

# SS.Galaxy

## 1.Introduction

SS.Galaxy game is a shooting game where you adventure through the space with your spaceship. Your main objective is to destroy alien, meteor and enemy's mothership that will appear along the way of your adventure.

## 2.Game detail

### 2.1 Main menu

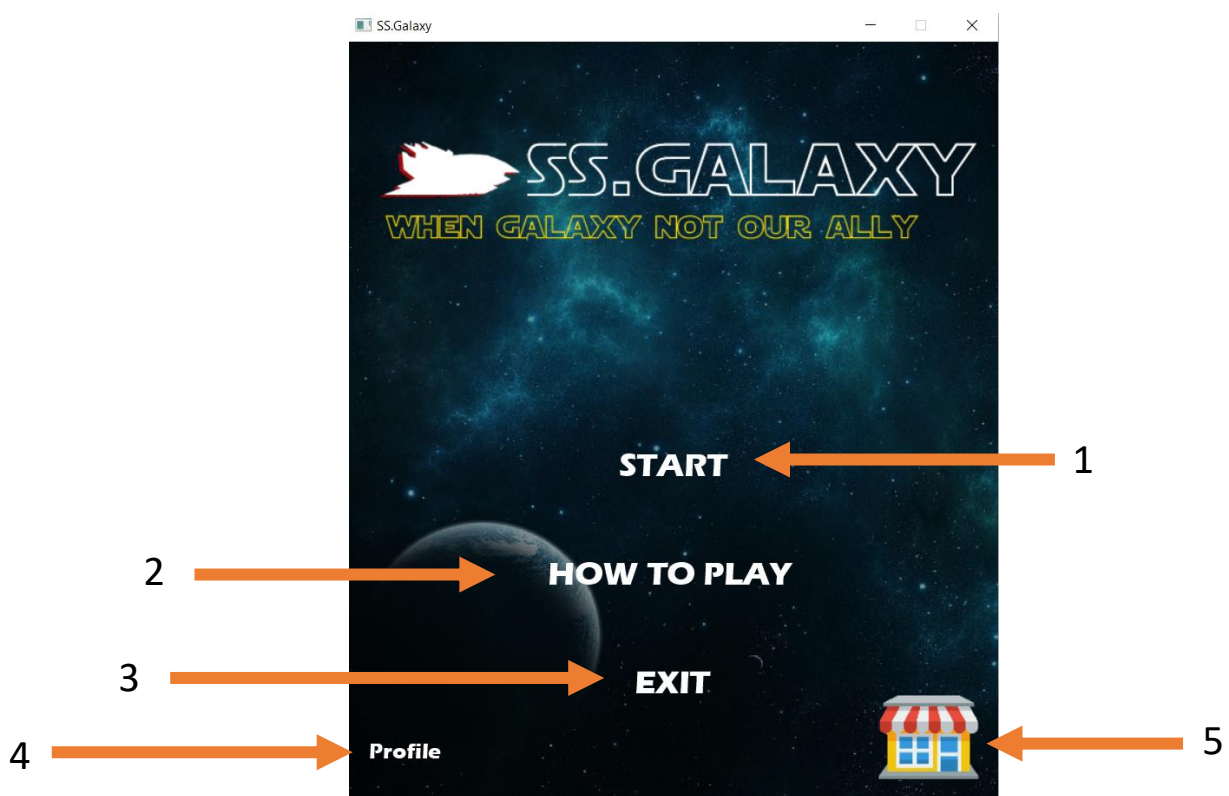


Figure 1: Main menu

Main menu contains title of game, moving background and 5 part that can be interacted.

1. Start button to start the game.

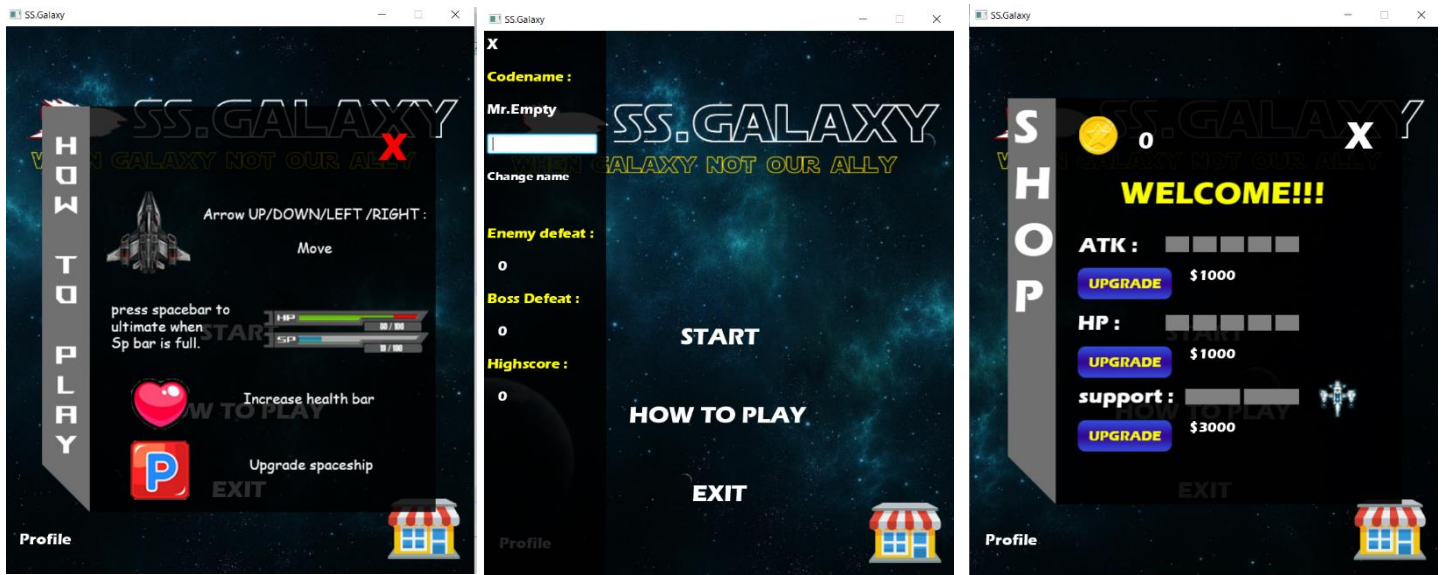


Figure 2,3,4 : How to play window, Profile window, Shop window

2. How to play button to open how to play window that describe control and item in the game.
3. Exit button to close the game.
4. Profile button to open profile window that show player codename, number of enemy that player defeat, number of boss that player defeat and player's high score.
5. Shop icon to open shop window.

In the Profile window, player can change their name but player's name can't be empty or longer than 10 characters. Also, their name can contain only "A-Z", "a-z", "0-9", " \_ " and ".".

In Shop window, player can upgrade their spaceship's attack, spaceship's hp and supporter with coin they have.

## 2.2 In-game



Figure 5 : Game screen

Game screen hud contain 3 component

1. Show current score and player's high score.
2. Show player's hp and sp.
3. Player can pause game by pressing ESC button.
4. Text that tell whenever player can use ultimate.

In-game, player's spaceship is auto-shooting and start with spaceship level 1. Player must control the spaceship to dodge enemies, enemies' bullet, meteors and defeat them. Enemies are spawn randomly above off screen ,then move to some point of y-axis , go left-right before do their attacks. Enemies appear more frequency as score reach higher There are three types of enemy and one meteor

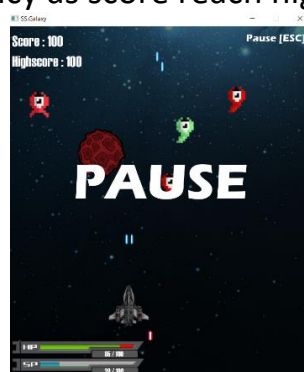


Figure 6: Pause game screen



Figure 7:

Normal enemy



Figure 8:

Shooting enemy



Figure 9:

Meteor



Figure 10: Boss enemy

1. Normal enemy can dash forward player anytime, but can't do anything else. When this enemy dash to off screen, it will disappear.
2. Shooting enemy can shoot bullets anytime and not disappear until it's die.
3. Meteor falls from above, go off screen and then disappear.
4. Boss enemy will approach when player's score reaches every 5500 points. Boss have two shooting form.
  - 1) Spread shot that shoot bullet in spread form.
  - 2) Laser that shoot straight down with high damage.

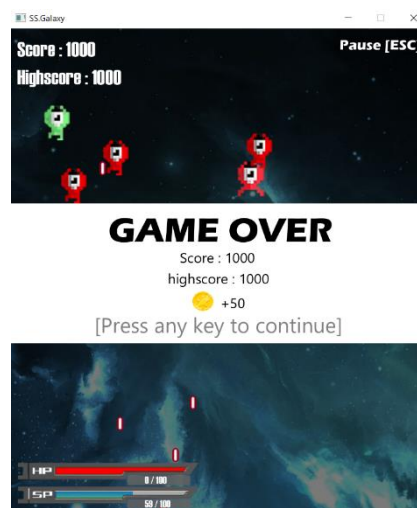


Figure 11 : Game over screen

When player's hp reach zero , game over screen which show player's score, high score and coin gain will appear. Player must press any key to be sent back to main menu.

### 2.3 Item and supporter

There are two type of item that randomly drop from defeating enemy (defeating boss will drop both item 100%)



Figure 12: Health item



Figure 13: Upgrade item

Health item increase player's hp by 30 (hp won't exceed player's max hp)

Upgrade item upgrade spaceship's level by 1 (spaceship's level won't exceed 3)



Figure 14: Supporter

Supporter help player defeat their enemy by shooting half damage bullet. Supporter don't take any damage and can't be destroy. It always flies beside player's spaceship. Player start with no supporter, but can purchase it at shop. Player can have at most two supporters.



Figure 15: Coin

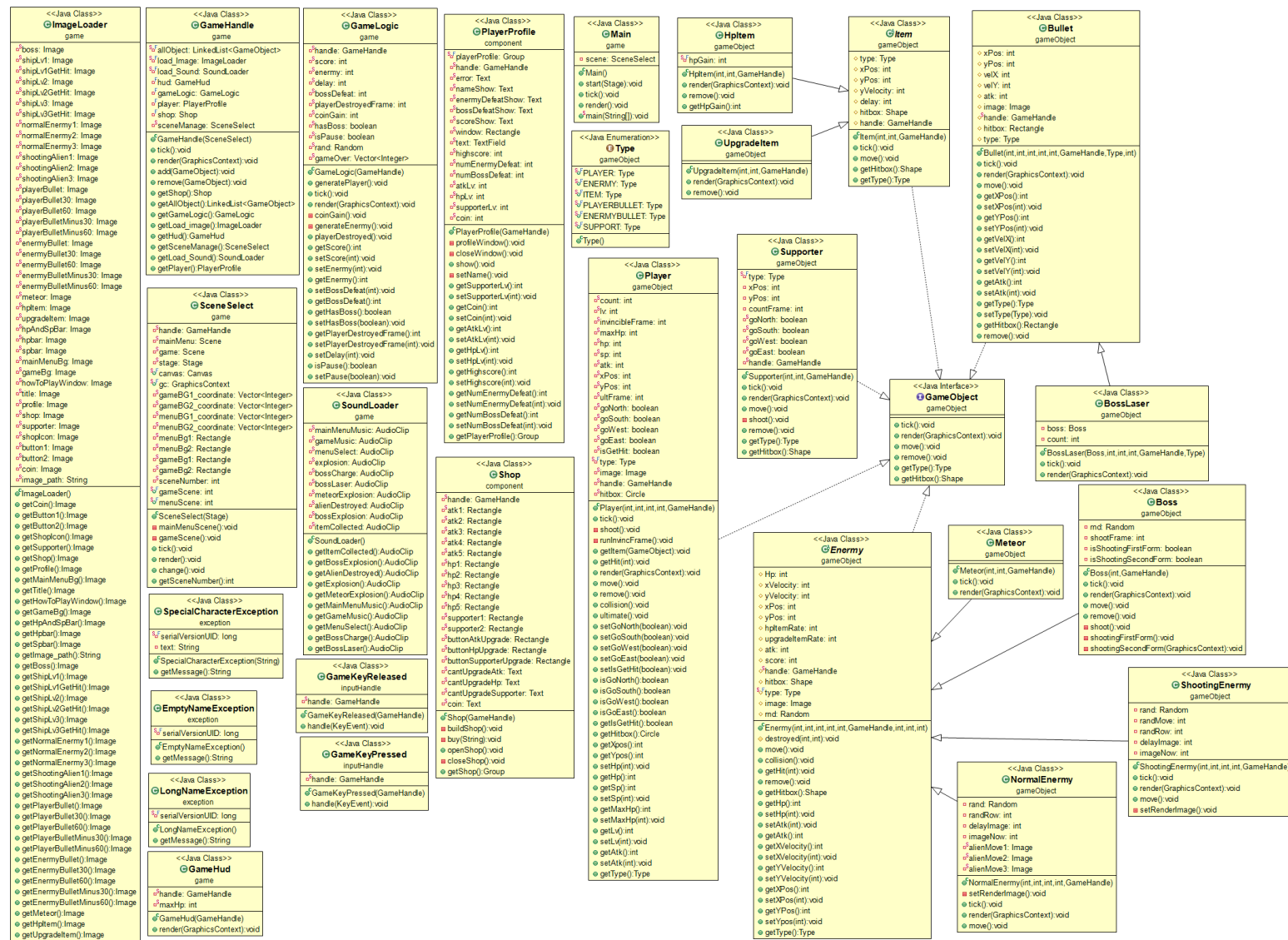
This symbol is representative of player's coin. It can be used to upgrade spaceship or purchase supporter in shop.

### **3.Control**

In-game:

Arrow Up:	move spaceship up.
Arrow Down:	move spaceship down.
Arrow Right:	move spaceship right.
Arrow left:	move spaceship left.
Spacebar:	when player's sp reach 100, do the ultimate which deals 600 damages to all enemy and meteor. Also, removes all enemy's bullet and laser
Esc:	pause the game.

#### 4.UML Diagram





## 5.Implementation Details

\* Noted that Access Modifier Notations can be listed below

+ (public)

# (protected)

- (private)

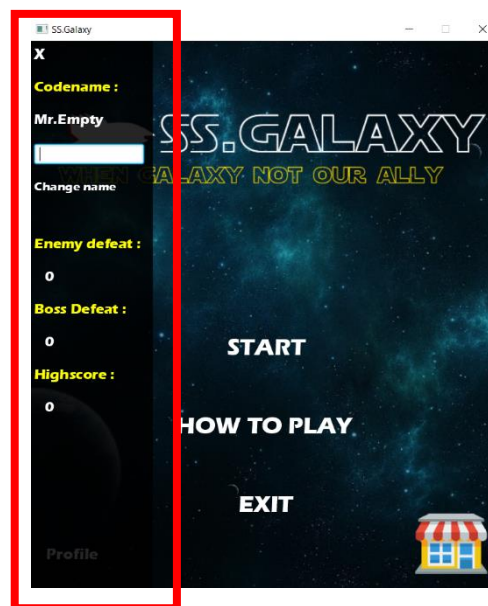
static will be underlined.

abstract will be italic.

bold will be final variable.

### 5.1 Package component

#### 5.1.1 Class PlayerProfile extends VBox



##### 5.1.1.1 Field

- <u>Group</u> <u>PLAYERPROFILE</u> = <u>new Group()</u>	Group for profile component.
- <u>GameHandle</u> <u>handle</u>	Medium to access other classes.
- <u>Text</u> <u>error</u>	Text show when player name is invalid
- <u>Text</u> <u>nameShow</u>	Name of player.
- <u>Text</u> <u>enemryDefeatShow</u>	Show number of enemy which player defeat so far.



- <u>Text bossDefeatShow</u>	Show number of boss which player defeat so far.
- <u>Text scoreShow</u>	Show player's high score.
- <u>Rectangle window</u>	Base window of player profile.
- <u>TextField text</u>	TextField for player to enter their name.
- <u>int highscore</u>	player's high score.
- <u>int numEnemyDefeat</u>	Number of enemy which player defeat so far.
- <u>int numBossDefeat</u>	Number of boss which player defeat so far.
- <u>int atkLv</u>	Player's attack level.
- <u>int hpLv</u>	Player's hp level.
- <u>int supporterLv</u>	Player's supporter level.
- <u>int coin</u>	Number of player's coin.

#### 5.1.1.2 Constructor

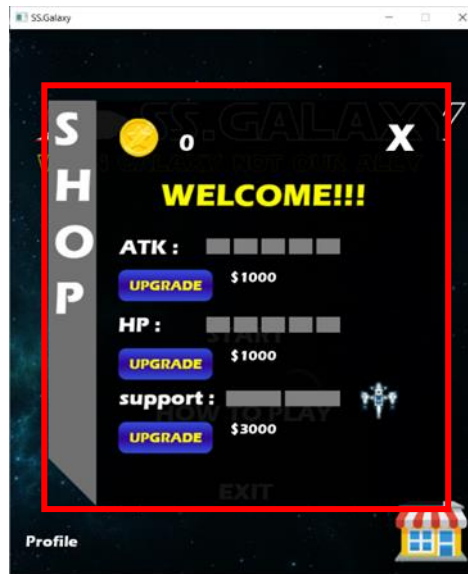
+ <u>PlayerProfile(GameHandle handle)</u>	Instantiate profile window. - Set spacing to 20. - Set width to 157. - Set height to 700. - Set padding to 5.
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#### 5.1.1.3 Method

- <u>void profileWindow()</u>	Create player profile window according to picture of player profile above. - Set font to "ERAS BOLD ITC". - Set text "X" to exit profile and play menuSelect sound on clicked. - Set text "Change name" to underlined when mouse enter and set name according to TextField on clicked.
- <u>void closeWindow()</u>	Close player profile.
- <u>void show()</u>	Open player profile. - Set scoreShow according to highscore. - Set bossDefeatShow according to numBossDefeat. - Set enemyDefeatShow according to numEnemyDefeat.
- <u>void setName()</u>	Check whether name from TextField is valid. Then, set nameShow when name is valid. - If name is longer than 10 characters, throw LongNameException.

	<ul style="list-style-type: none"> <li>- If name is empty ,throw <code>EmptyNameException</code>.</li> <li>- If name has special character, throw <code>SpecialCharacterException</code> (*There has cheat code which player name "Cheater" will get 100000 coins)</li> </ul>
Getter and Setter of int field and Getter of <code>playerProfile</code>	Getter and Setter

### 5.1.2 Class Shop extends Group



#### 5.1.2.1 Field

- <u>GamHandle handle</u>	Medium for communicate with other classes
- <u>Rectangle atk1, atk2, atk3, atk4, atk5</u>	1-5 rectangles are representative of player's attack level . Rectangle with number <= player's attack level will be green.
- <u>Rectangle hp1, hp2, hp3, hp4, hp5</u>	1-5 rectangles are representative of player's hp level . Rectangle with number <= player's hp level will be green.
- <u>Rectangle supporter1,supporter2</u>	1-2 rectangles are representative of player's supporter level . Rectangle with number <= player's supporter level will be green.
- <u>Rectangle buttonAtkUpgrade</u>	Button for upgrade attack level.
- <u>Rectangle buttonHpUpgrade</u>	Button for upgrade hp level.
- <u>Rectangle buttonSupporterUpgrade</u>	Button for upgrade supporter level.
- <u>Text cantUpgradeAttack</u>	Text show when player can't upgrade attack.
- <u>Text cantUpgradeHp</u>	Text show when player can't upgrade hp.

- <u>Text cantUpgradeSupporter</u>	Text show when player can't upgrade supporter.
- <u>Text coin</u>	Text show number of player's coin.

#### 5.1.2.2 Constructor

+ Shop(Gamehandle handle)	Initializes shop.
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#### 5.1.2.3 Method

- void buildShop()	Create shop window according to picture of shop above. - Set font to "ERAS BOLD ITC". - Set text "X" to exit shop on clicked. - Set all three button to check, upgrade player status and play menuSelect sound on clicked.
- void buy(String type)	Check player status and coin before upgrade player status according to status type player want to upgrade. - Upgrade attack and hp use 1000 coins. - Upgrade supporter use 3000 coins. - If player's coin not enough, set cantUpgrade text of that status type to tell player. - If the status type already reached its max level, player can't upgrade and set text to tell player
- void openShop()	Open shop window.
- void closeShop()	Close shop window.
- Group getShop()	Return this.

## 5.2 Package exception

### 5.2.1 Class EmptyNameException extends Exception

#### 5.2.1.1 Method

+ String getMessage()	Return "Name can't be empty".
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### 5.2.2 Class LongNameException extends Exception

#### 5.2.2.1 Method

+ String getMessage()	Return "Name can't be longer \n than 10 characters" .
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### 5.2.3 Class SpecialCharacterException extends Exception

#### 5.2.3.1 Field

- String text	Text which is exception.
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#### 5.2.3.2 Constructor

+ SpecialCharacterException(String text)	Constructor of the exception
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#### 5.2.3.3 Method

+ String getMessage()	Return "Character [{ text }] is not allowed."
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## 5.3 Package game

### 5.3.1 Class GameHandle

#### 5.3.1.1 Field

- <u>LinkedList&lt;GameObject&gt;</u> <b>allObject</b> = new <u>LinkedList&lt;GameObject&gt;()</u>	Keep all object in game
- <u>ImageLoader</u> <b>load_Image</b> = new <u>ImageLoader()</u>	Class for load images.
- <u>SoundLoader</u> <b>load_Sound</b> = new <u>SoundLoader()</u>	Class for load sounds.
- GameHud <b>hud</b> = new GameHud(this)	Class for hud in game.
- GameLogic <b>gameLogic</b> = new GameLogic(this)	Class for logic of the game.
- PlayerProfile <b>player</b> = new PlayerProfile(this)	Class for player profile
- Shop <b>shop</b> = new Shop(this)	Class for shop.
- <u>SceneSelect</u> <u>sceneManage</u>	Class for manage scene.

#### 5.3.1.2 Constructor

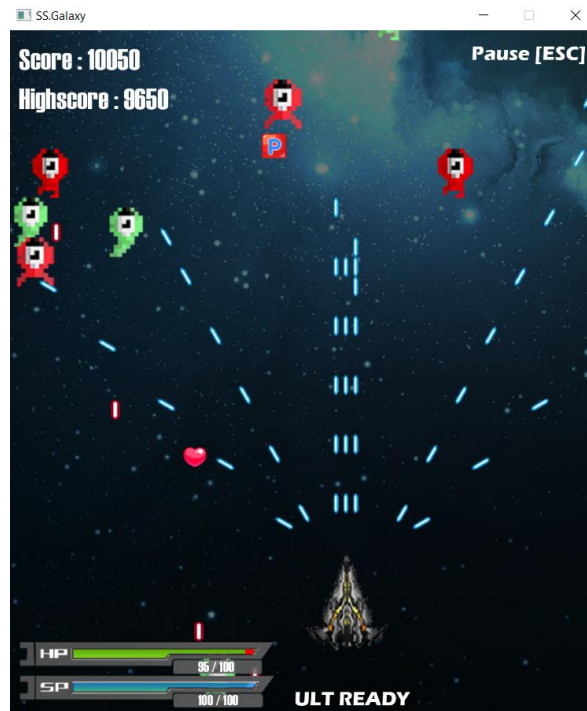
+ GameHandle(SceneSelect scene)	Constructor of GameHandle.
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#### 5.3.1.3 Method

+ void tick()	Method for update all logic.
+ void render()	Method for re-render all component and objects.
+ void add(GameObject gameObject)	Add specific game object.
+ void remove(GameObject gameObject)	Remove specific game object

Getter for all the fields	Getter method.
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### 5.3.2 Class GameHud



#### 5.3.2.1 Field

- <u>GameHandle handle</u>	Medium in communication with other class
- <u>int maxHp = 100;</u>	Player max hp.

#### 5.3.2.2 Constructor

+ GameHud(GameHandle handle)	Constructor of GameHandle.
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#### 5.3.2.3 Method

+ void render()	Set hud according to picture above - Calculate length of hp and sp bar - Show current hp and sp - When sp = 100 , text tell "ULT READY" appear.
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### 5.3.3 Class GameLogic

#### 5.3.3.1 Field

- <u>GameHandle handle</u>	Medium in communication with other class
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- <u>int score</u>	Keep current score.
- <u>int enemy</u>	Keep number of enemy in present.
- <u>int bossDefeat</u>	Keep number of boss which player defeat in current game.
- <u>int playerDestroyedFrame</u>	Frame counting after player defeated for animate game over screen
- <u>int coinGain</u>	Coin which player gain in that game. Calculate after player defeated.
- <u>int delay</u>	Delay between game start and first enemy can appear.
- <u>boolean hasBoss</u>	Is boss present?
- <u>boolean isPause</u>	Is the game paused?
- <u>Random rand = new Random()</u>	For generate enemy randomly.
- <u>Vector&lt;Integer&gt; gameOver = new Vector&lt;Integer&gt;()</u>	Keep coordinate to animate game over screen.

#### 5.3.3.2 Constructor

+ GameLogic(GameHandle handle)	Constructor for GameLogic
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#### 5.3.3.3 Method

+ void generatePlayer()	Generate player and supporter according to player status. Reset coinGain.
+ void tick()	Start generate enemy after delay. - Set high score properly.
+ void render(GraphicsContext game)	Render game over screen when player destroyed.
- void coinGain()	Calculate coin gain in that game and set player's coin.
- void generateEnemy()	Generate enemy above off screen randomly, then move to some point of y-axis , go left-right before do their attacks. - Meteor will fall straight down and fall off screen. - When player reach every 5500 scores, boss will appear. - ShootingEnemy can shoot straight down anytime. - NormalEnemy can dash forward player anytime and go off screen - Boss has spread shot and laser shot.
Getter of score, enemy, bossDefeat, hasBoss, playerDestroyedFrame, isPause	Getter method
Setter of score, enemy, bossDefeat, hasBoss, delay, isPause	Setter method

### 5.3.4 Class ImageLoader

#### 5.3.4.1 Field

- <u>Image boss,shipLv1, shipLv1GetHit, shipLv2, shipLv2GetHit,shipLv3, shipLv3GetHit, normalEnemy1,normalEnemy2,normalEnemy3, shootingAlien1, shootingAlien2, shootingAlien3, playerBullet, playerBullet30, playerBullet60, playerBulletMinus30, playerBulletMinus60, enemyBullet, enemyBullet30, enemyBullet60, enemyBulletMinus30, enemyBulletMinus60, meteor,hplItem,upgradItem,hpAndSpBar,hpbar,spbar, mainMenuBg,gameBg,howToPlayWindow, title,profile,shop,supporter,shopIcon,button1,button2,coin</u>	Image for game according to name.
- <u>String image_path</u>	String to image

#### 5.3.4.2 Constructor

+ ImageLoader()	Load all image.
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#### 5.3.4.3 Method

Getter for all the fields	Getter method.
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### 5.3.5 Class Main extends Application

#### 5.3.5.1 Field

- SceneSelect scene	For select scene.
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#### 5.3.5.2 Method

+ void start(Stage primary)	Build game loop and set scene - Set resizable false. - Set title to "SS.Galaxy".
+ void tick()	Tick scene.
+ void render()	Render scene.
+ <u>void main (String [] args)</u>	An entry point of the application.



### 5.3.6 Class SceneSelect



#### 5.3.6.1 Field

- <u>GameHandle handle</u>	Medium in communication with other classes.
- <u>Scene mainMenu</u>	Main menu scene.
- <u>Scene game</u>	Game scene.
- <u>Stage stage</u>	For setting scene.
- <u>Canvas canvas = new Canvas(600,700)</u>	For draw scene.
- <u>GraphicsContext gc = canvas.getGraphicsContext2D()</u>	For draw scene.
- <u>Vector&lt;Integer&gt; gameBg1_coordinate, gameBg2_coordinate</u>	Coordinate for in-game background 1 and 2.
- <u>Vector&lt;Integer&gt; menuBg1_coordinate, menuBg2_coordinate</u>	Coordinate for main menu background 1 and 2.
- <u>Rectangle menuBg1, menuBg2</u>	Main menu background 1 and 2.
- <u>Rectangle gameBg1, gameBg2</u>	In-game background 1 and 2.
- <u>int sceneNumber</u>	Indicate current scene.
+ <u>int gameScene = 2, mainScene = 1</u>	Number of scene

#### 5.3.6.2 Constructor

+ <u>SceneSelect(Stage stage)</u>	Initialize scene and set to mainMenu scene
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### 5.3.6.3 Method

- void mainMenuScene()	Initialize mainMenu scene according to picture above - Start text change scene on clicked - How to play text show howToPlay window on clicked. - Exit text close application on clicked. - Profile text show playerProfile on clicked. - Shop icon show shop window on clicked. - Set main menu background.
- void gameScene()	Initialize game scene - Set game background.
+ void tick()	Move background according to scene. - Play music background if not playing.
+ void render()	Clear graphicsContext2D and call handle.render() if current scene is game scene.
+ void change()	Change scene
+ int getSceneNumber()	Get current scene

### 5.3.7 Class SoundLoader

#### 5.3.7.1 Field

- <u>AudioClip mainMenuMusic, gameMusic, menuSelect, explosion, bossCharge, bossLaser, meteorExplosion, alienDestroyed, bossExplosion, ItemCollected</u>	All sounds used in game.
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#### 5.3.7.2 Constructor

+ SoundLoader()	Load all sound and set gameMusic volume to 0.5
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#### 5.3.7.3 Method

Getter for all Field	Getter Method
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## 5.4 Package gameObject

### 5.4.1 Class Boss extends Enemy

#### 5.4.1.1 Field

- Random rnd	For shooting randomly
- int shootFrame	For animate shooting

- boolean isShootingFirstForm	Tell that boss is shooting spread shot now.
- boolean isShootingSecondForm	Tell that boss is shooting laser now.

#### 5.4.1.2 Constructor

+ Boss(int hp, GameHandle handle)	Initialize hitbox, image - Set isShootingFirstForm and isShootingSecondForm to false - Set hitbox size to 460,260 at boss coordinate - Set boss score to 1000 - Boss start with xVelocity = 0, yVelocity = 5, x-coordinate = 10 , y-coordinate = -400, atk = 20 and both item drop chance = 100
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#### 5.4.1.3 Method

+ void tick()	Check collision , move boss and shoot.
+ void render(GraphicsContext game)	Draw boss and laser if boss is shooting.
+ void move()	Move boss with enemy algorithm described above.
+ void remove()	Remove boss and laser and set player score if boss is defeated.
- void shoot()	Shooting algorithm - Boss has chance to not shoot, shoot first form and shoot second form ,but not the same time.
- void shootingFirstForm()	Shooting 5 different angle on both left and right side for 6 times.
- void shootingSecondForm(GraphicsContext game)	Boss charge for a while before shooting laser for 1 second, play bossCharge and bosLaser sound.

#### 5.4.2 Class BossLaser extends Bullet

##### 5.4.2.1 Field

- Boss boss	Boss that shooting this laser.
- int count	For counting duration of laser.

##### 5.4.2.2 Constructor

+ BossLaser(Boss boss,int xPos, int yPos, int atk,GameHandle handle, Type type)	Initialize hitbox with size 60x800 - Set hit box coordinate to (xPos,yPos) - Count start from 0
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### 5.4.2.3 Method

+ void tick()	Move laser according to boss - increase count. - if count = 60, remove laser.
+ void render(GraphicsContext game)	Draw boss laser.

## 5.4.3 Class Bullet implements GameObject

### 5.4.3.1 Field

# int xPos, yPos	Coordinate of bullet
# int velX, velY	Velocity of bullet in x-axis and y-axis
# int atk	Bullet damage
# Image image	Bullet image
# GameHandle handle	Medium in communication with other classes
# Rectangle hitbox	Bullet hitbox
# Type type	Tell that this bullet is belong to player or enemy

### 5.4.3.2 Constructor

+ Bullet(int velX,int velY,int xPos,int yPos,int atk, GameHandle handle, Type type, int Rotate)	Initialize bullet and set bullet image and hitbox according to rotation of bullet.
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### 5.4.3.3 Method

+ void tick()	Move bullet and hitbox .If bullet go off screen, remove it.
+ void render(GraphicsContext game)	Draw bullet
+ void move()	Move bullet according to its velocity.
+ void remove()	Remove this bullet
Getter and setter method for all fields except image and handle	Getter and setter method

## 5.4.4 Class Enemy implements GameObject

### 5.4.4.1 Field

# int Hp	Enemy's hp
# int xVelocity, yVelocity	Enemy's velocity in x-axis and y-axis
# int xPos, yPos	Enemy's coordinate
# int hpItemRate, upgradeItemRate	Enemy's hp item and upgrade item drop rate

# int atk	Enemy's attack damage
# <u>GameHandle handle</u>	Medium in communication with other classes
# Shape hitbox	Enemy hitbox
# <u>Type <b>type</b> = Type.ENERMY</u>	Tell that this is enemy
# Image image	Enemy's image
# int score	Enemy's score
# Random rnd = new Random()	For randomly move and action

#### 5.4.4.2 Constructor

+ Enemy (int hp,int xVelocity,int yVelocity,int xPos,int yPos, GameHandle handle, int atk, int hpItemRate,int upgradeItemRate)	Initialize enemy
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#### 5.4.4.3 Method

# void destroyed(int hpRate, int upgradeRate)	Remove enemy and randomly drop item.
# void move()	Move enemy according to its velocity
# void collision()	Check whether this enemy collision with player's bullet.
# void getHit(int damage)	Decrease enemy hp
# void remove()	Remove this enemy ,increase player score
Getter method for hitbox, Hp, atk, xVelocity, yVelocity, xPos, yPos, <b>type</b>	Getter method
Setter method for Hp, atk, xVelocity, yVelocity, xPos, yPos	Setter method

#### 5.4.5 Interface GameObject

##### 5.4.5.1 Method

+ void tick()	Update object's logic
+ void render(GraphicsContext game)	Draw object
+ void move()	Move object
+ void remove()	Remove object
+ Type getType()	Get object's type
+ Shape getHitbox()	Get object's hitbox

### 5.4.6 Class HplItem extends Item

#### 5.4.6.1 Field

- int <b>hpGain</b> = 30	Player's hp increase 30 when collect this item
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#### 5.4.6.2 Constructor

+ HplItem (int xPos, int yPos, GameHandle handle)	Initialize hp item - Set hitbox to circle with radius length 13 at (xPos+13, yPos+13)
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#### 5.4.6.3 Method

+ void render(GraphicsContext game)	Move hitbox and render item
+ void remove()	Remove this item
+ int getHpGain()	Return <b>hpGain</b>

### 5.4.7 Abstract class Item implements GameObject

#### 5.4.7.1 Field

# Type type	Tell object's type
# int xPos, yPos	Coordinate of item
# int yVelocity	Velocity of item in y-axis
# int delay = 1	Slow down item's acceleration
# Shape hitbox	Item's hitbox
# GameHandle handle	Medium in communication with other classes

#### 5.4.7.2 Constructor

+ Item (int xPos, int yPos, GameHandle handle)	Initialize item, set yVelocity to -5
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#### 5.4.7.3 Method

+ void tick()	Move item and remove if item go off screen
+ void move()	Move item according to velocity
+ Shape getHitbox()	Return item's hitbox
+ Type type()	Return item's type

#### 5.4.8 Class Meteor extends Enemy

This class doesn't have any field

##### 5.4.8.1 Constructor

+ Meteor (int Xpos, int Ypos,GameHandle handle)	Initialize meteor - Set hitbox to circle with radius length 45 - Set meteor score to 200 - Set hp to 100 - Set xVelocity to 0 - Set yVelocity to 10 - Set atk and hpltemRate to 15 - Set upgradeltemRate to 30
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##### 5.4.8.2 Method

+ void tick()	Move meteor and hitbox . Remove if it go off screen
+ void render(GraphicsContext game)	Draw meteor

#### 5.4.9 Class NormalEnemy extends Enemy

##### 5.4.9.1 Field

- Random rand = new Random()	For random moving and action
- int randRow = row.nextInt(20)+1	For moving in random row
- int delayImage = 1	For delaying enemy animation
- int imageNow = 1	Current enemy animation
- <u>Image alienMove1, alienMove2, alienMove3</u>	All enemy image for animation

##### 5.4.9.2 Constructor

+ NormalEnemy (int XVelocity, int YVelocity,int Xpos,int Ypos,GameHandle handle)	Initialize normal enemy - Set hitbox to circle with radius length 20 - Set score to 100 - Set hp to 100 - Set atk to 15 - Set both item rate to 10
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##### 5.4.9.3 Method

- void setRenderImage()	Set enemy animation from alienMove1 -> alienMove2 -> alienMove3 -> alienMove2-> alienMove1 and go on with delayImage.
+ void tick()	Move enemy and hitbox and check collision. Remove if it go off screen



+ void render(GraphicsContext game)	Draw normal enemy
+ void move()	Move enemy with algorithm described above.

#### 5.4.10 Class Player implements GameObject

##### 5.4.10.1 Field

- int count	For delaying shoot
- int lv	Current spaceship's level
- int invincibleFrame = 0	For animating invincible frame when player get hit.
- int maxHp, hp, sp, atk	Tell player 's maxHp, current hp, current sp and attack
- int xPos, yPos	Player's position
- int ultFrame = 0	For animating ultimate
- boolean goNorth, goSouth, goWest, goEast	Tell that player is going in which direction
- boolean isGetHit = false	For animating invincible frame
- Type <b>type</b> = Type. <b>PLAYER</b>	Tell that this object is player
- Image image	Spaceship's image
- <u>GameHandle handle</u>	Medium in communication with other classes
- Circle hitbox	Player's hitbox

##### 5.4.10.2 Constructor

+ Player (int hp, int xPos, int yPos, int atk,GameHandle handle )	Initialize player - Set lv to 1 - Set hitbox to circle with radius length 10 at xPos+40, yPos+70
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##### 5.4.10.3 Method

+ void tick()	- Move player and hitbox - Check collision - Shoot - Do ultimate if using it - Increase sp
- void shoot()	Shoot according to level - Level 1, player shoot 2 bullets - Level 2, player shoot 3 bullets with more frequency. - Level 3, player shoot spread 5 bullets
- void runInvincibleFrame()	Player can't get hit for 1.5 seconds after get hit
+void getItem(GameObject item)	Get effect from item

+ void getHit(int damage)	Take damage and decrease level (level can't go below 1)
+ void render(GraphicsContext game)	Draw spaceship and ultimate if using it.
+ void move()	Move player position
+ void remove()	Remove player along with supporter
+ void collision()	Check collision and do action when collide with other.
+ void ultimate()	Start using ultimate
Getter method for goNorth, goSouth, goWest, goEast, isGetHit, hitbox, xPos, yPos, hp, sp, maxHp, lv, atk, type	Getter method
Setter method for goNorth, goSouth, goEast, goWest, hp, sp, maxHp, lv, atk	Setter method

#### 5.4.11 Class ShootingEnemy extends Enemy

##### 5.4.11.1 Field

- Random rand = new Random()	For random moving and shooting
- int randMove = rand.nextInt(100)	For random moving
- int randRow = rand.nextInt(20)+1	For random row
- int delayImage = 1	For delaying animation
- int ImageNow = 1	For animating enemy

##### 5.4.11.2 Constructor

+ ShootingEnemy(int XVelocity, int YVelocity, int Xpos, int Ypos, GameHandle handle)	Initialize shooting enemy - Set hp to 150 - Set atk to 20 - Set both item drop rate to 15 - Set hitbox to circle with radius length 20 - Set score to 150
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##### 5.4.11.3 Method

+ void tick()	Move enemy and hitbox - Shoot - Check collision and action if collide with other
+ void render (GraphicsContext game)	Draw enemy
+ void move()	Move according to algorithm described above
- void setRenderImage()	Animate enemy

#### 5.4.12 Class Supporter implements GameObject

##### 5.4.12.1 Field

- int xPos , yPos	Coordinate of supporter
- int countFrame	Delay shooting
- Type <b>type</b> = Type. <b>SUPPORT</b>	Tell that this object is supporter
- boolean goNorth, goWest, goEast, goSouth	Tell which direction that supporter is moving to
- GameHandle handle	Medium in communication with other classes

##### 5.4.12.2 Constructor

+ Supporter(int xPos, int yPos, GameHandle handle)	Initialize supporter
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##### 5.4.12.3 Method

+ void tick()	Move and shoot
+ void render()	Draw supporter
+ void move()	Move according to player
- void shoot()	Shoot straight up with delay
+ void remove()	Remove this supporter
+ Type getType()	Return <b>type</b>
+ Shape getHitbox()	Return null

#### 5.4.13 Enum Type

##### 5.4.13.1 Field

+ Type <b>PLAYER</b>	Player
+Type <b>ENEMY</b>	Enemy
+Type <b>ITEM</b>	Item
+Type <b>PLAYERBULLET</b>	Player's bullet
+Type <b>ENEMYBULLET</b>	Enemy's bullet
+Type <b>SUPPORT</b>	Supporter

#### 5.4.14 Class UpgradeItem extends Item

This class doesn't have any field

#### 5.4.14.1 Constructor

+ UpgradeItem(int xPos, int yPos, GameHandle handle)	Initialize upgrade item - Set hitbox to rectangle 25x25
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#### 5.4.14.2 Method

+ void render(GraphicsContext game)	Draw item and move hitbox
+ void remove()	Remove this item

### 5.5 Package InputHandle

#### 5.5.1 Class GameKeyPressed implements EventHandler<KeyEvent>

##### 5.5.1.1 Field

- <u>GameHandle handle</u>	Medium in communication with other classes
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##### 5.5.1.2 Constructor

+ GameKeyPressed(GameHandle handle)	Initialize GameKeyPressed
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##### 5.5.1.3 Method

+ void handle(KeyEvent key)	- Spaceship move when pressing arrow key - Use ultimate when pressing spacebar - Pause when pressing esc - when on game over screen ,press any key to be sent back to main menu
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#### 5.5.2 Class GameKeyReleased implements EventHandler<KeyEvent>

##### 5.5.2.1 Field

- <u>GameHandle handle</u>	Medium in communication with other classes
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##### 5.5.2.2 Constructor

+ GameKeyReleased (GameHandle handle)	Initialize GameKeyReleased
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##### 5.5.2.3 Method

+ void handle(KeyEvent key)	- Spaceship stop moving when releasing arrow key
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