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College of Computing

Computer Science Department

CS3141 Team Software Project

Spring 2022

**Power Play**

Section: R01

Team #: 8

| Roll # | Name | Role |
| --- | --- | --- |
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|  |  |  |

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# **Abstract**

This project includes the creation of an air hockey based game. The aim of this application is to try and create a more profound sense of community across the Michigan Tech Campus. This would help mitigate a sense of loneliness across the Michigan Tech community. Users will be able to play as either Michigan Tech or Northern Michigan, where power-ups will be dropped and the player with the higher score at the end of the designated time limit will be declared the winner. The incremental process model will be the best model to use for the development of this project. Using Unity3D and C# programming language for development and testing will also be beneficial.

It has been determined that the final product should be a straightforward game where user input moves each person's character. Users should not need more than a very brief tutorial to understand the process of playing the game.

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Chapter1

Specification

# **1.1 Introduction**

We will be developing a 1v1 air hockey game that includes numerous unique abilities and arenas. The game will be a 3D, top-down game with 2 players. Each player will control a paddle with the arrow keys on a keyboard. The goal of the game is to simply score more points than the other player at the end of the time limit. As the game progresses, abilities and obstacles may spawn in the arena, changing the pace of the game. This game will be a simple but fun and competitive game for Michigan Tech students to play. As mental health becomes more of a priority in society, there is an influx of applications, websites, and other resources that become available. While Michigan Tech does provide resources in the form of activities and counseling, we believe that more resources of a different type would help the cause. Given the technological affinity that the majority of students here have, we would like to offer a game that would encourage students to attend university events, namely the hockey games. Moral surrounding hockey games at Michigan Tech is relatively high, especially when they are playing against Northern. With these motivating factors, we want to create a Michigan Tech themed air hockey game that could be played by two people on the same keyboard and not only help to relieve feelings of social isolation through one-on-one socializing, but also by encouraging attendance at games and as a byproduct, enhancing school spirit and creating a further sense of community.

# **1.2 Problem Statement**

Many MTU students face the issue of isolation and other mental health issues but find it hard to attend events on campus without some form of encouragement. When mental health is not taken care of, the grades, socialization, networking, and overall well-being goes downhill. We would like to help support those students to take care of their mental health by fighting isolation through the use of a fun game that encourages involvement.

# **1.3 Aim and Objectives**

Aim:

The aim of this project is to develop a simple, fun, and competitive game to advertise Michigan Tech hockey. Ideally, the game would go viral around the Michigan Tech campus and would increase socialization and attendance at hockey games.

Objectives:

* To allow two students to play a quick and unique game of air hockey with each other on a computer.
* To make each individual game feel different from the other through different arenas and abilities to keep students interested.
* To improve the sense of community at Michigan Tech through a popular, competitive game.
* To improve the turnout at Michigan Tech hockey games by advertising hockey in the game.

# **1.4 Stakeholders**

# Users of the game

* Developers of the game
* Michigan Tech Hockey advertisement team

# **1.5** Methodology

The team will follow the incremental programming process for this project. They will also take advantage of different agile methodologies to be able to stay organized in program development. This includes Kanban board, burndown charts, and other processes to be able to stay organized and on task.

# **1.6 Tools**

We will be using Unity3D (game engine) and Visual Studio Code to develop our game. The game will run on any Windows computer.

# **1.7 High-Level Business Requirements**

Functional Requirements

* Controls of different pays shall use WASD and arrow keys.
* Product will be able to show the current score at all times.
* Abilities will spawn in the arena as the game progresses.
* Game will end after a certain amount of time, winner will be which ever player scored more.
* Game will be 3D and top-down.
* Players will be able to collide with the walls, other player, and puck.

Nonfunctional Requirements

* Game will increase socialization on Michigan Tech’s campus.
* Game will increase the attendance of Michigan Tech hockey games.

# **1.8 Product backlog**

**You can use the following table:**

| **Priority** | **User Story** | **Tasks** | **Estimated effort** | **Sprint** |
| --- | --- | --- | --- | --- |
| 1 | **As a player, I shall be able to move around my paddle with the WASD or Arrow keys.** | **Create a basic arena with colliders.** | **1 H** | **1** |
| **Develop two player objects movable with WASD and Arrow keys.** | **1.5 H** |
| **Place Camera in a top-down fashion to view the played and arena.** | **1 H** |
| **2** | **As a player, I want to see the score of the game So that I can know who is winning** | **Create a score counter and score board in the game.** | **1 H** | **1** |
| **Develop The score counter and display it correctly in game** | **2 H** |
| **Properly test to check the counter works and is displayed properly** | **1 H** |
| **1** | **As a player, I shall be able to hit the puck with my paddle.** | **Develop a puck object with colliders.** | **1 H** | **1** |
|  |  |
|  |  |
| **3** | **As a player, I shall be able to load into the game through a play button on the menu.** | **Create a menu with a button to load into the game.** | **1.5 H** | **2** |
| **4** | **As a player, I shall be able to see the screen shake when either player scores.** | **Add a camera shake function.** | **.5 H** | **3** |
| **2** | **As a player I shall be able to interact with abilities on the map.** | **Add different abilities into the game that the player can collide with.** | **5 H** | **2** |
| **4** | **As a player I shall be able to choose which map I want to player on through the menu.** | **Add function to choose different map themes in the main menu.** | **3 H** | **4** |
| **4** | **As a player I shall be able to change the map in game through abilities.** | **Add abilities that alter the arena.** | **3h** | **4** |

Chapter 2

Analysis and Design

Chapter 3

Implementation

The following [report](http://people.uncw.edu/simmondsd/documents/450_Implementation%20and%20Testing%20Report.pdf) is a good example that you can follow for implementation please refer to pages 25 - 30, and here is another [example](http://api.uofk.edu:8080/api/core/bitstreams/13308397-e07c-47ef-83e5-3bbb2e9f0a81/content) for your reference.

Chapter 4

## Validation

**For Chapter 4 (Validation)**: here you need to write about the process of checking that your software system meets specifications and requirements so that it fulfils its intended purpose, and to confirm or to prove the accuracy of your project.

Write about your testing and validation; **level of testing** you had, unit testing, integration testing, validation testing and acceptance testing.   Did you have **manual or automated** testing or both? specify the part(s) that have automated testing and part(s) that have manual testing, and **What is your oracle?**

**Write the** **test cases** for valid and invalid **input** (please see Week3 Automated Testing/ slide 11),

then confirm that no errors in the code and the application is able to operate in required condition (OS, web browsers) and you have created the code correctly.

For validation and acceptance testing write who tested your system? MTU students? computer science student? other department students? your group only? other college students? public users? How many students/users? How many times? could they use it easily or did they make mistakes?

Chapter 5

## Limitations and Future Work

**For Chapter 5**

Limitations: address everything that the project left,  if some project backlog items/ features/ requirements have not been implemented then mention them in this part with an explanation/justification why you couldn't implement them (Time constraints the time was not enough, some developers were unavailable, because of COVID19, or  tool limitation ....etc.). Many students tend to feel that presenting the limits of their work makes work weaker. on the contrary, approaching this section shows maturity for the academic universe, and writing about them actually strengthens your work by identifying any problems before reviewers/readers find them.

Future work : if the limitations can be addressed in the future then add this in here in future work, moreover, if you believe this project can be extendable (add more features/ more parts) that the project is worth extending to a Final Year Project (FYP) by you or other students or can be adopted and extended by industry as a product so you can give directions for that in future work.

Chapter 6

Conclusion

**For  Chapter 6 (Conclusion),**: write what you have concluded.

Examples:

I solved many problems in the project…

This application/project/system was applied to improve the learning process.

The results of this project showed that system significantly facilitated the students' learning process.

The system is useless, acceptable, usable, beneficial or maybe enjoyable and why do you believe that.

References

(Include any references to external documents or materials (for example, tutorials the team will be using, literature , web references or links to documentation of third-party tools you will use) here.

The references should be properly numbered and correctly used in the text.

The Reference section should be in the following fashion:

# References

Journal, Magazine/ Newspaper Article

| [1] | Author, "Title," *Journal name,* p. pages, year.  Book |
| --- | --- |
| [2] | Author, Book Title, publisher, year.  Internet Web page: |
| [3] | Author, "Name of the Web Page," [Online]. Available: URL. [Accessed Date]. |