Design and Analysis of algorithm

Lab 7
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Topic: Dynamic Programming

1) Write a C code to implement Travelling salesman problem using dynamic programming method.

CODE:

```
#include <stdio.h>
int ary[10][10], completed[10], n, cost = 0;
void takeInput() {
  int i, j;
  printf("Enter the number of villages: ");
  scanf("%d", & n);
  printf("\nEnter the Cost Matrix\n");
  for (i = 0; i < n; i++) {
    printf("\nEnter Elements of Row: %d\n", i +
      1);
    for (j = 0; j < n; j++)
      scanf("%d", & ary[i][j]);
    completed[i] = 0;
  }
  printf("\n\nThe cost list is:");
  for (i = 0; i < n; i++) {
    printf("\n");
    for (j = 0; j < n; j++) printf("\t%d", ary[i][j]);
  }
}
int least(int c) {
  int i, nc = 999;
  int min = 999, kmin;
  for (i = 0; i < n; i++) {
    if ((ary[c][i] != 0) && (completed[i] ==
        0))
```

```
 = ary[c][i];
    nc =
      i;
  }
}
}
if (min != 999) cost += kmin;
return nc;
}
void mincost(int city) {
  int i, ncity;
  completed[city] = 1;
  printf("%d--->", city + 1);
  ncity = least(city);
  if (ncity == 999) {
    ncity = 0;
    printf("%d", ncity + 1);
    cost += ary[city][ncity];
    return;
  }
  mincost(ncity);
}
int main() {
  takeInput();
  printf("\n\nThe Path is:\n");
  mincost(0);
  printf("\n\nMinimum cost is %d\n", cost);
  return 0;
}
```

OUTPUT:

Enter the number of villages: 4

Enter the Cost Matrix

Enter Elements of Row: 1

0 4 1 3

Enter Elements of Row: 2

4 0 2 1

Enter Elements of Row: 3

1 2 0 5

Enter Elements of Row: 4

3 1 5 0

The cost list is:

0 4 1 3

4 0 2 1

1 2 0 5

3 1 5 0

The Path is:

1—>3—>2—>4—>1

Minimum cost is 7