

Computer Games Development CW208

Technical Design Document

Year IV

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# Technical Design

## Tasks

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| Task Name: Display Game World **Steps to Test:**   1. Run the Game. 2. Check that the level is visible. 3. Check that Mega Man can be displayed. 4. Check that the Enemies can be displayed. |

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| Task Name: Movement **Steps to Test:**   1. Press Spacebar 2. Check that Mega Man Jumped. 3. Check that Mega Man can only jump when touching the ground. |

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| Task Name: Obstacles **Steps to Test:**   1. Spawn and activate the ground obstacle. 2. Check that the obstacle moves from the right to the left. 3. Check that the obstacle resets once it goes off screen. 4. Repeat steps 1-3 for the ceiling obstacle. 5. Check that the random obstacle selection/activation works. |

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| Task Name: Collisions **Steps to Test:**   1. Spawn the player on the far left. 2. Spawn activate a ground obstacle. 3. Check that the obstacle collides with the player and resets all objects in the game world. 4. Repeat steps 1-3 for the ceiling obstacle. |

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| Task Name: Input Capture **Steps to Test:**   1. Run the game and press the C key. 2. Play and avoid obstacles for 2 mins. 3. Close the game and check that the CSV containing the captured data exists. 4. Check that the Csv contains data regarding the player’s position, the currently activated obstacles position, and whether or not the player jumped. |

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| Task Name: Build Backpropagation Model **Steps to Test:**   1. Load the game. 2. Press the B key. 3. Close the game and check that the model exists in the games folder as a .h5 file. |

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| Task Name: Load and Use Backpropagation Model **Steps to Test:**   1. Run the game. 2. Press the P key. 3. Check that the model was loaded and the ANN is avoiding the obstacles. |

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| Task Name: Q Learning Training **Steps to Test:**   1. Run the game. 2. Press the T key. 3. Check that the ANN is playing through the game. 4. After training is completed, close the game and check that the Q table exists as a CSV file. 5. Open the file and check that it contains the Q values regarding which action to take in each state of the game. |

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| Task Name: Load and Use Q Table **Steps to Test:**   1. Run the game. 2. Press the R key. 3. Check that the ANN loaded the Q table and is making decisions in reponse to the upcoming obstacles. |

# References

**Book**

Sutton, R. and Barto, A. (2020). *Reinforcement Learning.* 2nd Edition. Cambridge, Massachusetts: The MIT Press

Russel, S. and Norvig P. (2010). *Artificial Intelligence: A Modern Approach.* 3rd Edition. Upper Saddle River, New Jersey: Prentice Hall