EE4371: Assignment 5 - Dynamic Programming

October 10, 2016

1. Consider the following maze

S									
	x	x	x	x		x	x	x	
	x		x					x	x
			x		x			x	E
	x	x	x		x	x	x	x	
	x				x			x	
	x		x		x				
	x		x					x	
	x		x	x	x		x	x	

The goal is to find the shortest path from S to E. Allowed directions are NSEW only. All squares marked with "x" passable but cost N units of time. The blank squares cost 1 unit of time.

(a) Suppose $N = \infty$. Develop a dynamic programming strategy to find the shortest path. Code this and *show the shortest path*. (Your program must print out the table, and also print the maze with the shortest path marked). **Hint:** If an alternate path comes to a square that has already been visited, that route can be discarded since it is not the shortest path to that square.

(b) Suppose $N = 15$. How will you design your algorihtm? When a path attempts to go through a wall, it adds 15 units of time to the path. Note that it only takes one unit of time to come OUT of a wall. Code your startegy and show the table and the shortest path. **Hint:** Use time rather than distance as your unit.

(c) Suppose $N = 10$. Repeat your algorithm. There are two shortest paths in this case.

2. Implement the triangulation problem explained in the textbook. The algorithm has to be converted into code. Print out the table and also draw the lowest cost triangulation for the example given in the textbook.