BALLOON BATTLES

Created by “1617”

Natcha Hungsapruek 6531316121

Dalai Jotisalikorn Surenjargal 6531317821

2110215 Programming Methodology

Semester 2 Year 2022

Chulalongkorn University

BALLOON BATTLES

Introduction

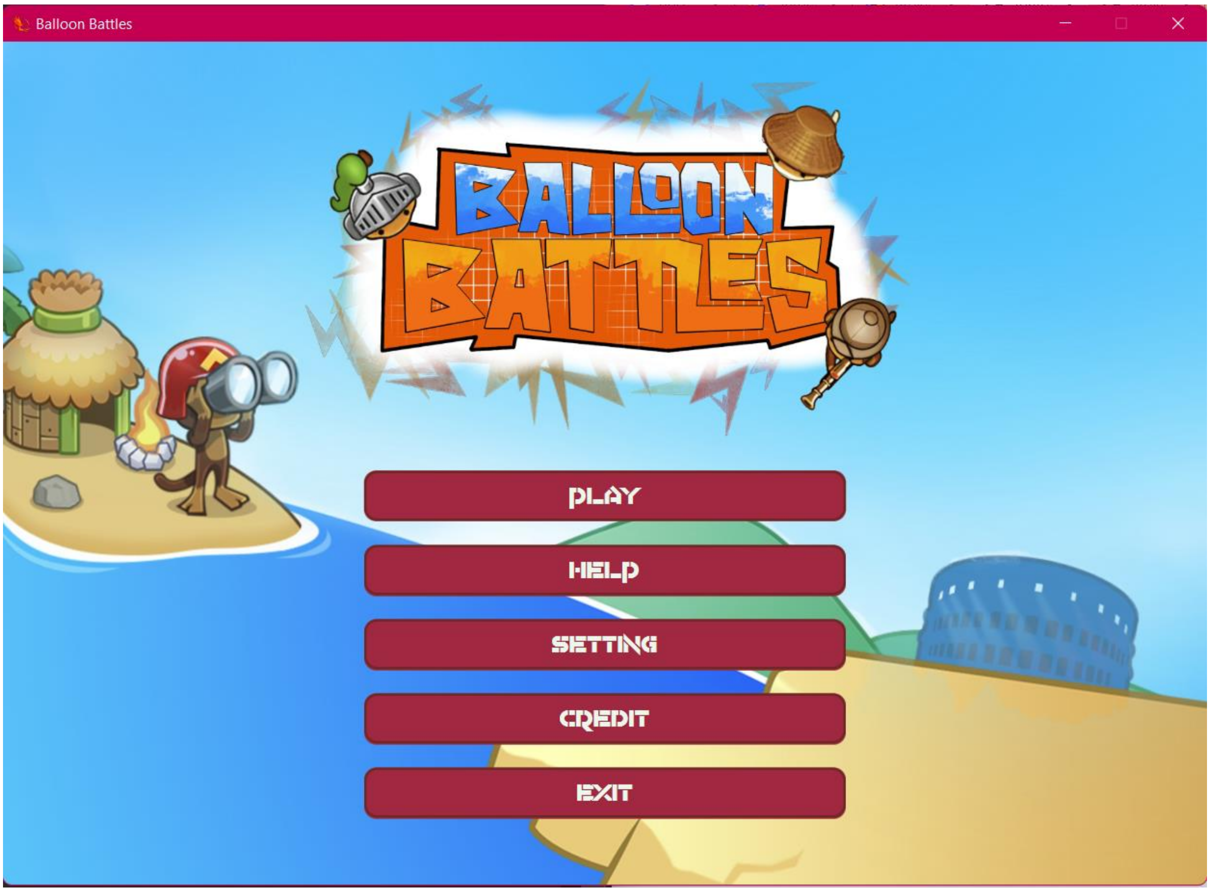
"BALLON BATTLES" is basically a tower defense game based on widely known "Bloons Tower Defense" game - i.e. Bloons TD5 - the goal of the game is to stop any balloons from escaping the map of which the path is already provided by placing towers that can pop the balloons in various ways.Players win when they complete all 12 rounds.

Rules

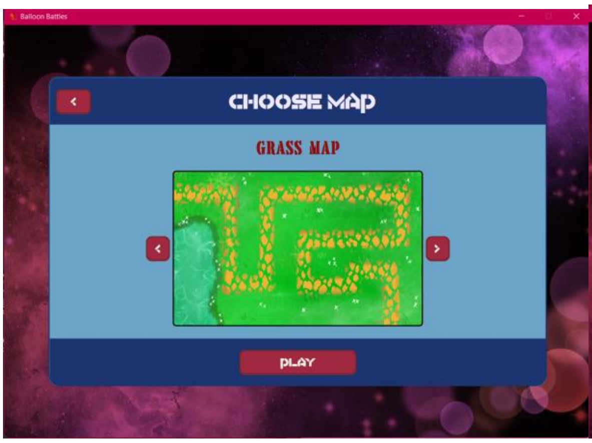
There are four different types of towers in the game in order to defend against all the balloons.Three of them including "**NINJA**","**DARTSHOOTER**","**SNIPER**" are land towers - they could be placed only on the land area.Anoter one is "**SCUBADIVER**" - tower that could be placed in water area.

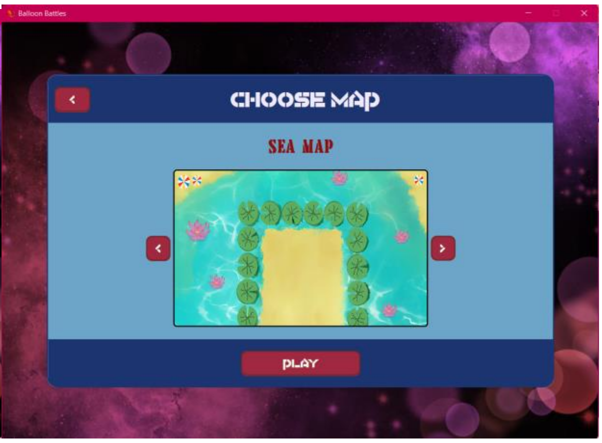
If a certain balloon reaches the end of a path, the player loses their hp; once these are all depleted, the game ends.

Main menu scene



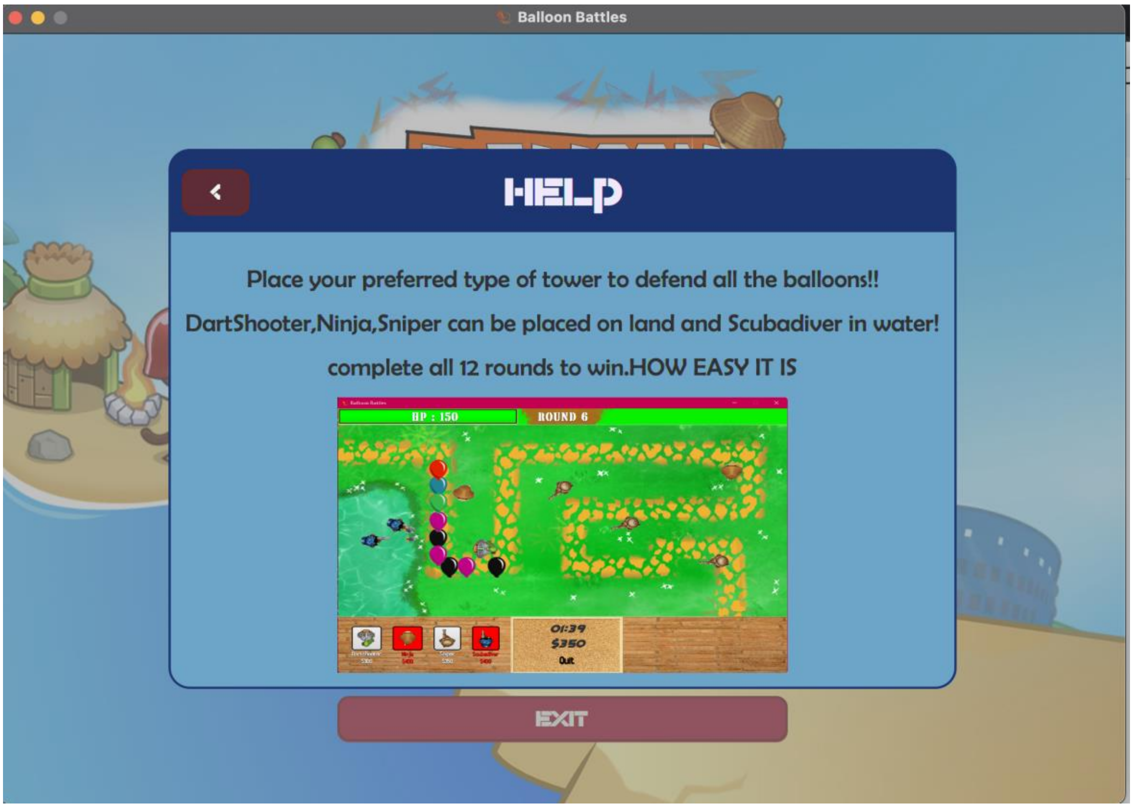
When you click “PLAY” button it will proceed you to a map selection panel.





There will be two maps for you to choose from : GRASS map,SEA map.

When you ready,click “PLAY” button to start the game where we will demonstrate on how to play later on.

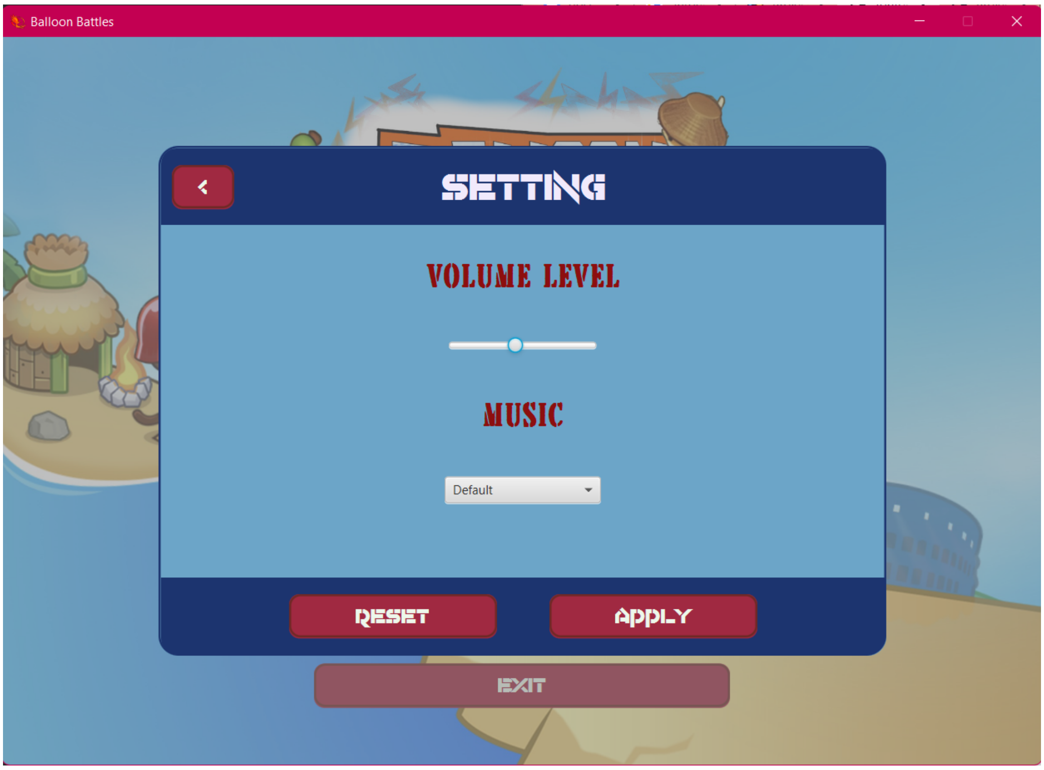


Place your preferred type of tower to defend all the balloons!!

DartShooter,Ninja,Sniper can be placed on land and Scubadiver in water!

complete all 12 rounds to win.HOW EASY IT IS

“HELP” button will guide you through game rules and teach you how to play this game.

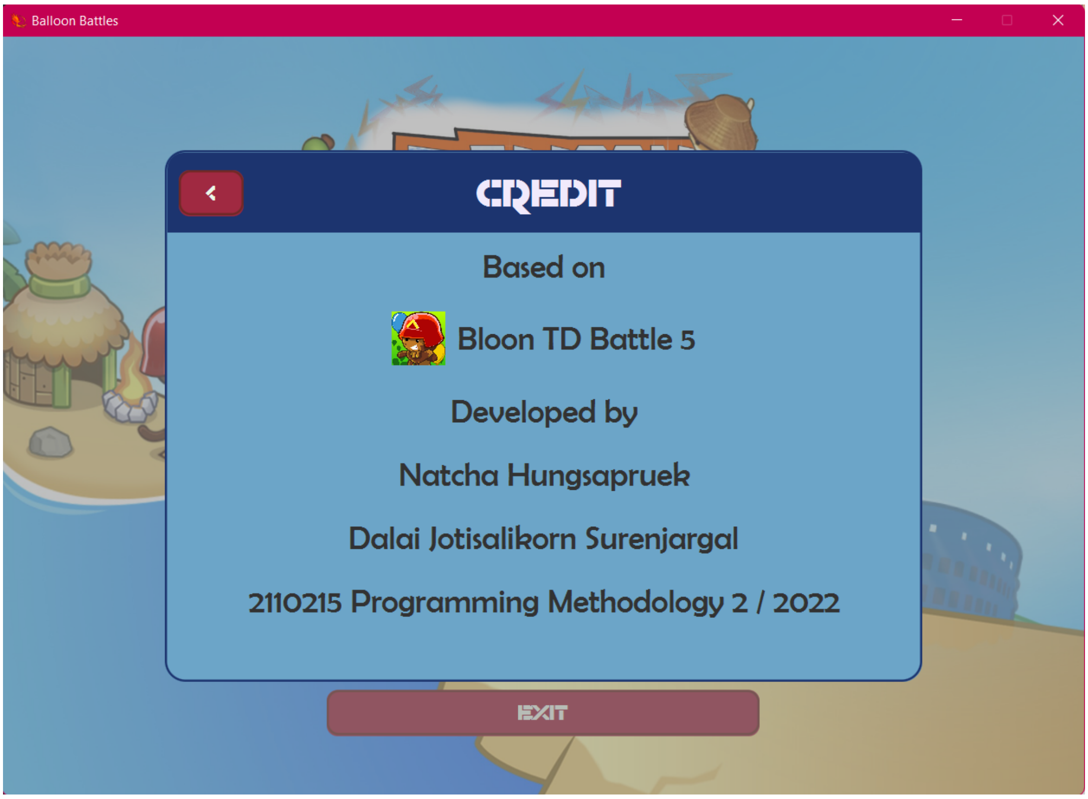


MUSIC: Default

You will be able to adjust a music volume level and change a music track when you clicked **"SETTING"** button.DO NOT forget to click on **"APPLY"** button to save your changes.

Track lists:

1. Default song : Bloons TD Battle main theme.
2. Equal Exchange : FMAB OP4 (Period) / FMA ost (Brother).
3. Space : Space atmospheric background.
4. Usamaro : Hiroyuki Sawano (Usamaro) / Braveheart (For the love of a princess).
5. Limitless : Lorenzo Ferrara (Limitless) / Fox Sailor (The legend of the sword).
6. Bounce : Bounce song theme.
7. Adventure : Fox Sailor (The great adventure) / Fox Sailor (Elven Kingdom).
8. Timekeeper : Dota 2 (JJ Lin's Timekeeper music pack).
9. Risk : Risk song.



CREDIT

Based on

Bloon TD Battle 5

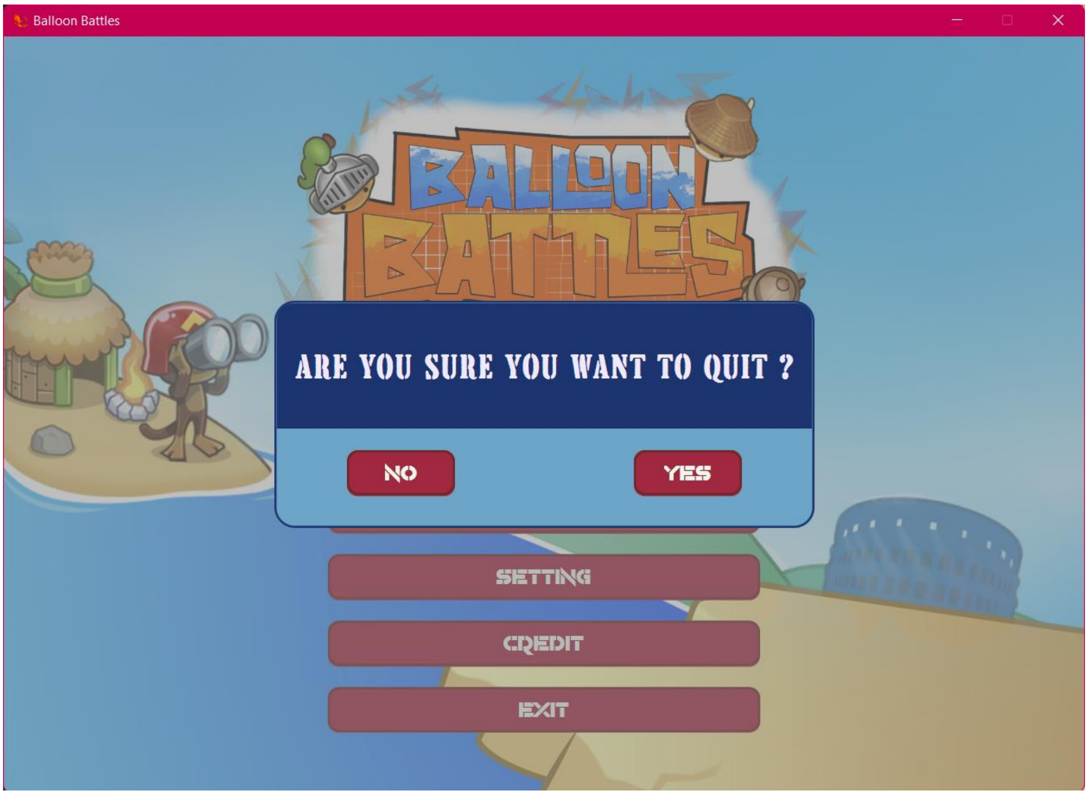
Developed by

Natcha Hungsapruek

Dalai Jotisalikorn Surenjargal

2110215 Programming Methodology 2 / 2022

"CREDIT" button will lead you to where we are proud of after a long-dedicated work.



ARE YOU SURE YOU WANT TO QUIT ?

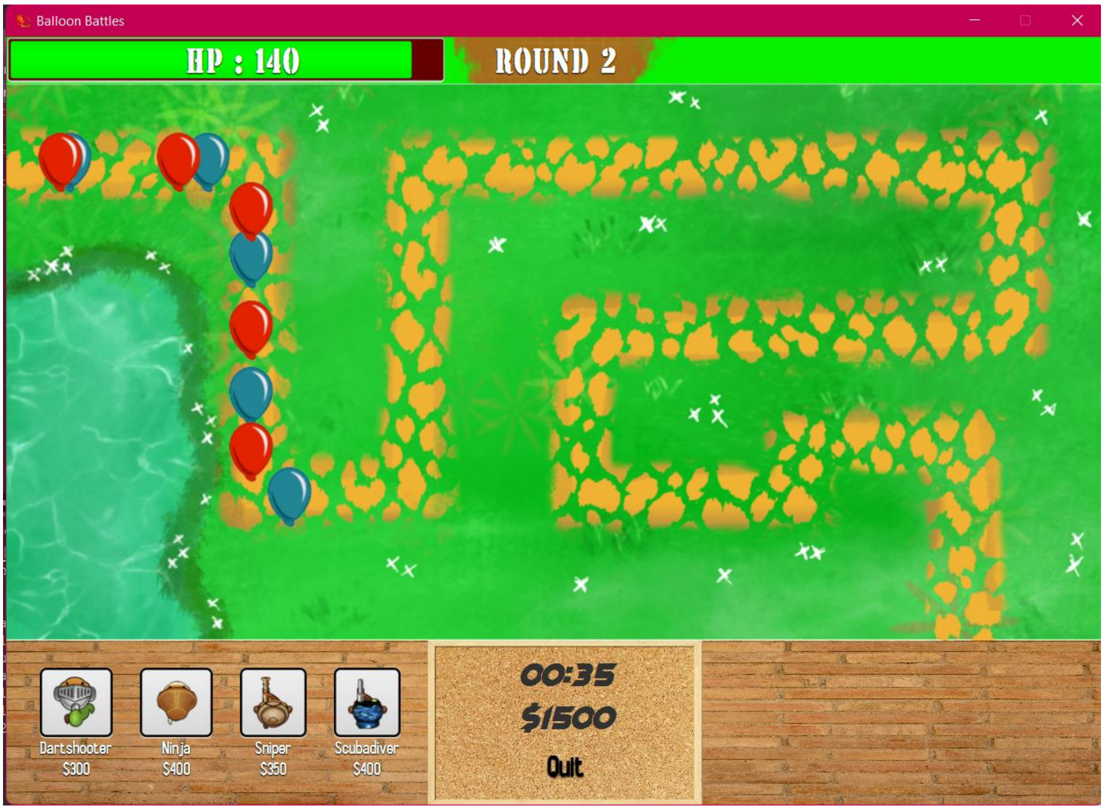
"EXIT" button will reassure you if you really want to quit our magnificent game.

How to play

After you choose your preferred map from our two options and press "PLAY" button,you will immediately proceed to our game.

NOTED: We will demonstrate this using a grass map.

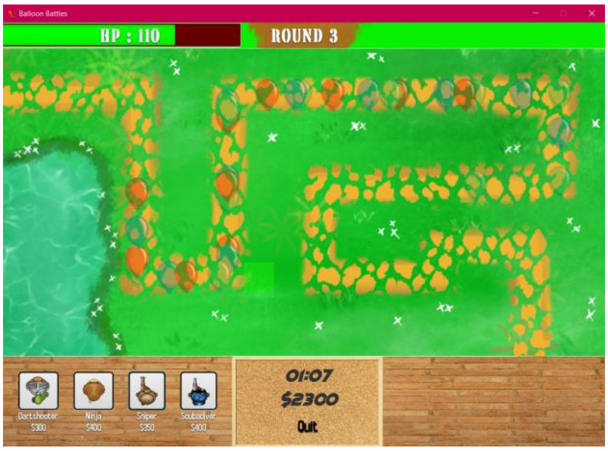
Each round – where we have all twelves – will have different types of balloons arrived.Different type means different speed and hit points

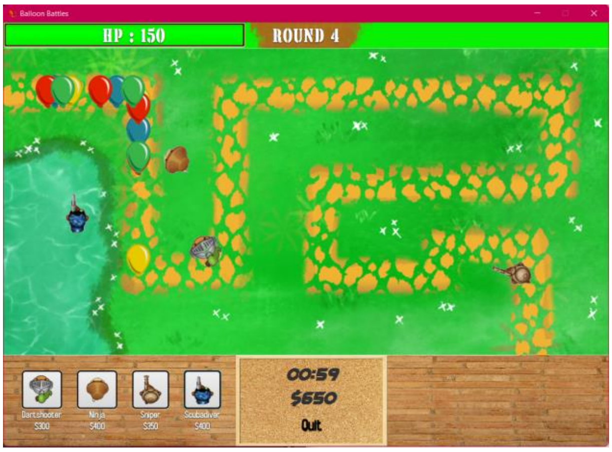


Player's job is to place a tower to prevent those set of balloons from escaping the map.Different tower means different price and also different area to be placed:

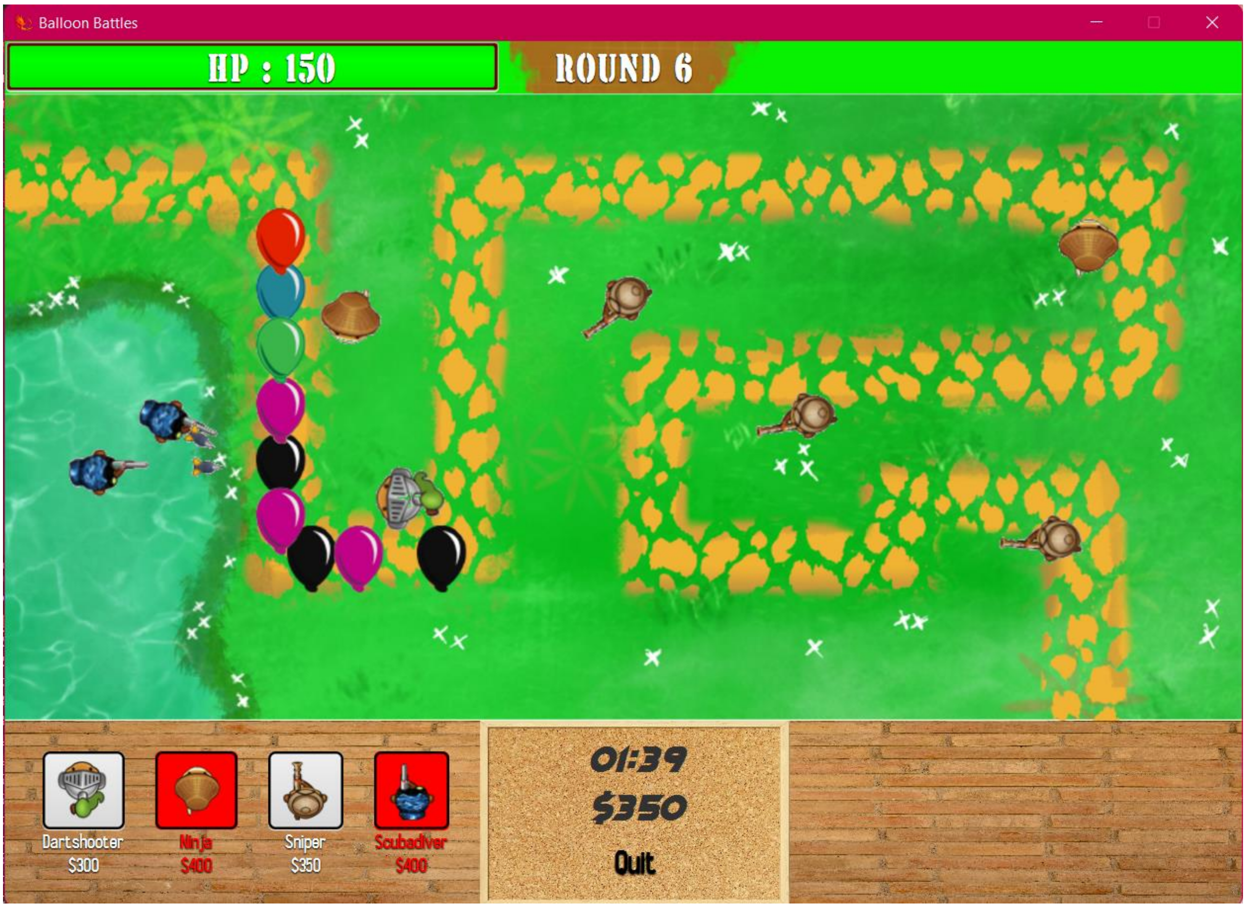
TERRESTRIAL tower : "Dartshooter", "Ninja", "Sniper"

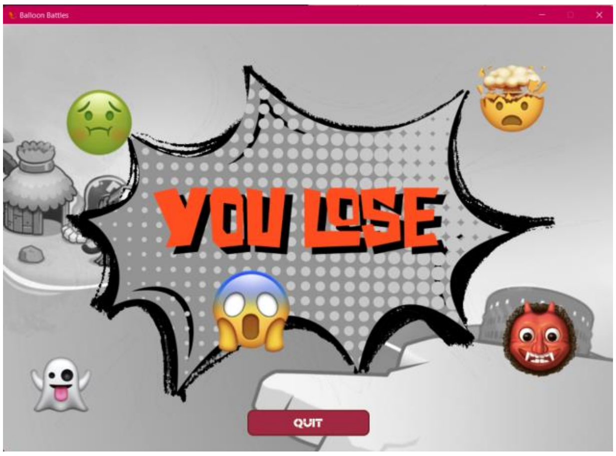
AQUATIC tower : "Scubadiver"

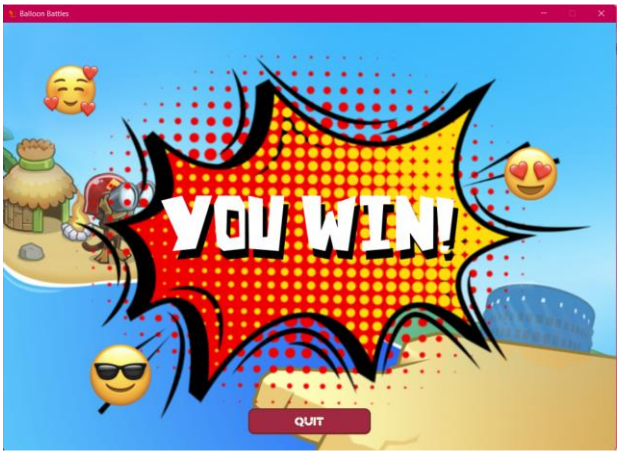




Your money will automatically increase $200 every 7 seconds.You will use this money to buy your preferred tower.





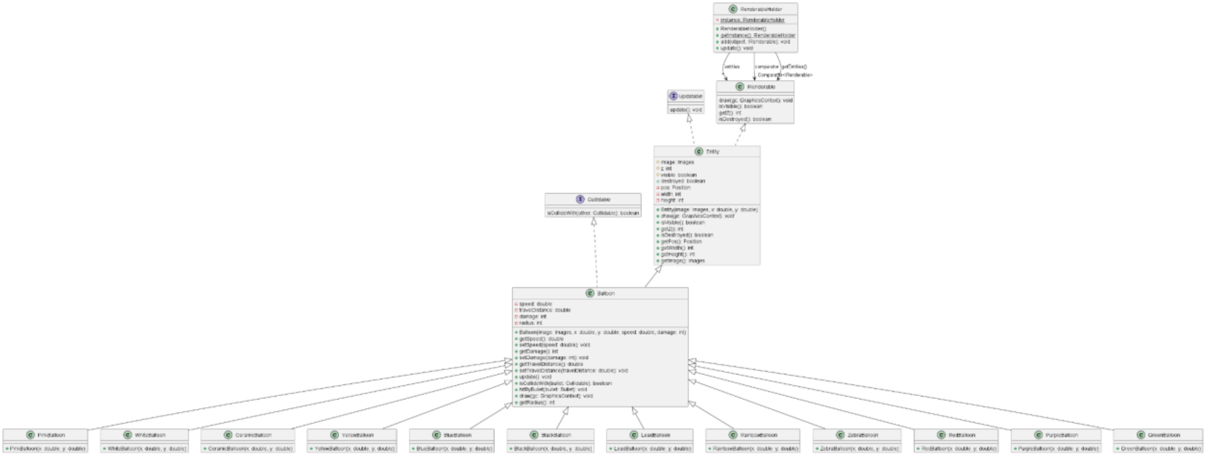


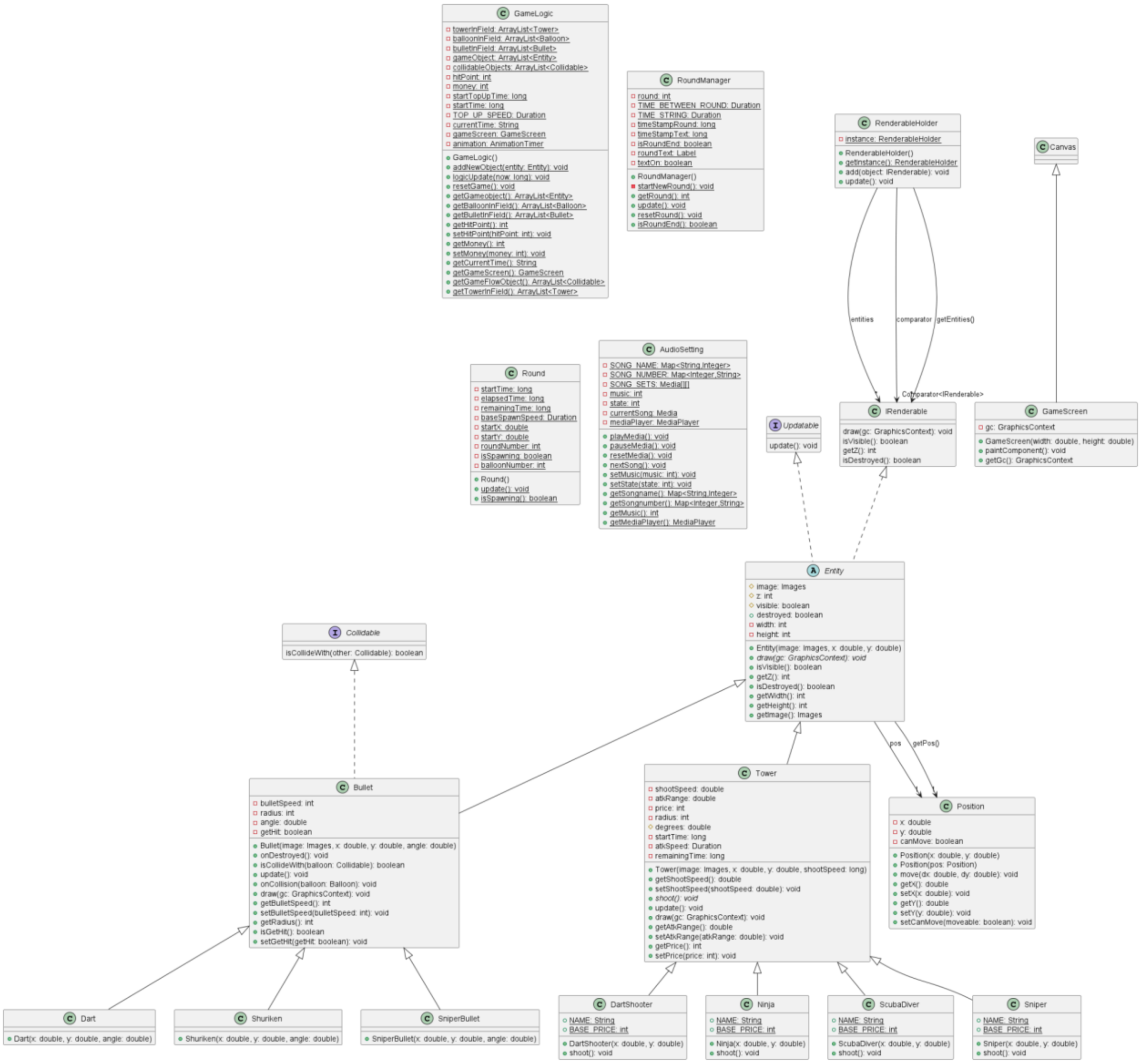
If any balloon escaped,your HP decreased.

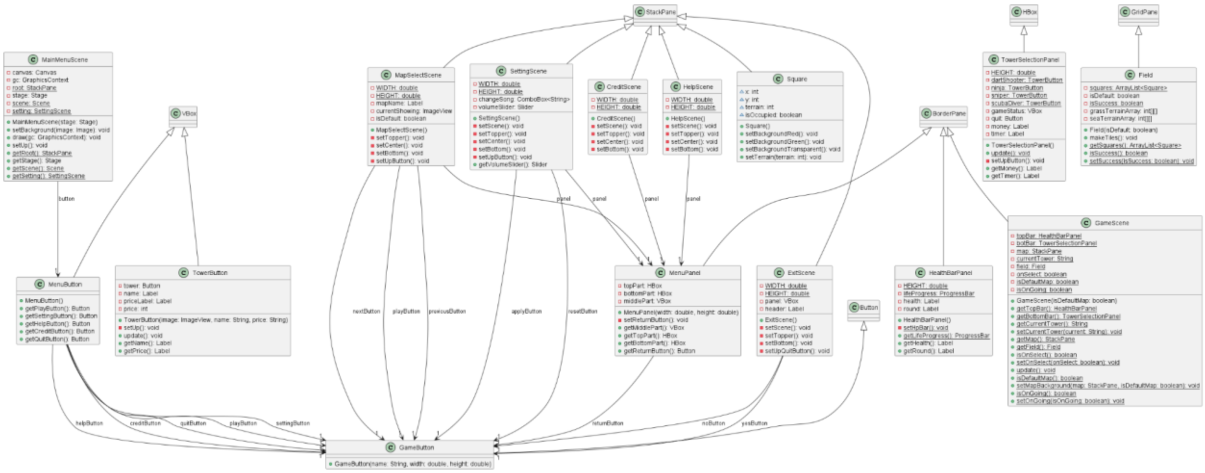
When it reaches zero,YOU LOSE!!!!

Complete 12 rounds and YOU WIN!!!

Class diagram


RenderableHolder
instance: RenderableHolder
RenderableHolder()
getInstance(): RenderableHolder
add(object: IRenderable): void
update(): void
entities
comparator
getEntities()
Comparator<IRenderable>
IRenderable
draw(gc: GraphicsContext): void
isVisible(): boolean
getZ(): int
isDestroyed(): boolean
Updatable
update(): void
Entity
image: Images
z: int
visible: boolean
destroyed: boolean
pos: Position
width: int
height: int
Entity(image: Images, x: double, y: double)
draw(gc: GraphicsContext): void
isVisible(): boolean
getZ(): int
isDestroyed(): boolean
getPos(): Position
getWidth(): int
getHeight(): int
getImage(): Images
Collidable
isCollideWith(other: Collidable): boolean
Balloon
speed: double
travelDistance: double
damage: int
radius: int
Balloon(image: Images, x: double, y: double, speed: double, damage: int)
getSpeed(): double
setSpeed(speed: double): void
getDamage(): int
setDamage(damage: int): void
getTravelDistance(): double
setTravelDistance(travelDistance: double): void
update(): void
isCollideWith(bullet: Collidable): boolean
hitByBullet(bullet: Bullet): void
draw(gc: GraphicsContext): void
getRadius(): int
PinkBalloon
PinkBalloon(x: double, y: double)
WhiteBalloon
WhiteBalloon(x: double, y: double)
CeramicBalloon
CeramicBalloon(x: double, y: double)
YellowBalloon
YellowBalloon(x: double, y: double)
BlueBalloon
BlueBalloon(x: double, y: double)
BlackBalloon
BlackBalloon(x: double, y: double)
LeadBalloon
LeadBalloon(x: double, y: double)
RainbowBalloon
RainbowBalloon(x: double, y: double)
ZebraBalloon
ZebraBalloon(x: double, y: double)
RedBalloon
RedBalloon(x: double, y: double)
PurpleBalloon
PurpleBalloon(x: double, y: double)
GreenBalloon
GreenBalloon(x: double, y: double)





1.Package application

1.1 public class Main extends Application

This class is provided to launch JavaFX application.

Method

Name	Description
+ void start(Stage primaryStage)	create a new MainMenuScene,provide substantial component e.g.Title,Icons,and music then start the application
+ void main()	launch the application

2.Package balloon

2.1 public class Balloon extends Entity implements Collidable

Field

Name	Description
- double speed	Speed of certain balloon
- double travelDistance	Distance certain balloon travels
- int hp	Balloon's hit points
- int radius	Radius of all types of balloons in order to define a boundary of defense

Constructor

Name	Description

+ Balloon(Images image, double x, double y, double speed, int hp)	Initiate this balloon with a super constructor and set all fields according to the given parameters.

Method

Name	Description
+ double getSpeed()	Return speed of certain balloon
+ void setSpeed(double speed)	Set speed of certain balloon as a value given
+ int getHp()	Return balloon's hit points
+ void setHp(int hp)	Set balloon's hit points as value given
+ double getTravelDistance()	Return distance certain balloon travels
+ void setTravelDistance(double travelDistance)	Set distance certain balloon travels: If travelDistance value given is less than 0,set it to 0.Otherwise,set it to value given
+ void update()	Update a position of the balloon frame by frame in order to move along the designated path
+ boolean isCollideWith(Collidable bullet)	Check if a balloon is hit by the bullet
+ void hitByBullet(Bullet bullet)	If the balloon is hit by the bullet,destroy it and play popped sound
+ void draw(GraphicsContext gc)	Draw the image on canvas.
+ int getRadius()	Return the radius of a balloon

2.2 public class RedBalloon extends Balloon

Constructor

Name	Description
+ RedBalloon(double x, double y)	Initiate RedBalloon according to given positions,set its speed to 3.0 ,and set its hp to 1

2.3 public class BlueBalloon extends Balloon

Constructor

Name	Description
+ BlueBalloon(double x, double y)	Initiate BlueBalloon according to given positions,set its speed to 3.5 ,and set its hp to 2

2.4 public class GreenBalloon extends Balloon

Constructor

Name	Description
+ GreenBalloon(double x, double y)	Initiate GreenBalloon according to given positions,set its speed to 4.0 ,and set its hp to 3

2.5 public class YellowBalloon extends Balloon

Constructor

Name	Description
+ YellowBalloon(double x, double y)	Initiate YellowBalloon according to given positions,set its speed to 4.5 ,and set its hp to 4

2.6 public class PinkBalloon extends Balloon

Constructor

Name	Description
+ PinkBalloon(double x, double y)	Initiate PinkBalloon according to given positions,set its speed to 4.5 ,and set its hp to 5

2.7 public class BlackBalloon extends Balloon

Constructor

Name	Description
+ BlackBalloon(double x, double y)	Initiate BlackBalloon according to given positions,set its speed to 5.0 ,and set its hp to 11

2.8 public class WhiteBalloon extends Balloon

Constructor

Name	Description
+ WhiteBalloon(double x, double y)	Initiate WhiteBalloon according to given positions,set its speed to 5.5 ,and set its hp to 11

2.9 public class PurpleBalloon extends Balloon

Constructor

Name	Description
+ PurpleBalloon(double x, double y)	Initiate PurpleBalloon according to given positions,set its speed to 6.0 ,and set its hp to 11

2.10 public class LeadBalloon extends Balloon

Constructor

Name	Description

+ LeadBalloon(double x, double y)	Initiate LeadBalloon according to given positions,set its speed to 6.0 ,and set its hp to 23

2.11 public class ZebraBalloon extends Balloon

Constructor

Name	Description
+ ZebraBalloon(double x, double y)	Initiate ZebraBalloon according to given positions,set its speed to 7.0 ,and set its hp to 23

2.12 public class RainbowBalloon extends Balloon

Constructor

Name	Description
+ RainbowBalloon(double x, double y)	Initiate RainbowBalloon according to given positions,set its speed to 7.5 ,and set its hp to 47

2.13 public class CeramicBalloon extends Balloon

Constructor

Name	Description
+ CeramicBalloon(double x, double y)	Initiate CeramicBalloon according to given positions,set its speed to 8.0 ,and set its hp to 104

3.Package bullet

3.1 public class Bullet extends Entity implements Collidable

Field

Name	Description
- int bulletSpeed	Speed of the bullet
- int radius	Radius of the bullet
- double angle	Angle of the bullet that assign which way its going to move
- Boolean getHit	Check if the bullet hits a balloon

Constructor

Name	Description

+ Bullet(Images image, double x, double y, double angle)	Initiate this bullet with a super constructor and set all fields according to the given parameters. Also, add this to specific arraylist of entity in GameLogic

Method

Name	Description
+ void onDestroyed()	Remove the bullet from bulletInField arraylist.In other words,remove it from the screen.
+ boolean collideWith(Collidable balloon)	Check if the bullet collide with a balloon
+ void update()	To update the bullet position based on its speed and angle
+ void onCollision(Balloon balloon)	Destroy the bullet If it hits a ballon,remove it from a screen
+ void draw(GraphicsContext gc)	Draw the image on the canvas.
+ int getBulletSpeed()	Return speed of the bullet
+ void setBulletSpeed(int bulletSpeed)	Set the bullet's speed: If bulletSpeed value given is less than 1 ,set it to 1.Otherwise,set it to value given
+ int getRadius()	Return radius of the bullet
+ Boolean isGetHit()	Return whether the bullet hit a balloon
+ void setGetHit(boolean getHit)	Set whether the bullet hit a balloon following a given value

3.2 public class Dart extends Bullet

Constructor

Name	Description
+ Dart(double x, double y, double angle)	Initiate this balloon with a super constructor and set all fields according to the given parameters.Also,set a bullets speed to 15

3.3 public class Shuriken extends Bullet

Constructor

Name	Description
+ Shuriken(double x, double y, double angle)	Initiate this balloon with a super constructor and set all fields according to the given parameters.Also,set a bullets speed to 10

3.4 public class SniperBullet extends Bullet

Constructor

Name	Description
+ SniperBullet (double x, double y, double angle)	Initiate this balloon with a super constructor and set all fields according to the given parameters.Also,set a bullets speed to 50

4.Package logic

4.1 public class AudioSetting

Field

Name	Description
- static final Map<String, Integer> SONG_NAME	Map of music provided in the game.
- static final Map<Integer, String> SONG_NUMBER	Map of track numbers in the game.
- static final Media[][] SONG_SETS	Set of music track.
- static int music	Number
- static int state	State of the game (Mainmenu / Playing scene).
- static Media currentSong	Current music track.
- static MediaPlayer mediaPlayer	To play the current music.

Method

Name	Description
+ static void playMedia()	Play the music.
+ static void pauseMedia()	Pause the music.
+ static void resetMedia()	Reset the music.
+ static void nextSong()	Play the next song according to the music and state.
+ Getter/Setter	Getter and setter of the field.

4.2 public class GameLogic

Field

Name	Description
- static ArrayList<Tower> towerInField	List of towers in the game field.
- static ArrayList<Balloon> balloonInField;	List of balloons in the game field.
- static ArrayList<Bullet> bulletInField;	List of bullets in the game field.
- static ArrayList<Bullet> gameObject;	List of game objects in the game field.
- static ArrayList<Collidable> collidableObjects	List of collidable objects in the game field.

- static int hitPoint	Player current hitpoint.
- static int money	Player current money.
- static long startTopUpTime	The latest time that the money is added.
- static long startTime	Counting time.
- static final Duration TOP_UP_SPEED	Time interval between adding money.
- static String currentTime	Current time that has been playing.
- static GameScreen gameScreen	Game screen
- static AnimationTimer animation	Thread used to run the game.

Constructor

Name	Description
+ GameLogic()	Initializes all values.

Method

Name	Description
+ static void addNewObject(Entity entity)	Add the object to the renderable list and entity list.
+ static void logicUpdate(long now)	Update all components in the game scene.
+ static void resetGame()	Reset the value of the game.
+ Getter	Getter of all fields.

4.3 public class GameScreen extends Canvas

Field

Name	Description
- GraphicsContext gc	The graphic context of the game.

Constructor

Name	Description
+ GameScreen(double width, double height)	Initializes the values. Set the visibility to true.

Method

Name	Description
+ void paintComponent()	Draw the background and draw the visible objects.

+ GraphicsContext getGc()	Getter of the field.

4.4 public class Position

Field

Name	Description
- double x	x - coordinate.
- double y	y - coordinate.
- Boolean canMove	The state of the object.

Constructor

Name	Description
+ Position(Position pos)	Initialized the values of the field.

Method

Name	Description
+ void move(double dx, double dy)	Translate the object by the value.
+ Getter/Setter	Getter/Setter of all fields.

4.5 public class Round

Field

Name	Description
- static long startTime	Time that the previous balloon spawned.
- static long elapsedTime	Time interval between current time and start time.
- static long remainingTime	Time left to spawn new balloon
- static Duration baseSpawnSpeed	Time interval between spawned balloon and spawning balloon.
- static double startX	Balloon starting X position.
- static double startY	Balloon starting Y position.
- static int roundNumber	Round number.
- static boolean isSpawning	Spawning status.
- static int balloonNumber	Number of the balloons in the round.

Constructor

Name	Description
+ Round()	Initialized all the values in the field.

Method

Name	Description
+ static void update()	Create the balloon according to the field.
+ static boolean isSpawning()	Check whether the balloons are spawning in the round.

4.6 public class RoundManager

Field

Name	Description
- static int round	Current round number.
- static final Duration TIME_BETWEEN_ROUND	Time interval between the ended round and the new round.
- static final Duration TIME_STRING	Time of the round label appeared in the game pane.
- static long timeStampRound	Time for the end of the round.
- static long timeStampText	Time of the shown label on the game field.
- static boolean isRoundEnd	Round ongoing status.
- static Label roundText	Round text on the game pane.
- static boolean textOn	Round text status.

Constructor

Name	Description
+ RoundManager()	Initialized all the values of the field.

Method

Name	Description
- static void startNewRound()	Start a new round. Increase the round number by 1.
+ static void update()	Update the round status if the balloons are no longer spawning. Update text round label.
+ static void resetRound()	Reset the round number to 0.
+ Getter	Getter of round and round end status.

5.Package map

5.1 public class Field extends GridPane

Field

Name	Description
- static ArrayList<Square> squares	arraylist of all grid squares which will later be utilized to check whether the area occupied by the square is able to place specific types of tower or not.
- boolean isDefault	check if the map is a default map
- static boolean isSuccess	check whether certain tower is successfully placed on the specific area of square

Constructor

Name	Description
+ Field(boolean isDefault)	Set value to "isDefault" field with given parameter value.Then,set Preferred width and height to 1000,508 respectively,set background image and Opacity.Moreover execute makeTiles()

Method

Name	Description
+ void makeTiles()	initialize new square,set its terrain value respect to each map.set its height and width to 50.Then add this square to this field and arraylist "squares"
+ static ArrayList<Square> getSquares()	return "squares" arraylist
+ static boolean isSuccess()	return value whether certain tower is successfully placed on the specific area of square
+ static void setSuccess(boolean isSuccess)	set "isSuccess" field value according to parameter value given

5.2 public class Square extends StackPane

Field

Name	Description
- int x,y	X and Y position of the square.
- int terrain	Terrain value of the square area: 0: unable to place any tower 1 : able to place an terrestrial type of tower (land area) 2 : able to place an aquatic type of tower (water area)
- boolean isOccupied	Check whether an area of the square is already occupied.
- boolean isPlacable	Check if it is placeable square

Constructor

Name	Description
+ Square()	set EventHandlers for each square

Method

Name	Description
+ void setBackgroundRed()	set background color of the square to red
+ void setBackgroundGreen()	set background color of the square to green
+ void setBackgroundTransparent()	set background style of the square to transparent
+ void setTerrain(int terrain)	set a terrain value of the square as parameter value

6.Package resource

6.1 public class AudioManager

Field

Name	Description
- static Map<Audios, AudioClip> soundEffectResources	Map of the sound effects of the game..
- static Map<Audios, Media> songResources	Map of the music of the game.

Enum

Name	Description
+ enum Audios	BALLOON_POPPED, MAIN_MENU_MUSIC, MAIN_MENU_MUSIC2, MAIN_MENU_MUSIC3, MAIN_MENU_MUSIC4, MAIN_MENU_MUSIC5, MAIN_MENU_MUSIC6, MAIN_MENU_MUSIC7, MAIN_MENU_MUSIC8, MAIN_MENU_MUSIC9, BUTTON_CLICKED, INGAME_SONG, INGAME_SONG2, INGAME_SONG3, INGAME_SONG4, INGAME_SONG5, INGAME_SONG6, INGAME_SONG7, INGAME_SONG8, INGAME_SONG9

Method

Name	Description

- static AudioClip getAudio(String path)	Convert String path to AudioClip class.
- static Media getSong(String path)	Convert String path to Media class.
+ static void loadAudio()	Load all audios from the resource and put them to the maps.
+ static AudioClip getSoundTrack(Audios audio)	Get the AudioClip from the map.
+ static Media getSong(Audios audio)	Get the Media from the map.

6.2 public class FontManager

Field

Name	Description
- static Map<Fonts, Font> fontResources	Map of the fonts of the game.

Enum

Name	Description
+ enum Fonts	TITLE_MENU_PANEL, BUTTON, TEXT, BUYING_TEXT, SETTING, ROUND_SHOWING, TIME_TEXT

Method

Name	Description
- static Font getFont(String path, double size)	Convert String path to Font class with the specific size.
+ static void loadFonts()	Load all fonts from the resource and put them to the map.
+ static Font getFont(Fonts font)	Get the Font from the map.

6.3 public class ImageManager

Field

Name	Description
- static Map<Fonts, Font> imageResources	Map of the Image of the game.

Enum

Name	Description
+ enum Images	LOGO, DARTSHOOTER, SNIPER, NINJA, SCOOBADIVER, GRASS_MAP, SEA_MAP, MAIN_MENU, BACKGROUND, BACKGROUND2, BACKGROUND3, BACKGROUND4, SNIPERBULLET, BOMB, SHURIKEN, DART, RED_BALLOON, BLUE_BALLOON, GREEN_BALLOON, YELLOW_BALLOON, PINK_BALLOON, WHITE_BALLOON, BLACK_BALLOON, PURPLE_BALLOON, ZEBRA_BALLOON, LEAD_BALLOON, RAINBOW_BALLOON, CERAMIC_BALLOON, TOPPER, WIN_SCENE, LOSE_SCENE, SNIPER_BULLET

Method

Name	Description
- static Image getImage(String path, double width, double height)	Convert String path to Image class with specific size.
- static Image getImage(String path)	Convert String path to Image class.
+ static void loadImages()	Load all fonts from the resource and put them to the map.
+ static Image getImage(Images image)	Get the image from the map.
+ static ImageView getImageView(Images image, int width, int height)	Get the image from the map and convert to ImageView.

7.Package scene

7.1 public class CreditScene extends StackPane

Field

Name	Description
- static final double WIDTH	Width of the pane.
- static final double HEIGHT	Height of the pane.
- MenuPanel panel	Pane's menu panel.

Constructor

Name	Description
+ CreditScene()	Set scene size. Add background and set its opacity. Set the scene.

Method

Name	Description
- void setScene()	Set topper, center, bottom.
- void setTopper()	Set the top bar component. Change the label to "Credit".
- void setCenter()	Add all credits as VBox.
- void setBottom()	Set the bottom pane to null.

7.2 public class ExitScene extends StackPane

Field

Name	Description
- static final double WIDTH	Width of the pane.
- static final double HEIGHT	Height of the pane.
- GameButton noButton, yesButton	No and Yes buttons.
- VBox panel	Panel of the pane.
- Label header	Header of the pane.

Constructor

Name	Description
+ ExitScene()	Set scene size. Add background and set its opacity. Set the scene and quit button.

Method

Name	Description
- void setScene()	Set the alignment to center, set topper and bottom.
- void setTopper()	Add the text of the pane
- void setBottom()	Add the bottom
- void setUpQuitButton()	Quit the game if the action is "Yes".

7.3 public class GameButton extends Button

Constructor

Name	Description
+ GameButton(String name, double width, double height)	Set size, text according to the variable. Set color and Alignment.

7.4 public class GameScene extends BorderPane

Field

Name	Description
- static HealthBarPanel topBar	Top bar of the game scene which includes a health bar and the round number.
- static TowerSelectionPanel botBar	Bottom bar of the game scene which includes tower selection buttons and money pane.
- static StackPane map	Center part of the game scene.
- static String currentTower	Current selected tower.
- static Field field	Field of the game.
- static boolean onSelect, isDefaultMap, isOnGoing	The state of tower selection, the chosen map and the game status.

Constructor

Name	Description
+ GameScene(Boolean isDefaultMap)	Initializes all the variables in the field. Set the pane size.

Method

Name	Description
+ static void update()	Update the health bar, money, timer according to the set duration.
- static void setMapBackground(StackPane map, Boolean isDefaultMap)	Set the background of the game scene.
+ Getters/Setters	Getters/Setters of all variables.

7.5 public class HealthBarPanel extends BorderPane

Field

Name	Description
- static final double HEIGHT	Height of the pane.
- static ProgressBar lifeProgress	Width of the pane.
- Label health	Current health
- Label round	Game current round.

Constructor

Name	Description
+ HealthBarPanel()	Set the size of the pane. Set the health bar and health text with the current round number.

Method

Name	Description
- static void setHpBar()	Set the HP bar.
+ Getters	Getter of all variables in the field.

7.6 public class HelpScene extends StackPane

Field

Name	Description
- static final double WIDTH	Width of the pane.
- static final double HEIGHT	Height of the pane.
- MenuPanel panel	Menu panel of the pane.

Constructor

Name	Description
+ HelpScene()	Set the background and its opacity. Set the scene size and add the components.

Method

Name	Description
- void setScene()	Initializes the menu panel and adds all components.
- void setTopper()	Set the top bar component. Change the label to "Help".
- void setCenter()	Explain how to play the game.
- void setBottom()	Set the menu panel bottom value to null.

7.7 public class MainMenuScene

Field

Name	Description
- Canvas canvas	Canvas to draw the background.
- GraphicsContext gc	Graphic context of the pane.
- static StackPane root	Root pane which will add the components in it.
- Stage stage	The stage of the game.
- MenuButtonList button	The list of main menu buttons.
- static Scene scene	Game scene.

- static SettingScene setting	Updatable setting scene.

Constructor

Name	Description
+ MainMenuScene(Stage stage)	Initializes all the variables of the field.

Method

Name	Description
+ void setBackground(Image image)	Set the background image.
+ void draw(GraphicsContext gc)	Draw the background image.
+ void setUp()	Set up the buttons to receive an action.
+ Getter	Getter of some fields.

7.8 public class MapSelectScene extends StackPane

Field

Name	Description
- static final double WIDTH	Width of the pane.
- static final double HEIGHT	Height of the pane.
- MenuPanel panel	Panel of the pane.
- GameButton playButton, previousButton, nextButton	Buttons of the pane.
- Label mapName	Name of the selected map.
- ImageView currentShowing	Current showing image acc
- Boolean isDefault	Check if the map is default (Grass map).

Constructor

Name	Description
+ MapSelectScene()	Set topper, center and bottom. Add background image to the pane.

Method

Name	Description
- void setTopper()	Set the top bar component. Change the label to "Choose Map".
- void set Center()	Add the map image and switching map button.
- void setBottom()	Set the play button.

- void setUpButton()	Set up buttons to handle the events.

7.9 public class MenuButtonList extends VBox

Field

Name	Description
- GameButton playButton	Play button.
- GameButton settingButton	Setting button.
- GameButton helpButton	Help button.
- GameButton creditButton	Credit button.
- GameButton quitButton	Exit button.

Constructor

Name	Description
+ MenuButton()	Initializes all the values in the field. Set the size of the pane, add the variables to the pane.

Method

Name	Description
+ Getter	Getters of all variables in the field.

7.10 public class MenuPanel extends BorderPane

Field

Name	Description
- GameButton returnButton	Return-to-main-menu button.
- HBox topPart, bottomPart	Top part and bottom part of the pane.
- VBox middlePart	Center part of the pane.

Constructor

Name	Description
+ MenuPanel(double width, double height)	Initializes all the variables in the field. Set the styling, add the variables to the pane.

Method

Name	Description
+ Getters	Getters of all variables in the field.

7.11 public class SettingScene extends StackPane

Field

Name	Description
- static final double WIDTH	Width of the pane.
- static final double HEIGHT	Height of the pane.
- MenuPanel panel	Menu panel of the pane.
- GameButton applyButton, resetButton	Menu apply and reset button.
- ComboBox<String> changeSong	The box that can change the music.
- Slider volumeSlider	The slider that can increase or decrease volume.

Constructor

Name	Description
+ SettingScene()	Set topper, center and bottom. Add background image to the pane.

Method

Name	Description
- void setScene()	Set the alignment to center, set topper and bottom.
- void setTopper()	Add the text of the pane.
- void setCenter()	Initializes the variables, set volume slider, combo box and the texts.
- void setBottom()	Set the apply button and reset music status.
- void setUpButton()	Set the button to play the music according to the selected one.
+ Slider getVolumeSlider	Getter for volume slider.

7.12 public class TowerButton extends VBox

Field

Name	Description
- Button tower	Tower button.
- Label name	Tower's name.
- Label priceLabel	Price label.
- int price	Tower's price.

Constructor

Name	Description
+ TowerButton(ImageView image, String name, String price)	Initializes the variable of the field. Set the alignment to center.

Method

Name	Description
+ void setup()	Set the tower event handler whether that tower can be placed or not.
+ void update()	Update the color of the tower button and texts according to current money.
+ Getters	Getter of the variables in the field.

7.13 public class TowerSelectionPane extends HBox

Field

Name	Description
- static final double HEIGHT	Height of the pane.
- static TowerButton dartShooter, ninja, sniper, scoobaDiver	Towers buttons.
- VBox gameStatus	Game status pane.
- Button quit	Quit button.
- Label money, timer	Money and time text.

Constructor

Name	Description
+ TowerSelectionPanel()	Initialized the variables of the field.

Method

Name	Description
+ static void update()	Get the tower buttons update method.
- void setUpButton()	Add the exit scene pane to the game scene pane.
+ Getters	Getters of some variables in the field.

8.Package sharedObject

8.1 public interface Collidable

Method

Name	Description
+ Boolean collideWith(Collidable other)	check whether this collidable object collide with another collidable object or not

8.2 public abstract class Entity implements IRenderable, Updatable

Field

Name	Description
# Images image	picture of that specific entity
# int z	position in z axis
# Boolean visible	Check whether certain entity is visible on the screen
+ Boolean destroyed	Check whether certain entity is destroyed or not
- Position pos	Entity position
- int width	Entity's width
- int height	Entity's height

Constructor

Name	Description
+ Entity(Images image, double x, double y)	Initiate this entity and set all fields according to the given parameters including image,x,and y value.Also,set destroyed value to false

Method

Name	Description
+ abstract void draw(GraphicsContext gc)	Draw this entity on canvas.
+ getters	Getters of other related fields

8.3 public interface IRenderable

Method

Name	Description
+ void draw(GraphicsContext gc)	Draw specific object on canvas.
+ boolean isVisible()	Check whether this object is visible
+ int getZ()	Getter of z-axis position value
+ boolean isDestroyed()	Check whether certain entity is destroyed or not

8.4 public interface Updatable

Method

Name	Description
+ void update()	Update specific updatable object in different ways.

9.Package tower

9.1 public abstract class Tower extends Entity

Field

Name	Description
- double shootSpeed	Tower's speed of shooting
- double atkRange	Attack range of the tower
- int price	Price of certain tower
- int radius	Tower's radius of attack
# double degree	Angle for rotation
- long startTime	Latest time of attack
- Duration atkSpeed	Tower's speed of attack
- long remainingTime	Remaining time for attack

Constructor

Name	Description
+ Tower(Images image, double x, double y, long shootSpeed)	Initiate this tower with a super constructor and set all fields according to the given parameters. Also add this tower to specific arraylist TowerInField.

Method

Name	Description
+ void setShootSpeed(double shootSpeed)	Set the tower's shoot speed: If shootSpeed value given is less than 1 ,set it to 1.Otherwise,set it to value given
+ abstract void shoot()	Each type of towers' specific way of shooting
+ boolean update()	If the balloon is in range and is out of remaining time then shoot
+ void draw(GraphicsContext gc)	Draw the tower on canvas.
+ void setAtkRange(double atkRange)	Set the tower's attack range:: If shootSpeed value given is less than 0 ,set it to 0.Otherwise,set it to value given
+ getters,setters	getters and setters for other related fields

9.2 public class DartShooter extends Tower

Field

Name	Description
+ static final String NAME	Name: "Dart Shooter"
+ static final int BASE_PRICE	Base Price: 300

Constructor

Name	Description
+ DartShooter(double x, double y)	Initiate this DartShooter with a super constructor and set all fields according to the given parameters.Also,set its attack range to 200,its price to 300

Method

Name	Description
+ void shoot()	When shooted,add new Dart to specific arraylist BulletInField.

9.3 public class Ninja extends Tower

Field

Name	Description
+ static final String NAME	Name: "Ninja"
+ static final int BASE_PRICE	Base Price: 400

Constructor

Name	Description
+ Ninja(double x, double y)	Initiate this DartShooter with a super constructor and set all fields according to the given parameters.Also,set its attack range to 200,its price to 400

Method

Name	Description
+ void shoot()	When shooted,add new Shuriken to specific arraylist BulletInField.

9.4 public class Sniper extends Tower

Field

Name	Description
+ static final String NAME	Name: "Sniper"
+ static final int BASE_PRICE	Base Price: 350

Constructor

Name	Description
+ Sniper(double x, double y)	Initiate this Sniper with a super constructor and set all fields according to the given parameters.Also,set its attack range to 10000,its price to 350

Method

Name	Description
+ void shoot()	When shooted,add a new Sniper bullet to specific arraylist BulletInField.

9.5 public class Scubadiver extends Tower

Field

Name	Description
+ static final String NAME	Name: "Scuba Diver"
+ static final int BASE_PRICE	Base Price: 400

Constructor

Name	Description
+ ScubaDiver(double x, double y)	Initiate this ScubaDiver with a super constructor and set all fields according to the given parameters.Also,set its attack range to 200,its price to 400

Method

Name	Description
+ void shoot()	When shooted,add new Dart to specific arraylist BulletInField.

10.Package utility

10.1 public class Configuration

Field

Name	Description
+ static final int GAME_WIDTH	Game screen width.
+ static final int GAME_HEIGHT	Game screen height.
+ static double soundVolume	Game base sound volume.
+ static final double MENU_PANEL_WIDTH	Game option width.
+ static final double MENU_PANEL_HEIGHT	Game option height.
+ static final String BUTTON_SETTING	Get the CSS string setting for the button.

10.2 public class Utility

Method

Name	Description
+ static double getObjectDistance(Entity obj1, Entity obj2)	Get the distance of two objects.
+ static double turningDegree(Entity obj1, Entity obj2)	Get the angle of two objects.

10.3 public class UtilityGUI

Method

Name	Description
+ static void playButtonClicked()	Play the sound effect.
+ static void balloonPopped()	Play the sound effect.
+ static void buttonHovered(Button button)	Set the button background color according to the mouse action.
+ static Image makeTransparent(Image inputImage)	Remove the image background.
+ getNodeFromGridPane(GridPane gridPane, int col, int row)	Get the node from the grid pane with the specified index.

Special Thanks

ChatGPT

stackoverflow

most importantly,our superb teamwork!