

**Offline 3**  
**Marks 20**

1. You can only use BINARY SEARCH TREE for this question.

Write a function to find the kth smallest element in a BST. (For clarification see the sample input output below) The first line of the input will contain n (number of elements in the BST) and k. The next line contains n integers.

SAMPLE INPUT	SAMPLE OUTPUT
5 3 20 31 22 28 54	28
6 1 8 11 5 1 2 15	1

2. Write a program to show the vertex with the highest number of adjacent nodes in an undirected graph. The first two lines of the input will contain v (vertices) and e (edges). The next e number of lines contains the list of edges. You have to create the Adjacency Matrix first then do the rest of the code.

Sample Input	Sample Output
10 12 0 5 0 2 0 1 1 4 1 3 2 5 3 7 4 9 4 8 5 6 8 9 4 3	4
5 6 0 3 0 2 0 1 0 4 1 2 2 4	4

3. A root vertex of a directed graph is a vertex  $u$  with a directed path from  $u$  to  $v$  for any pair of graph vertices  $(u, v)$ . In other words, the root vertex can reach every other vertex in the graph. Find the root vertex of a directed graph. Take user input for this problem.