EX5A: implementation of best first search algorithm

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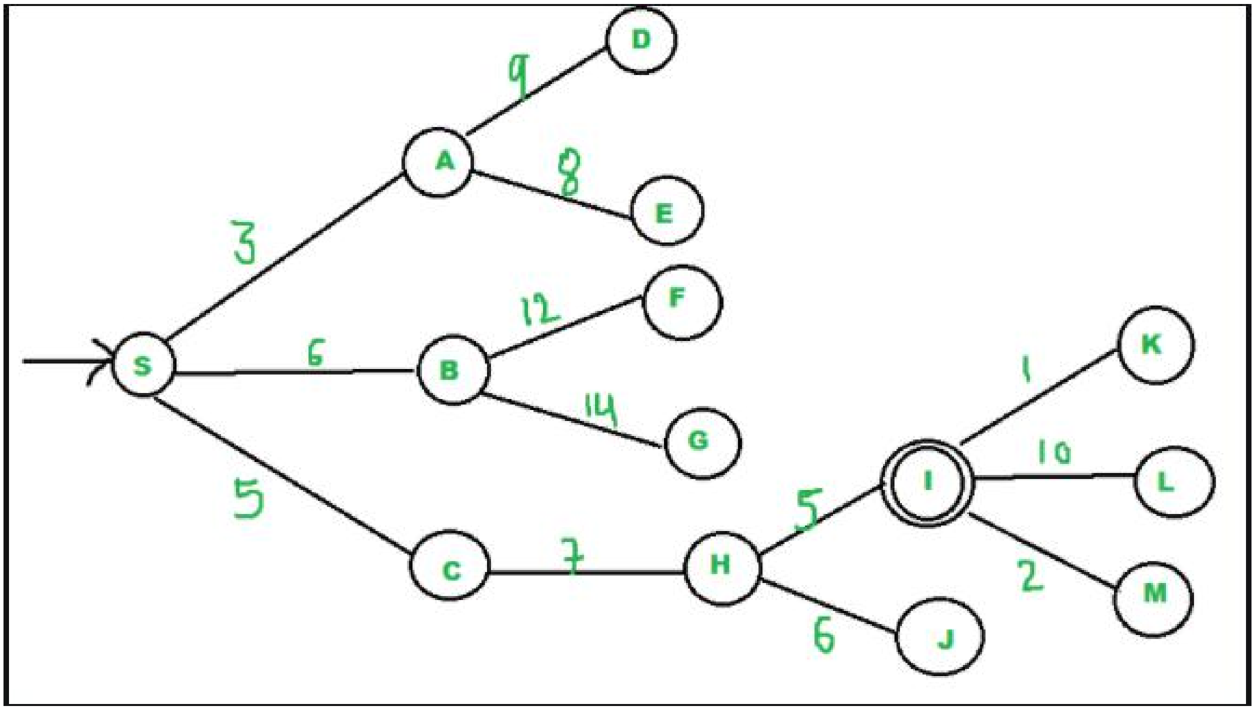
AIM: To implement the best first search algorithm using python.

Algorithm:



We start from source "S" and search for goal "I" using given costs and Best First search.

pq initially contains S
We remove s from and process unvisited neighbors of S to pq.
pq now contains {A, C, B} (C is put before B because C has lesser cost)

We remove A from pq and process unvisited neighbors of A to pq.
pq now contains {C, B, E, D}

We remove C from pq and process unvisited neighbors of C to pq.
pq now contains {B, H, E, D}

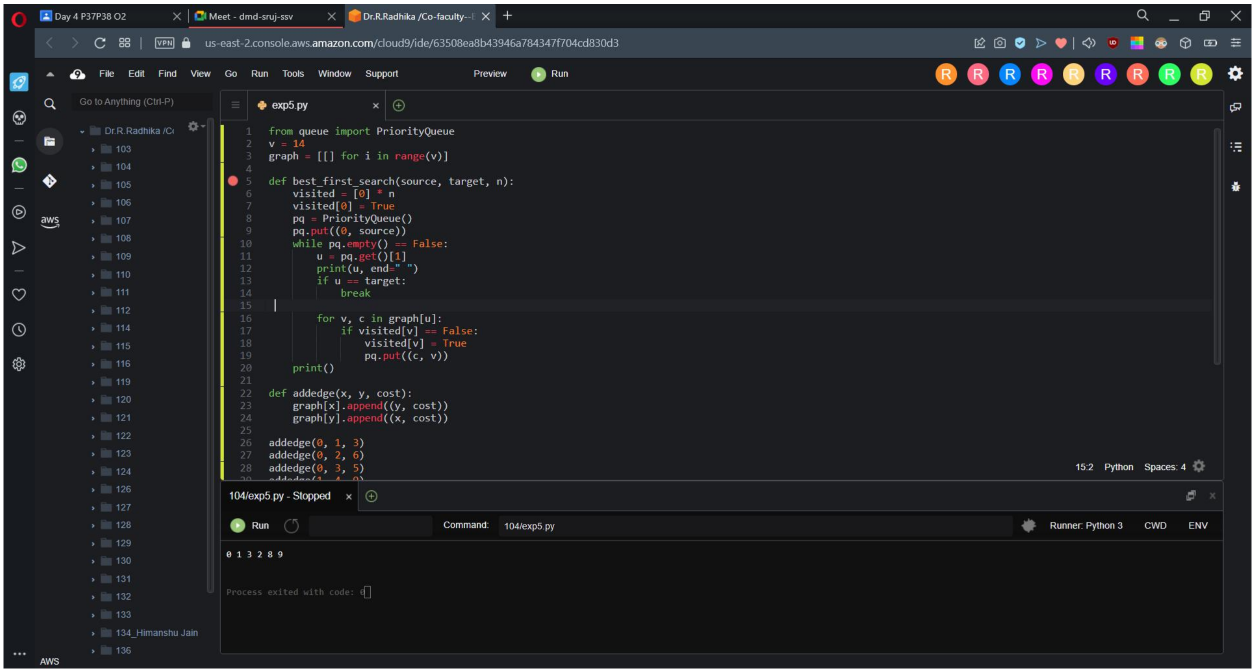
We remove B from pq and process unvisited neighbors of B to pq.
pq now contains {H, E, D, F, G}

We remove H from pq. Since our goal "I" is a neighbor of H, we return.

Code:

```
from queue import PriorityQueue
v = 14
graph = [[] for i in range(v)]

def best_first_search(source, target, n):
    visited = [0] * n
    visited[0] = True
    pq = PriorityQueue()
    pq.put((0, source))
    while pq.empty() == False:
        u = pq.get()[1]
        print(u, end=" ")
        if u == target:
            break

        for v, c in graph[u]:
            if visited[v] == False:
                visited[v] = True
                pq.put((c, v))
    print()

def addedge(x, y, cost):
    graph[x].append((y, cost))
    graph[y].append((x, cost))

addedge(0, 1, 3)
addedge(0, 2, 6)
addedge(0, 3, 5)
addedge(1, 4, 9)
addedge(1, 5, 8)
addedge(2, 6, 12)
addedge(2, 7, 14)
addedge(3, 8, 7)
addedge(8, 9, 5)
addedge(8, 10, 6)
addedge(9, 11, 1)
addedge(9, 12, 10)
addedge(9, 13, 2)

source = 0
target = 9
best_first_search(source, target, v)
```

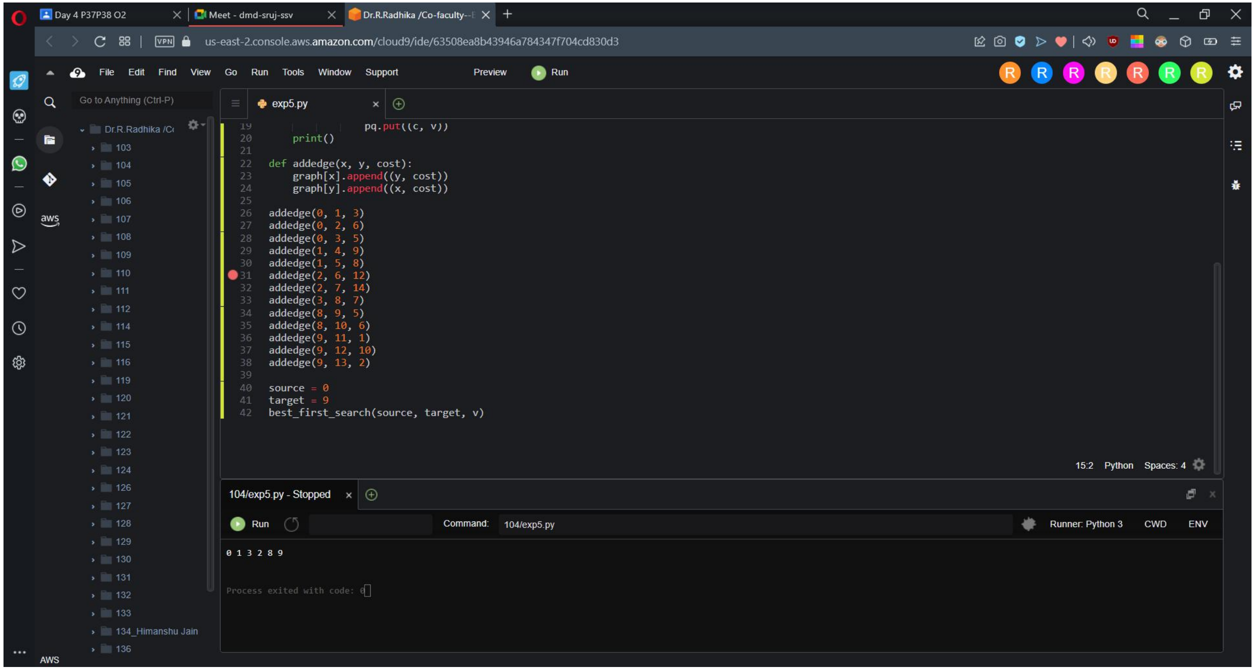
OUTPUT:



```python
from queue import PriorityQueue
v = 14
graph = [[] for i in range(v)]

def best_first_search(source, target, n):
    visited = [0] * n
    visited[0] = True
    pq = PriorityQueue()
    pq.put((0, source))
    while pq.empty() == False:
        u = pq.get()[1]
        print(u, end=" ")
        if u == target:
            break

        for v, c in graph[u]:
            if visited[v] == False:
                visited[v] = True
                pq.put((c, v))
    print()

def addedge(x, y, cost):
    graph[x].append((y, cost))
    graph[y].append((x, cost))

addedge(0, 1, 3)
addedge(0, 2, 6)
addedge(0, 3, 5)
```

Command: 104/exp5.py

```
0 1 3 2 8 9


Process exited with code: 0
```



```python
                pq.put((c, v))
    print()

def addedge(x, y, cost):
    graph[x].append((y, cost))
    graph[y].append((x, cost))

addedge(0, 1, 3)
addedge(0, 2, 6)
addedge(0, 3, 5)
addedge(1, 4, 9)
addedge(1, 5, 8)
addedge(2, 6, 12)
addedge(2, 7, 14)
addedge(3, 8, 7)
addedge(8, 9, 5)
addedge(8, 10, 6)
addedge(9, 11, 1)
addedge(9, 12, 10)
addedge(9, 13, 2)

source = 0
target = 9
best_first_search(source, target, v)
```

Command: 104/exp5.py

```
0 1 3 2 8 9


Process exited with code: 0
```

RESULT: Hence we have successfully implemented the best first search algorithm using python.