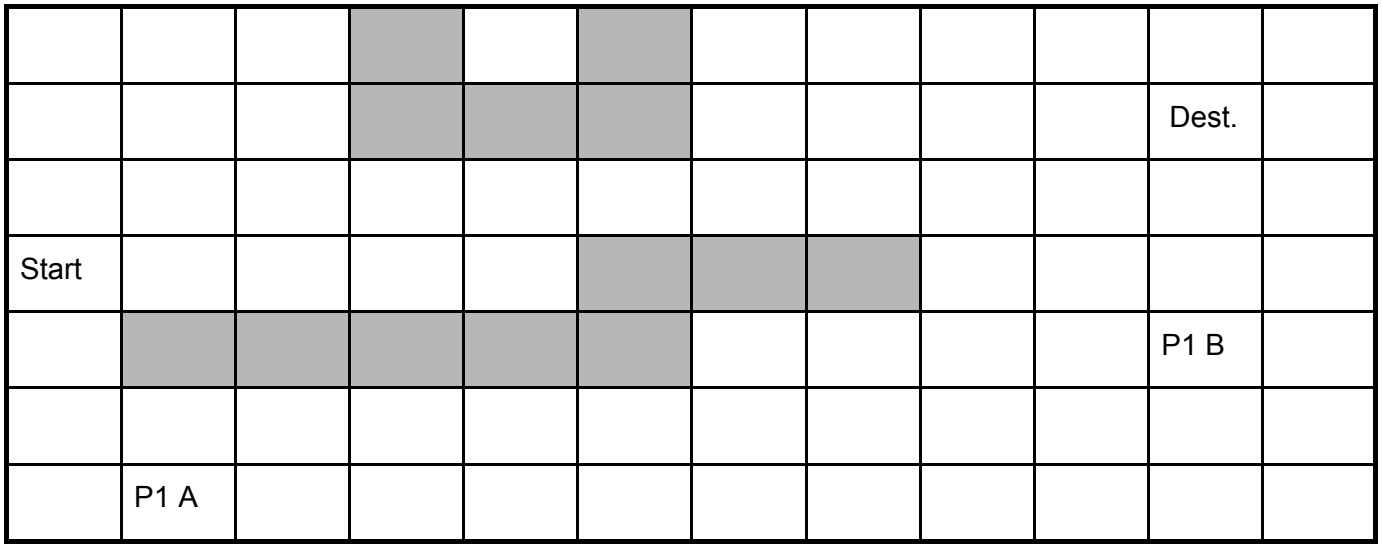
CITM Game Development - Midterm 2 Examination - Nov 2015

Your Name:

- You have 1 hour and 50 min 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, write them down and explain your reasoning.

1. **(3 points)** Adapt the A* algorithm to accept **bidirectional** portals: nodes that teleport the player instantly to another place in the map. Explain the advantages and limitations of your approach if we would have many portals at once. *E. g. Entering "P1 A" would instantly place the player in the other "P1 B" tile and vice versa.*



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: **the highway (H) is three times faster than normal tiles**. Take in account diagonals but you cannot use them to cut walls.

*Map Legend: **S**: Start **E**: path end **H**: Highway **W**: Wall*

							S		
				E	W	H	H	H	H
H	H	H	H	H	H				

3. **(3 points)** Describe your strategy and the UML of each of the classes (including methods and attributes) of an entity manager for Mario World only taking in account what can be seen in this picture. Remember that Yoshi (the green lizard that Mario is riding) likes to eat apples and turtles. If he eats a turtle it can spit it back making an attack.

Check: https://www.youtube.com/watch?v=1FnPe6tinVs from (0:40 to 2:30)

4. **(2 points)** If we have a game where the logic runs at 100 frames per second with vsync turned on (monitor refresh rate of 75 Hz) and our main character moves at 150 pixels per second. Taking in account that we have variable time step, how many pixels the character moves every frame ? And if we suddenly drop our logic frame rate to 32 ? **Elaborate** your answer.