TUDelft

Delft University of Technology

Software Engineering Methods
CSE2115

Asteroids Game Requirements

Group 60

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Contents

1 Functional Requirements

1.1 Must Haves

Minimum requirements the project guarantees to deliver

- The player shall be able to create an account with a username and password

- The password of a player shall be encrypted using the PBKDF2 algorithm together with a randomly generated salt

- The encrypted password of a player shall be stored in the database together with the salt and username

- The player shall be able to rotate their spaceship at a certain speed (TBD) using the LEFT and RIGHT ARROW keys. The game will accelerate the ships to its maximum rotation speed in TBD seconds/milliseconds and upon release of the arrow key the game will slow down the ships until it stops in TBD seconds/milliseconds

- The player can fire their weapon forward by using the SPACE key

- Bullets shall move (at a certain speed TBD)

- Bullets shall disappear after they have covered a certain distance (TBD)

- The player shall be able to thrust their spaceship forward by using the UP ARROW key

- The player shall be able to change the direction their spaceship is moving or start moving their spaceship in by thrusting

- When the ship is thrusted forward the game shall accelerate the ship to its maximum speed (exact speed TBD) in 1 second after which the ship will slow down during TBD seconds after which it will come to a stop (if not thrusted before stopping)

- The game shall have a fixed size screen (800px by 800px)

- The game shall store the result of each play in a database

- At the end of each play the game should display the top 5 scores that have been recorded

- At the end of each play, the player shall be able to enter a name together with the recorded score.

- The game shall initially place the player's spaceship at the center of the screen

- The game shall have 3 different asteroids: large, medium and small rocks.
    - The large asteroid shall be of size 50x50
    - The player shall be awarded 20 points for
    - destroying a large asteroid
    - The game shall move the large asteroid at a speed TBD
    - The game shall split the large asteroid into two medium asteroids when hit by a bullet
    - The medium asteroid shall be of size 30x30
    - The player shall be awarded 50 points for destroying a medium asteroid
    - The game shall move the medium asteroid at a speed TBD (faster than large)
    - The game shall split the medium asteroid into two small asteroids
    - The medium asteroid shall be of size 20x20
    - The player shall be awarded 100 points for destroying a medium asteroid
    - The game shall move the small asteroid at a speed TBD (faster than medium)
    - The game shall remove the small asteroid when hit by a bullet

- The game shall display the current score of the player during a play

- The game shall spawn asteroids at set intervals (exact length TBD) that get shorter as the player earns more points

- The game shall display the fired bullets on the screen

- The player shall lose a life when they collide with an asteroid

- The player shall lose a life when they are hit by a bullet from a flying saucer

- When the player loses a life they will re-spawn at the center of the screen

- When the player spawns they shall be invulnerable for a certain time (TBD)

- The game shall stop when the player has no lives left

- The player shall earn a life for every 10,000 points earned

- The game screen shall have an upper menu that shows: the lives of the player (left corner), the points (center) and eventually the level (right corner).

- The user shall have a maximum amount of attempts to login, which is TBD

- The chosen password has to be at least 5 characters long

1.2 Should Haves

Important but not vital requirements

- The game shall have two types of flying saucers that have the ability to fire their weapon

- The small saucer shoots bullets (at speed TBD) towards the player's ship

- The small saucer shall move seemingly at random (at speed TBD)

- The large saucer shoots bullets (at speed TBD) in random directions

- The large saucer shall move seemingly at random (at speed TBD)

- The player shall be awarded 200 points for destroying a large saucer

- The player shall be awarded 1000 points for destroying a small saucer

- The game shall start spawning small saucers after the player has earned 10,000 points

- The game shall spawn saucers at set intervals (exact length TBD) that get shorter as the player earns more points

- The user shall be able to pause and resume the game by pressing the 'P' key

- The game shall display the pause menu when paused

- The game shall place moving objects that move off the edge of the screen at the corresponding point on the opposite edge, moving with the same velocity and at the same angle.

- The player can cause the ship to disappear and reappear on a random location of the screen by pressing the 'F' key

- The player can activate a shield by pressing the DOWN ARROW key

- The player shall not lose a life when colliding with an asteroid or a bullet when their shield is active

- The player's shield will become inactive after a certain amount of time (TBD)

- The player won't be able to use their shield again for a certain amount of time after it ran out, the shield is on a cool down

1.3   Could Haves

Wanted or desirable but less important requirements

- The game shall have levels

- The game shall display the current level on the screen

- The player shall be able to aim their spaceship using the mouse

- The game shall not allow the spaceship to move outside of the screen

- The game shall have a moving background

- The game shall play sound effects when certain events(thrusting, shooting, a bullet hitting an object, etc.) happen

- The game shall play music while the player is actively playing (the game is not paused)

- The player shall be able to turn the sound effects and music on and off by pressing the 'S' key

- The game shall have a Store where the user can buy power-ups
  - The store shall be accessible from the main menu
  - The player shall be able to buy a gun upgrade power-up in the store
  - The gun upgrade power-up will change the speed bullets move at by 1.5x and it will change the fire rate of the gun to 6 bullets per second
  - The points awarded during a game shall be converted into coins to spend in the Store

1.4   Would/Won't Haves

Least-critical lowest-payback requirements

- The game shall have functionality that two players play together at the same time on one instance of the game (one player uses wasd- and the other uses arrow-keys for example)

2   Non-functional Requirements

- The game shall be implemented in Java

- The implementation of the game shall have at least 75% meaningful line test coverage

- There will always be a working version of the game available (on the master branch)

- The game shall use an SQLite database to store usernames and high-scores

- The game shall use a JDBC driver to interact with the database

- The game shall use prepared statements to avoid code-injection vulnerabilities

- The game shall have authentication using a username and password via a database