

Write a program to implement Dijkstra's algorithm.

```
#include <stdio.h>
#include <conio.h>
#define INFINITY 9999
#define MAX 10

void dijkstra (int G[MAX][MAX], int n, int startnode)
int main()
{ int G[MAX][MAX], i, j, n, u;
  printf("Enter no of vertices");
  scanf("%d", &n);
  printf("\nEnter adjacency matrix\n");
  for (i=0; i<n; i++)
  { for (j=0; j<n; j++)
  { scanf("%d", &G[i][j]); } }
  printf("Enter starting node");
  scanf("%d", &u);
  dijkstra (G, n, u);
  return 0;
}
```

```
void dijkstra (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[nextnode][i] < distance[i])
```

```
{ distance[i] = mindistance + cost[nextnode][i];
```

```
pred[i] = nextnode;
```

```
}
```

```
count++;
```

```
for (i = 0; i < n; i++)
```

```
if (i != startnode)
```

```
{ printf("\n Distance of node %d = %d", i,
```

```
distance[i]);
```

```
printf("\n path = %d", i);
```

```
j = i;
```

```
do
```

```
{ j = pred[j];
```

```
printf("%d", j);
```

```
} while (j != startnode);
```

```
}}
```

Output:-

Enter no. of vertices : 4

Enter adjacency matrix

	0	1	2	3
0	0	1	1	1
1	1	0	1	0
2	1	1	0	1
3	1	0	1	0

Enter starting node :: 1

Distance of 0 = 1

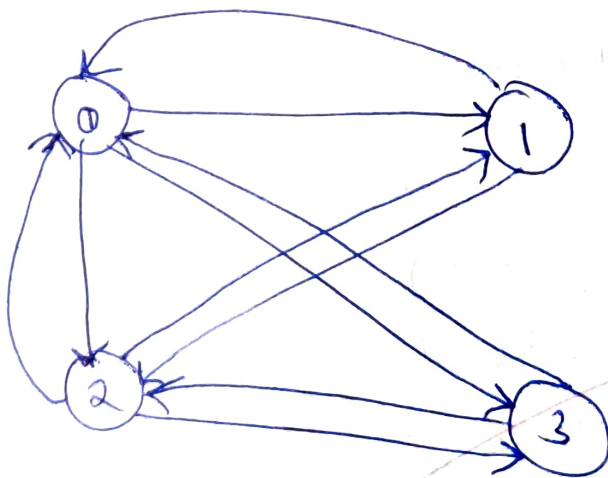
Path = 0 \leftarrow 1

Distance of 2 = 1

Path = 2 \leftarrow 1

Distance of 3 = 2

Path = 3 \leftarrow 0 \leftarrow 1



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