Labset1:

1. For the given network graph, write a program to implement Link state routing algorithm to build a routing table for the given node.

Program:

```
#include<stdio.h>
#include<stdlib.h>
#define inf 999
int cost[10][10],n;
int spath(int s,int d)
{
   struct path
   {
      int len;
      enum{tentative,confirmed}label;
   }state[10];
   int i,u,j,num=2,min=inf;
   for(i=1;i<=n;i++)
   {
      state[i].label=tentative;
      state[i].len=cost[s][i];
   }
   state[s].label=confirmed;
   while(num<=n)
   {
      min=inf;
      for(i=1;i<=n;i++)
      {
         if(state[i].label==tentative && state[i].len<min)
         {
         min=state[i].len;
         u=i;
         }
      }
      state[u].label=confirmed;
      num++;
      for(j=1;j<=n;j++)
      {
         if(state[u].len + cost[u][j]<state[j].len && state[j].label==tentative)
         {
         state[j].len=state[u].len+cost[u][j];
         }
      }
   }
   return state[d].len;
}
int main()
{
   int i,j,min,d;
```

```
    char src;
    printf("Enter number of nodes : ");
    scanf("%d",&n);
    printf("Enter the Cost Matrix : (0 for inf)\n");
    for(i=1;i<=n;i++)
    {
       for(j=1;j<=n;j++)
       {
           scanf("%d",&cost[i][j]);
           if(cost[i][j]==0 && i!=j)
           {
              cost[i][j]=inf;
           }
       }
    }
    printf("Link State Protocol");
    for(i=1;i<=n;i++)
    {
       printf("\n From Node = %c     \n",64+i);
       printf("Node\tCost\n");
       for(j=1;j<=n;j++)
       {
          if(cost[i][j]!=0 && cost[i][j]!=inf)
             printf("%c\t%d\n",64+j,cost[i][j]);
       }
    }
    printf("Enter the source : ");
    scanf(" %c",&src);
    for(i=1;i<=n;i++)
    {
       min=spath(src-64,i);
       printf("Min path from %c to %c =%d\n",src,64+i,min);
    }
    return 0;
}
```

Output:

```
Enter number of nodes : 5
Enter the Cost Matrix : (0 for inf)
0       10      0       5       0
10      0       6       0       10
0       6       0       3       6
5       0       0       0       8
0       10      6       8       0
Link State Protocol
 From Node = A
Node   Cost
B       10
D       5

 From Node = B
```

Node Cost
A 10
C 6
E 10

From Node = C
Node Cost
B 6
D 3
E 6

From Node = D
Node Cost
A 5
E 8

From Node = E
Node Cost
B 10
C 6
D 8
Enter the source : A
Min path from A to A =0
Min path from A to B =10
Min path from A to C =16
Min path from A to D =5
Min path from A to E =13