lab_ml and Reinforcement Learning

<table>
<thead>
<tr>
<th>Available Tokens</th>
<th>Learned Move</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Take 1 token $\rightarrow$ 9</td>
</tr>
<tr>
<td>9</td>
<td>Take 2 tokens $\rightarrow$ 7</td>
</tr>
<tr>
<td>8</td>
<td>Take 2 tokens $\rightarrow$ 6</td>
</tr>
<tr>
<td>7</td>
<td>Take 1 token $\rightarrow$ 6</td>
</tr>
<tr>
<td>6</td>
<td>Take 1 token $\rightarrow$ 5</td>
</tr>
<tr>
<td>5</td>
<td>Take 2 tokens $\rightarrow$ 3</td>
</tr>
<tr>
<td>4</td>
<td>Take 1 token $\rightarrow$ 3</td>
</tr>
<tr>
<td>3</td>
<td>Take 1 token $\rightarrow$ 2</td>
</tr>
<tr>
<td>2</td>
<td>Take 2 tokens $\rightarrow$ 0 (win)</td>
</tr>
<tr>
<td>1</td>
<td>Take 1 token $\rightarrow$ 0 (win)</td>
</tr>
</tbody>
</table>

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 vertex pairs
4
5 Let d be a adj. matrix initialized to +inf
6 foreach (Vertex v : G):
7     d[v][v] = 0
8 foreach (Edge (u, v) : G):
9     d[u][v] = cost(u, v)
10 foreach (Vertex u : G):
11     foreach (Vertex v : G):
12         foreach (Vertex w : G):
13             if d[u, v] > d[u, w] + d[w, v]:
14                 d[u, v] = d[u, w] + d[w, v]
15 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:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Exam #13 (makeup exam) starts today</td>
</tr>
<tr>
<td>2.</td>
<td>MP7 due Monday, Dec. 11 at 11:59pm</td>
</tr>
<tr>
<td>3.</td>
<td>Final exam starts Thursday</td>
</tr>
</tbody>
</table>

Good luck on all your finals! : )