Game Design Document

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1   Goals and Requirements

1.1   Context

BOXINIXOB(Box in Box) is a 2D platformer puzzle game made as a personal project. It was made with inspiration from Patrick's Paradox.

1.2   Team

Design and Programming-Bill Cao

1.3   Goal

1.3.1   General Goal

To make a simple game that has multiple levels showcasing the main mechanics of the game, namely the combination of moving in and out of the box.

1.3.2   Mechanics

The game should allow the player to toggle between the player movement and grid movement. The player movement uses 2D physics including gravity, while the grid movement is simply rearranging the tiles as if they are puzzle pieces.

1.3.3   Levels

1. The first level should showcase the movement system for both player movement and grid movement.

2. The second level should be as simple as the first with a twist that the player can move outside the tile to reach a different tile.

3. The third level should introduce the red filter which prohibits the player to move a tile, and the accompanying pressure pads that can remove the filter in certain tiles.

4. The remaining levels should use the previous introduced mechanics and produce levels combining them.

1.4   Requirements

- controls to accomodate both grid and player movements
- Tileset for both player and environment
- Background music and jumping SFX
- about 5-10 levels to showcase mechanic

2 Gameplay and Mechanics

2.1 Gameplay

2.1.1 Game Progression

In a typical walkthrough, the player should toggle between grid and player views to plan a route. The route might change after a pressure pad is found. The untimate goal would be to reach the red portal. To do so, they would rearrange the tiles to pave a path, sometimes with the player in it.

2.1.2 Objectives

The objective of the game is reaching the end red portal.

2.2 Mechanics

2.2.1 Player and Grid Movement

In player view, the player can use A and D to move left and right, and SPACE to jump. In grid view, the player should be able to use WASD to move the selector and SPACE to select and deselect tiles. Player could use E to toggle between the two modes. To avoid physics problems, an extra constraint is added that the player must be fully within a tile to enter the grid view to avoid clipping.

2.2.2 Limiter and Pressure Pad

The player should be able to see tiles highlighted in red which are ones that cannot be moved in grid view. They serve as pivots and obstacles. In order to add a layer of controllablity to it, pressure pads are used to remove limiters as long as the pads are activated to allow players move the limited tiles when player is in a specific tile.

2.2.3 Save System

More as practice but also to serve the purpose of progress tracking, a save system is implemented which registers the latest level achieved by the player and allows the player to select any level before that in the menu. A reset progression button is also introduced.

3 Levels

3.1 level 1

A simple introductory level that requires the player to utilise double jump and the grid controller to move the tiles to reach the portal. There is no restriction in the level and has text tutorial messages for movement and controls that are included to help the player understand the mechanics.
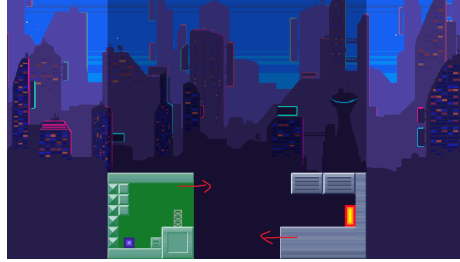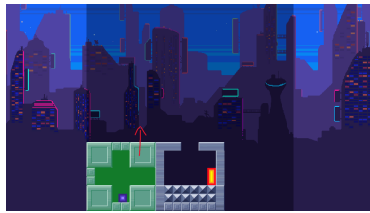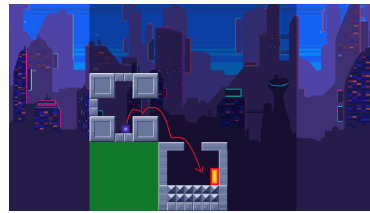
Figure 1: Level 1

3.2   level 2

Another simple level where the player is required to think outside of the box and move outside of pre-definead tiles to reach the destination. An exemplary solution is provided in the image.,
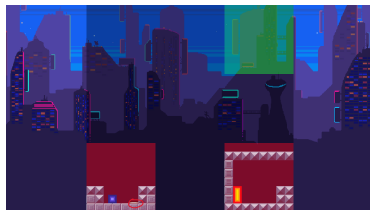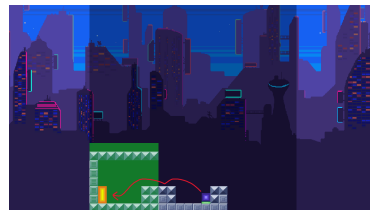

(a) Step 1

(b) Step 2

Figure 2: Level 2 Breakdown

3.3   level 3

A level that introduces the idea of limiter and pressure pads. The pressure pad is marked in the image below. The pressure pad in the level unlocks both tiles allowing a rather simple switch which would allow the player to enter the tile from the right. An exemplary solution is provided below.

(a) Step 1

(b) Step 2

Figure 3: Level 3 Breakdown

3.4 level 4

The first non-tutorial level. It is designed to be another simple level where the player would use the pressure pad highlighted to move tiles into the shape in step two and move to the end.
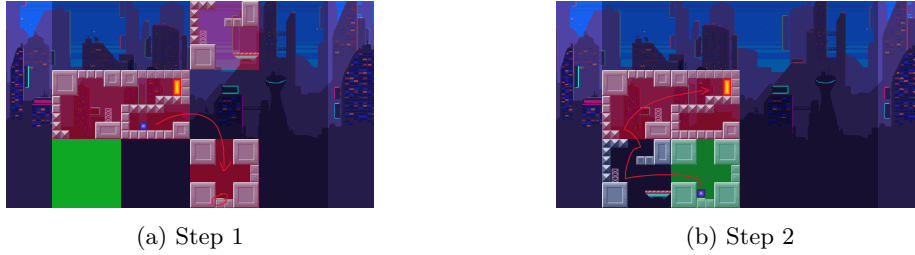

(a) Step 1

(b) Step 2

Figure 4: Level 4 Breakdown

3.5 level 5

A level revolving around the idea of utilising one moving part to transport player around. The goal and starting tile are both stationary, and the movable tile cannot reach the end. Hence the work around would require the player to move outside the grid again to reach the pressure pad which can unlock the only tile that can be used to the goal.
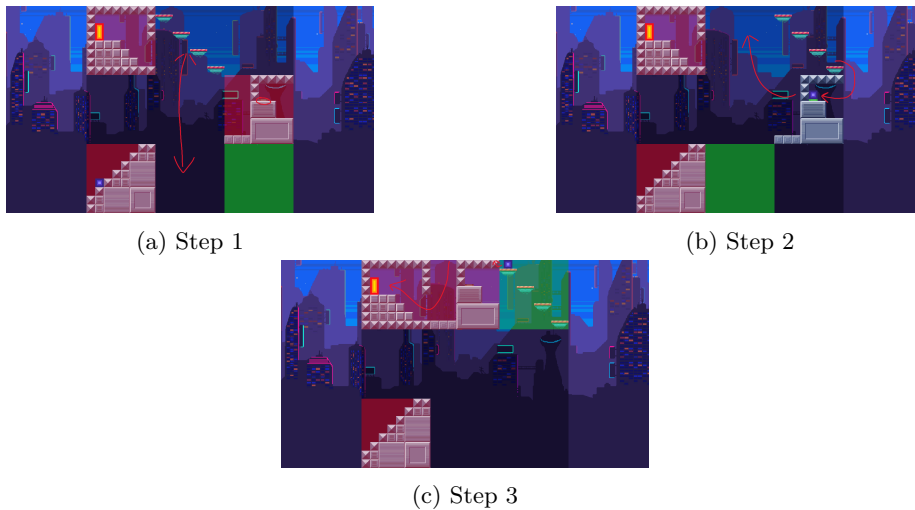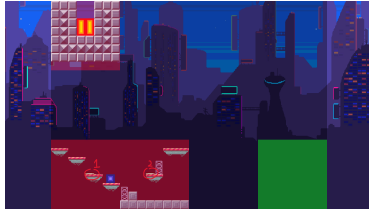

(a) Step 1

(b) Step 2

(c) Step 3

Figure 5: Level 5 Breakdown

3.6 level 6

A level that revolves around the idea of switching positions. By observation the tile containing pressure pad 1 is the one that can reach the goal. However, unless we make a transition move, the tile can never be moved to the second column as pressure pad 1 and 2 each control the opposite tile. Hence the player needs to have a single column transition as shown in step 2, which shifts the two movable pieces one column to the right.
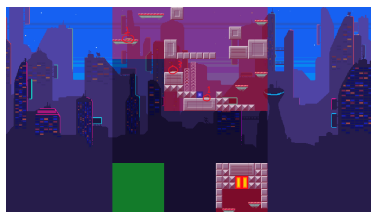

(a) Step 1
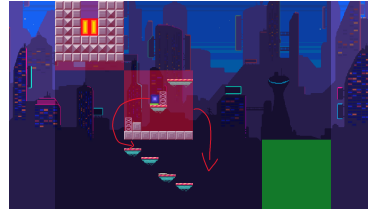
(b) Step 2

(c) Step 3

Figure 6: Level 6 Breakdown

3.7   level 7

A level that uses the idea of rotation. The player needs to use pressure pad 1 to control the tile containing pressure pad 2, which in turn controls the 3 tiles that are shown as movable in step 2. However, after reaching the initial tile as indicated in step 2, the player would need to redo whole rotation as the tile moved initially would have blocked the path for the goal tile. After moving that out of the way and reaching pressure pad 3, the level will be trivial.

(a) Step 1
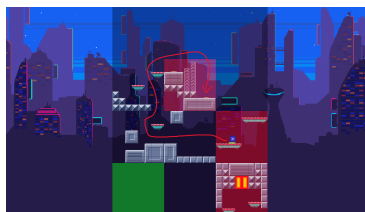
(b) Step 2

(c) Step 3

Figure 7: Level 7 Breakdown