

UNIVERSIDAD TECNOLÓGICA DE LOS ANDES
INGENIERÍA DE SISTEMAS E INFORMÁTICA
ALGORITMOS Y PROGRAMACIÓN II

TEMA: 2° EXAMEN PARCIAL

FECHA: 20/12/2022

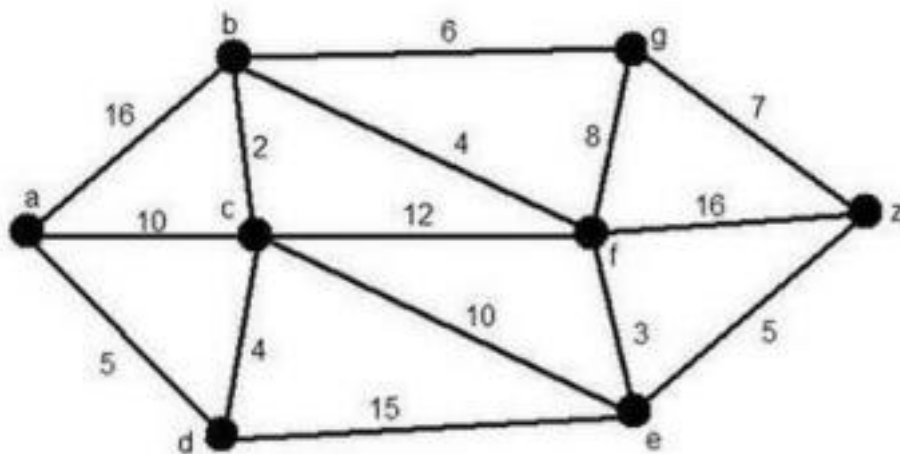
SEMESTRE 2022-I

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Nota: La entrega se realiza en formato PDF, Para su revisión:

Pregunta 1. Usando como base la guía 19, ejercicio propuesto 2 algoritmo de Dijkstra con Clases encuentre la ruta mínima del siguiente grafo desde el nodo (a) hasta el nodo (z), se desea imprimir los vértices con sus respectivos pesos.



```

from heapq import *
from collections import defaultdict

def dijkstra(edges, strat_node, end_node):
    g = defaultdict(list)
    for start, end, weight in edges:
        g[start].append((weight, end))
    q, visited = [(0, strat_node, ())], set()
    while q:
        (cost, v1, path) = heappop(q)
        if v1 not in visited:
            visited.add(v1)
            path = (v1, path)
            if v1 == end_node:
                return (cost, path)
            for c, v2 in g.get(v1, ()):
                if v2 not in visited:
                    heappush(q, (cost+c, v2, path))

    print (q)
    return float("inf")

if __name__ == "__main__":
    #Bordes
    edges = [
        ("A", "B", 16),
        ("A", "C", 10),
        ("A", "D", 5),
        ("B", "G", 6),
        ("B", "F", 4),
        ("B", "C", 2),
        ("C", "B", 6),
        ("C", "F", 12),
    ]

```

```

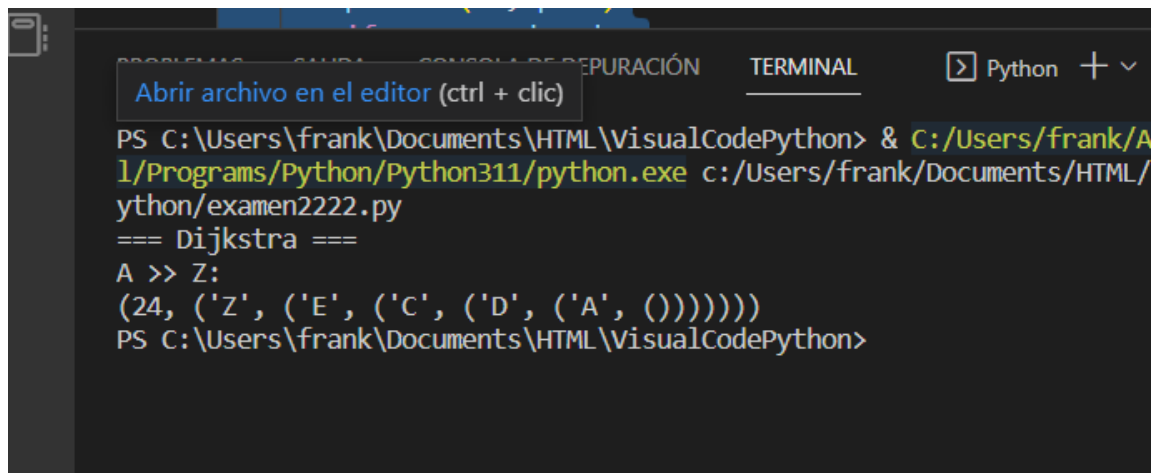
        ("C", "D", 4),

        ("C", "E", 10),
        ("D", "C", 4),
        ("D", "E", 15),
        ("E", "F", 3),
        ("E", "Z", 5),

        ("F", "G", 8),
        ("F", "Z", 16),
        ("F", "E", 3),

        ("G", "F", 8),
        ("G", "Z", 7)
    ]
print ("=== Dijkstra ===")
print ("A >> Z:")
print (dijkstra(edges, "A", "Z"))

```



The screenshot shows a Visual Studio Code interface with a terminal window open. The terminal is running a Python script that implements Dijkstra's algorithm. The output of the script is as follows:

```

PS C:\Users\frank\Documents\HTML\VisualCodePython> & C:/Users/frank/AppData/Local/Programs/Python/Python311/python.exe c:/Users/frank/Documents/HTML/VisualCodePython/examen2222.py
=== Dijkstra ===
A >> Z:
(24, ('Z', ('E', ('C', ('D', ('A', ()))))))
PS C:\Users\frank\Documents\HTML\VisualCodePython>

```

The output indicates that the shortest path from node A to node Z has a total weight of 24. The path is A → D → C → E → Z, represented as a nested tuple: ('Z', ('E', ('C', ('D', ('A', ())))).