**Exponential Search**

public class ExponentialSearch {

public static void main(String[] args) {

Scanner sc = new Scanner(System.in);

int[] arr = {5, 65, 89, 3, 1, 10, 11, 22, 34, 43};

Arrays.sort(arr);

System.out.println("Sorted array- " + Arrays.toString(arr));

System.out.println("Enter value to search: ");

int searchElement = sc.nextInt();

int index = exponentialSearch(arr, searchElement);

if(index != -1){

System.out.println("Searched item " + arr[index] + " found at index "+index);

}else{

System.out.println("Searched item " + searchElement + " not found in the array");

}

sc.close();

}

private static int exponentialSearch(int[] arr, int searchElement){

int bound = 1;

// increase upper bound

while (bound < arr.length && arr[bound] < searchElement) {

bound \*= 2;

}

// do binary search with in the range

return binarySearch(arr, bound/2, Integer.min(bound + 1, arr.length), searchElement);

}

private static int binarySearch(int[] arr, int start, int end, int searchElement){

// exit condition

if(start > end){

return -1;

}

int middle = (start+end)/2;

// element found

if(searchElement == arr[middle]){

return middle;

}

// left half

if(searchElement < arr[middle]){

return binarySearch(arr, start, middle-1, searchElement);

}else{

// right half

return binarySearch(arr, middle+1, end, searchElement);

}

}}