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Experiment 4

Code:

```
#include<stdio.h>
#define INFINITY 9999
#define MAX 10
void dijikstra(int G[MAX][MAX], int n, int startnode);
void main(){
	int G[MAX][MAX], i, j, n, u;

	printf("\nEnter the no. of vertices:: ");
	scanf("%d", &n);
	printf("\nEnter the adjacency matrix::\n");
	for(i=0;i < n;i++)
		for(j=0;j < n;j++)
			scanf("%d", &G[i][j]);
	printf("\nEnter the starting node:: ");
	scanf("%d", &u);
	dijikstra(G,n,u);
}
void dijikstra(int G[MAX][MAX], int n, int startnode)
{
	int cost[MAX][MAX], distance[MAX], pred[MAX];
	int visited[MAX], count, mindistance, nextnode, i,j;
	for(i=0;i < n;i++)
		for(j=0;j < n;j++)
			if(G[i][j]==0)
				cost[i][j]=INFINITY;
			else
				cost[i][j]=G[i][j];
	for(i=0;i< n;i++){
		distance[i]=cost[startnode][i];
		pred[i]=startnode;
		visited[i]=0;}
	distance[startnode]=0;
	visited[startnode]=1;
	count=1;
	while(count < n-1){
		mindistance=INFINITY;
		for(i=0;i < n;i++)
			if(distance[i] < mindistance&&!visited[i]){
				mindistance=distance[i];
				nextnode=i;}
		visited[nextnode]=1;
		for(i=0;i < n;i++)
			if(!visited[i])
					if(mindistance+cost[nextnode][i] < distance[i]) {
					 distance[i]=mindistance+cost[nextnode][i];
					  pred[i]=nextnode; }
			count++;}
	for(i=0;i < n;i++)
```

```
if(i!=startnode){
        printf("\nDistance of %d = %d", i, distance[i]);
        printf("\nPath = %d", i);
       j=i;
        do{
                j=pred[j];
                 printf(" <-%d", j); }
        while(j!=startnode); } }
```

Output:

Enter the no. of vertices:: 4
Enter the adjacency matrix::
0 1 1 1
1 0 1 0
1 1 0 1
1 0 1 0
Enter the starting node:: 1
Distance of 0 = 1
Path = 0 <-1
Distance of 2 = 1
Path = 2 <-1
Distance of 3 = 2
Path = 3 <-0 <-1