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Project Description [5 pts]: The name of the term project and a short description of what it will be. My term project name is Pacman 112. It is a replica of the popular game Pacman. The default mode will be an automatically generated maze and ghosts, but there will also be a mode that enables players to create their own maps and place their own ghosts.

Structural Plan [5 pts]: A structural plan for how the finalized project will be organized in different functions, files and/or objects.
Currently, my project is organized in one singular file. However, as the project progresses, I plan on splitting my project into multiple files. One file would handle ghosts, which are a class of objects. Another file would handle the movement of PacMan. Lastly, a file would handle the remaining game functions, such as grid, pellets, fruits (potentially), among other functions. Some other things that may be separated from the aforementioned files would be any graphics or UI enhancing features and potentially a leaderboard function.

Algorithmic Plan [5 pts]: An algorithmic plan for how you will approach the trickiest part of the project. Be sure to clearly highlight which part(s) of your project are most complex.
The most complex parts of my term project include basic maze generation algorithm and enemy AI pathfinding. It can also include additional upgrades, different game modes, nice UI, splash screens, login/saving features if time allows. According to Wikipedia's pseudocode, Prim's algorithm would start with a grid full of walls and generate a maze from that. However, with all maze gen algorithms, it will only generate one path so I may modify it slightly to make Pacman playable. One idea suggested was to mirror the board for each quadrant. As for pathfinding AI, I believe DFS would likely use some form of distance calculation to see whether the ghost should continue down a path that it randomly chooses or to backtrack. This would likely be based on distance (drow, dcol) compared to Pacman's position. As for the remainder, I have not yet spent the time exploring and understanding how to implement since that would only be on the table if I reach MVP.

Version Control Plan [5 pts]: A short description **and image** demonstrating how you are using version control to back up your code.
I will use Google Drive and upload my code after each code update.

TP2 Update:

- fixed bugs with wraparound and enemy movement
    - This was fixed through a simple indexing issue and modulus issue.
- working on DFS (buggy)
    - This is completed through backtracking, which creates a path that leads to Pacman's current location (pink) or Pacman's previous location (orange).
        - This scheme is meant to mimic the actual game where one ghost chases Pacman's current tile, one goes to four tiles ahead of where Pacman is going, one that uses red and Pacman's future position, and one that is seemingly random when within 8 tiles of Pacman.
    - In each time step, one step of that path is taken.
    - Every increment of 50 in app.time, the path is recalculated.
    - The DFS ghosts are only released after 250 increments in app.time.
    - In the meantime, the two ghosts that target at random are released.
- working on Game Over screen (buggy)
    - I created a start screen and a game over screen.
    - Initially, the game starts with the start screen and says "Press 'Space' To Start"
    - Then, when space is pressed screen enters the main game
    - When Pacman's lives drop below 3, the game is over and the Game Over screen is displayed
    - For both these screens, there is a flashing text to emulate retro games. These are based on the modulus of app.time.
- Pacman's movement has been corrected so that illegal moves are not registered and it continues in the original direction.
- Power Pellets have been drawn, these flash, but have no other uses yet.
- Ghosts can no longer be placed while playing. Nor can the map be changed.

Important Keys:
Space → Starts game and also can function as a pause. Clicking this will disable "Creative Mode" which disables placing blocks and ghosts.
'1' → enables obstacle removing, opens up paths
'2' → enables ghosts to be placed (these ghosts move randomly, which may look weird given there is no timer delay)
Up, Down, Right, Left → Pacman movement
'R' → completely resets game

TP3 Update:

1. Added leaderboard page which tracks the five highest scores saved in a leaderboard.txt file
2. Added an instructions page which contains the basic rules of Pacman and includes controls
3. Refined the start screen and game over screen. Also, refined UI during the game which includes the scoring, lives, pause, and mode.
4. Removed the gridlines
5. Added random fruit dropping into the game worth 100 points each.
6. Added power pellets that function where Pacman can eat the ghosts and have them sent back to the cage.
7. Sprites are added