a) Write a JAVA program to search for an element in a given list of elements using binary search mechanism.

```
class BinarySearchExample{

 public static void binarySearch(int arr[], int first, int last, int key){

   int mid = (first + last)/2;

   while( first <= last ){

     if ( arr[mid] < key ){

       first = mid + 1;

     }else if ( arr[mid] == key ){

       System.out.println("Element is found at index: " + mid);

       break;

     }else{

        last = mid - 1;

     }

     mid = (first + last)/2;

   }

   if ( first > last ){

     System.out.println("Element is not found!");

   }

 }

 public static void main(String args[]){

       int arr[] = {10,20,30,40,50};

       int key = 30;

       int last=arr.length-1;

       binarySearch(arr,0,last,key);

 }

}
```

b) Write a JAVA program to sort for an element in a given list of elements using bubble sort

```
class BubbleSortExample {
   static void bubbleSort(int[] arr) {
       int n = arr.length;
       int temp = 0;
        for(int i=0; i < n; i++){
                for(int j=1; j < (n-i); j++){
                        if(arr[j-1] > arr[j]){
                                //swap elements
                                temp = arr[j-1];
                                arr[j-1] = arr[j];
                                arr[j] = temp;
                        }

                }
        }
    }
   public static void main(String[] args) {
                int arr[] ={3,60,35,2,45,320,5};

                System.out.println("Array Before Bubble Sort");
                for(int i=0; i < arr.length; i++){
                        System.out.print(arr[i] + " ");
                }
                System.out.println();
```

```
        bubbleSort(arr);//sorting array elements using bubble sort


       System.out.println("Array After Bubble Sort");

        for(int i=0; i < arr.length; i++){

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

        }


    }

}
```

c) Write a JAVA program using String Buffer to delete or remove character.

```
class StringBufferDeleteExample1 {
  public static void main(String[] args) {
     StringBuffer sb = new StringBuffer("javatpoint");
     System.out.println("string1: " + sb);
     // deleting the substring from index 2 to 6
     sb = sb.delete(2,6);
     System.out.println("After deleting: " + sb);

     sb = new StringBuffer("let us learn java");

     System.out.println("string2: " + sb);
     // deleting the substring from index 0 to 7
     sb = sb.delete(0, 7);
     System.out.println("After deleting: " + sb);
  }
}
```