

'Balls of Steel'

Group 4

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6. Functional Test Cases

Functional Description referenced from Functional Requirement 1:

The system shall provide a menu-screen on start-up, allowing the user to select to start a new game, to continue one that is in progress, to view the high-score, to make general settings, to view instructions and to exit the program.

Input: None.

Output/Observed Effects: Menu is correctly displayed on the screen.

Test: Start up the game, and check that the relevant menu items are presented on the screen.

Functional Description referenced from Functional Requirement 2:

The system shall allow users to turn off sound and/or music via the settings-option on the menu-screen.

Input: Key/Touchpad press.

Output/Observed Effects: The sound turned on/off.

Test: Turn off game sound, and start playing and confirm the loss of sound. After that restore sound and repeat procedure.

Functional Description referenced from Functional Requirement 3:

The inexperienced user shall be able to gain instructions on gameplay mechanics and goals via the instructions menu.

Input: Key/Touchpad press.

Output/Observed Effects: Instruction text is displayed.

Test: Test and check if we have access to the instruction screen.

Functional Description referenced from Functional Requirement 4:

The user shall be able to see the 10 highest times, as well as the signature of the user who achieved it via the high-score option on the menu-screen.

Input: Key/Touchpad press.

Output/Observed Effects: Highscore is displayed.

Test: Try to add a high score to the list and check if it is represented in the list. See what happens when we add more scores to fill the table. Test and check if we have access as players to this menu.

Functional Description referenced from Functional Requirement 5:

The user shall be able to return to the main menu at any time during play.

Input: Key/Touchpad press.

Output/Observed Effects: The menu screen is displayed.

Test: Test from all menus, game settings and levels that we can make it back to the main menu by pressing the return key.

Functional Description referenced from Functional Requirement 6:

The user shall be able to control the motion of the ball.

Input: Key/Touchpad press.

Output/Observed Effects: The ball is moved.

Test: In game, test if ball responds to the given motion controls in the way specified.

Functional Description referenced from Functional Requirement 7:

There shall be a gravitational force that propels the ball, and the default direction is downwards.

Input: None.

Output/Observed Effects: The ball is propelled in the direction of the gravity.

Test: Check if the ball bounces opposite the gravity and then returns to the given direction of gravity.

Functional Description referenced from Functional Requirement 8:

The game will provide a number of obstacles that provide special events on collision, including walls, mines, magnets and wormholes.

Input: None.

Output/Observed Effects: Observe the specific behavior for collision with an obstacle.

Test: Test that you can observe the specific behavior for each obstacle upon collision with the ball.

Functional Description referenced from Functional Requirement 9:

Mines shall, upon coming in contact with the ball, return the ball to the levels starting point and subtract a preset amount of time from the global countdown.

Input: None.

Output/Observed Effects: Ball is moved to the starting point at the time is correctly updated.

Test: Collide with a mine, and check if the right amount of time is subtracted, and that we now are at the beginning of the map.

Functional Description referenced from Functional Requirement 10:

Mines can either be static or dynamic. Dynamic mines shall move in a predetermined

pattern, static mines shall remain at their original position at all times.

Input: None.

Output/Observed Effects: Ball is moved to the starting point at the time is correctly updated.

Test: Collide with a mine, and check if the right amount of time is subtracted, and that we now are at the beginning of the map.

Functional Description referenced from Functional Requirement 11:

Magnets shall exercise a force upon the ball if it is within a given distance and alter the trajectory of the ball.

Input: None.

Output/Observed Effects: The ball's trajectory is changed.

Test: Move into the range of the magnet, and check if we are affected as described by the requirements.

Functional Description referenced from Functional Requirement 12:

Wormholes shall, upon contact with the ball, transfer the ball to a corresponding wormhole in another location on the level.

Input: None.

Output/Observed Effects: The ball's position is updated to the outgoing wormhole.

Test: Enter a wormhole, and check that we are transported to the corresponding wormhole as specified.

Functional Description referenced from Functional Requirement 13:

Walls are the standard impediment. Upon contact with the ball, the ball bounces off at a trajectory determined by the angle of the wall and the balls original vector.

Input: None.

Output/Observed Effects: The ball bounces off the wall.

Test: Check that walls hinder movement and that the ball bounces off it as specified.

Functional Description referenced from Functional Requirement 14:

The user shall be able to collect keys throughout the levels. Upon collecting all the keys, the exit point for that level shall be unlocked.

Input: None.

Output/Observed Effects: The exit point is unlocked.

Test: Try to collect all the keys and check if the exit point is unlocked.

Functional Description referenced from Functional Requirement 15:

Upon reaching the exit point for a level, the next level shall begin. Players shall receive

additional time for the global countdown, determined by which level they just completed.

Input: None.

Output/Observed Effects: The new level is loaded and the time is updated.

Test: Upon connection with the exit check that we are given the extra time specified, and that the next level is loaded as specified.

Functional Description referenced from Functional Requirement 16:

The player shall be able to collect power-ups throughout the level. These shall include time-increases, low gravity, reverse gravity and freeze.

Input: None.

Output/Observed Effects: The effect caused by the power-up is observed.

Test: Try to collect the power up and see if the specified behaviour is as expected.

Functional Description referenced from Functional Requirement 17:

Time Increase power-ups shall give the player additional time to the global countdown.

Input: None.

Output/Observed Effects: Time is added to the global countdown

Test: Pick it up (collide with) and check that we are given the right amount of time.

Functional Description referenced from Functional Requirement 18:

Low Gravity power-ups shall lower the gravitational acceleration of the ball, resulting in changes to how the ball behaves when bouncing. This effect ceases after a given time.

Input: None.

Output/Observed Effects: The ball will bounce higher.

Test: Pick it up (collide with) and check that the gravity changes and that it returns to normal after given time.

Functional Description referenced from Functional Requirement 19:

Reverse Gravity power-ups shall change the direction of the gravitational force, in effect turning the ceiling into the floor and vice versa. This effect ceases after a given time.

Input: None.

Output/Observed Effects: The ball will be propelled in the direction of the new gravitational force.

Test: Pick it up (collide with) and check if the ball "falls" in the opposite direction and with the same speed as normal.

Functional Description referenced from Functional Requirement 20:

Freeze power-ups shall stop the motion of all dynamic mines throughout the level. This effect ceases after a given time.

Input: None.

Output/Observed Effects: All the dynamic mines become static for the duration of the power-up.

Test: Pick it up (collide with) and check if the mines have stopped in their movement.

Functional Description referenced from Functional Requirement 21:

The game shall provide a number of levels. If the player completes all of these, the player shall return to the first level and shall be subject to increased difficulty. This shall take the shape of increased penalties for hitting mines, less time given upon level completion and less power-ups given across the level. This effect is cumulative until the game ends.

Input: None.

Output/Observed Effects: The required changes are in affect.

Test: Check that the required changes take effect after the game starts over again.

Functional Description referenced from Functional Requirement 22:

When the global countdown reaches zero, the game shall display a Game Over screen, on which shall be displayed the total time played. It shall also display whether or not the time was sufficiently high to be displayed on the High score.

Input: None.

Output/Observed Effects: The game over screen is displayed together with the additional information.

Test: Let the game time end, and check if the game records and show the items as required.

Functional Description referenced from Functional Requirement 23:

If the player time was sufficient to be displayed on the High Score, the game shall allow the player to input his signature at the specified place.

Input: None.

Output/Observed Effects: The Highs core is displayed and the player's name is on the list.

Test: Enter High Score and check if it is added.

Functional Description referenced from Functional Requirement 24:

If the players time was not sufficient to merit a mention on the High Score, the High Score shall be displayed.

Input: None.

Output/Observed Effects: The High Score is displayed and the player's name is not on the list.

Test: Check if the High Score is presented and that the player's score is not present.

Functional Description referenced from Functional Requirement 25:

If the phone receives a call during play, the game shall pause, and the phone shall use its standard procedures for handling incoming calls. Upon terminating the call, the game shall be able to continue.

Input: System interrupt message.

Output/Observed Effects: The game is paused and resumable.

Test: Send a call to the phone, and check that we can resume the game afterwards.

Functional Description referenced from Functional Requirement 26:

If the phone receives an sms, mms or some other form of message, the game will be paused.

Input: System interrupt message.

Output/Observed Effects: The game is paused and resumable.

Test: Send an sms and mms to the phone, and check that we can resume the game afterwards.

Functional Description referenced from Functional Requirement 27:

If the phone issues a warning or another kind of system message, the game shall be paused.

Input: System interrupt message.

Output/Observed Effects: The game is paused and resumable.

Test: Force warnings and phone messages to the user, and check if the game is paused and resumable.