Logo, company name

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**Project Definition and Scope**

**Project Goal Statement**

The project’s goal is to design a game that students can use to help improve their ability to solve projectile motion questions through visualization. The game will also be playable for individuals who love slingshot strategy shooter games but do not want to get to the technical side of calculations. The game will consist of one level and display variables needed to calculate the trajectory of a shot. The game will be developed with the consideration of ease of use for users, creating challenging levels, and enjoyability of each level.

**Learning Goal Statement**

Project’s Learning Outcomes:

* **Accountability:** Members will acknowledge and correct their mistakes as well as hold each other to high standards.
* **Collaboration:** Members are encouraged to participate in discussion and provide insight, ideas, improvements, or changes.
* **Flexibility:** Members will need to recover quickly from setbacks or delays, find alternative ways to reach the goal, and remain open to suggestions from other members or stakeholders.
* **Professionalism:** Members will hold themselves with integrity, positive mind set, and student mentality.
* **Time Management:** Members are expected to organize their work, school, and life schedules to be able to meet deadlines.
* **Written and Verbal Communication:** Members will all partake in creating the documentation of the game as well as presenting the game to the stakeholders.

**Project Scope**

**This project is:**

The project is a post-apocalyptic, taken over by robots themed, slingshot strategy shooter game. The game will be developed using Game Maker Studio 2. The objective of the game is to launch a projectile toward a target at varying heights. As mentioned, the game targets individuals who want to get technical with projectile motion calculations but does also welcome others as the game can be played in one of two ways. The first way is that users can use projectile motion formulas learned from their physics class to calculate the trajectory of a shot. Variables needed to make these calculations will be displayed on the screen. The second way is that users can randomly choose force, mass, and angle values until they hit the desired target. For score count, there will be a counter to keep the number of attempts the user has taken.

**Formulas used:**

|  |  |
| --- | --- |
| **Newton’s Second Law** | **Vertical Motion** |
|  |  |

**This project will include:**

* Game Mechanics:
  + Users will have the ability to:
    - change the force
      * The force will be displayed as a numeric value found at the bottom of the screen and will have a range of values in Newtons.
    - change the mass
      * There will be 3 options for the mass which users can toggle through.
        + Low – 30kg
        + Medium – 40kg
        + Heavy – 50kg
    - change the angle of the shot
      * Users will be able to change the angle through keyboard presses, w to increment, s to decrement.
      * Users can either calculate this using projectile motion formulas learned from their physic classes or by randomly assigning values.
  + Users will need to determine the force and angle needed to destroy the target.
  + The game will provide the user with the values that are needed to calculate the angle of the shot such as target distance and target height on the screen.
  + The target will also have a health bar and it is up to the user to destroy the target as little attempts as possible.
* Screens:
  + Info Screen:
    - This screen will appear before the title screen explaining what the game is. Such as notifying the user that if they have some physics knowledge then they are welcome to calculate the angle of the shot. If not, they are still welcome to enjoy the game.
  + Title screen
    - Will contain a start bar
  + Help/Controls Screen
    - This screen will contain how the game is played, such as letting users know what values can be changed.
  + Formula Screen:
    - There will be a screen where when users tap the icon an overlay screen will appear that shows the three formulas provided.
  + Game screen
    - Launcher on the left side launching projectile towards the target on the right
    - An attempt counter will be displayed on the screen.
    - 1 level with the different target positions
      * Level 1: The target is on flat land, the launcher is on the left, three targets can be found on the right at varying heights.
  + Results Screen
    - Black screen with the number of attempts the user has taken to clear each level.
* Sprites:
  + Slingshot
  + Projectile
  + Velocity Bar
  + Target
  + Walls
* Audio tracks:
  + Slingshot
  + Launch
  + Impact
  + Music
  + Goal
* Story: infecting computers with viruses to take save the world

**This project is not:**

* Multiplayer
* Use to teach physics (specifically projectile motion)

**“Wish List”**

* Various projectile effects (explosion, scattershot, freeze, etc.…)
* Random height variation
* Random target variation
* Trajectory lines (output formula)
* Solution sheet
* Move the target after each hit
* Interaction with smashing crates which will contain power ups.
* Interactions with pipes where the buttons to deactivate a shield will be located.
* Each weight will provide different damage values when hitting the target.
* 3 levels with the different target positions
  + Level 1: The target is on flat land, the slingshot is also on flat land, and there is a giant wall in between the target and slingshot.
  + Level 2: The target is on a hill and there is horizontal wind resistance.
  + Level 3: Two targets on different planes, the user will be obstructed by a moving wall, and there is angled wind resistance.

## **Project Scope Management Indicators and Change Process**

1. What might cause you to change the scope of your project?

* Difficulty of the gaming platform used
* Difficulty of the physics concepts
* Fast game development
* Slow game development
* Stakeholders/Sponsor Opinions/Feedback
* Team Conflict
* Unachievable goals

1. When we change scope what considerations (impacts) should be made?

* Are we still meeting our business goal?
* Is the project still measurable?
* Will the project still meet deadlines?
* Will the change improve the project?

## **Sign Off**

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| --- | --- |
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| **Approved by the Project Sponsors:** | **Date:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |