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Course : Data-structure.

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Assignment no: 04.

1) Describe the concept of Abstract data type. (ADT) and how they differ from concrete. data structures. Design an ADT for a stack. and implement it using. arrays and Linked. List in C. Include operations like Push, Pop, Peek, is empty, is full and Peek.

Sol Abstract Data Types (ADT) and stack implementation.

An Abstract Data type (ADT) is a theoretical concept that defines a data structure by it's behaviour from the Point of view of a user of the data. It specifies the operation that can be perform on the data and the types of operations allowed without specifying the details of how these operations are implemented. Difference between ADT's and concrete. and data structure.

1. Definition:

* ADT: focuses on what operations are to be performed but not on how they are. implemented.
* Concrete Data structure: specifies how data is stored and how operations are Performed on the data.

2. implementation:

* API : Abstract and does not prescribe. implementation details.

* Concrete Data structure: Provides a specific implementation, e.g., array or linked list.

Designing and implementing a stack API:

Operations:

1. Push : Adds an item to the top of the stack.
2. POP( ): Removes and returns the item at the top of the stack.
3. Peek( ) : Return the item at the top of the stack.
4. isEMPty ( ): checks if the stack is empty.
5. isfull ( ) : checks if the stack is full.

2. The university announced the selected candidates register numbers for placement training, The student XXX, reg. No. 2014201o. wishes to check whether his name is listed or not. The list is not sorted in any order. Identify the searching technique. that can be applied. and explained the searching steps with the suitable Procedure.

List includes 20142015, 20142033, 20142011, 20142017, 20142010, 20142056, 20142003 (.

Sol Searching Technique.

since the list is unsorted, a linear search is the appropriate technique.

Steps for Linear search:

1. Initialize : start from the beginning of the list.
2. compare : check each element in the list to see if the matches the target value. (20142010).
3. Return Results: If a match is found, ret-urn the index or Position of the element. If the end of the list is reached without finding the target.

Procedure:

1. start at the first element of the list.
2. compare each element to 20142010.
3. If you find 20142010, return its Position.
4. If you reach the end of the list. without finding it, conclude that the element is not Present.

Pseudocode:

```
List = [20142015, 20142033, 20142011, 20142017, 20142010,
        20142056, 20142003]

Target = 20142010.

    for i from 0 to Length(List) - 1:
        if [ist[i] == Target:
            Point "Target found at Position";i
            return I
    Point "Target not found".
```

OutPut:

Target found at Position.