## OMKAR BHARIKAR 112016020 ECE



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DSA Lab 3: Theory.

- Q1. What is array 9 How are arrays decleared 9 How are the elements of an array storred in memory.
- ) An array is a data structure that caintains a group of elements.
  - Amray variables are decleared identically to variables of their data types, expect that the variable name is followed by one pair of square [] by kets far each dimension of the array.

    far eq. if x is a parameter and is intended to represent an array of integers, it can be decleared as any one of the fallowing declarations:

    int(x); intx; intx[10]
  - An array stores its elements in carriaguous memory location, if you created the array locally it will be an Stack. Where the elements are stored depends an the storage specification



Q2. Define the terms:

a) ADT:

Abstract Data type (ADT) is a type lor class far objects whose behaviour is define by a set of values and a set of operations it is call'abstract's because it gives an implementation-independent view.

6) Persistent data structure:

A persistent data structure is a data

Structure that always perserver the

previous version of itself when it is

modified. Such data structure are

effectively immutable, of their operative

do not (visibly) update the structure

in-place, but instead always yield

a new updated structure

Q3. In what respect linear dria structures of differ from mon-linear duta structures of

Bequentially connected, and each a elements are is towns: traversable through a single seen where as in non-linear data structure, data



elements are hierarchically connected and one present at various levels.

- ② In linear data structure, all data elements one present at a single level where as in non-linear data structure data elements are present at multiple levels
- Dienear data structures are easier to implement, Non linear data structures are difficult to understand and implement as compared to linear data structures
- Completely in a single run, Non linear data structures are difficult to understand.
- 10 linear data structures are now very memory friendly, Non linear uses memory very efficiently.
- 94. What are advantages of array data structures?
  - Advantages af array data structures:
  - O Arrays represent multiple data items of the same type using a single name.



- accessed remdomly by using the index number.
- Arrays allocated memany in contiguous memary locations for all its elements there is no chance of extra memory being allocated in ease of arrays, this arraids memo werflow as shortuge of memory in donnys.
- (1) Using arrays, other data structure linked lists, stacks, queue, tress, graphs etc can be implimented.
- 5 700 dimensional arrays are used to represent matrices,
- Q5. What are the dis-advantages of array
  - Disadvantages of Array data truchere
  - In an array should be known in advance.
  - An array is a static structure (which means the array is af fixed size). Once declar the size all the array cannot be modified. The memory which is allocated to it cannot be increased or decreased.



- 3 Insection and deletion are quit difficult in an array as the elements are stored in consecutive memory locations and the shipting operation is coastly.
- A Allocating more more memory than the requirement leads to wastage of memory space and less culocation of memory also leads to a problem.
- Q6. State and explain applications of arrays.
  - Application of arrays:
  - 1 Array stones data elements of the same data type.
  - De Maintain multiple variable names using a single name. Arrays help to maintain large data under a single var ble name. The avail the confusion of using muliple variables.
  - 3 Arrays can be used for sarting data elements
    officent sorting techniques like Bubble sart,
    Insertion sorts selection sart etc use
    arrays to 8 tour and sart elements
    easily.



- Arrays can be used for performing matrix operations. many databases, small and large, consist of one-dimensional arrays where elements are recorded.
- 6) Arrays can be use for ou scheduling.
- 6 lastly, arrays are also used to implement other data structures like stacks, queue, Heaps, Hosh tables, etc.

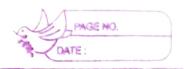
programming whenever you have to keep track of an ordered list of items you will end up using manarray an array.

97. What are the properties of abstract data types ?

General Properties:

An abstract data type is an en en-capsulation mechanism. In general it is composed of several camponents.

1 A data structure or structures (often carled



	( ) A set of operations ( called the method
	of aperations).
	@ A precise description of the type of the methods (called a signature).
	methods (called a signature).
	A A precise set of rolles about how it
	behaus (called the abst. et specification
	az the axio matic des cription).
	3 An implementation widden from the progra
	Es An implementation hidden Arom the programmer who uses the data type.
98.	Have are overage decleared?
	v .
-3	Same question repealed (Q1,b).
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