SQM ASSIGNMENT.

Ques. Write a program for Quick Sort and calculate average live variable.

Ans Code to Quick Sort -

```
1.   # include <stdio.h>
2.
3.   int partition (int arr[], int low, int high) {
4.        int pivot = arr [high];
5.        int i = low - 1;
6.        printf ("Live variables in partition:");
7.
8.        for ( int j = low; j <= high - 1; j++) {
9.             if (arr[j] < pivot) {
10.                 i++;
11.                 int temp = arr[i];
12.                 arr[i] = arr[j];
13.                 arr[j] = temp;
14.             }
15.        }
16.        int temp = arr[i+1];
17.        arr[i+1] = arr[high];
18.        arr[high] = temp;
19.        return i+1;
20.  }
21.
22.  void quicksort (int arr[], int low, int high) {
23.        if ( low < high) {
24.             int pi = partition (arr, low, high);
25.
26.             quicksort (arr, low, pi - 1);
27.             quickSort (arr, pi + 1, high);
28.        }
29.  }
30.
```

```c
31.     void printArray (int arr[], int size ) {
32.         for ( int i = 0 ; i < size ; i++) {
33.             printf ( "%d", &arr[i]);
34.         }
35.     }
36.
37.  int main() {
38.         int arr[] = { 10, 7, 8, 9, 1, 5 };
39.         int n = sizeof (arr) / sizeof (arr[0]);
40.
41.         printf ("Original Array : ");
42.         printArray (arr, n);
43.
44.         quickSort (arr, 0, n-1);
45.
46.         printf ("Sorted Array: ");
47.         printArray ( arr , n);
48.
49.         return 0;
50.     }
```

Line	Live Variables	Count
3	—	0
4	pivot, arr, high	3
5	pivot, arr, high, i, low	5
6	pivot, arr, high, i, low	5
7	pivot, arr, high, i, low	5
8	pivot, arr, i, j	4
9	arr, i, j	3
10	arr, j	2
11	arr, temp, j, i	4
12	arr, temp, j, i	4
13	arr, temp, j, i	4
14	arr, temp, j, i	4
15	arr, temp, j, i	4
16	temp, arr, i	3
17	temp, arr, i, high	4
18	temp, arr, i, high	4
19	temp, arr, i, high	4
20	temp, arr, i, high	4
21	—	0
22	—	0
23	low, high	2
24	low, high, pi, arr	4
25	low, high, pi, arr	4
26	low, high, pi, arr	4
27	low, high, pi, arr	4
28	low, high, pi, arr	4
29	low, high, pi, arr	4
30	—	0
31	—	0
32	i, size	2
33	i, size, arr	3
34	i, size, arr	3
35	i, size, arr	3
36	—	0
37	—	0
38	arr	1

39	arr, n	2
40	arr, n	2
41	arr, n	2
42	arr, n	2
43	arr, n	2
44	arr, n	2
45	arr, n	2
46	arr, n	2
47	arr, n	2
48	arr, n	2
49	arr, n	2
50	arr, n	2

Avg. Live variables $= \dfrac{\text{Sum of count of live variables}}{\text{no. of executable statements}}$

$$= \frac{128}{48} = 2.667$$