

3. Writing a program in Java implementing the exponential search algorithm

```
package javafsd4;
```

```
public class ExponentialSearch {
```

```
    public static int exponentialSearch(int[] array, int target) {  
        int n = array.length;
```

```
        // If the target is present at the first index  
        if (array[0] == target) {  
            return 0;  
        }
```

```
        // Find the range for binary search  
        int i = 1;  
        while (i < n && array[i] <= target) {  
            i *= 2;  
        }
```

```
        // Perform binary search within the range  
        return binarySearch(array, target, i / 2, Math.min(i, n - 1));  
    }
```

```
    private static int binarySearch(int[] array, int target, int low, int high) {  
        while (low <= high) {  
            int mid = low + (high - low) / 2;  
  
            if (array[mid] == target) {  
                return mid;  
            } else if (array[mid] < target) {  
                low = mid + 1;  
            } else {  
                high = mid - 1;  
            }  
        }  
  
        // Element not found  
        return -1;  
    }
```

```

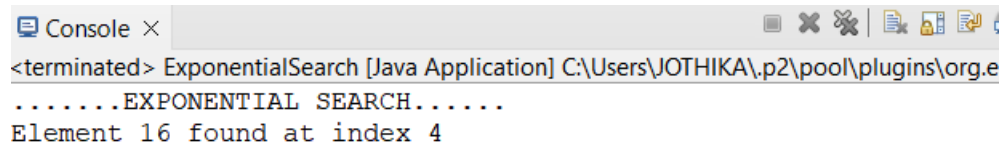
public static void main(String[] args) {
    int[] array = {2, 5, 8, 12, 16, 23, 38, 56, 72, 91};
    int target = 16;
    System.out.println(".....EXPONENTIAL SEARCH.....");

    int index = exponentialSearch(array, target);

    if (index != -1) {
        System.out.println("Element " + target + " found at index " + index);
    } else {
        System.out.println("Element " + target + " not found in the array");
    }
}
}

```

OUTPUT



The screenshot shows a console window titled "Console" with the following output:

```

<terminated> ExponentialSearch [Java Application] C:\Users\JOTHIKA\.p2\pool\plugins\org.e
.....EXPONENTIAL SEARCH.....
Element 16 found at index 4

```