-: QUESTION 1 :-

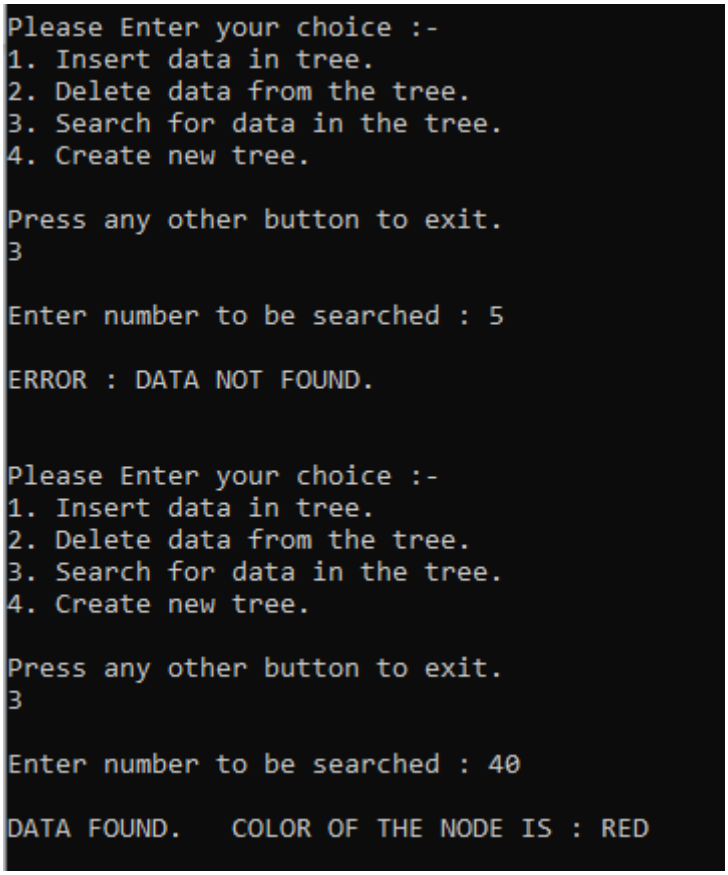
-: Adding data to the tree :-

```
Red Black Tree created successfully.

Please Enter your choice :-
1. Insert data in tree.
2. Delete data from the tree.
3. Search for data in the tree.
4. Create new tree.

Press any other button to exit.
1

Enter the number to be inserted in tree : 10

Data inserted in tree successsfully.


Please Enter your choice :-
1. Insert data in tree.
2. Delete data from the tree.
3. Search for data in the tree.
4. Create new tree.

Press any other button to exit.
1

Enter the number to be inserted in tree : 20

Data inserted in tree successsfully.


Please Enter your choice :-
1. Insert data in tree.
2. Delete data from the tree.
3. Search for data in the tree.
4. Create new tree.

Press any other button to exit.
1

Enter the number to be inserted in tree : 30

Data inserted in tree successsfully.
```

```
Please Enter your choice :-
1. Insert data in tree.
2. Delete data from the tree.
3. Search for data in the tree.
4. Create new tree.

Press any other button to exit.
1

Enter the number to be inserted in tree : 40

Data inserted in tree successsfully.


Please Enter your choice :-
1. Insert data in tree.
2. Delete data from the tree.
3. Search for data in the tree.
4. Create new tree.

Press any other button to exit.
1

Enter the number to be inserted in tree : 50

Data inserted in tree successsfully.


Please Enter your choice :-
1. Insert data in tree.
2. Delete data from the tree.
3. Search for data in the tree.
4. Create new tree.

Press any other button to exit.
1

Enter the number to be inserted in tree : 80

Data inserted in tree successsfully.
```

```
Please Enter your choice :-
1. Insert data in tree.
2. Delete data from the tree.
3. Search for data in the tree.
4. Create new tree.

Press any other button to exit.
1

Enter the number to be inserted in tree : 4

Data inserted in tree successsfully.


Please Enter your choice :-
1. Insert data in tree.
2. Delete data from the tree.
3. Search for data in the tree.
4. Create new tree.

Press any other button to exit.
1

Enter the number to be inserted in tree : 1

Data inserted in tree successsfully.


Please Enter your choice :-
1. Insert data in tree.
2. Delete data from the tree.
3. Search for data in the tree.
4. Create new tree.
```

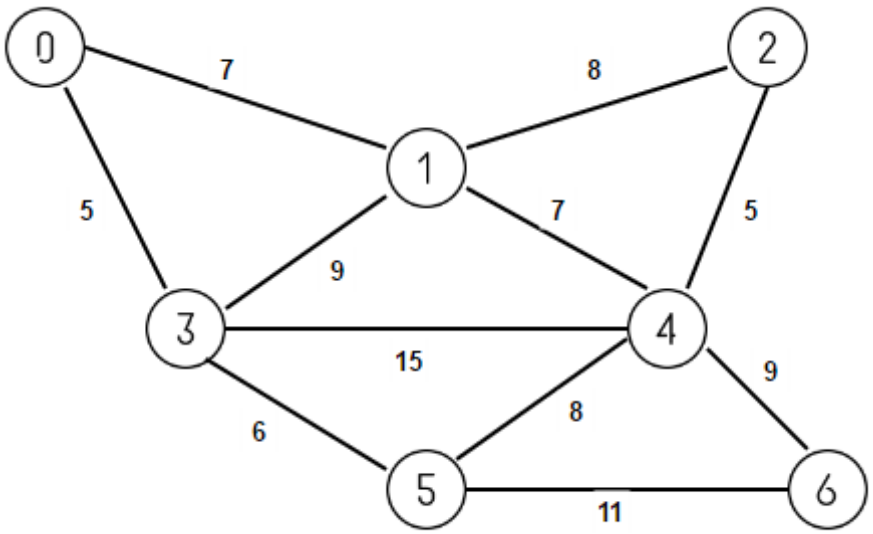
-: Searching data in the tree :-



-: Deleting data from the tree :-

```
Please Enter your choice :-
1. Insert data in tree.
2. Delete data from the tree.
3. Search for data in the tree.
4. Create new tree.

Press any other button to exit.
2

Enter number to be deleted : 17
Key not found in the tree

Data deleted from tree successsfully.


Please Enter your choice :-
1. Insert data in tree.
2. Delete data from the tree.
3. Search for data in the tree.
4. Create new tree.

Press any other button to exit.
2

Enter number to be deleted : 1

Data deleted from tree successsfully.


Please Enter your choice :-
1. Insert data in tree.
2. Delete data from the tree.
3. Search for data in the tree.
4. Create new tree.

Press any other button to exit.
3

Enter number to be searched : 1

ERROR : DATA NOT FOUND.
```

-: QUESTION 2 :-



-: Adding data to the program :-

```
Enter the no. of vertices : 7
Enter the no. of edges : 11
Enter the no. from which graph starts : 0
Press 0 to enter edges manually or Press 1 to enter edges with help : 0

Enter starting vertex, ending vertex  and weight of an edge with a space between all of them : 0 1 7
Enter starting vertex, ending vertex  and weight of an edge with a space between all of them : 0 3 5
Enter starting vertex, ending vertex  and weight of an edge with a space between all of them : 3 1 9
Enter starting vertex, ending vertex  and weight of an edge with a space between all of them : 1 2 8
Enter starting vertex, ending vertex  and weight of an edge with a space between all of them : 2 4 5
Enter starting vertex, ending vertex  and weight of an edge with a space between all of them : 1 4 7
Enter starting vertex, ending vertex  and weight of an edge with a space between all of them : 4 3 15
Enter starting vertex, ending vertex  and weight of an edge with a space between all of them : 3 5 6
Enter starting vertex, ending vertex  and weight of an edge with a space between all of them : 5 4 8
Enter starting vertex, ending vertex  and weight of an edge with a space between all of them : 5 6 11
Enter starting vertex, ending vertex  and weight of an edge with a space between all of them : 4 6 9


The minimum Spanning Tree is :-

Edge    Weight
0 - 1   7
4 - 2   5
0 - 3   5
1 - 4   7
3 - 5   6
4 - 6   9


Press 1 to search again / any other key to exit : _
```

-: QUESTION 3 :-

```
A random array is created with 74 elements:-

1361 17927 24932 18366 14478 21244 29639 23826 10842 8825 26598 25907 16317 18236 25 26986 11246 31345 22634 32487 13157
 8824 25161 9131 9527 14057 18561 25253 32419 9685 20330 795 27880 7759 1376 18252 8538 25643 22389 32340 11189 4358 241
63 27983 20145 26247 30661 21441 727 5603 32646 3894 7058 8359 15769 8741 17033 14002 23530 8730 15660 13696 30869 20756
 12429 11439 10327 26156 22386 3003 32065 18808 24232 23821


Please select the sorting method you want to use :-
1. Merge sort
2. Insertion sort
3. Quick sort
4. Bubble Sort
5. Selection sort
Press any ohter key to exit.

Enter your choice :- 1
Sorted array is :-
25 727 795 1361 1376 3003 3894 4358 5603 7058 7759 8359 8538 8730 8741 8824 8825 9131 9527 9685 10327 10842 11189 11246
11439 12429 13157 13696 14002 14057 14478 15660 15769 16317 17033 17927 18236 18252 18366 18561 18808 20145 20330 20756
21244 21441 22386 22389 22634 23530 23821 23826 24163 24232 24932 25161 25253 25643 25907 26156 26247 26598 26986 27880
27983 29639 30661 30869 31345 32065 32340 32419 32487 32646


No. of comparisons :- 373

Press 1 to search again / any other key to exit : 1
A random array is created with 17 elements:-

11587 23848 22882 26856 30184 926 17930 24336 19018 8233 26774 16159 16967 8700 3841 3185 19410


Please select the sorting method you want to use :-
1. Merge sort
2. Insertion sort
3. Quick sort
4. Bubble Sort
5. Selection sort
Press any ohter key to exit.

Enter your choice :- 2
Sorted array is :-
926 3185 3841 8233 8700 11587 16159 16967 17930 19018 19410 22882 23848 24336 26774 26856 30184
```

```
No. of comparisons :- 102

Press 1 to search again / any other key to exit : 1
A random array is created with 30 elements:-

21812 29768 20831 2578 13123 13375 6221 24847 27194 7642 26951 6410 17616 31933 7658 12153 27575 13222 14223 25507 5933
30639 15741 27651 32462 20685 19294 6893 31660 925


Please select the sorting method you want to use :-
1. Merge sort
2. Insertion sort
3. Quick sort
4. Bubble Sort
5. Selection sort
Press any ohter key to exit.

Enter your choice :- 3
Sorted array is :-
925 2578 5933 6221 6410 6893 7642 7658 12153 13123 13222 13375 14223 15741 17616 19294 20685 20831 21812 24847 25507 269
51 27194 27575 27651 29768 30639 31660 31933 32462


No. of comparisons :- 144

Press 1 to search again / any other key to exit : 1
```

```
A random array is created with 37 elements:-

10541 32729 3422 23207 20977 19600 367 25102 14898 7346 27039 17920 17941 10781 9566 253 31658 16884 28504 15570 4127 27
900 29771 24089 21811 30534 19477 26879 6894 6927 2322 9034 22927 21220 20900 6042 14279


Please select the sorting method you want to use :-
1. Merge sort
2. Insertion sort
3. Quick sort
4. Bubble Sort
5. Selection sort
Press any ohter key to exit.

Enter your choice :- 4
Sorted array is :-
253 367 2322 3422 4127 6042 6894 6927 7346 9034 9566 10541 10781 14279 14898 15570 16884 17920 17941 19477 19600 20900 2
0977 21220 21811 22927 23207 24089 25102 26879 27039 27900 28504 29771 30534 31658 32729


No. of comparisons :- 666

Press 1 to search again / any other key to exit : 1
```

```
A random array is created with 40 elements:-

21289 17825 27485 754 24904 22713 30207 8845 8750 7198 27083 7291 1719 205 26904 27071 17315 18715 19261 26986 19607 101
47 4017 5924 102 19075 3185 4104 27279 9928 23458 22965 15879 6182 19576 8097 27960 10477 23382 23217


Please select the sorting method you want to use :-
1. Merge sort
2. Insertion sort
3. Quick sort
4. Bubble Sort
5. Selection sort
Press any ohter key to exit.

Enter your choice :- 5
Sorted array is :-
102 205 754 1719 3185 4017 4104 5924 6182 7198 7291 8097 8750 8845 9928 10147 10477 15879 17315 17825 18715 19075 19261
19576 19607 21289 22713 22965 23217 23382 23458 24904 26904 26986 27071 27083 27279 27485 27960 30207


No. of comparisons :- 780

Press 1 to search again / any other key to exit :
```