***Operations on Arrays***

**Types of Array operations:**

* Traversal: Traverse through the elements of an array.
* Insertion: Inserting a new element in an array.

import java.util.\*;

import java.io.\*;

import java.lang.\*;

class GFG

{

static int insert(int arr[], int n, int x, int cap, int pos)

{

if(n == cap)

return n;

int idx = pos - 1;

for(int i = n - 1; i >= idx; i--)

{

arr[i + 1] = arr[i];

}

arr[idx] = x;

return n + 1;

}

public static void main(String args[])

{

int arr[] = new int[5], cap = 5, n = 3;

arr[0] = 5; arr[1] = 10; arr[2] = 20;

System.out.println("Before Insertion");

for(int i=0; i < n; i++)

{

System.out.print(arr[i]+" ");

}

System.out.println();

int x = 7, pos = 2;

n = insert(arr, n, x, cap, pos);

System.out.println("After Insertion");

for(int i=0; i < n; i++)

{

System.out.print(arr[i]+" ");

}

}

}

* Deletion: Deleting element from the array.
* Searching:  Search for an element in the array.

import java.util.\*;

import java.io.\*;

import java.lang.\*;

class GFG

{

static int search(int arr[], int n, int x)

{

for(int i = 0; i < n; i++)

{

if(arr[i] == x)

return i;

}

return -1;

}

public static void main(String args[])

{

int arr[] = {20, 5, 7, 25}, x = 5;

System.out.println(search(arr, arr.length, x));

}

}

* Sorting: Maintaining the order of elements in the array.

**Advantages of using Arrays:**

* Arrays allow random access to elements. This makes accessing elements by position faster.
* Arrays have better cache locality which makes a pretty big difference in performance.
* Arrays represent multiple data items of the same type using a single name.
* Arrays store multiple data of similar types with the same name.
* Array data structures are used to implement the other data structures like linked lists, stacks, queues, trees, graphs, etc.

**Disadvantages of Array:**

* As arrays have a fixed size, once the memory is allocated to them, it cannot be increased or decreased, making it impossible to store extra data if required. An array of fixed size is referred to as a static array.
* Allocating less memory than required to an array leads to loss of data.  
  An array is homogeneous in nature so, a single array cannot store values of different data types.
* Arrays store data in contiguous memory locations, which makes deletion and insertion very difficult to implement. This problem is overcome by implementing linked lists, which allow elements to be accessed randomly.

**Application of Array:**

* They are used in the implementation of other data structures such as array lists, heaps, hash tables, vectors, and matrices.
* Database records are usually implemented as arrays.
* It is used in lookup tables by computer.
* It is used for different sorting algorithms such as bubble sort insertion sort, merge sort, and quick sort.