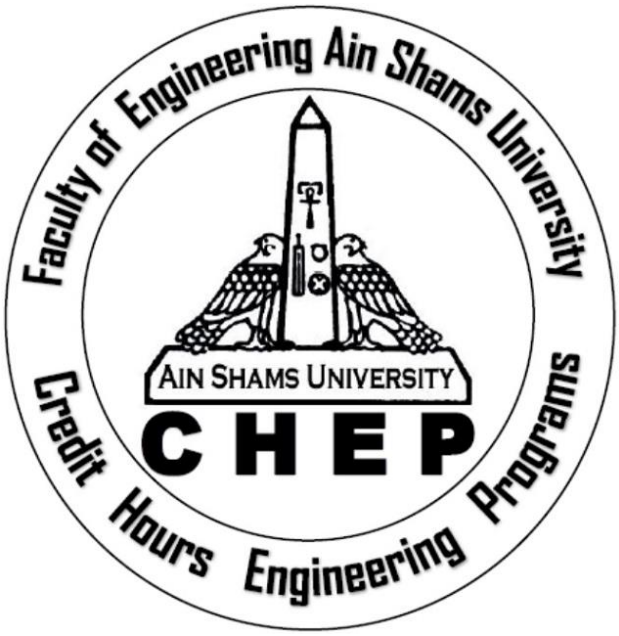
INTERCEPTOR

Programming project report



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INTERCEPTOR INTRODUCTION

GAME DESCRIPTION

Interceptor is a 2D based arcade shooter game that utilizes fast players' reflexes to protect a home city from randomized enemy bombs that fall from the sky and inflicts damage upon the city and lowers its lifespan (health bar). To prevent so, the player fires projectile missiles from the base's turret to destroy the bombs and protect the city from imminent damage. But as your level in game increases, harder difficulties ensue as bombs frequency increases, so you'll have to upgrade your turret and city soon by hitting coins that fall from above to acquire enough money to upgrade your turret to withstand the attacks.

IMPLEMENTATION

The game uses java language to instantiate and destroy objects automatically. Objects are destroyed when a collision is detected between GUI objects. The game also is capable of making animations using graphics, such as: fire, explosions, and bombs.

Java resources (imports) needed:

- *Javax.swing.**
- *Java.awt.**
- *Java.util.**
- *Java.io.File*
- *Java.io.IOException*
- *Javax.sound*

Classes made:

- *GameFrame:*

  Operates the whole game and joins all classes with each other.

- *Turret:*

  Class where the turret's image is uploaded, reloads the turret by implementing delay between each projectile fired. Also draws fire animation when turret fires

- *Projectile:*

  Uses Newton's laws of motion to draw a projectile missile with realistic curvature because of gravity

- *StatusPanel:*

  Houses the upgrade buttons, and informs player of the current levels of difficulty, the city and the turret. As well as showing player amount of coins gathered

- *Interceptor:*

  Initializes the Game Frame and runs the GameServer in a thread in case of being a Host.

- *HealthBar:*

  Shows the city's health. Decreases with each hit an equal amount and changes color when critically low.

- *GamePnl:*

  has the mouse listener to fire turret where you clicked and mouse motion listener to adjust angle as you move the mouse.

- *class Explosion and class BigExplosionCity:*

  Since main game loop is 7 milliseconds per frame, all graphic animations are handled by viewing each single image 10 consecutive times (to produce 70 milliseconds view time per image) before moving to the next image.

- *Coins:*

  Draws the coins and moves them from above until it reaches the city, where if it did not collide with a projectile to gain in-game money, would be destroyed just above the Status panel.

- *GameServer:*

  Houses the Socket for the multiplayer server, if it receives 2 connections, it sends the order to the clients start the multiplayer game…and receives order to end the game and prints to each player whether they win or lose based on their score.

- *Bomb:*

  Draws the bombs and moves them from above until it reaches the city, where if it did not collide with a projectile to prevent it from hitting the city, would collide with the city triggering an exploding animation and decreases the city's health bar.

- *Audio:*

  Initializes 6 clips of audio to play them as needed.

BONUS FEATURES

- *Has another game variation:*

  Multiplayer mode; where 2 computers, a host and a client, battle to see who is faster at destroying the bombs but under a 60 second time limit.

- *Supports levels of various difficulties:*

  Once a player accumulates 100 points, difficultly level is raised by one giving the prompt to increase the bombs frequency.

- *Support 2 or more players(multiplayer):*

  By building a server and ensuing a LAN or WAN connection, two computers can play the game simultaneously in a multiplayer mode.

  N.B: If the WAN feature is needed, activate port 5000 forwarding on your router or contact the team to provide an online server.

- *Contains a hall of fame list(Leaderboards):*

  Once you entered a name and began a new game, that name and the score that you accumulate on said game are recorded on the leaderboard, the higher the score the higher the name's rank. Only the 10 top players are shown.

INTERCEPTOR
USER GUIDE

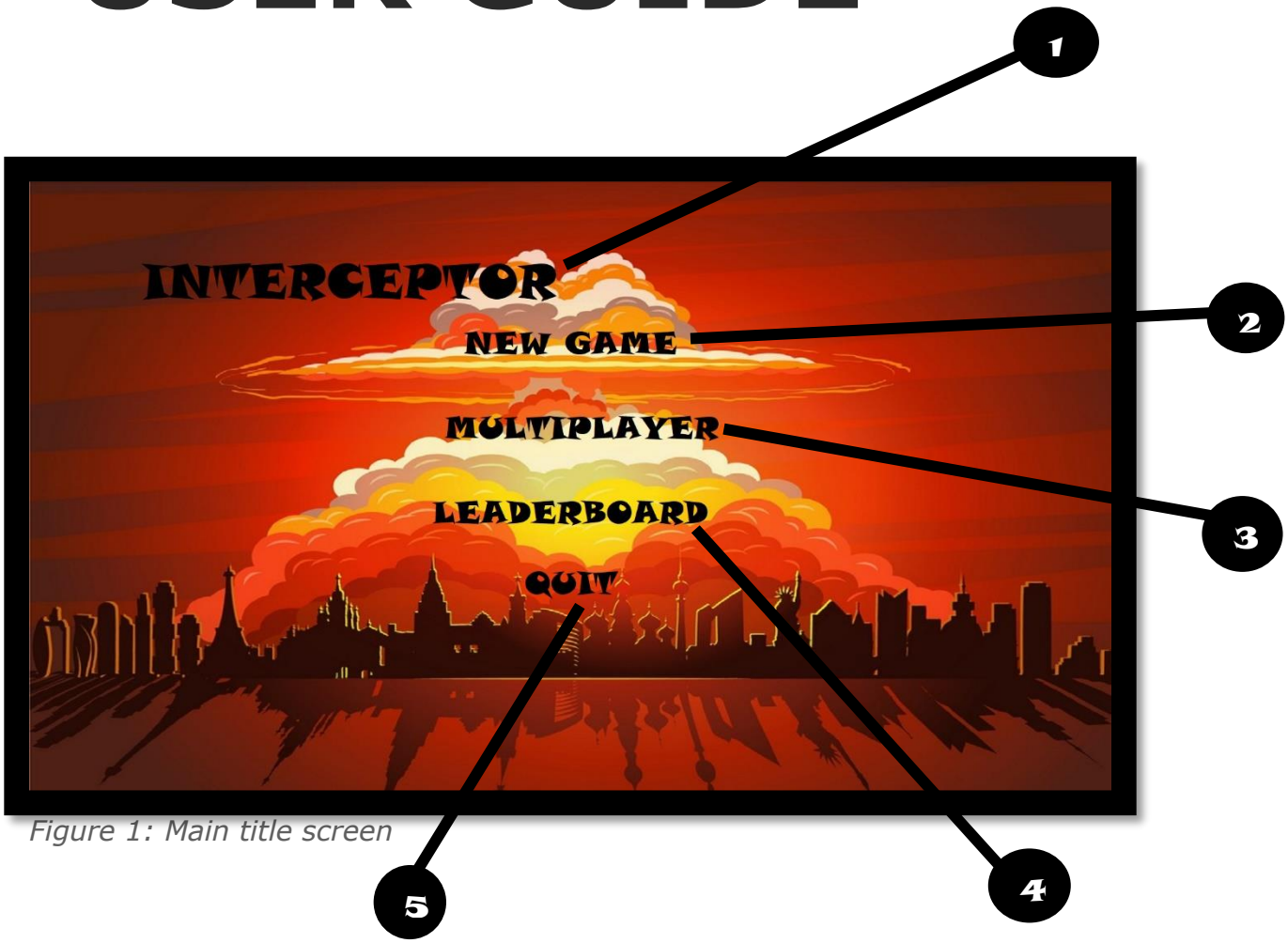


Figure 1: Main title screen

MAIN MENU SCREEN

*1- **INTERCEPTOR**: Game title*

*2- **NEW GAME**: Create a new game you'll be greeted with another panel where you'll enter your name for your score in game to be attached to the name and both to be recorded on the leaderboard.*

Figure 2: NAME panel

3- **MULTIPLAYER**: *Create a multiplayer game between two players on two different computers where one acts as a host and the other as a client. The game mode depends on speed as its different than the normal in that you have a 60 second time limit and no health bar and the player that hits more bombs wins! Like the new game choice, you'll also be greeted with a new panel where you enter the host's IP address and your name if you're a client, or your own IP and name if you're host then wait for both players to confirm.*

Figure 3: Multiplayer Panel

4- **LEADERBOARD**: *Your in-game score is recorded here alongside your name, the higher the score the higher your name will rank on the list.*

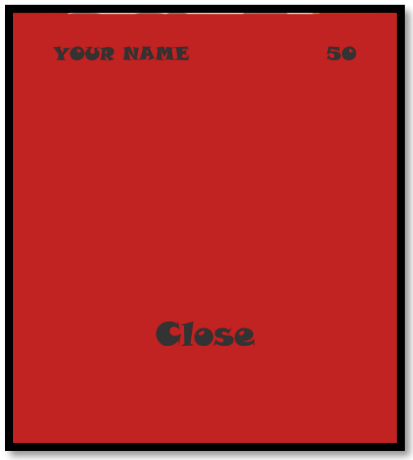


Figure 4: Leaderboard

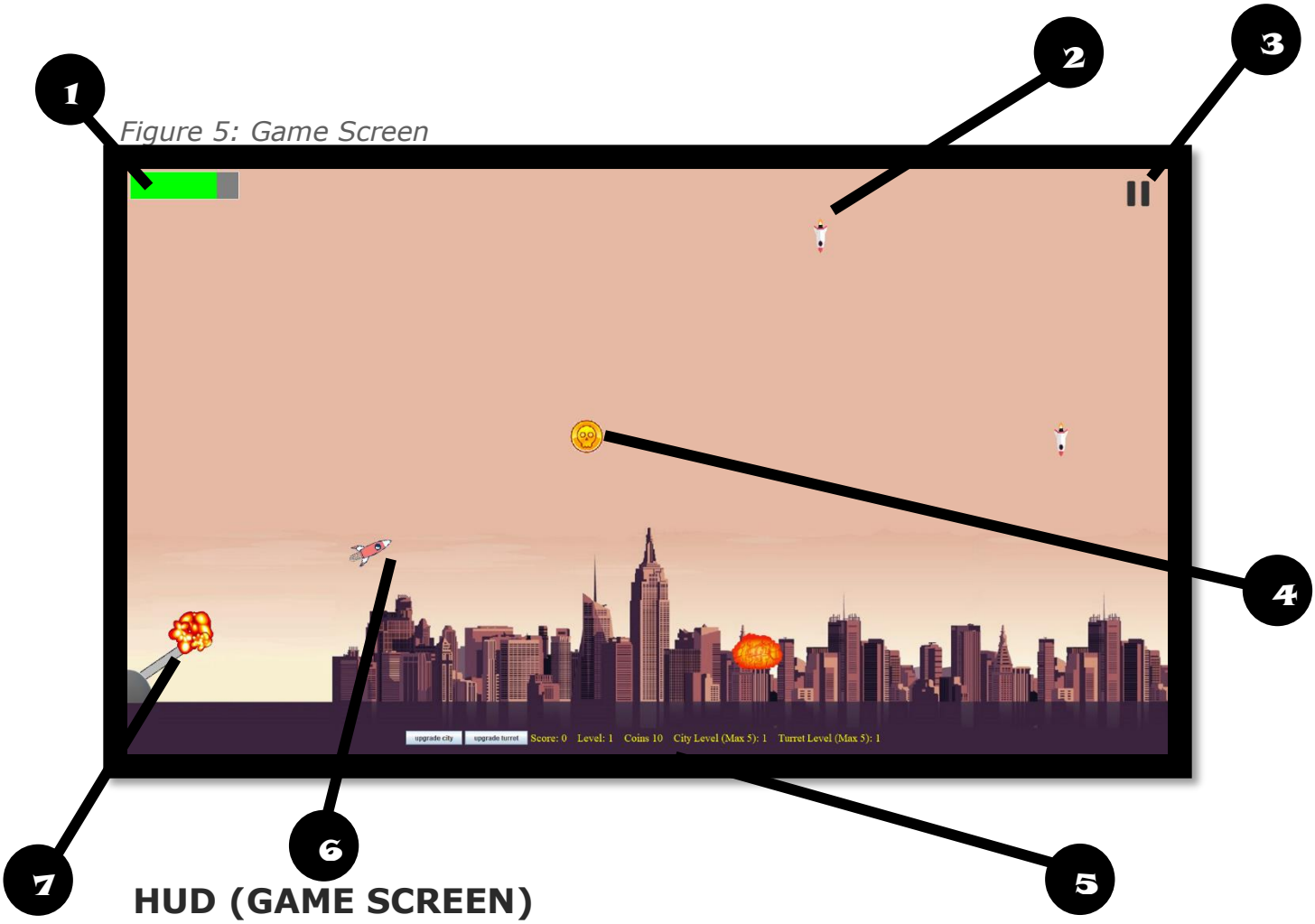
5- **QUIT**: *to quit the game and return to the desktop*

CONTROLS

Move your mouse accordingly to adjust turret's angle. Don't forget to aim a little higher as to provide space for gravity to play its part.

Left click as to fire the projectile.

Figure 5: Game Screen



HUD (GAME SCREEN)

1- *The Health bar: represents the health left in your city each bomb decreases an equal amount of your health once your health bar is gone, the game is over.*

2- *The Bombs: these bombs will decrease your city's health and can only be destroyed by your projectile missiles.*
3- *Pause button: meant to pause game, redirects you to pause screen. Once you want to return to where you left off, just simply click* **CONTINUE**. *If you want to exit the current game and go back to the title screen press* **QUIT**.

Figure 6: Pause Screen

4- *Gold coins: Collect by firing your projectiles at them so you can afford future upgrades either to the city or the turret.*
5- *Your Status:*

Figure 7: Status Panel

- *<u>Score:</u> Each bomb you destroy you gain 10 points*
- *<u>Level:</u> Every 100 points on your score you raise 1 level (Max level: 10)*
- *<u>Coins:</u> Each gold coin collected is worth 10*
- *<u>Upgrade turret button:</u> collect gold coins to upgrade*
- *<u>Upgrade city button:</u> collect gold coins to upgrade*
- *<u>City level:</u> Each upgrade raises the city level by one (Max level: 5)*
- *<u>Turret level:</u> Each upgrade raises the turret's level by one (Max level: 5)*

6- *Projectiles: projectile missiles fired from your turret to destroy bombs before hitting the city.*
7- *Your turret: Fires projectiles. Aim using you mouse to adjust firing angle.*

INTERCEPTOR WORK DISTRIBUTION

MOHAMMED EHAB ELSAEED

Supervised the project onto the tracks. Adjusted the turret to rotate to angle desired to aim, as well as making the bombs and randomizing them.

Classes worked on:

- *Interceptor*
- *Game Frame*
- *Game Panel*

KARIM WALID EL HAMMADY

Implemented Newton’s laws of motion to give the projectiles a realistic curvature.

Classes worked on:

- *Health Bar*
- *Projectile*
- *Game Panel*
- *Bomb*

AHMED SAMEH SHAHIN

Helped with the server as well as the early game's prototype.

Classes worked on:

- *GameFrame*
- *GameServer*
- *Coins*

YOUSSEF ASSEM

Focused solely on the games overall animations as well as helping with the games multiplayer and creating the servers.

Classes worked on:

- *Big Explosion City*
- *Menu Panel*
- *GameServer*
- *Explosion*

MOATAZ KHALID

Supervised the game's overall aesthetic and introduced the audio to the game.

Classes worked on:

- *Menu Panel*
- *Status Panel*
- *Audio*

INTERCEPTOR EXTRAS

CODE DOCUMENTATION

Code documentation is provided alongside the games code as java.doc html

DIFFICULTIES ENCOUNTERED

- *Perfecting the turret's angle and having the turret follow the mouse to aim required a lot of trial and error.*
- *Destroying all projectiles that exit the screen for performance issues.*
- *To detect collisions, we used two points on boundaries of image (top and bottom). Collisions weren't reliable as not always would the projectile destroy the bombs. To solve that, 2 more points were added.*
- *For multiplayer gaming, both computers needed to start a new game at the same exact time. To solve that conundrum we*

issued a timer, which is client based that starts with server's host command.

- *Audio import sun.audio.AudioStream is not supported and was removed from latest Java addition, edition 9.*

TRICKS USED

1- Pause Menu:

- *Saves exact point where you stopped in game.*
- *Redirects you to a pause screen which is actually the same as the Main (Title) screen but with some hidings and position adjustments.*
- *If you decide to quit from the game, your name and score will be saved on the leaderboard.*

2- Bombs:

- *Bombs are randomized*
- *Bombs are erased when it collides with either a projectile or the city and then redrawn*

3- Animations:

- *Animation of small explosion when projectile hits the bomb*
- *Animation of a big explosion when bomb hits the city*
- *Animation of fire when turret it fires the missiles*

4- Audio:

- *Main screen theme song*
- *Firing sound when turret fires missiles*
- *When projectile hits Coins*
- *A Siren sounds when game begins*
- *Explosion sound when projectile hits bomb*
- *Explosion sound when Bomb hits city*