8. Write a program in C in which a one dimensional array defined globally containing a list of unsorted integers and show whether binary search is better/worse than linear search using number of comparisons in the output .The search should include the following 4 cases:-

a) First element(-100)
b) Middle element(0)
c) Last element (99)
d) Non-existing element.(7)

Provide suitable justification for each of the individual cases.

Test Case:-100,-89,-56, -5 0,6,10 75, 99

1. Write a program in C that implements the following:-
i) A one dimensional array defined globally containing a list of unsorted integers.
ii) Module Merge_sort () when called sorts the list.
iii) Sorted content is displayed in the main module

3. Write a program in C that calls module maxmin1, maxmin2, maxmin_dac() for the same input sorted set and compare between them using number of comparisons. Also analyze the best case, worst case for maxmin1 (), maxmin2 ().

Test Case: 10,20,45,50,56,64,78,89,91,100 Output:- 10,100 ___ comparisons for max1,10,100 ____ comparisons for max2 .

10.Write a program in C that implements the following:-
i) A one dimensional array defined globally containing a list of unsorted integers.
ii) Module Quick_sort() when called sorts the list.
iii) Sorted content is displayed in the main module.
iv) Record the time duration taken to sort elements (start time- end time) for different values of n i.e. 500, 1000, 5000 .Plot it on a graph, Time (ns.) Vs. Input Size (n) and comment on the asymptoticity.

5.Write a program in C that implements the following:-

i) A one dimensional array defined globally containing a list of unsorted integers.

ii) Module Heap_sort() when called sorts the list.

iii) Sorted content is displayed in the main module

9. Write a program in C that implements the following:-

i) It accepts a finite number of parameters as matric dimensions from the user, along with the value of parameters.

ii) The program calls the module matrix _chain () which computes the optimal number of multiplications needed and optimal split point

iii) Module print_parens() when called prints the order of multiplication of the matrices.

iv) The main module prints the minimum number of multiplications needed and the optimal split point.

v) Test Case:-5,(5,4,6,2,7) Output:-No.:154,3, ((A1(A2A3)))

2.Write a program in C that implements the following: -

i) The user supplies the number of items & knapsack capacity.

ii) For each item the user specifies the weight & total profit for that item.

iii) Print the proportions in which the items are chosen so as to maximize the profit and also the maximum profit that can be achieved.

Test Case:

Items	**I1**	**I2**	**I3**	**I4**	**I5**
Weight	5	10	15	22	25
Cost	30	40	45	77	90

Output: 230

7.) Write a program in C that implements the following:-

i) The program accepts N Queens from the user and places N Queens in an N X N chessboard so that none of the placed queens are in the same row, same column, in the same diagonal in both sides.

ii) Print the positions of the columns for each of the n queens.

6.Write a program in C that implements the following:-

i) i) The user supplies a graph as shown in the figure through an adjacency matrix.

ii) ii) Module graph_coloring() when called colours the graph in such a way such that the nodes are coloured such that no adjacent nodes have the same colour.

4. Write a program in C that implements the following:-

i) A graph is supplied by the user as shown in the figure along with a starting node s

ii) The program finds the minimum cost of reaching every vertex along its corresponding parent or intermediate node with respect to the starting node s and prints the minimum cost and the intermediate parent node.

Test Case :G3, Output: d[s]=0 ,p[s]=NULL, d[y]=5,p[y]=s, d[t]=7,p[t]=y, d[x]=8,p[x]=t,d[z]=7,p[z]=y

11. Write a program in C that implements the following:-

i) A graph is supplied by the user along with a starting node

ii) The program finds the minimum cost of reaching every vertex along its corresponding parent or intermediate node, between all pair of nodes and prints the minimum cost and the intermediate node.

12. Write a program in C that accepts a input graph with negative edges and finds the single source shortest path.

13. Write a program in C that implements the following:-

i) The user supplies a graph through an adjacency matrix and a starting node.

ii) Module bfs() when called prints the breadth first traversal order of the graph.

14. Write a program in C that implements the following:-

i) A String(like “Techno International New Town”) & pattern(like “Town”) is taken as input from the user.

ii) Bruteforce() module when called informs whether the pattern is found or not, & if found the corresponding index and the number of comparisons incurred.

15. Write a program in C that accepts a input graph with negative edge weight cycle and gives the corresponding desired output as expected in attempting to find the single source shortest path.

16. Write a program in C that accepts a input graph and finds the corresponding minimum spanning tree.

17. Write a program in C that implements the following: -

i) The user supplies a graph through an adjacency matrix and a starting node.

ii) Module dfs() when called prints the breadth first traversal order of the graph