**Task :2**

Implementation of **Hill climbing algorithm for Heuristic search** approach using following constraints in python.

**Aim:** To Implement Hill climbing algorithm for Heuristic search approach for travelling salesman problem using python

**Algorithm:**

**Step 1:** start

**Step 2:** define TSP with (graph, s) and assign value for vertex.

**Step 3:** store all vertex apart from source vertex.

**Step 4:** store minimum weight hamiltonian cycle and assign permutation (vertex).

**Step 5:** store current path weight (cost) and compute current path weight.

**Step 6:** Update minimum and matrix representation of the graph values and print it. **Step 7:** stop

**Program:**

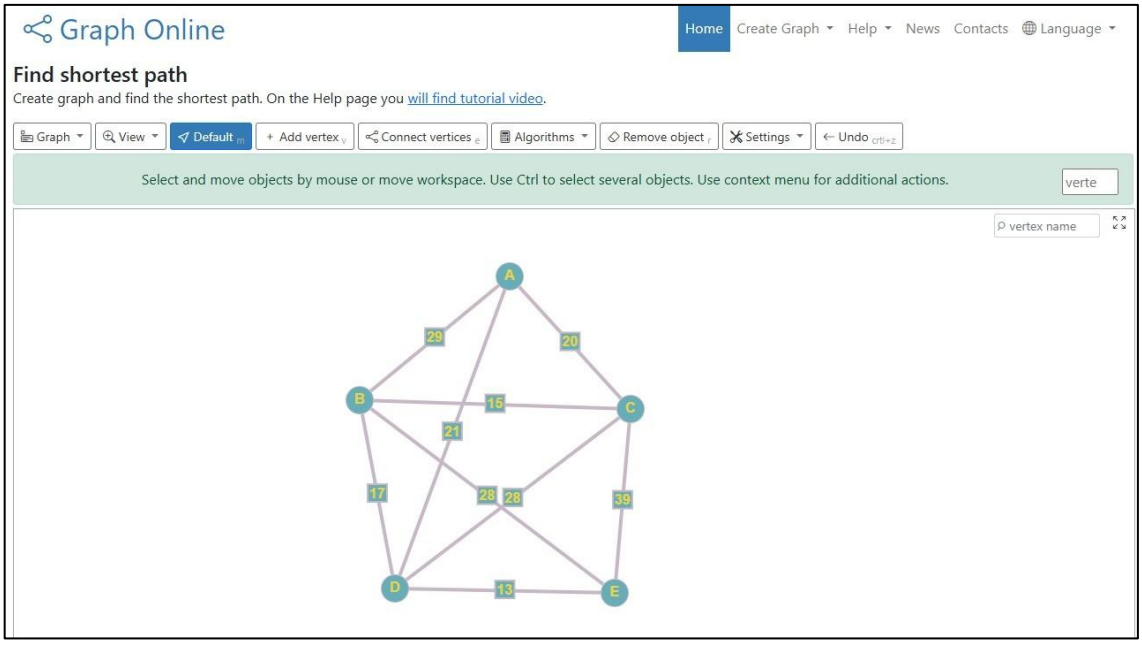
```
from sys import maxsize from itertools import
        permutations  V      =      4      def
travellingSalesmanProblem(graph, s):
    vertex = [] # Changed variable name to lowercase 'vertex' for
    i in range(V): # Fixed capitalization of 'for' if i != s: #
    Changed capitalization of 'if' vertex.append(i)

    min_path = maxsize # Changed variable name to lowercase 'min_path' next_permutation
    = permutations(vertex) # Changed variable name to lowercase
'next_permutation' for i in next_permutation: # Fixed capitalization of 'for'
   current_pathweight = 0 # Changed variable name to lowercase 'current_pathweight' k
   = s # Changed variable name to lowercase 'k' for j in i: # Fixed capitalization of 'for'
   current_pathweight += graph[k][j] k = j  current_pathweight += graph[k][s]
   min_path =
       min(min_path, current_pathweight)
```

```
    return min_path # Changed capitalization of 'return' if  name
== "_main_":
    graph = [[0, 10, 15, 20], [10, 0, 35, 25],
             [15, 35, 0, 30], [20, 25, 30, 0]] s = 0
    print(travellingSalesmanProblem(graph, s)) # Changed capitalization of 'print'
```

**Output:**

```
Python 3.12.1 (tags/v3.12.1:2305ca5, Dec  7 2023, 22:03:25) [MSC v.1937 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:/Users/Student/AppData/Local/Programs/Python/Python312/TASK 2.py ==========
80
>>>
```




**Result:**

Thus the Implementation of Hill climbing algorithm for Heuristic search approach for travelling salesman problem using python was successfully executed and output was verified.