Architecture

Team 19

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Backend Design

Class Structure

Class Object:

- **ID* (Int PrimaryKey)** - *All objects have a unique ID, if all inherit from OBJECT then we won't have duplication, for example a ship and a duck having the same ID as they're different types!*
- **type (String)** - *The type of the object (useful for quick conditional referencing). For example, is this a ship, a floating item, a cannonball, etc.*
- **Object {...}** - *Child, the actual object. Object.Object will be the actual thing.*

Class StaticObject ← Object: *(<-- indicates inheritance)*

- **dimensions (2d/3d Matrix of 1s and 0s)** - *Matrix of 1s and 0s, the 1s representing 'part of this object' and the 0s 'not part of this object'*
- **bLPosition ([x,y] coordinates - 2d static array)** - *The bottom left of the object, the bottom left of the 'dimensions' matrix (keeps everything positive and doesn't matter if diameter is odd or even) for positioning on the main map. Doesn't need to be able to change, this is a static object.*
- **danger (boolean)** - *Is this object dangerous to collide with? For example, crashing a boat into land will cause damage to the boat.*

Class Ship ← Object:

- **velocity ([x,y] coordinates - 2d non-static array)** - *Movement across the x and y coordinates. Of course, needs to change as the ship changes direction / speed etc. (let's see if the library has anything helpful for velocity stuff)*
- **arsenal ([<gun>, <gun>, … , <gun>])** - *the ship's arsenal - it's array of guns. Guns can fire with a cooldown period etc. and guns are the parents of cannonballs. Guns need to be their own objects, as you could fire one side as the other side cools down etc. It's important that we can access a ship's gun objects via the ship…* *`ship.guns.where(side: port).fire()`* *(example of 'fire the ship's port-side guns)*
- **HP (Int)** - *HP as an integer*

  METHODS:

- **destroy()** - *Destroys this ship object (or do we want to keep all objects but just have an 'alive or dead' boolean maybe? More like an archive? Or destroy so that we can re-use IDs and memory.*
- **move(**xChange, yChange) - *Causes a change in the ship's velocity attribute, based on the change in x and change in y arguments given. Causes this change every time the method is called. So, for example, for a gradual left turn, if the ship's velocity attributes are both positive (assume we're going straight up), this would be called with two negative values every given time interval (say - 20ms), rather than all at once, slowly reducing the x and y into negatives*

Class UserShip ← Ship:

- **USER CONTROL METHODS FROM THE LIBRARY**

Class CPUShip ← Ship:

- **agent (Object)** - *This is the 'team' that the ship fights for. We should store the actual object, so that we can use it for lookup. For example* `downedShip.agent.reduceShipCount(1)` *could be used to reduce the number of ships that a sunk ship's agent has by one, before destroying this object*

  METHODS
- **seek(coords)** - *Essentially we need to implement a pathfinding algorithm here - this needs to let the ship 'seek' to a set of coordinates (perhaps a treasure, an enemy or user ship, etc.), avoiding obstacles such as land. Implement A*? :(*
- **patrol(patrol)** - *Sets the ship on a loop patrol of going up and down 'doing nothing' (when it is not aware of the user or 'guarding' a location, etc.). Basically will just take a patrol object and that'll have vectors to tell it where to go up and down. Will follow the path vector given.*

Class Gun ← Object:

- **ammunition (Int)** - *Ammunition count remaining*

  METHODS
- **restock(value)** - *Increases the supply of ammunition by 'value'*
- **fire()** - Fires the gun. Reduces the ammo stock by one, and creates a child object of 'cannonball'

Class Cannonball ← Object:

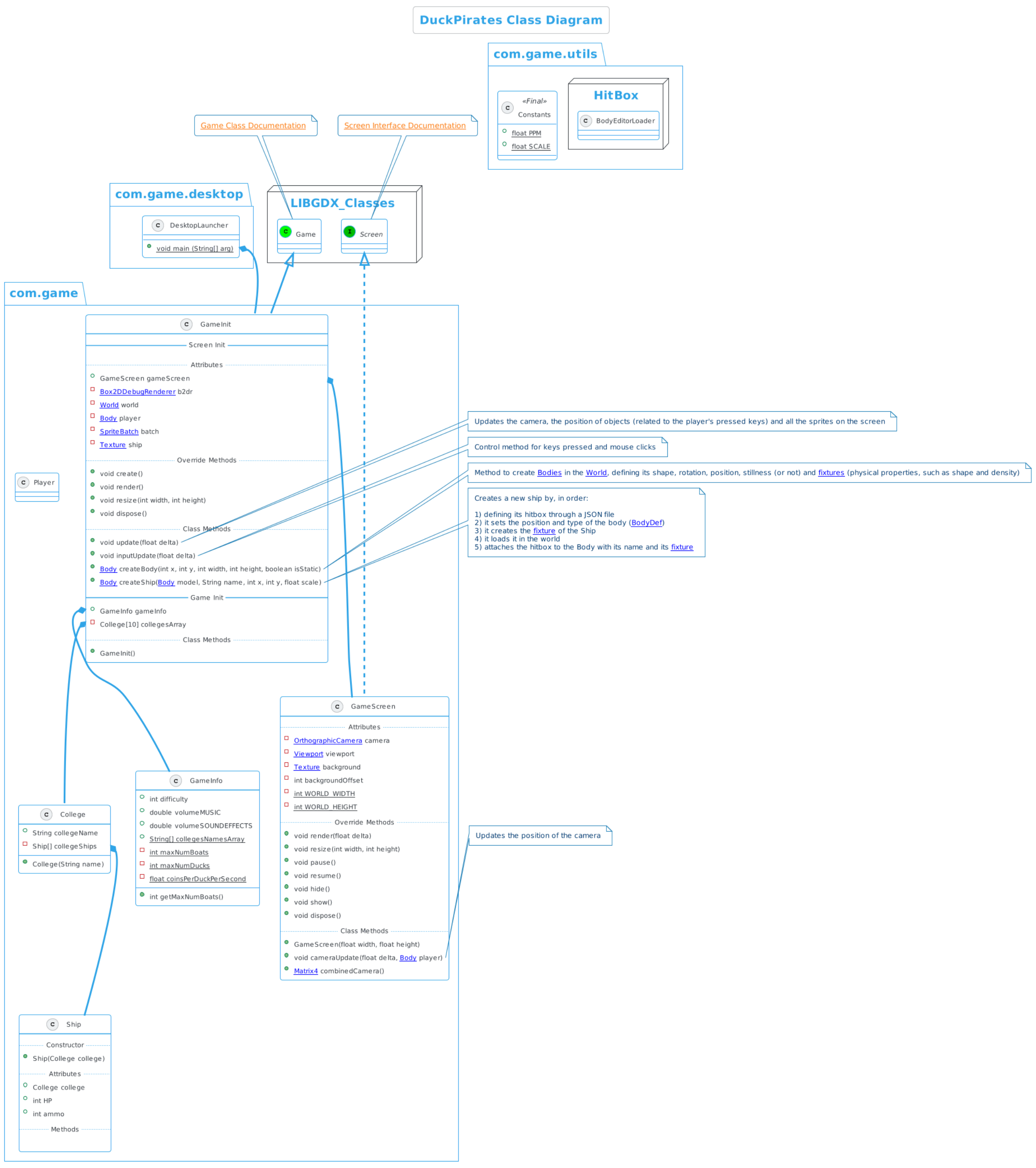
- **gun (Gun object)** - *The gun object that fired this cannonball - parent -* `thisCannonball.gun`
- **velocity ([x,y] coordinates - 2d non-static array)** - *The velocity of the cannonball - works in the same way as any other object like a ship… just probably a little faster!*
- **payload (Int)** - damage in HP that will be done to the target ship upon collision
- **range (int)** - *The range of the shot across the map*

  METHODS:
- **hitTarget?()** - *Use game engine hitboxing here?*
- **destroy()** - Destroy itself if the range has been covered - fall into sea or the land, cannonballs don't have infinite range!

Class Patrol ← Object:

- **vectors ([[x,y], [x,y], …, [x,y]])** - *A list of coordinates acting as vectors for a ‘pre-defined route’. Can be passed as an argument to a ship to tell it where to go on a ‘patrol loop’ etc.*

Ship


DuckPirates Class Diagram
com.game.utils
«Final»
Constants
float PPM
float SCALE
HitBox
BodyEditorLoader
Game Class Documentation
Screen Interface Documentation
com.game.desktop
DesktopLauncher
void main (String[] arg)
LIBGDX_Classes
Game
Screen
com.game
GameInit
Screen Init
Attributes
GameScreen gameScreen
Box2DDebugRenderer b2dr
World world
Body player
SpriteBatch batch
Texture ship
Override Methods
void create()
void render()
void resize(int width, int height)
void dispose()
Class Methods
void update(float delta)
void inputUpdate(float delta)
Body createBody(int x, int y, int width, int height, boolean isStatic)
Body createShip(Body model, String name, int x, int y, float scale)
Game Init
GameInfo gameInfo
College[10] collegesArray
Class Methods
GameInit()
Updates the camera, the position of objects (related to the player's pressed keys) and all the sprites on the screen
Control method for keys pressed and mouse clicks
Method to create Bodies in the World, defining its shape, rotation, position, stillness (or not) and fixtures (physical properties, such as shape and density)
Creates a new ship by, in order:
1) defining its hitbox through a JSON file
2) it sets the position and type of the body (BodyDef)
3) it creates the fixture of the Ship
4) it loads it in the world
5) attaches the hitbox to the Body with its name and its fixture
Player
GameScreen
Attributes
OrthographicCamera camera
Viewport viewport
Texture background
int backgroundOffset
int WORLD_WIDTH
int WORLD_HEIGHT
Override Methods
void render(float delta)
void resize(int width, int height)
void pause()
void resume()
void hide()
void show()
void dispose()
Class Methods
GameScreen(float width, float height)
void cameraUpdate(float delta, Body player)
Matrix4 combinedCamera()
Updates the position of the camera
GameInfo
int difficulty
double volumeMUSIC
double volumeSOUNDEFFECTS
String[] collegesNamesArray
int maxNumBoats
int maxNumDucks
float coinsPerDuckPerSecond
int getMaxNumBoats()
College
String collegeName
Ship[] collegeShips
College(String name)
Ship
Constructor
Ship(College college)
Attributes
College college
int HP
int ammo
Methods