# GAM 495 Course Artifact Metadata Sheet

**Part I: Original Artifact**

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| Artifact Name: | Marble Pusher | | |
| Original Course or Origin: | GAM 207 | Date Completed: | 10/29/17 |
| Artifact Description: | | | |
| A simple game that turns Newtonian mechanics into a puzzle. The player must find and push a ball onto launch pads so that the fixed impulse of the launch pad plus the player’s force is enough to eject the ball from the area for the player to move onto the next level. It features a simple menu, which opens when the game starts, where a player may choose to play the game from the beginning, select one of the three levels, or quit. | | | |
| Keywords: | Unreal Engine 4, Puzzle, Platformer, Physics | | |
| Tool(s) Used: | Unreal Engine 4 | | |
| Skills You Hope to Highlight: | | | |
| I hope to highlight my ability to create a game in Unreal Engine 4 using blueprints to construct a relatively simple game, as well as my ability to create an AI using the in-engine tools of Unreal, e.g. blackboard keys, behavior trees, AI perception. | | | |

**Part II: Refinement Plan**

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| Proposed change(s) to create a polished artifact: | | |
| Add a new game mode accessible from the menu where the player competes directly against an AI, or possibly team vs. team if I can figure it out. There will be two launch pads which act as goals, the player and AI compete to launch balls off their respective launch pad. Each ball ejected from the arena will award 1 point, whoever has the most points at the end of the game will win. I am not sure if it would be better to have one ball in the arena or multiple balls, that is a decision best left for when the AI is working. The behaviors I have in mind for the AI are as follows: 1) find the ball, 2) if the AI sees the ball, navigate to the side of the ball opposite of the AI’s launch pad, 3) if the AI has maneuvered to the side of the ball, move directly towards the launch pad, this task is terminated after a short period. Tasks 1 and 2 will be ignored during task 3, which should allow the AI to lose the ball as a player might when pushing a physics object. I will also update the main menu, add a pause menu which allows the player to quit to the main menu, and a simple widget indicating the location of the ball(s). Adding a few more levels to the single player mode would also help to flesh out the game. | | |
| Format of your original artifact (include link or zipped attachment for artifact files) | Unreal Engine 4.24 blueprint project (originally UE4.18)  <https://github.com/Heros-Tempus/Ball-Pusher> | |
| Indicate which components your revised artifact will demonstrate. | | |
| ☐ Game Engine Mastery | | ☐ Game AI |
| ☐ 2D Graphics | | ☐ Game Physics |
| ☐ 3D Graphics | | ☐ Complex Logic Problem Solution |
| ☐ Graphic Interface Design | | ☐ Other |
| Indicate how your proposed changes will showcase your relevant knowledge, skills, and abilities. | | |
| The menu overhaul and ball indicator are relatively simple tweaks that can be implemented relatively quickly. However, they are no less important because they communicate essential information to the player. The game sorely needs a UI overhaul, which is an opportunity to demonstrate my aptitude with Graphic Interface Design and 2D graphics.  The big-ticket item is the AI. I have only made an AI using Unreal’s behavior tree once before, as part of the group project in GAM 305. Usually I would try to steer clear of the behavior tree because it has been my experience that behavior trees are not friendly to newcomers, but because it has to react to a physics object a decision tree will create a better experience for the player than a hard coded AI.  I am not sure how to justify game engine mastery to be honest, it is a very nebulous concept. | | |
| Instructor Feedback: | | |
| *This area for use by the instructor.* | | |