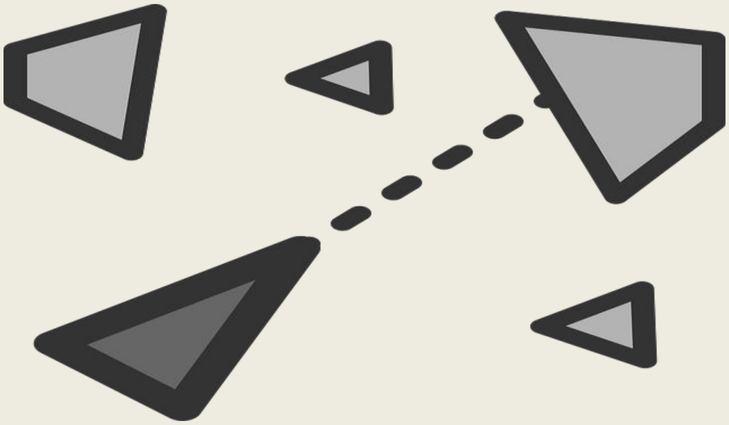
# Asteroids

## Software Requirements Specification



Team 4

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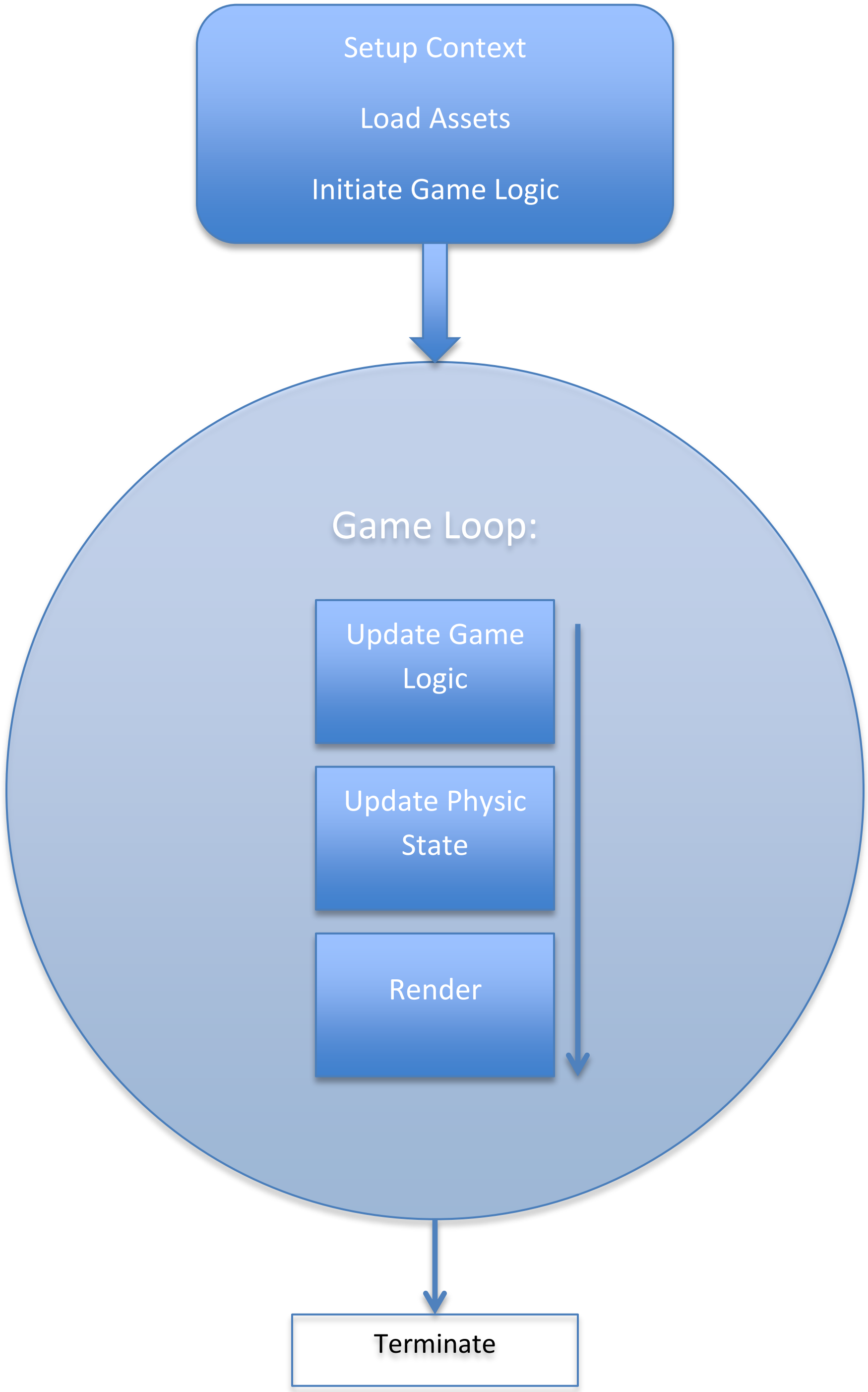

Setup Context
Load Assets
Initiate Game Logic
Game Loop:
Update Game Logic
Update Physic State
Render
Terminate

|  | Game Objects: |
|---|---|
| GameObject | Abstract class that acts as the model for all active objects in the program(asteroids, player, spaceship, Menu items, etc.). Contains basic shared attributes by all Game objects |
| GameChar | Abstract Class that extends GameObject. Base object for all Game character units. Shares Render, transform, and Rigid Body attributes |
| Player | Extends GameChar. Specific Player attributes: Render, lives, damages… |
| Asteroid | Extends GameChar. Specific Asteroid attributes: Render, size. |
| Alien | Extends GameChar. Specific Alien attributes: AlienAI |
| AlienGrunt | Extends Alien. Specific Render attributes, and AI properties, damages… |
| AlienLord | Extends Alien. Specific Render attributes, and AI properties, damages… |
| Bullet | Extends GameChar. Specific Bullet Attributes: Render |
| WeaponUp | Extends GameChar. Adds weapon upgrade when picked up. Characterized by duration, weapon type, upgrade amount. |
| LifeUp | Extends GameChar. Adds life to player when picked up. Characterized by coords, duration, upgrade amount. |
| ShieldUp | Extends GameChar. Shields player for a duration when picked up. Characterized by shield strength, shield type, duration. |
| BombUp | Extends GameChar. Clears field when picked up. Characterized by duration, damage. |
| SpeedUp | Extends GameChar. Increases player speed when picked up. Characterized by duration, speed increase. |
| FireRateUp | Extends GameChar. Increase player fire rate when picked up. Characterized by duration, rate increase. |
| RandomUp | Extends GameChar. Produces random powerup when picked up by player. Characterized by duration, type. |
| ConfuseUp | Extends GameChar. Player loses control upon pickup. Characterized by duration, confusion level. |
| GUIElement | Extends Game object. Implement GUI elements/Panels. Share a Render, Transform attributes. |
| Level | Extends Game object. Contains level properties, such as number of asteroids, number of saucers. |

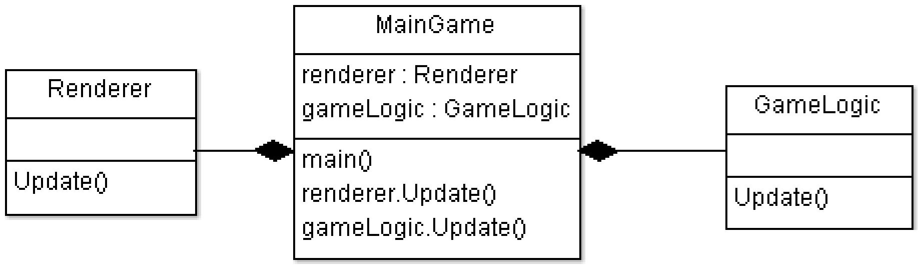
|  | Object Components: |
|---|---|
| Transform | A class holding game object space transform information (Ex: Vector2 position, size, position) ... |
| RigidBody | A class for keeping track and updating the physic states of game object (updating velocity, acceleration, collisions…) |
| ObjectRenderer | A class holding all specific information about the object rendering attribute such as textureInfos, its visibility. Will be interpreted by the Render() function of the renderer class. |
| AlienAI | A class that determines the alien Ai. |

|  | Main game Classes |
|---|---|
| Renderer | The main rendering class: Implements functions for creating and updating the OpenGL context (Drawing arrays of object, resize window...).<br>An Update() function will be called at each frame. |
| GameLogic | A class for holding and updating the state of the game according to the game rules.<br>Here we will create and update our Game Objects.<br>The class will also be in charge of listening for player inputs and update the game state accordingly.<br>The menu logic is also part of the game logic. |
| MainGame | And here is our Main() function! It will instantiate Renderer and GameLogic singletons, and will initiate the game loop, where we will list all the stuff our main singletons will execute (Ex: renderer.Update(), gameLogic.Update() ) until termination request. |

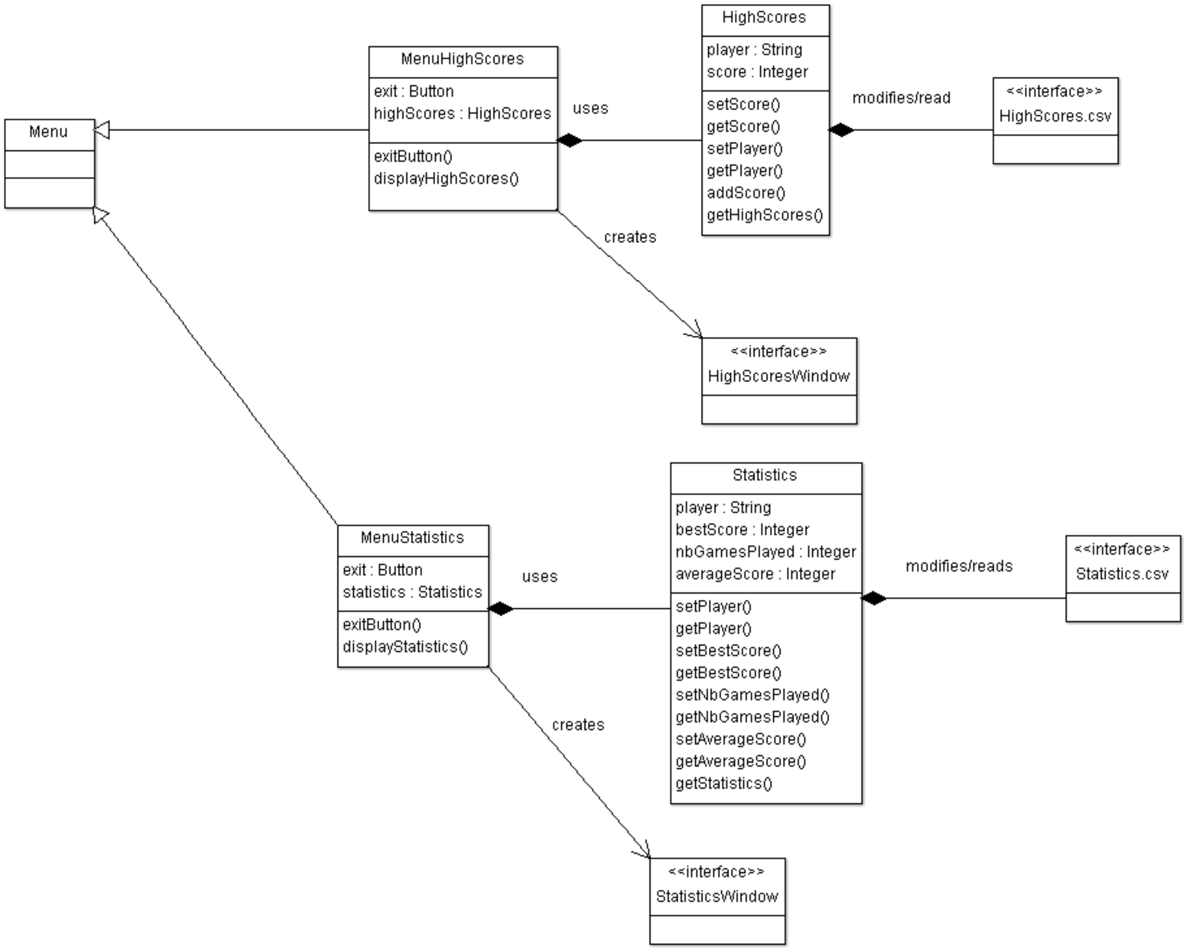
|  | "Helper" Classes: |
|---|---|
| Helper | Will store all the generic and quite random but handy functions we will hack during our implementation trip. (Ex: "DecimalToString(…), YourMothersMass()) |
| Maths | Will store all the Maths related functions we could happen to need to implement ourselves (Ex: FastSqrFTW()). |
| Vector2 | A 2D Vector class implementing 2D Vectors stuff (Ex: SqrMagnitude(), Dot/CrossProduct(…), Normalize()) |
| Matrix2 | A 2D Matrix class implementing 2D Matrices stuff (Ex: Mult(…), LocalToWorld(), WorldToLocal(), Rotation(…)). |

# Class Diagrams

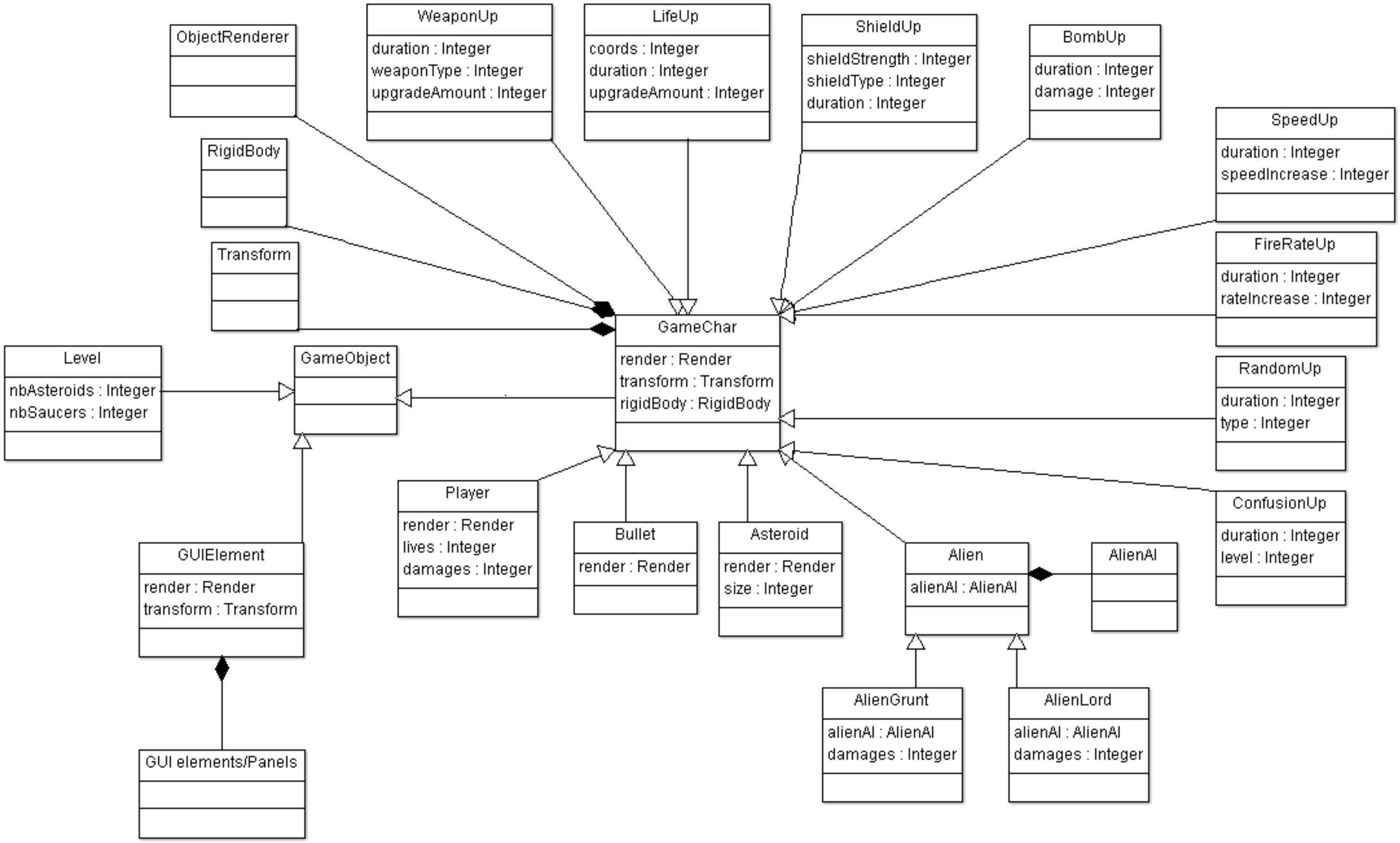
## Main Game Classes



## High Scores and Statistics Menu



## Game Objects


ObjectRenderer
WeaponUp
duration : Integer
weaponType : Integer
upgradeAmount : Integer
LifeUp
coords : Integer
duration : Integer
upgradeAmount : Integer
ShieldUp
shieldStrength : Integer
shieldType : Integer
duration : Integer
BombUp
duration : Integer
damage : Integer
SpeedUp
duration : Integer
speedIncrease : Integer
RigidBody
Transform
FireRateUp
duration : Integer
rateIncrease : Integer
GameChar
render : Render
transform : Transform
rigidBody : RigidBody
Level
nbAsteroids : Integer
nbSaucers : Integer
GameObject
RandomUp
duration : Integer
type : Integer
Player
render : Render
lives : Integer
damages : Integer
Bullet
render : Render
Asteroid
render : Render
size : Integer
ConfusionUp
duration : Integer
level : Integer
GUIElement
render : Render
transform : Transform
Alien
alienAI : AlienAI
AlienAI
AlienGrunt
alienAI : AlienAI
damages : Integer
AlienLord
alienAI : AlienAI
damages : Integer
GUI elements/Panels