**Talay Kondhorn Term Project Proposal**

**Project Description**: The name of my term project is Angry Birds: Student Edition. My project will be an implementation of the original Angry Birds game, where the player launches birds with various skills from a slingshot and attempt to hit the pigs. The player will pass any given level if they are able to kill all the pigs on the screen.

**Competitive Analysis**: My project will closely resemble the original Angry Birds game. In the original version, the player launches birds with different powers towards multiple pigs who are protected by obstacles. These obstacles include wooden blocks, iron blocks, glass blocks, and others. My project will also include a bird being launched from a slingshot to destroy pigs. However, my version of the game will also include a no gravity version, where there is no gravity acting on any of the objects as if they are in space. My game will also potentially include a Maker Lab (post MVP), where players can create their own levels.

**Structural Plan**: I will create classes for each of the characters / objects on the screen, including the Bird class, the Pig class, the Block class, and Dynamite class (after MVP). All these classes will be in separate files. Most of the calculations related to physics will be in these classes, so each object governs its own physics. There will be a main file that consolidates all the classes and writes code for the animation.

**Algorithmic Plan**: The trickiest part of my project is implementing the physics on my own without using a module. The first part is launching the bird, where I will use conservation of energy. The bird will gain energy from the slingshot based on the distance pulled back, and that energy will transform into the initial velocity of the bird. The second part is modeling projectile motion of the bird in midair. The trickiest part is the collisions. For this, I will model them as elastic collisions and use conservation of momentum. I would have to implement the law of conservation of momentum and divide the velocities into the x and y components for each object. I will include these calculations in the classes of each item (Bird, Pig, Block, etc.).

**Timeline Plan**: By TP1, I plan to have the projectile motion of the bird and the slingshot energy completely working, and the elastic collisions working for the most part. The collisions are quite complicated, so I would allocate myself some more time to polish the algorithms and make the collisions smoother. I would like all the physics done by TP2 (MVP). After this, I would work on adding levels and including different types of birds. I might also include a Maker Lab where the user can design their own levels.

**Version Control Plan**: My term project versions are backed up into Google Drive before any new implementations are going to be made. For example, in TP0, I backed-up the old version before adding projectile motion. Thus, every TP deadline will have a few versions with different upgrades added to each.

Graphical user interface, text, application

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Graphical user interface

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**Module List**: None

**TP2 Update**: I did not make any design changes.

**TP3 Update:** I decided not to implement the maker level and instead focus on adding birds with different abilities and blocks with different characteristics. Thus, the two game modes are the normal game mode and the no gravity game mode, each with 6 levels. Both game modes include varying types of birds and varying types of blocks.