Phase-1 Practice Project: Assisted Practice

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

Source code:

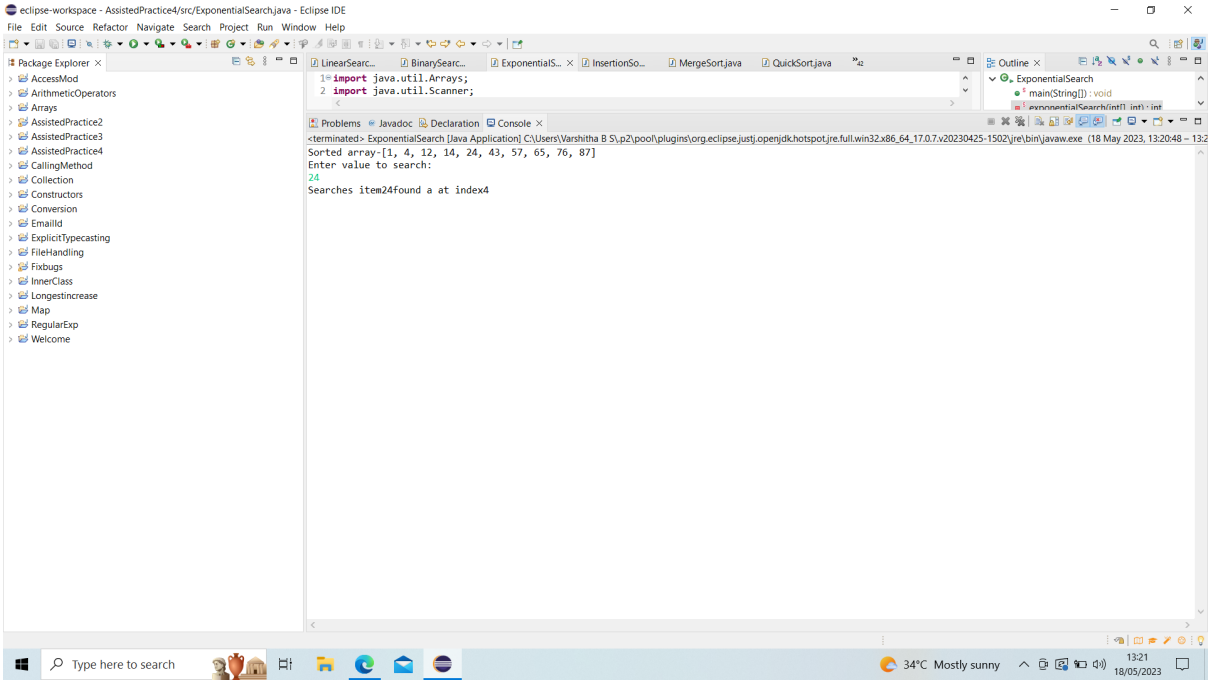
```
import java.util.Arrays;
import java.util.Scanner;
public class ExponentialSearch {
	public static void main(String[] args) {
		Scanner sc=new Scanner(System.in);
		int[] arr= {4,76,24,57,1,87,14,65,43,12};
		Arrays.sort(arr);
		System.out.println("Sorted array-" + Arrays.toString(arr));
		System.out.println("Enter value to search: ");
		int searchelement=sc.nextInt();
		int index=exponentialSearch(arr, searchelement);
		if(index!=-1) {
			System.out.println("Searches item"+ arr[index] + "found a 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;
		while (bound<arr.length && arr[bound]<searchElement) {
			bound*=2;
		}
		return binarySearch(arr,bound/2,Integer.min(bound+1,arr.length),searchElement);
	}

	private static int binarySearch(int[] arr,int start,int end, int searchElement) {
		if(start>end) {
			return -1;
		}
		int middle=(start+end)/2;
		if(searchElement==arr[middle]) {
			return middle;
		}

		if(searchElement<arr[middle]) {
			return binarySearch(arr,start,middle-1,searchElement);
		}else {
			return binarySearch(arr, middle+1,end,searchElement);
		}
	}
}
```

Output:


eclipse-workspace - AssistedPractice4/src/ExponentialSearch.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer
AccessMod
ArithmeticOperators
Arrays
AssistedPractice2
AssistedPractice3
AssistedPractice4
CallingMethod
Collection
Constructors
Conversion
EmailId
ExplicitTypecasting
FileHandling
Fixbugs
InnerClass
Longestincrease
Map
RegularExp
Welcome
LinearSearc...
BinarySearc...
ExponentialS...
InsertionSo...
MergeSort.java
QuickSort.java
1 import java.util.Arrays;
2 import java.util.Scanner;
Outline
ExponentialSearch
main(String[]) : void
Problems
Javadoc
Declaration
Console
<terminated> ExponentialSearch [Java Application] C:\Users\Varshitha B S\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_17.0.7.v20230425-1502\jre\bin\javaw.exe (18 May 2023, 13:20:48 – 13:2
Sorted array-[1, 4, 12, 14, 24, 43, 57, 65, 76, 87]
Enter value to search:
24
Searches item24found a at index4
Type here to search
34°C Mostly sunny
13:21
18/05/2023