


CITM Game Development - Midterm 2 (test) Examination - Nov 2015

- You have 1 hour and 30 minutes to complete the assignment.
- Be clear and concise on your explanations.
- You can only use the square below to answer each question.
- If you take assumptions, explain them and be specific and explain your reasoning.

1. **(3 points)** Adapt the A* algorithm to accept creatures with size of 2x2. Paths that including tight spaces of 1 square should be rejected. Explain your reasoning to solve the problem. Assume you cannot move in diagonals. *E. g.: Our Ogre is 2x2 and needs to reach the destination X.*

A 10x10 grid with a pattern of gray squares. A 2x2 block of squares at (1,1), (1,2), (2,1), and (2,2) is outlined with a thick black border. Other gray squares are at (0,4), (1,3), (1,4), (2,4), (2,5), (3,5), (3,6), (3,7), and (4,5). An 'X' is in the cell at (1,9).

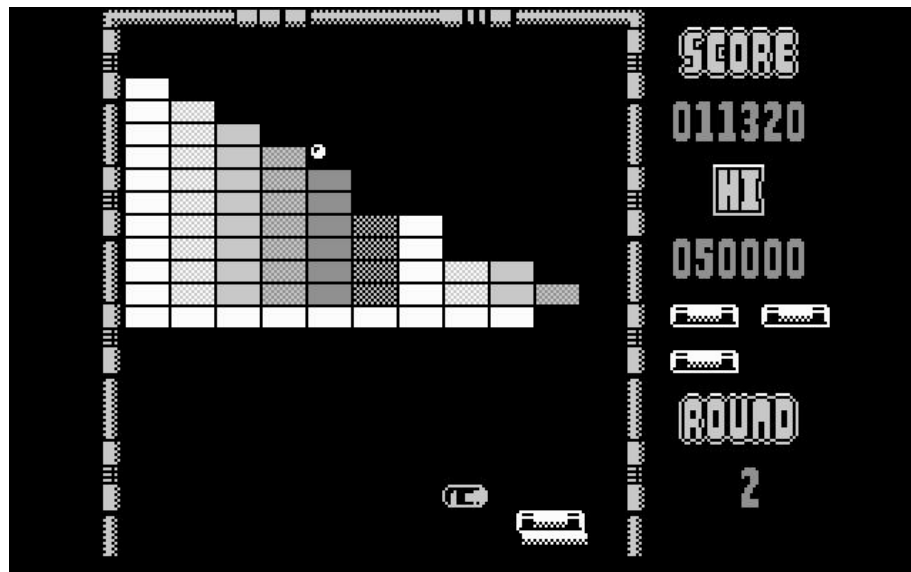


2. **(2 points)** Write down the step-by-step internal process of a A* algorithm in the map, taking in account that this map contains variable costs for squares: **river squares cost double to cross**. Assume that you cannot move in diagonals.

Map Legend: S: Start E: destination R: River W: Wall

S		R							
		R	R			W			
			R			W			E

1. **(3 points)** Describe your strategy and the UML of each of the classes (including methods and attributes) of an entity manager for Arkanoid. Remember that Arkanoid features power ups for the player and the ball.



Play the game at: <http://www.officegamespot.com/arcade/arkanoid.htm>

1. **(2 points)** If we have a game where the logic runs at 45 frames per second with vsync turned on (monitor refresh rate of 60 Hz) and our main character moves at 200 pixels per second. How much, in average, is he moving each frame taking in account that we have variable time step ?