Multiplayer Platform Game

Group 19

Martin Pettersson
Misael Berrios Salas
Christoffer Ekeroth
Oskar Kvist

User Requirements

Functional Requirements

1. **Basic concepts**
   1.1. **Between two and four players shall be able to compete against each other on the same machine.**
   1.2. **The game world shall be two-dimensional.**

2. **Win and loss conditions**
   2.1. **The player who reaches the end of the level first shall win.**

   2.2. **If there is only one player left, he/she shall win (see Requirement 2.3).**
   Rationale: The players that have forfeited the race shall not have to wait for the single player left.

   2.3. **A player starts the game with a certain amount of lives. If a player loses all of his/her lives he/she shall automatically forfeit the race.**
   Rationale: The game should encourage skillful navigation through its levels.

3. **Presentation**
   3.1. **The game shall present the game world using 3D graphics.** Keep in mind that the actual gameplay is two-dimensional! (see Requirement 1.2)
   Rationale: Drawing and animating characters in a high enough level of detail to be sufficient for high-definition displays would be far too time-consuming. 3D graphics also makes the game stand out from other platform games.

   3.2. **The graphical style of the game shall be simple, with colorful and cartoony levels and characters.**
   Rationale: Cartoony characters and environments fit in with the playful theme of the game, and are easier to create than more realistic characters or environments.

   3.3. **The game shall feature music.**
   Rationale: Music enhances the gameplay experience and appeals to the emotions of players.

   3.4. The game shall feature sound effects.
   Rationale: Sound effects provide aural feedback to the players and makes the game come alive.

4. **Character and level selection**
   4.1. **Players shall be able to select characters.** Two players will not be able to select the same character.
   Rationale: Being able to select different characters helps differentiate the players and helps players identify with their character.

   4.2. **Apart from appearance and sound effects, the characters are identical.** Choice of character does not affect gameplay.
   Rationale: Making all characters the same makes balancing the game easier. It also makes the game more fair, since two players cannot select the same character (see Requirement 4.1).

4.3. **There shall be at least three levels in the game.**
Rationale: Having different levels adds variety to the game.

4.4. **A player shall be able to select which level to play on.**
Rationale: The players shall be able to select the level they think is the most fun to play.

4.5. **The player who gets to select the level is selected at random.**
Rationale: Letting a random player select which level to play on is a fair method of level selection.

5. Game environment features
5.1. Obstacles
5.1.1. **The game shall present the players with various challenging obstacles on their way to the end of the level.** These will be divided into different categories of obstacles:
- Stationary obstacles that cause the player to disappear from the screen (such as a river of lava or a bottomless pit) (see Requirement 7.3)
- Stationary obstacles that cause the player to lose life (such as spikes or a cactus) (see Requirement 2.2)
- Moving obstacles that cause the player to lose life (such as falling boulders or a press) (see Requirement 2.2)

Rationale: A level without hazards would not be very challenging, and a game that is not challenging will not be entertaining.

5.1.2. **The game shall feature computer-controlled enemies to provide additional challenge to the players**. Enemies differ from obstacles in that they can be disabled by the players.
Rationale: Populating the world with enemies, in addition to inanimate dangers, makes the game world feel more alive.

5.2. Special level elements
5.2.1. **The levels of the game shall feature special elements that change how the players travel through the level.** This will include:
- Springboards that catapult the player high up in the air
- Slippery ground

5.3. Powerups
5.3.1. **The game shall have powerups distributed throughout its levels that the player can pick up and use** (see Requirements 5.3.2 and 5.3.3). Powerups temporarily grants the player special abilities. These will include:
- A spring-loaded boxing glove that can be used to punch enemies off of platforms or into obstacles.
- A retractable claw that can be used to grab onto an enemy and then toss the enemy.
- A temporary speed boost.
- A device that temporarily reduces the gravitational forces exerted on the player.
- A fetter with a weight attached that, when dropped, waits for an enemy to approach and attaches itself to the enemy.
- A shrinking ray that can shrink an enemy, reducing his movement speed and jumping height.
- A cluster of banana peels that makes whoever steps on them slip and slide.
- An extra life point.

Rationale: Using powerups will allow players to directly affect the performance of

their competitors.

5.3.2. **Players shall be able to store up to two powerups at one time and activate either one whenever they please.**
Rationale: The ability to store powerups allows for more strategic gameplay.

5.3.3. **Players shall be able to pick up powerups by touching powerup dispensers located throughout the levels.** The powerup dispenser continually cycles through powerups, and the powerup dispensed depends on where in the cycle the player touched the dispenser.
Rationale: Letting players influence which powerups they get allows for more strategic gameplay.

6. **Player movement**
6.1. **The player shall be able to run forwards or backwards.**
Rationale: Running is a fundamental gameplay element.

6.2. **The player shall be able to jump.**
Rationale: Jumping is a fundamental gameplay element.

6.3. **Landing on another player shall stun the other player for a short time.**
Rationale: This provides another way, besides powerups, to interact with the other players that is available all the time.

7. **The screen**
7.1. **The game shall provide information about the powerups and lives left of the players.**
Rationale: The amount of lives a player has left and the player's powerups are important information that need to be accessible.

7.2. **All players shall occupy the same screen.** The game will *not* split the screen into smaller areas reserved for each player, and the field of view of the screen will be fixed. The "camera" tracks the player who's in the lead, trying to fit in as many of the other players as possible while still giving the leader a clear view of what's ahead.
Rationale: Splitting the screen reduces the feeling of competing against other players, since you won't see all of your opponents at once. Having several small screens would also make it harder to get an overview of the game world.

7.3. **If a player gets too far behind the others she will end up outside the screen.** If the player doesn't get back in view in a few seconds she will be penalized by losing a life and then reappear close to the middle of the screen.
Rationale: Since the camera has a fixed field of view, it will be possible for players to end up outside the screen and this must be taken care of in some way.

Non-functional requirements

The game shall have a refresh rate of at least 30 frames per second, at all times.
Rationale: The screen refresh time must be high enough to provide smooth movement and scrolling. Low refresh times will produce slow or choppy animation and scrolling, which will detract from the gameplay experience.

It shall not take the game more than 100 milliseconds to respond to user input.
Rationale: Low response time to input is important in order for the game to feel responsive, which is

an important quality for games.

The game shall be playable on any Xbox 360 console as long as it's equipped with an Xbox 360 memory card or hard-drive.
Rationale: We don't want to exclude users by making our game larger than the size of the smallest available storage units.

It shall not take more than ten seconds between starting the game and getting to the menu screen. When players have selected their characters and a level it should not take more than five seconds to actually start playing.
Rationale: A short game session might only last for half an hour, and if it takes five minutes to start a game that means one sixth of the session is spent on not playing.

The control scheme shall not include more than three buttons and one directional pad. The player shall not be required to move his fingers between buttons while playing.
Rationale: If the control scheme uses too many buttons then inexperienced users might become uninterested in playing the game.

The control scheme shall not map more than one function to each button. Users shall not be required to use combinations of buttons to perform an atomic action, and the functions mapped to each button should not change during the course of the game.

Use cases

Select character
Primary actor: Player
Stakeholders and Interests:
The player: Wants to pick a certain character to play as.
The player's opponents: Wants to pick characters to play as. One or several of the opponents might want to play as the same character as the player.
Preconditions: The game is started, every player has a controller in his or her hands.
Success Guarantee: The player is assigned a character.

Main Success Scenario:
1. Player confirms that he is to participate in this race of the game.
2. Player selects the character he or she wants to play as.

Extensions:
2a. Another player has selected the character the player wanted to play as.
    1. The player selects another character

Frequency of Occurrence: Before the start of each race.

Select level
Primary actor: Player
Stakeholders and Interests:
The player: Wants to select a level.
The player's opponents: Might wish for a specific level to be selected.
Preconditions: Every player has selected a character. A player has been chosen at random to select a level.
Success Guarantee: A level is selected.

Main Success Scenario:
1. The player selects a level.

Frequency of Occurrence: Before the start of each race.

Pick up a powerup
Primary actor: Player
Stakeholders and Interests:
The player: Wants to pick up a powerup. Might wish for a specific powerup.
The player's opponents: Might want to prevent the player from picking up powerups. Are interested in what powerup the players pick up.
Preconditions: The player must have one powerup slot free and must be in the vicinity of a powerup dispenser.
Success Guarantee: The player gets the powerup he wanted.

Main Success Scenario:
1. The player approaches the powerup dispenser.
2. The player observes the powerup dispenser and times his contact with the dispenser so that it dispenses the powerup he wants.

Extensions:
2a. The player mistimes his contact with the powerup dispenser, or interference from another player or some obstacle delays him
    1. The powerup dispenser dispenses a powerup other than the powerup the player wanted.

2b. The player somehow misses the powerup dispenser
    1. The player decides it's not worth the time to go back to the powerup dispenser and continues on, without a powerup or the player turns back to try to get the powerup.

Frequency of Occurrence: Several times during a race.

Use a speed boost powerup
Primary actor: Player
Stakeholders and Interests:
The player: Wants a speed boost.
The player's opponents: The opponents are interested in what the player does.
Preconditions: The player must have at least one speed boost powerup.
Success Guarantee: The player uses up the speed boost powerup and gains a speed boost.

Main Success Scenario:
1. The player uses up a speed boost powerup.
2. The player gains a temporary speed boost.

Frequency of Occurrence: A few times during a race.

Use a gravity reduction powerup
Primary actor: Player
Stakeholders and Interests:
The player: Wants reduced gravity.

The player's opponents: The opponents are interested in what the player does.
Preconditions: The player must have at least one gravity reduction powerup.
Success Guarantee: The player uses up the gravity reduction powerup and gains the ability to jump higher than usual.

Main Success Scenario:
1. The player uses up a gravity reduction powerup.
2. The player gains a temporary gravity reduction, which in turn allows the player to jump higher than usual.

Frequency of Occurrence: A few times during a race.

Use a fetter powerup
Primary actor: Player
Stakeholders and Interests:
The player: Wants to place a fetter on the ground.
The player's opponents: The opponents do not want to be caught in the fetter. Also, the opponents are interested in what the player does.
Preconditions: The player must have at least one fetter powerup.
Success Guarantee: The player uses up the fetter powerup and places a fetter on the ground, which traps another player.

Main Success Scenario:
1. The player uses up a fetter powerup.
2. The player places a fetter on the ground.
3. Another player gets caught by the fetter, and is slowed down.

Extensions:
2a. The player uses the powerup in a way that results in the fetter falling down a bottomless pit.
    1. The fetter disappears.
3a. No one gets caught by the fetter.
3b. The player herself gets caught in the fetter.
    1. The fetter becomes attached to the player, slowing her down.

Frequency of Occurrence: A few times during a race.

Use a shrink powerup
Primary actor: Player
Stakeholders and Interests:
The player: Wants to shrink another player.
The player's opponents: The opponents do not want to get hit by the shrink ray. Also, the opponents are interested in what the player does.
Preconditions: The player must have at least one shrink powerup.
Success Guarantee: The player uses up the shrink powerup and shrinks another player, making the victim slower and unable to jump as high as usual.

Main Success Scenario:
1. The player uses up a shrink powerup.
2. The player shoots a ray that hits another player, shrinking the victim.

Extensions:
2a. The player misses his target.

1. The powerup has no effect.

Frequency of Occurrence: A few times during a race.

Use a boxing glove powerup
Primary actor: Player
Stakeholders and Interests:
The player: Wants to punch another player, possibly into danger.
The player's opponents: The opponents do not want to get hit by the boxing glove. Also, the opponents are interested in what the player does.
Preconditions: The player must have at least one boxing glove powerup.
Success Guarantee: The player uses up the boxing glove powerup and punches another player, possibly into danger.

Main Success Scenario:
1. The player uses up a boxing glove powerup.
2. The player releases a spring-loaded boxing glove that extends to a certain length and punches another player, making the victim fly forward into danger.

Extensions:
2a. The player punches another player, but the victim does not come in contact with any danger.
    1. The victim is punched forward and stunned for a short time.
2b. The player misses the opponent.
    1. The boxing glove disappears.

Frequency of Occurrence: A few times during a race.

Use a claw powerup
Primary actor: Player
Stakeholders and Interests:
The player: Wants to grab an opponent, and possibly toss the victim into danger.
The player's opponents: The opponents do not want to get caught by the claw. Also, the opponents are interested in what the player does.
Preconditions: The player must have at least one claw powerup.
Success Guarantee: The player uses up the claw powerup and grabs an opponent. After grabbing an opponent the player can toss the opponent, possibly into danger.

Main Success Scenario:
1. The player uses up claw powerup.
2. The player releases a spring-loaded, retractable, claw, which grabs the opponent.
3. The player tosses the opponent into danger.

Extensions:
2a. The player misses the opponent.
    1. The claw disappears
3a. The player has held on to the opponent for too long.
    1. The opponent breaks free of the claw.
3b. The player tosses the opponent, but not into any danger.
    1. The opponent is released.

Frequency of Occurrence: A few times during a race.

Use a banana peels powerup

Primary actor: Player

Stakeholders and Interests:

The player: Wants to place banana peels on the ground in order to make an opponent slip into something dangerous.

The player's opponents: The opponents do not want to slip. Also, the opponents are interested in what the player does.

Preconditions: The player must have at least one banana peels powerup.

Success Guarantee: The player uses up the banana peels powerup and an opponent slips on them, putting her in dire straits.

Main Success Scenario:

1. The player uses up banana peels powerup.
2. The player places a few banana peels on the ground.
3. An opponent steps on the peels and slips, putting her in dire straits.

Extensions:

2a. The player uses the powerup in a way that results in the banana peels falling down a bottomless pit.

      1. The banana peels disappear.

3a. No one slips on the banana peels.

3b. An opponent slips on the banana peels but not into danger.

3c. The player herself slips on the banana peels.

      1. The player slips, possibly into danger.

Frequency of Occurrence: A few times during a race.

Jump on an opponent

Primary actor: Player

Stakeholders and Interests:

The player: Wants to stun an opponent by jumping on her head.

The player's opponents: The opponents want to avoid being jumped on. Also, the opponents are interested in what the player does.

Success Guarantee: The opponent is stunned for a short time.

Main Success Scenario:

1. The player jumps and lands on an opponent.
2. The opponent is stunned.

Extensions:

1a. The player misses the opponent.

      1. Nothing happends—the opponent does not get stunned.

Frequency of Occurrence: A few times during a race.

Jump across platforms

Primary actor: Player

Stakeholders and Interests:

The player: The player wants to jump across platforms to advance through the level.

The player's opponents: The opponents might want to interfere with the player in some way, causing

him to miss the platform.
Success Guarantee: The player lands successfully on a platform.

Main Success Scenario:
1. The player jumps from one platform.
2. The player lands safely on another platform.

Extensions:
2a. The player misjudges the jump
      1. The player plummets into a bottomless pit or some other danger
2b. An opponent interferes with the player in some way, causing him to fail the jump
      1. The player plummets into a bottomless pit or some other danger

Frequency of Occurrence: Several times during a race.

Reaching the finish
Primary actor: Player
Stakeholders and Interests:
The player: The player wants to reach the finish.
The player's opponents: The opponents might want to interfere, causing the player to miss the finish.
Success Guarantee: The player successfully finish the level.

Main Success Scenario:
1. The player reaches the finish.

Extensions:
1a. An opponent interferes with the player.
      1. The player misses the finish, and has to try again.

Frequency of Occurrence: One or a few times during a race.