UNIVERSITY OF YORK

DEPARTMENT OF COMPUTER SCIENCE

# ENG1 Group Assessment 2
# Team 1

# Auber

# Arch1.pdf - Architecture

[Based on the Assessment 1 deliverable created by Team 4]

## Group Members:

Jonathan Davies

Jamie Hewison

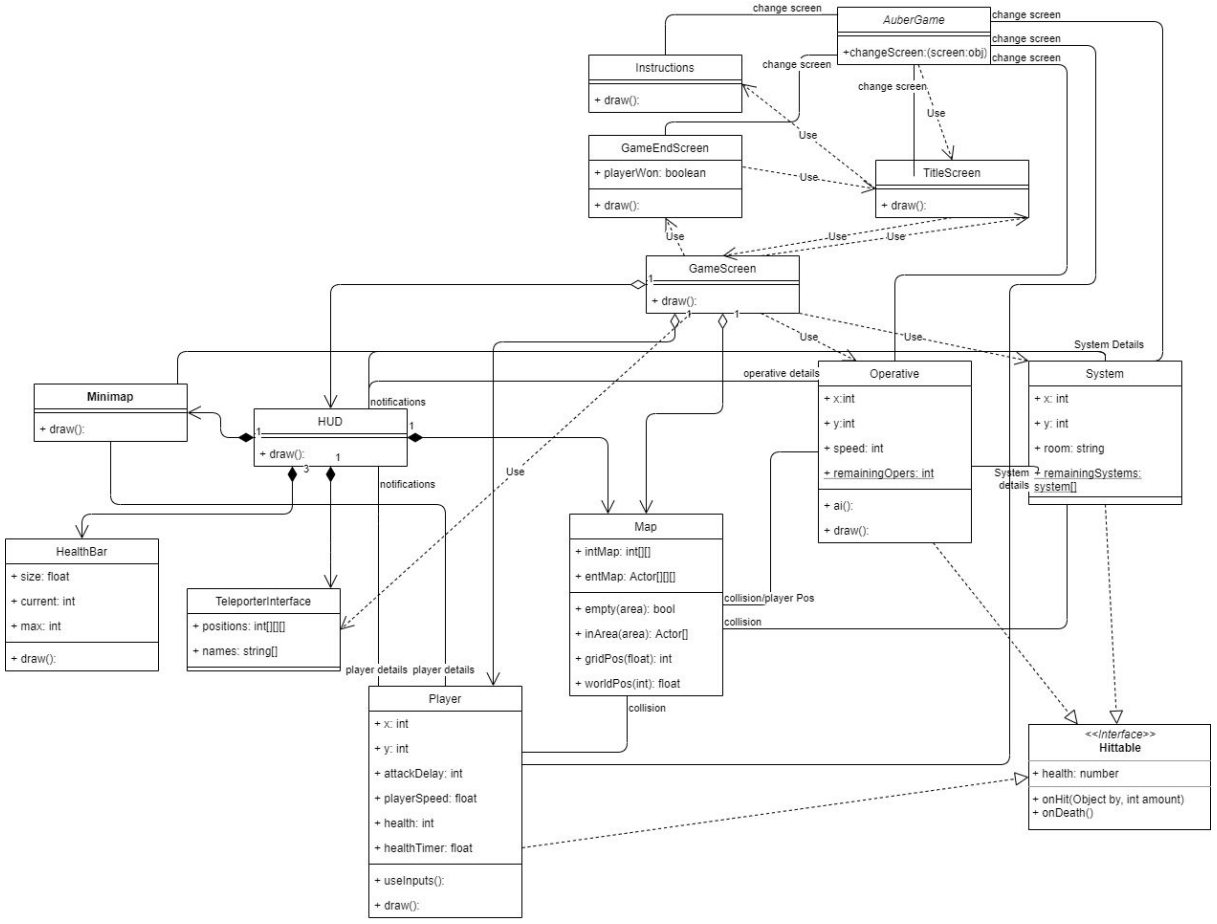
Harry Smith

Zee Thompson

Mark Varnaliy

Both the abstract and concrete representations of the architecture were created in Class UML using [draw.io](draw.io) a free online diagram maker.

Our initial plan was to use a main AuberGame class to swap between the different game states or screens, with GameScreen (the one where you play the game) consisting of a HUD (heads up display), a map background, and multiple entities on top of that background (but behind the HUD). These entities would communicate with the map class for collison and hitboxes.




The concrete architecture follows the abstract one pretty closely other than:

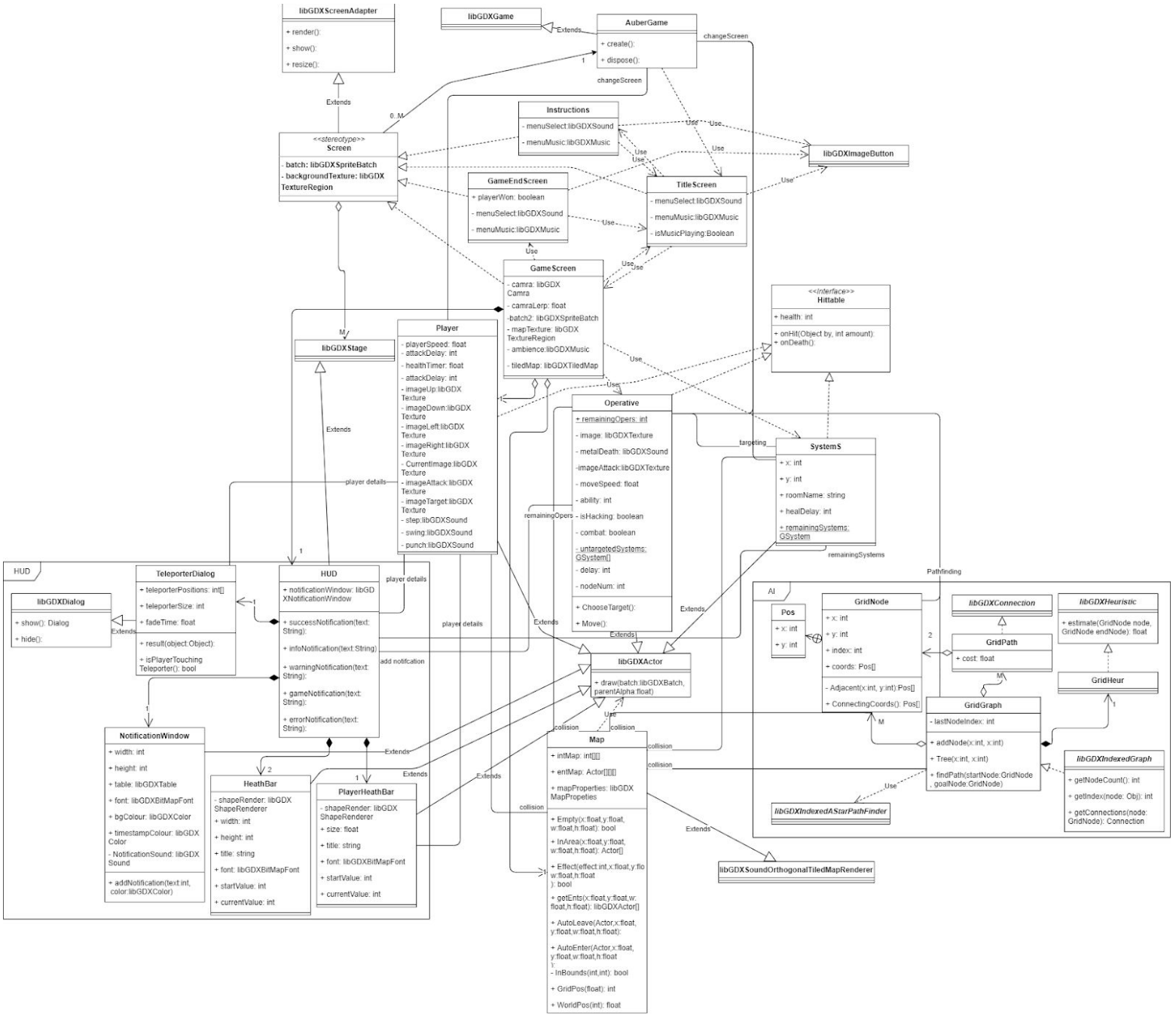
- ai() and draw() being merged into one (as that's the easiest way to do it using libGDX actors)
- The minimap being replaced with a notification system (as the minimap was unnecessary for the brief and programmatically challenging).
- The drawing of the map being moved into the Map class (we changed to use a tile renderer with multiple layers, moving it to its own class helped simplify GameScreen)

Other than those some classes got more fleshed out as we realised extra requirements/useful methods for them.

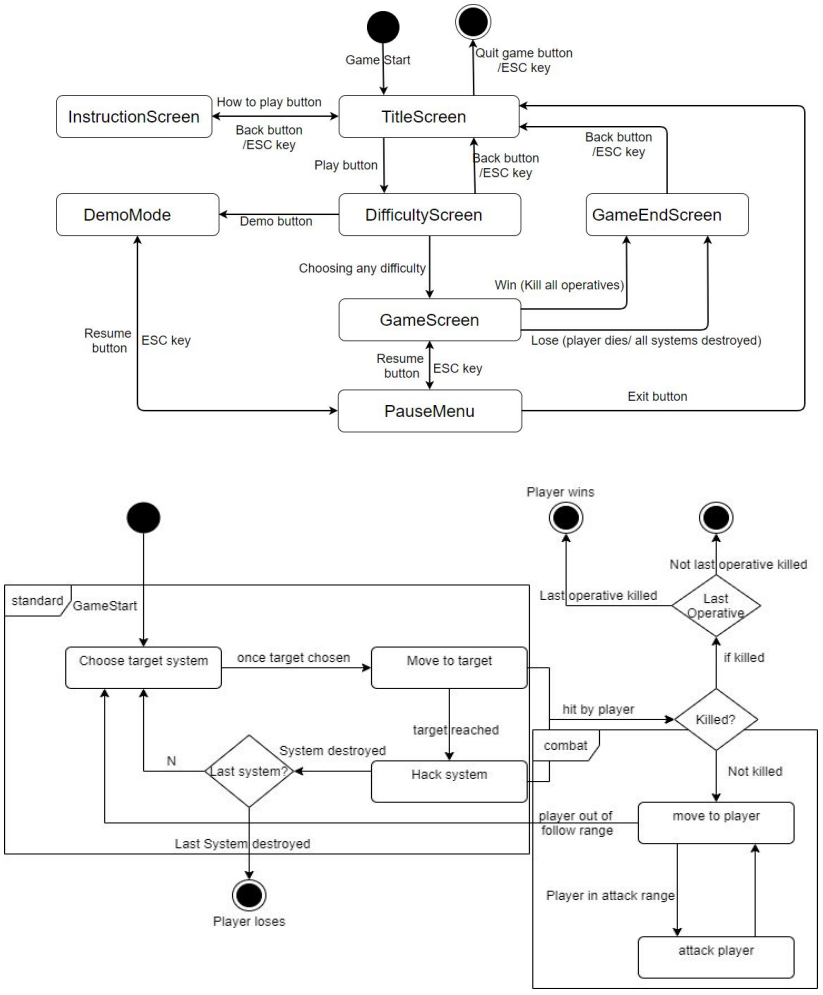
The concrete representation has libGDX types included as basic types (i.e. as attribute types) only including them (without irrelevant details) when they have been inherited from or

implemented. The game screens also implement a stereotype of Screen showing the common features/relationships of all the screens.

These were done to minimize the already too large diagram and to increase legibility.
Concrete ClassUML.drawio.



Below are the behaviour diagrams (UML state machine) of how the screen system and operative AI should work:




The abstract representation allows us to create a representation of the architecture in a low level of detail to describe the relationship between the game's classes without it being influenced by the game engine. The concrete representation however takes each aspect of the abstract representation and modifies it so that it includes the classes from the game engine and allows us to relate our own classes to them meaning the concrete representation is in a much higher level of detail and will be identical to the structure of the end product.

| Function Requirement ID | Area of Architecture | Justification |
|---|---|---|
| FR_GAME_WIN | GameEndScreen-playerWon | If Operative.remainingOperatives = 0 then the game is won |
| FR_GAME_LOSE | GameEndScreen. playerWon | If the Player.onDeath() is called the game is over. |
| FR_GAME_REAL TIME | Player.draw() | When the player is drawn they will move according to their key presses. |
| FR_OPER_NUM | Operatives.remainingOperatives GameScreen.show() | Inside the GameScreen.show() 8 instances of the Operative class are created, Operatives.remainingOperatives will be equal to the number of operatives that haven't been arrested. |
| FR_OPER_ABILITY | Operative.ability | In the draw() method of operatives it checks the value of .ability and causes the effects of it |
| FR_OPER_SYSTEM_ATTACK | Systems implements Hittable | When operatives are on a system and 'attack' it the onHit() of the system is called, which will reduce the health of the system. |
| FR_PLAYER_HEALTH | Player.health Player implements Hittable | The player's onHit() can be called by operatives |
| FR_PLAYER_ARREST | Operative implements Hittable | When the onDeath() of an operative is called they are no longer drawn and counted as arrested. |
| FR_PLAYER_HEAL | player.healthTimer | As long as the player is in the infirmary the healthTimer will allow their health to increase. |
| FR_PLAYER_TELEPORT | TeleporterDialog<br><br>isPlayerTouchingTeleporter | The player is able to interact with the teleporter by pressing a key as long as they are touching the teleporter |
| FR_PLAYER_NOTIFIED | NotiifcationWindow.addNotification | HUD.warningNotification is called whenever an operative begins sabotaging a system. |
| FR_PLAYER_SYSTEM_LOCATION | System.x, System.y | Each system has a location, which allows operatives to find a path to them. |
| FR_MAP_SYSTEMS | System | Each system on the map an instance of the System class |
| FR_MAP_ROOMS | System.roomName | Each room has its own system. |
| FR_MAP_LAYOUT | Map.intMap | The intMap defines the collisions of the walls of the map |

| | | |
|---|---|---|
| FR_MAP_TELEPORTERS | TeleporterDialog.teleporterPositions | There is an array of teleporter positions and TeleporterDialog.isPlayerTouchingTeleporter to decide whether the player is currently able to teleport. |
| FR_MAP_INFIRM | Map.effect Map.intMap | In the Map.intMap the area of the infirmary is marked with 2 |
| FR_MAP_INFIRM_TELEPORTER | TeleporterDialog.teleporterPositions | There is a teleporter in the infirmary. |
| FR_MAP_INFIRM_HEAL | Map.effect(2, Player) player.healthTimer | If the Player's current position is 2 in the intMap then the player is inside the infirmary and will heal. |
| FR_UI_SCALABLE | GameScreen.show() | The height and width of the player's screen is used to scale the game and the UI accordingly. |
| FR_GAME_DEMO | PlayerDemo | There is a demo mode able to be used by the player |
| FR_GAME_DIFFICULTY | DifficultyScreen | Before the game the player is asked what difficulty they wish to set (Easy, Medium or Hard) |