrays?
A2 Arrays are used to store similar data types.

Q3 Is array of structures possible?
A3 Is array of structures are possible.

Q4 How structures are declared?
A4 Declaration: struct book
{ char name;
Float price;
Int pages;
};

Q5 Why we use functions?
A5 Writing functions avoids rewriting the same code over and over.

Q6 Name some library functions?
A6 printf(), scanf() are examples of library function.

Q7 What are user defined functions?
A7 Functions declared by the user are called user defined functions.

Q8 Explain call by value?
A8 When the value is passed in the function is called call by value.

Q9 Explain call by reference?
A9 When the address of the value is passed is called call by reference.

Q10 Why we used keyword ‘break’?
A10 When break is encountered inside any loop, control automatically passes to the first statement after the loop.

Title of the Practical: **Program to implement PUSH and POP operation on stack**.

Q1 What is stack?
A1 Stack is an ordered collection of elements like array.

Q2 What are the operations performed on stack?
A2 Push for insertion and pop for deletion.

Q3 What is push operation?
A3 When an element is inserted into the stack is called push operation

Q4 What is pop operation.
A4 When an element is deleted from the stack is called pop operation.

Q5 How stacks are implemented?
A5 Stacks are implemented in two ways: static implementation –array
Dynamic implementation –pointers.
Q6 What are the applications of stack?
A6 infix , post fix and prefix notations are the applications of stack.

Q7 What is recursion.
A7 Recursion is defined as function calling itself.

Q8 What are the different types of stack
A8 Direct: a system calls itself from witin itself.
Indirect: two functions mutually calls one another

Q9 Define “Top of stack”
A9 Pointer indicating the top element of the stack.

Q10 Is stack is prinmitive or non primitive data structure ?
A10 Non primitive data structure.

Title of the Practical: **Program based on infix to prefix and post fix notation.**

Q1 What is Stack ?
A1 Stack is ordered collection of element like arrays out it has a special feature that deletion and insertion of element can be done only from one end called top of stack .It is also called LIFO(last in first out).

Q2 Application of Stack ?
A2 Infix
Prefix
Postfix

Q3 Terms used in Stack ?
A3 > Context
> Stack frames
> Maxsize

Q4 Explain infix in Stack ?
A4 The operator is written in between the operands.
Ex:- A+B

Q5 Explain Postfix in Stack ?
A5 The operator is written ofter the operands.It is also called suffix notation.
Ex:- AB+

Q6 Define operations on Stack ?
A6 The basic operation that can be performed on Stack are as follows:
>PUSH
>POP
Q7 Give postfix form for (A+B)*C/D
A7 AB+C*D/
Q8 Give postfix form for A+B/C-D
A8 ABC/+D-
Q9 Give prefix form for A/B^C+D
A9 +/A^BCD
Q10 Give prefix form for A*B+C
A10 +*ABC

Title of the Practical: **Program based on queue & their operations for an application**

Q1 Define queue.
A1Queue is an homogeneous collection of elements. It is logically a first in first out (FIFO) type of list.Queue means a line.
Q2 In how many ways queue is implemented?
A2 Queues can be implemented in two ways: 1. static implementation (using array)
2. dynamic implementation (using pointers)
Q3 What is the rear end in a queue?
A3 in a queue new elements are added at one end called the rear end .

Q4 What is a front end?
A4 The existing elements in a queue are deleted from an end called the front end.

Q5 What is the value of front and rear end in an empty queue?
A5 Front =-1 and rear =-1.

Q6 Write an algorithm for deleting a node from a queue.
A6 1. If (front == null)
Write queue is empty and exit
Else
Temp = start
Value = temp ->no
Start = start -> next
Free (temp)
Return(value)
2. exit.
Q7 What are the different variarions in a queue?
A7 Major variations are: 1. circular queue 2. double ended queue 3. priority queue.

Q8 What is the full form of dequeue?
A8 DEQUEUE : Double ended queue.It is another form of queue in which both insertion and deletion are performed at the either end.

Q9 When an element is added to the dequeue with n memory cells ,what happens to LEFT or RIGHT.
A9 If the element is added an the left , then LEFT is decreases by 1 (mod n) . IF the element is added on the right , then RIGHT is increase by 1 (mod n)

Q10 What are the applications of queue.
A10 Applications are: 1. round robin technique for processor scheduling
2. All types of customer services(eg. RTC)
3. Printer server routines.

Title of the Practical: **Program based on the implementation of circular queue.**

Q1 What is Circular Queue?
A1 A Circular Queue is one in which the insertion of a new element is done at the very first variation of the Queue if the last location of the Queue is full.

Q2 Why use of Circular Queue?
A2 A Circular Queue over comes the problem of un utilized space in linear Queue implemented as Array.

Q3 Explain Dequeue ?
A3 It is also a homogenous list of element in which insertion deletion of element are perform both the ends we insert element from the rear or from the front end.

Q4 What is Queue ?
A4 It is a non primitive linear data structure. In a Queue new element are added at the one end called rear end and the element are removed from another end called front end.

Q5 Variation in a Queue ?
A5 Circular Queue
-> Dequeue
->Priority Queue

Q6 What is Priority Queue ?
A6 Priority Queue determines the order in which the exist in the Queue the highest Priority items are removed first.

Q7 Application of Queue ?
A7 1> Customer service center
2> Ticket counter
3> Queue is used for determine space complexity & time complexity.

Q8 What is Queue implemention?
A8 >> Static implemention(Array)
>>Dynamic implemention(Pointer)

Q9 Define operations on queue?
A9 The basic operation that can be performed on queue are –
1>To insert an element in a Queue
2>To delete an element from the Queue

Q10 What is Stack ?
A10 Stack is ordered collection of element like arrays out it has a special feature that deletion and insertion of element can be done only from one end called top of stack .It is also called LIFO(last in first out).

Title of the Practical: **Program based on list operations and its applications.**

Q1 Define linked list.
A1 Linked list are special list of some data elements linked to one another .The logical ordering is represented by having each element pointing to the next element. Each element is called a node.

Q2 What does a node define?
A2 Node has two parts: INFO – it stores the information and POINTER – which points to the next element.

Q3 What are the different types of linked list?
A3 Linked list are of four types: 1. singly linked list 2. doubly linked list 3. circular linked list 4. circular doubly linked list.

Q4 What are the different operations performed on a linked list?
A4 Basic operations are: creation, insertion, deletion , traversing, searching , concatenation and display.

Q5 What are the advantages of linked list?
A5 Advantages are:

1. linked lists are dynamic data structures
2. Efficient memory utilizations
3. Insertion and deletions are easier and efficient

Q6 What is null pointer?
A6 The link field of the last node contains NULL rather than a valid address. It is a null pointer and indicates the end of the list.

Q7 What is external pointer?
A7 It is a pointer to the very first node in the linked list, it enables us to access the entire linked list.

Q8 What are the different notations used in a linked list.
A8 Node(p) : a node pointed to by the pointer p
Data (p) : data of the node pointed by p
Link (p) : address of the next node that follows yhe node pointed to by the pointer p.

Q9 What are advantages of circular linked list.
A9 1.Nodes can be accessed easily. 2. deletion of node is easier 3. concatenation and splitting of circular list is more efficient.

Q10 A doubly linked list contains how many fields?
A10 Doubly linked list consists of three fields:
Data : contains the information
Next: contains the address of the next node
Prev: contains the address of the previous node

Title of the Practical: **Program based on pointers in C.**

Q1 Which of the following abstract data types are NOT used by Integer Abstract Data type group?

A1. A)Short
B)Int
C)float
D)long

Q2 What pointer type is used to implement the heterogeneous linked list in C?
A2 The answer is the void pointer. The heterogeneous linked list contains different data types in it's nodes and we need a link, pointer, to connect them. Since we can't use ordinary pointers for this, we use the void pointer. Void pointer is a generic pointer type, and capable of storing pointer to any type.

Q3: What issue do auto_ptr objects address?
A3: If you use auto_ptr objects you would not have to be concerned with heap objects not being deleted even if the exception is thrown.

Q4.: What is a dangling pointer?
A4: A dangling pointer arises when you use the address of an object after its lifetime is over. This may occur in situations like returning addresses of the automatic variables from a function or using the address of the memory block after it is freed.

Q5: What is the difference between a pointer and a reference?
A5: A reference must always refer to some object and, therefore, must always be initialized; pointers do not have such restrictions. A pointer can be reassigned to point to different objects while a reference always refers to an object with which it was initialized.

Q6: What is the difference between const char *myPointer and char *const myPointer?
A6: Const char *myPointer is a non constant pointer to constant data; while char *const myPointer is a constant pointer to non constant data.

Q7: From which is the pointer to object of a base class type compatible ?
A7: Pointers to object of a base class type is compatible with pointer to onject of a derived class . Therefore , we can use single pointer variable to point to objects of base class as well as derived class.

Q8: What is a **this** pointer?
A8: A special pointer known as **this** pointer stores the address of the object that is currently invoking a member function.

Q9:How are objects passed to functions?
A9: Objects can be passed to functions through call-by –value as well as call-by- reference mechanism.

Q10: Why is Arrow operator (“-> “) used?
A10: The arrow operator is used to access the public members of the class with a pointer to an object.

Title of the Practical: **Implementation of tree using linked list.**

Q1 What is a tree?
A1 A tree is a non linear data structure in which items are arranged in a sorted sequence.It is a finite set of one or more data items.

Q2 What is a root in a tree?
A2 A root is the first node in the hierarchical arrangement of data items.

Q3 What do you mean by degree of a tree?
A3 It is a maximum degree of nodes in a given tree .

Q4 What are non terminal nodes?
A4 Any node(Except the root node) is not zero is called non terminal node. Non terminal nodes are the intermediate nodes in traversing the given tree.

Q5 Who are called siblings in a tree?
A5 The children nodes of a given parent node are called siblings. They are also called brothers.

Q6 . During linear search, when the record is present somewhere in search table, then how many comparisons are made?
Ans- (n+1)/2.

Q7 How can access one-dimentional aray elements?
A7 array_name[index or subscript];

Q8 What is the traversing of an array?
A8 Traversing means to access all the elements of the array, starting from first element upto the last element in the array one-by-one.

Q9Explain the types of searching?
A9There are two types of searching: - 1> linear searching, 2> binary searching.

Q10 What is the linear search?
A10 We access each element of and see whether. It is desire element or not a search will be unsuccessful.If the all elements are access and the desired element is not found.

Title of the Practical: **Implementation of different types of sorting techniques.**

Q1 Explain the sorting?
A1 Searching and sorting and merging are three related operations which make the job of retrieval at data from the storage device easier & speeder.

Q2 What are the different types of sorts in data structures ?
A2. 1> bubble sort 2> selection sort 3> insertion sort 4> quick sort 5> radix sort 6> merge sort 7> heap sort.

Q3 Define the bubble sort?
A3 In bubble sort each element is compared with its adduct element is larger than the second element is than the position at the element are interchanging otherwise it is not change.

Q4 Define the selection sort?
A4 Selection sort technique is based upon the extension of the minimum maximum technique by means at a next at loop.

Q5 What is a bucket sort?
A5 The bucket sort is also called radix sort. It is a method that can be used to sort list at name alphabetically or numerically.

Q6 What is insertion sort?
A6 An insertion sort is one that sorts a set of values by inserting values into an existing sorted file.

Q7 How many passes are required in selection sort?
A7 The selection sort makes first pass in n-1 comparisions, the second pass in n-2 comparisons and so on.

Q8 How does quick sort works?
A8 The quick sort works by partitioning the array to be sorted . And each partition is in turn sorted recursively.

Q9 How does bucket sort works?
A9 First or all the list of names is sorted according to the first letter of each name in26 buckets. In second pass , names are arranged according to the second letter of each name and so on.

Q10 What is the efficiency of heap sort in worst case?
A10 O(n log n) is the efficiency of heap sort in worst case.

Title of the Practical: **Implementation of binary search algorithm using binary tree**

Q1 What do you understand by binary search?
A1 A binary search algorithm or binary chop is a technique for finding a particular value in a sorted list.

Q2 Explain the steps of algorithm of binary search?
A2 Step 1. Find the middle element of array f+1/2 = middle value

Step 2. Our derived element is greater than the main element

Q3 Define the complexity of binary search?
A3. In worst cause there is log(n+1) in the average causes.

Q4 Explain the difference between linear search and binary search?
A4

Linear search	binary search
1. linear search can be applied on any list of data.	binary search can be applied on Sorted list of data.
2. It can be applied on linked list.	It can not be applied on linked list

Q5 Define tree?
A5 A tree is a non linear data structures in which item are arranged in a sorted sequence.

Q6 Explain tree terminology?
1> root, 2> node.

A6 1> root: - it is the first in the hierarchical arrangement at data item.

2> node: - each item in a tree is called a node.

Q7 Explain the degree of node?
A7 It is the no. of sub tree of a node in a given tree.

Q8 Explain the terminal node & non terminal node?
A8 Terminal node:- a node with degree of 0 is called terminal node.

Non terminal node:- a node without degree of 0 is called non terminal node.

Q9 What do you understand by binary tree?
A9 The binary tree is a collection of finite node or set of data object.

Q10 Explain the application of binary tree?
A10 1> it is used in game programming.e.g. tic-tac-toe etc.

2> it is used to solve the problem of mathematical expression.

Title of the Practical: **Assignment based on graph theory**

Q1 What is agraph?
A1: A graph G consists of a set V of vertices (nodes) and a set E of edges . G= (V,E) is a finite and non empty set of vertices.

Q2What do you mean by directed acyclic graph?
A2:Directed acyclic graph – A graph consists of no circular path and all the vertices are connected by the directed edges.

Q3 What is adjacent matrix?
A3 Vertex v1 is said to be adjacent to a vertex v2 if there is an edge (v1, v2) or (v2,v1)

Q4 What is a path?
A4 A path from vertex w is a sequence of vertices , each adjacent to the next.

Q5 What do you mean by a cycle?
A5 A cycle is a path in which first and last vertices are the same.

Q6 What is a connected graph?
A6 A graph is called connected if there exists a path from any vertex to any other vertex.

Q7 What is a degree of a graph
A7 The number of edges incident on a vertex determine its degree. The degree of vertex u, is written as degree(u)

Q8 What do you understand by the term complete graph?
A8 A graph G is said to complete or fully connected if there is path from every vertex to every other vertex. A complete graph with n vertices will have n(n-1)/2 edges.

Q9 What is a weighted graph?
A9 A graph is said to be weighted graph if every edge in a graph is assigned some weight or value. The weight of the edge is a value representing the cost or distance between the vertices.

Q10 What ia a tree?
A10 A graph is a tree,iff it is connected and there are no cycles in the graph.