PHASE 1 PRACTICE ASSISTED PROJECT

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

```
4.package main;
5.
6.public class ExponentialSearch {
7.    public static int exponentialSearch(int[]
  arr, int target) {
8.        int n = arr.length;
9.
10.            // If the target is present at the
  first position
11.            if (arr[0] == target) {
12.                return 0;
13.            }
14.
15.            // Find the range for binary search
16.            int i = 1;
17.            while (i < n && arr[i] <= target) {
18.                i *= 2;
19.            }
20.
21.            // Perform binary search in the
  identified range
22.            int left = i / 2;
23.            int right = Math.min(i, n - 1);
24.
25.            while (left <= right) {
26.                int mid = left + (right - left)
  / 2;
27.
28.                if (arr[mid] == target) {
29.                    return mid; // Target found
30.                } else if (arr[mid] < target) {
31.                    left = mid + 1; // Search in
  the right half
32.                } else {
33.                    right = mid - 1; // Search
  in the left half
34.                }
35.            }
36.
```

```
            return -1; // Target not found
        }

        public static void main(String[] args) {
            int[] arr = {2, 5, 8, 12, 16, 23, 38, 56, 72, 91};
            int target = 23;

            int index = exponentialSearch(arr, target);

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

OUTPUT-