Project Proposal

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Link to GitHub: https://github.com/xiaolong-tian-19/final_game_project

1. Game Design

   The 2D game I will be creating is an arcade game that gives a different game play feeling for flappy bird. As in the original flappy bird game, the player will control the flappy bird and attempt to fly through as many pipe obstacles as possible. Similarly, each successful pass will award the player one point. When the game is over, the player will be presented with different medals for their accomplishment. The original flappy bird game is known to be difficult and quite additive. The 2D game I will be creating would introduce a more accessible version. The gimmick of the 2D game will be features added to the flappy bird game. This majorly will be game mechanics particularly powerups and interactive elements, including, lives that the flappy bird could acquire, portals that transport the flappy bird to different portals, ~~dynamites that will destroy the next pipe obstacle(s)~~, ~~pipes that moves instead of staying still on the spot~~, pipes mixed with flaming torches that the flappy bird must dodge.
   1. Additional lives: they will appear between the obstacles as floating items. If the flappy bird touches them, the flappy bird acquires an additional life. When the flappy bird hits a pipe obstacle, one live is taken away from the flappy bird, and the game is only over when the flappy bird has zero lives left. This will give the player additional chances.
   2. Portals: they will appear as elliptical objects with animation that gives the feeling of a portal and allow themselves to be identifiable as such. If the flappy bird chooses to enter a portal, it will transport the flappy bird to another portal, which is always ahead of the flappy bird and not behind. This will be an additional challenge that the player could use to boost up their scores.
   3. ~~Dynamites: they will appear as floating items with different colors to signify how powerful they are. If the flappy bird touches the dynamite and acquire it, the dynamite will destroy the next pipe obstacle(s) depending on how powerful it is. When the pipe obstacles are destroyed, additional animation will accompany it to increase to visual effects.~~
   4. ~~Moving pipes: as the flappy bird is moving through the screens, the pipes will move up and down repeatedly. The gap between the pipes will stay the same. However, the position of the upper pipe will move up and down and the position of the lower pipe will follow otherwise. This will give a more dynamic feeling to the game.~~
   5. Pipes mixed with flaming torches: some of the pipes will appear as pipes. While about half of them will appear as flaming torches. This will add a more dynamic and animated feeling to the game. It will make the game more interesting and appealing. It adds a slight twist from the classical flappy bird game, and I think it will make it more unique.
   I am also interested in including a day and night mode for the flappy bird game to induce a realistic feeling for the players. When the player is controlling the flappy bird, the screen will switch from day (light) to night (dark) and vice versa after a certain amount of time. This will also

make the game more exciting to play because of the challenge with getting adjusted to the transition.
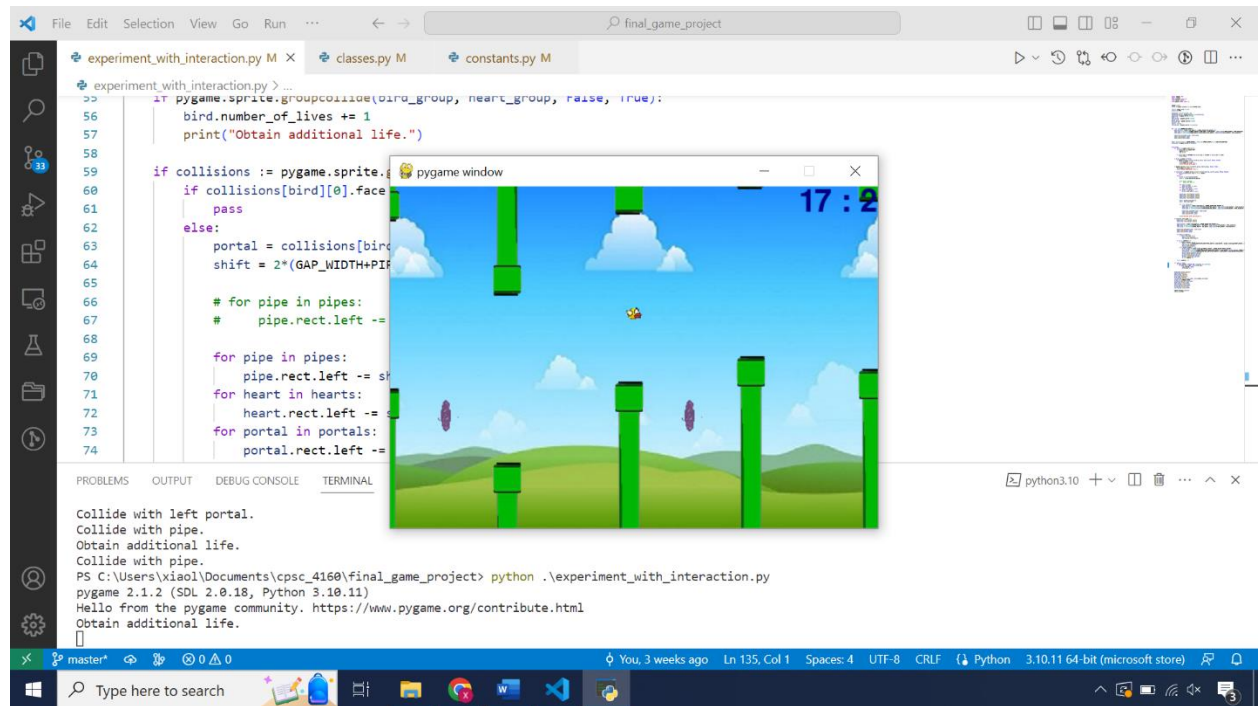

Figure 1 Game play of the current code.

2. Development Design

1. Game's architecture: The game will be implemented using a model view controller architecture with a game loop. The models will consist of classes that represent the flappy bird, the pipe obstacles, the background, the top & bottom floors, and the each of the powerup that the player would acquire. A view will be used to display the models on the screen to the player. The controller will handle user inputs and updates the models. The game loop will initiate instances of the models and tie everything together.

2. User interface: The user interface is relatively simple. At the beginning of the game, the player will be presented with a screen that ask them if they would like to get started. During the game, the flappy bird will descend and will only ascend if the player left clicks. At the end of the game, the player will be presented with a screen that shows the accomplishment, the medal, and an option to play again.

3. Technical challenges: the greatest challenges I could think of are getting the motion and the movement of the flappy bird correctly. When the user clicks, the flappy bird must ascend based on some rules and produce animation accordingly. When the flappy bird descends, the animation must also change to reflect the motion of the flappy bird. Another technical challenge might be the playable placement of the powerups the player might acquire. Placing an entering portal where it is not possible to reach, such as right behind a pipe

obstacle, and an exiting portal right in front of a pipe obstacle which might results in the player coming out of the portal and hitting right in front of the pipe obstacle might not be playable and sensible. On the other hand, the appearance of the powerups should somewhat appears to be random and should not be hardcoded. The last challenge might be creating the portals themselves. When the flappy birds enter a portal and exits one, there should be a smooth transition, and an update of the game state.

To address these challenges, I think that there are plenty of resources that I could utilize. The motion and animation of the flappy bird might not be easy, but there are plenty of examples to look at. Placement of the powerups could be a challenge. I am not sure exactly how to solve it yet. However, such game mechanics is very common, and I think I should be able to find help on it.

Additional challenges include having a playable game. The mechanics of the game are currently working. However, I need to figure out the right size of the pipe, flappy bird, gaps between the pipes, distance between the pipes, number of pipes on the screen, etc. to make the game more playable. This will include trying different parameters to test out the game to see which works best.

Another challenge is having the animation working. It might be difficult to find the right animation graphics that fits well with the game. I believe that there are quite a few resources online for 2D games that I could use. I think I could use those resources to help me address this challenge.

A new challenge that I have found is to choose the most visually appealing animation. Sometimes it is hard to find animation images online that works well and fit with the overall theme. Some of them look nice on the website but looks somewhat different when actually used in the 2D game. I think that solving this challenge really just requires many practices and experimentations to get it right.

3. Division of Labor
4. Timeline

Milestone 1: March 15
Tasks:
- Create the background of the game
- Create pipe obstacles
- Create side scrolling of the game
- Updated game document

Milestone 2: March 29
Tasks:
- Create all the classes represent objects in the game
- Create view, controller, and game loop
- Create a functional version of the game that the player could replay as many times as desired
- Updated game document

~~Milestone 3: April 12~~
~~Tasks:~~
- ~~Complete testing of the game~~
- ~~Add day/night mode for the game~~
- ~~Updated game document~~

Milestone 1: March 30
- Create the background of the game
- Create pipe obstacles
- Create side scrolling of the game
- Create all classes represent objects in the game
- Create view, controller, and game loop
- Updated game document

Milestone 2: April 18
- Add animation to the objects in the game – April 12
- Adjust the game parameters to make the game more playable – April 16
- ~~Add moving pipes functionality to the game – April 10~~
- ~~Add day/night mode for the game – April 8~~
- ~~Allow the player to replay as many times as desired – April 8~~
- Updated game document – April 16

Final Game Submission: April 26
- Allow the player to replay as many times as desired – April 25
- Replace some of the pipes with flaming torches – April 25
- Completed and polished game
- Completed game document

Final Game Presentation: May 4
- Present your game during the final period for this class

Milestone 1

Part I: Updated Game Document

Changes to the game and development design: the changes to the game document are highlighted. The parts of the original game document that are deleted are strikethrough and highlighted in red, and the parts that are added are highlighted in green.

How has the game evolved since you started working on it: as I worked on the game, I realize that some of the original ideas are good, but others are not so good. In addition, new ideas come to mind that I believe will make the game play more interesting. Particularly, I think that the dynamite inserted into the flappy game would not make the play more enjoyable. However, moving pipes would seem a novel idea that would make the game more interesting.

An updated version of project timeline: old parts of the project timeline is strikethrough and highlighted in red, while the new parts are highlighted in green.

What tasks have been postponed or moved up: the task to replay games as many times as desired as been moved up. Furthermore, a few additional tasks have been added, such as adding animation to the objects in the game, adjusting the game parameters to make the game more playable, adding moving pipes functionality to the game, etc.

Any technical challenges encountered: the new technical challenges are highlighted in green.

How will these challenges impact the development timeline: a few of the tasks have been moved up to the next milestone, such as adding animation to the objects in the game, adjusting the game parameters to make the game more playable, etc. These tasks directly correspond to the challenges I have encountered.

Will the final game design need to change: yes, but only slightly. I am planning to add moving pipes to the game as an additional gimmick game mechanic.

Part II: Updated Project Timeline

See (4.) Timeline

Part III: Technical Challenges

See (2.) Game Development Design (3.) Technical challenges

Milestone 2

Part I: Updated Game Document

Changes to the game and development design: the changes to the game document are highlighted. The parts of the original game document that are deleted are strikethrough and highlighted in red, and the parts that are added are highlighted in green

How has the game evolved since you started working on it: After more development, I realize that the playability of the game might be impacted by pipes that could move up and down. By more experimentation, I think that a good idea might be to replace some of the pipes by other objects, such as flaming torches. Although that this is somewhat of a deviation from the classical flappy bird, this gimmick could make the game more unique and special.

An updated version of project timeline: old parts of the project timeline is strikethrough and highlighted in red, while the new parts are highlighted in green.

What tasks have been postponed or moved up: the task to replay games as many times as desired has been moved up. I think it is more important to get major elements of the game working. In the end, it is more suitable to add this functionality once everything else has been completed.

Any technical challenges encountered: the new technical challenges are highlighted in green.

How will these challenges impact the development timeline: the major mechanics of the game have been finished. Furthermore, I have gotten the game to be more playable. It is somewhat difficult to get the animation more visually appealing. However, it shouldn't be too difficult and impact the development timeline significantly.

Will the final game design need to change: Yes. I am planning to replace some of the pipes with other objects, such as flaming torches, that the flappy bird have to dodge to make the game a bit more special and unique.

Part II: Updated Project Timeline

See (4.) Timeline

Part III: Technical Challenges

See (2.) Game Development Design (3.) Technical challenges