UNIT II

Concept of Array Structures

Concept of array

- An array is a finite, ordered and collection of homogeneous data elements
- • Finite: Because it contains only a limited number of elements.
- • Ordered: All the elements are stored one by one in contiguous locations of computer memory in a linear fashion.
- • Homogeneous: All elements of an array are of the same data type only

Types of arrays

All the data structures as mentioned are called basic data structures

- Other any complex data structures can be realized with them.

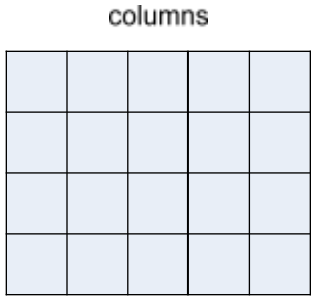
- Since, data structures are important to build any software system (because together algorithm and data structures are used to develop programs), Java developer elegantly supports a good l ibrary of built-in data structures utilities.

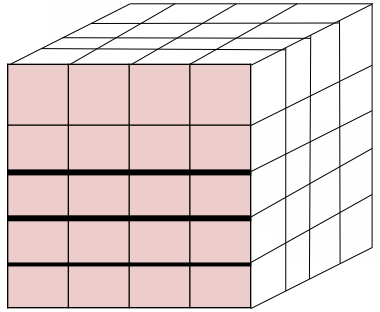
- In Java, a concept has been introduced called collection.

Types of arrays

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
5	34	49	89	0	15	75	11	65	0	95	25	20	44	1	55

.length =





2D array

Multidimensional arrays

More than one indexing to specify a location

2D: row, column

•Two-dimensional arrays (alternatively termed as matrices) are the collection of homogeneous elements where the elements are ordered in a number of rows and columns

•Indexing: *row, column*

A *sparse* matrix is a two-dimensional array having the value of majority elements as null

Operations: 1D Arrays

- Insertion
- Deletion
- Traversal
- Searching
- Sorting

Operations: 1D Array insertion algorithm

•Let A be an 1D Array with N elements and K is a positive integer such that K<=N. Following is the algorithm where ITEM is inserted into the K-th position of A.

1.Start
2.Set J = N
3.Set N = N+1
4.While J > = K
5.Set A[J+1] = A[J]
6.Set J = J-1
7.End
8.Set A[K] = ITEM
9.Stop

Operations: 1D Array deletion algorithm

Consider A is an 1D array with N elements and K is a positive integer such that K <= N. Following is the algorithm to delete an element available at the K-th position of A

1. Start
2. Set J = K
3. While J < N
4. Set LA[J] = LA[J + 1]
5. Set J = J+1
6. End
7. Set N = N-1
8. Stop

Operations: 1D Array traversal algorithm

Consider A is an 1D array with N elements. Following is the algorithm to traverse the entire array A to find MIN, MAX and AVERAGE.

Start

2. MIN = A[1], MAX = A[1], SUM = A[1]
3. Set J = 2
3. While J <= N
4. If A[J] < MIN Then Set MIN = A[j]
5. If A[J] > MAX Then Set MAX = A[j]
6. SUM = SUM + A[J]
5. Set J = J+1
6. End
7. Print MIN, MAX, SUM/N
8. Stop

Operations: 2D Arrays

- Matrix traversal
- Matrix addition / subtraction
- Matrix multiplication

Thank You