RANDOMI-ZED SELECT

```cpp
#include <bits/stdc++.h>
using namespace std;

int random_partition(int *arr, int start, int end)
{
    srand(time(0));
    int pivotIdx = start + rand() % (end - start + 1);
    int pivot = arr[pivotIdx];
    swap(arr[pivotIdx], arr[end]); // move pivot element to the end
    pivotIdx = end;
    int i = start - 1;

    for (int j = start; j <= end - 1; j++)
    {
        if (arr[j] <= pivot)
        {
            i = i + 1;
            swap(arr[i], arr[j]);
        }
    }

    swap(arr[i + 1], arr[pivotIdx]);
    return i + 1;
}

int random_selection(int *arr, int start, int end, int k)
{
    if (start == end)
        return arr[start];

    if (k == 0)
        return -1;

    if (start < end)
    {

        int mid = random_partition(arr, start, end);
        int i = mid - start + 1;
        if (i == k)
            return arr[mid];
        else if (k < i)
            return random_selection(arr, start, mid - 1, k);
        else
            return random_selection(arr, mid + 1, end, k - i);
    }
}
int main()
{
    int n;
    cout << "size of array-->";
    cin >> n;
    int A[n];
    int lb = 0, ub = 100;
    for (int i = 0; i < n; i++)
    {
        int x = (rand() % (ub - lb + 1)) + lb;
        cout << x << " ";
        A[i] = x;
    }
```

```
    }
    cout << endl;
    // int k;
    // cout << "input k , kth smallest element-->";
    // cin >> k;
    cout<<endl;
    for(int i=1;i<8;i++)
    {
    int loc = random_selection(A, 0, n-1, i);
    cout << i << "th smallest element is " << loc;
    cout<<"\n\n";
    }
}
```

OUTPUT

```
size of array-->100
41 65 31 41 19 15 72 11 78 69 37 23 29 63 75 4 5 49 75 99 27 61 62 17 79 61
22 13 49 71 61 8 81 67 80 47 83 88 30 12 74 78 33 23 58 83 76 59 77 85 25 18
 98 16 100 79 88 36 53 72 95 93 39 78 5 15 56 26 62 65 57 69 63 31 63 68 46
40 46 15 87 49 47 17 61 8 42 39 64 86 49 43 44 47 69 25 67 58 57 35

1th smallest element is 4

2th smallest element is 5

3th smallest element is 5

4th smallest element is 8

5th smallest element is 8

6th smallest element is 11

7th smallest element is 12

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```