MP-2 Tutorial - 4

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In [1]:

```python
def printpath(parent, vertex):
    if vertex < 0:
        return

    printpath(parent, parent[vertex])
    print(vertex, end=' ')
```

In [2]:

```python
def bellmanford(edges, source, N):


    distance = [float('inf')] * N
    parent = [-1] * N


    distance[source] = 0


    for k in range(N - 1):

        for (u, v, w) in edges:

            if distance[u] + w < distance[v]:

                distance[v] = distance[u] + w

                parent[v] = u

    for (u, v, w) in edges:  # edge from u to v having weight w

        if distance[u] + w < distance[v]:
            print("Negative Weight Cycle Found!!")
            return

    for i in range(N):
        print("Distance of vertex", i, "from the source is", distance[i], end='.')
        print(" It's path is [ ", end='')
        printpath(parent, i)
        print("]")
```

In [3]:

```python
if __name__ == '__main__':

    edges = [
        (0, 1, -1), (0, 2, 4), (1, 2, 3), (1, 3, 2),
        (1, 4, 2), (3, 2, 5), (3, 1, 1), (4, 3, -3)
    ]

    N = 5

    source = 0

    bellmanford(edges, source, N)
```

```
Distance of vertex 0 from the source is 0. It's path is [ 0 ]
Distance of vertex 1 from the source is -1. It's path is [ 0 1 ]
Distance of vertex 2 from the source is 2. It's path is [ 0 1 2 ]
Distance of vertex 3 from the source is -2. It's path is [ 0 1 4 3 ]
Distance of vertex 4 from the source is 1. It's path is [ 0 1 4 ]
```