CS 225

#42: Floyd-Warshall's Algorithm

December 11, 2017 · *Wade Fagen-Ulmschneider*

lab_ml and Reinforcement Learning

Available Tokens	Learned Move
10	Take **1** token ➔ 9
9	Take **2** tokens ➔ 7
8	Take **2** tokens ➔ 6
7	Take **1** token ➔ 6
6	Take **1** token ➔ 5
5	Take **2** tokens ➔ 3
4	Take **1** token ➔ 3
3	Take **1** token ➔ 2
2	Take **2** tokens ➔ 0 (win)
1	Take **1** token ➔ 0 (win)

Final Exam Details with Mattox

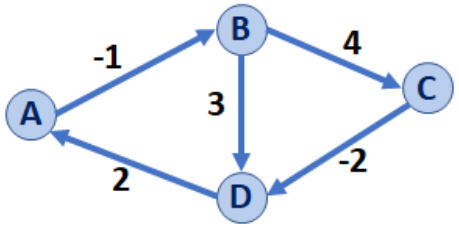
Floyd-Warshall Algorithm

Floyd-Warshall's Algorithm is an alternative to Dijkstra in the presence of negative-weight edges (but not negative weight cycles).

Pseudocode for Floyd-Warshall's Algorithm

```
1  FloydWarshall(G):
2    Input: G, Graph;
3    Output: d, an adjacency matrix of distances between all
4            vertex pairs
5
6    Let d be a adj. matrix initialized to +inf
7    foreach (Vertex v : G):
8      d[v][v] = 0
9    foreach (Edge (u, v) : G):
10     d[u][v] = cost(u, v)
11
12   foreach (Vertex u : G):
13     foreach (Vertex v : G):
14       foreach (Vertex w : G):
15         if d[u, v] > d[u, w] + d[w, v]:
16           d[u, v] = d[u, w] + d[w, v]
17
18   return d
```

Running Floyd-Warshall:



	A	B	C	D
A				
B				
C				
D				

Comparison of Graph Algorithms:

Implementations

- Edge List
- Adjacency Matrix
- Adjacency List

Traversals

- Breadth First
- Depth First

Minimum Spanning Tree

- Kruskal's Algorithm
- Prim's Algorithm

Shortest Path

- Dijkstra's Algorithm
- Floyd-Warshall's Algorithm

CS 225 – Things To Be Doing:
1. Exam #13 (makeup exam) starts today **2.** MP7 due Monday, Dec. 11 at 11:59pm **3.** Final exam starts Thursday **Good luck on all your finals! :)**