PACMAN DOCUMENTATION

BIT PROGRAMMING 2 – ASSIGNMENT 2

WORK IN PROGRESS

Aardhyn Lavender

Problem Description

Pacman is a game where the player controls a yellow mouth directing him to eat pink dots in a simple maze while avoiding ghosts of varied personalities. Each level level is completed when Pac-Man eats all the points (and energisers) or loses when entering the same tile as a Ghost type.

The Characters in the game are

- **Pacman** – the protagonist controlled by the player. Directed using arrow keys, Pac-man continues in the direction specified until hitting a wall or changing direction. Pacman can round corners faster by turning early.

- ***Ghosts*** – Sprites in the game who alternate between 'chasing' Pacman and 'scattering'. while chasing, ghosts use a specialised tactic to track down Pacman, but all ghosts use the same pathfinding algorithm in order to reach him

Blinky	The red ghost targets Pacman directly.
Pinky	The Pink ghost that attempts to ambush Pacman getting in front of him
Clyde	Targets Pacman directly like Blinky, but scatters when he gets too close.
Inky	The most seemingly sporadic ghost, who teams up with Blinky to corner Pacman.

- In the original Pacman, the game is never won as the final level 256 is corrupted (*due to the byte allocated in memory to store the level overflowing and bit shifting the subsequent game code*) and does not allow all the points to be collected.
  For This rendition, I will end the game after an optional length of levels less than 255, this could be set to *one* for testing, as an example.
  Given this alteration, the game is won when all points are collected for each level.

- The game is lost when Pacman dies with no remaining *lives* – of which there are 3, giving Pacman 4 attempts to complete the game before it restarts (we'll leave the coin insert out of this one!).
  A *life* is lost when Pacman occupies the same tile as any Ghost type.

Design

Like Breakout, I will make minimum use of WinForms components in favour of 'pixel perfect' rendering to the screen as bitmap data to a large image canvas of specified size and scaled resolution. This means omission of the **DataGridView** in favour of simple 2D array math.

The main functionality of the rendering and component management can be transferred from the *assignment one* as it was made abstract in its implementation for this very purpose (This includes the **Game** and **Screen** classes, as well as other utility classes such as **Animation, Time**, and **Task**).

The UI for the actual game of Pacman involves merely switching the data stored in tiles around, such as the **lives**, **Score**, **high score**, and **Items.**

To add Extra functionality of the game, such as a debug view, window scaling, game speed etc., I plan to create custom UI elements like **buttons,** and **toggles** like in Breakout and keep them in the Pacman style—blues, and yellows—that will be rendered to the screen as image data like everything else.

When the application is run, the user will be able to choose to run the game, configure preferences, or view the credits.

Selection of the Items in menus and will be by directional keyboard input (WASD or Arrow Keys), and selection input (space bar, or Return/Enter).

MVP Planning

The Minimum viable product for Pacman (excluding the boilerplate game engine code) will be **Pacman**, and a **world** Class to manage **GameObject** types.

Game Objects contain boilerplate information for all objects that are a part of the game. They will know what **Game** their part of**,** where to find their texture information they have a position, a **screen** to render to, and virtual **Update**, **Draw**, and **Input** functions. Game Objects will eventually be defined as *abstract* when the dependency on their use for debugging purposes ceases.

The **Sprite** class is a derived **GameObject** type that combines a GameObject with a **World** type reference to determine the current tile of the object. Sprites also have trajectory and direction information.

The **Pacman** class – a derived **Sprite** requests the directions currently being inputted and sets the Trajectory, accordingly, checking what tile in the **World** his absolute pixel coordinate aligns with and using 2D array math to determine if the **GameObject** of that index has a wall property of *true*.

The **World** class groups **GameObject** together – Eventually will be replaced with a **TileObject** derived **GameObject** class – and provides methods to query, add, and remove them safely. Worlds build tile maps based off data stored in *.tmx* files – generated by the application **Tiled**.

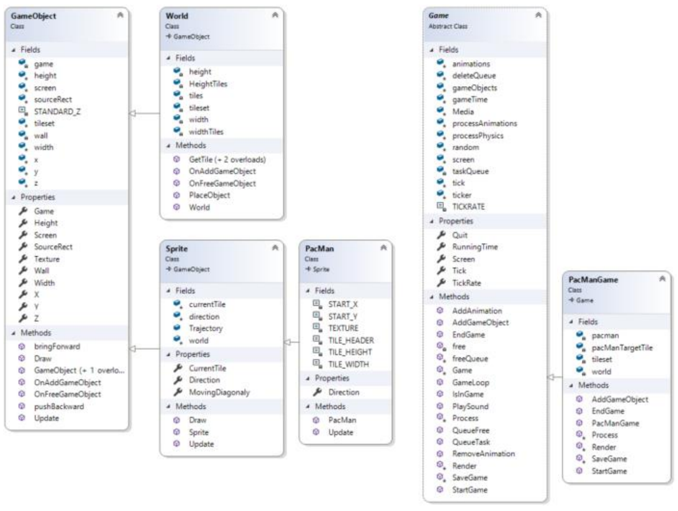
Everything is tied together with the **PacManGame** class which derives the abstract **Game** type. This is the controller class which creates the world, and Pacman, providing entry code for the games start and end

Other classes relating to the object management and rendering are excluded here as their purpose does not strictly relate to *game behaviour*.

You can view the MVP version of this program with the following git command

```
git checkout b4711ca88796d8b0a7ea78b898573b2145dc0fe0
```

Class Diagrams – as of MVP


GameObject
Class
Fields
game
height
screen
sourceRect
STANDARD_Z
tileset
wall
width
x
y
z
Properties
Game
Height
Screen
SourceRect
Texture
Wall
Width
X
Y
Z
Methods
bringForward
Draw
GameObject (+ 1 overlo...
OnAddGameObject
OnFreeGameObject
pushBackward
Update
World
Class
GameObject
Fields
height
HeightTiles
tiles
tileset
width
widthTiles
Methods
GetTile (+ 2 overloads)
OnAddGameObject
OnFreeGameObject
PlaceObject
World
Sprite
Class
GameObject
Fields
currentTile
direction
Trajectory
world
Properties
CurrentTile
Direction
MovingDiagonaly
Methods
Draw
Sprite
Update
PacMan
Class
Sprite
Fields
START_X
START_Y
TEXTURE
TILE_HEADER
TILE_HEIGHT
TILE_WIDTH
Properties
Direction
Methods
PacMan
Update
Game
Abstract Class
Fields
animations
deleteQueue
gameObjects
gameTime
Media
processAnimations
processPhysics
random
screen
taskQueue
tick
ticker
TICKRATE
Properties
Quit
RunningTime
Screen
Tick
TickRate
Methods
AddAnimation
AddGameObject
EndGame
free
freeQueue
Game
GameLoop
IsInGame
PlaySound
Process
QueueFree
QueueTask
RemoveAnimation
Render
SaveGame
StartGame
PacManGame
Class
Game
Fields
pacman
pacManTargetTile
tileset
world
Methods
AddGameObject
EndGame
PacManGame
Process
Render
SaveGame
StartGame