TRASHPOINTS

D2. Game Design Document

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1. Overview of Concept

TrashPoints follows an ambient theme and consists of a point and click game where the player must find hidden objects and recycle them in the correct bins, with the goal of teaching the players how to recycle and encourage them to do so.

The game will be developed using Unity, with the target platform being PC.

2. Objectives

The serious objective for this game is to teach a younger audience about pollution, but most importantly, about how to recycle different kinds of trash. To do so, different kinds of trash are displayed, and the player must collect them all for later recycling with the use of different bins (common, plastic and metal, paper and cardboard, glass, E-waste). Acting correctly rewards the player, while getting wrong choices lowers their score, discouraging from taking these wrong actions.

3. Description

TrashPoints fits in the "find the hidden objects" genre with an ambient theme. The target audience for this game would be a younger audience – children from 6 to 12 years old – as it is a very simple game and easy to play.

The game contains several levels with increasing difficulty, where the goal is to find trash that is ruining the different scenery presented. As such, this is a point and click game, because the player needs to find all the trash before moving on to the second goal which consists of separating the trash into the correct bins, granting them extra points for each correct decision, and penalizing them for wrong choices. The trash will get progressively harder to find, with these objects blending into the scene more and more (for example, trash buried in the sand, or a small piece of gum stuck somewhere, harder to notice). The end goal of the game is to beat all the levels with the highest score possible. The general style of the game is fairly cartoonish for the most part, adaptable to children. There are no actual characters in the game.

3.1. Key Features

While the concept of hidden objects that must be found is something that is already present on several games, the key feature of this game would be the part where the player has to separate

the trash into the correct recycling bins, and in doing so, learning the recycling practices. This would be used to teach a younger audience to recycle and motivate them to do so.

3.2. Game's Levels

As previously mentioned, this is a point and click game, where the player must click on the trash items and, on a second phase, classify them by clicking on the correct trashcans. The only action in this game is clicking.

FIRST PHASE: FINDING THE TRASH

While playing the first phase of a level, there are different trash items you can find hidden on the background image, namely:

- Common trash: fish spine, donut, mushroom, pizza slice, rotten apple, cheeseburger, watermelon;
- Plastic/Metal: metal chain, spanner, plastic bag, plastic water bottle, can of soda, yogurt;
- Paper/Cardboard: box, coffee cup, newspaper, paper, paper bag;
- Glass: broken glass cup, glass bottle, glass cup, mirror, sunglasses;
- E-waste: batteries, camera, cellphone, laptop, mouse, keyboard, toaster.

During this phase, you will see a "Bonus Score Time Remaining" text at the top of your screen: this is a timer that starts at 2 minutes and counts backwards until it gets to 0. It is a statement that you have unlimited time to pass each level, however, if you pass them while this timer is still going, you will receive bonus points in your final score. On the section **3.3. Score System** you can see how many points you get from this bonus.

You will also have access to your current score, a trash counter and a button to "Use Hint". The trash counter will tell you the number of items to find and the number of items you have found already. For example, on the first level it will start at "0/7", meaning that you have currently found 0 of a total of 7 trash items. The "Use Hint" button will give you a hint anytime you click it, however, if you use it more than 2 times per phase, it will affect your final score (the button will change its color to warn you that you've already used it two times). This button is also available at the second phase of the game and works the same way.

Finally, an "Easter Egg" of our game is that if you pass the mouse over the game's logo (the smiley trash can) you can see an image showing how many trash items you still need to find, with their pictures, just so you can find them in the image with less difficulty.

All the features mentioned will be explained in the rules section (accessible through the "?" icon at the top right of the screen) that you can visit at any point during the game.

SECOND PHASE: CLASSIFYING THE TRASH

When classifying the trash, it is followed the Portuguese color system for the recycling bins and common trash:

- Common trash is black;
- Plastic/Metal is yellow;
- Paper/Cardboard is blue;
- Glass is green;
- E-waste is red.

As previously mentioned, if at any point of the game you need to remind yourself of the rules and/or trash classification, they are available at one of the icons at the top right of the screen. You can also quit a level at any point but you will lose your progress. To do so, click the exit icon at the top right of the screen.

3.3. Score System

The scoring system in this game works like this in the first part of the game (finding trash):

- +40 points for each trash element found in the scene;
- -20 points for a missed click on the scene (the player must not click around randomly);
- When the game ends, if the "Bonus Score Time Remaining" is still going, +2 points for each second left;

And for the second part (recycling the trash):

- +100 points for each item classified correctly;
- -100 points for each item classified incorrectly.

In both parts, you will lose 40 points for each hint you use after two hints (by clicking on the "Use Hint" button).

3.4. Technical Specification

The software to use for the development of the game will consist in the following:

- Figma;
- Adobe Illustrator CC 2021;
- Adobe Photoshop CC 2021;
- Unity 2020.3.22f1;
- Microsoft Visual Studio 2019.

The recommended hardware specifications for the development of the game are:

- A 64-bit processor and operating system (Windows 10);
- Processor: Intel(R) Core(TM) i7-10510U or AMD CPU equivalent or better;
- Memory: 16 GB RAM;
- Graphics: NVidia GTX 1650 or AMD Radeon RX 580 or better.

The recommended hardware specifications for the players of the game are:

- Requires a 64-bit processor and operating system (Windows 10);
- Processor: Ryzen 5 2600 6-Core CPU or Intel CPU equivalent or better;
- Memory: 12 GB RAM;
- Graphics: NVidia GTX 1050 or AMD Radeon RX 560 or better.

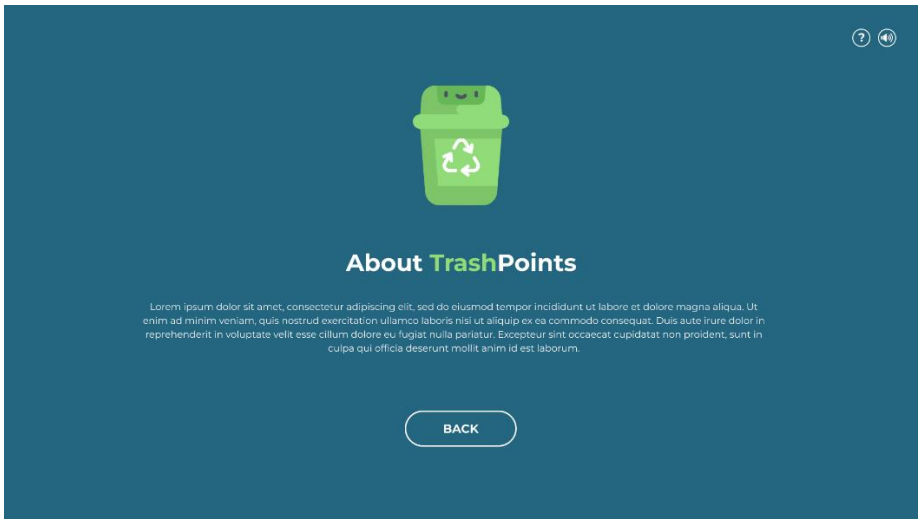
The target platform will be PC (Windows 10). There isn't multiplayer support for this version of the game.

3.5. Concept art

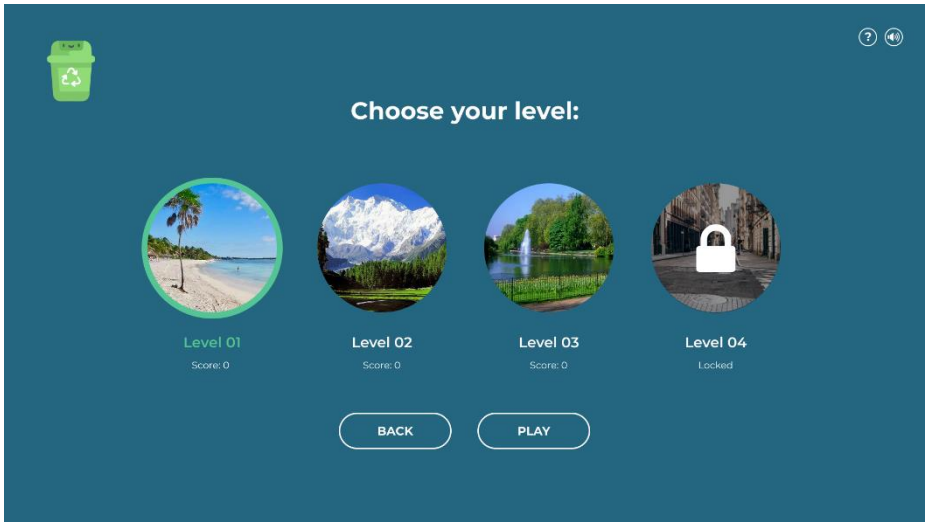
Below is presented the initial UI of the game. The game's UI was made using the Figma Design Platform and can be visited here. We must note that this design will suffer some changes on the game's final prototype, having more elements added onto it.

1. Main Menu

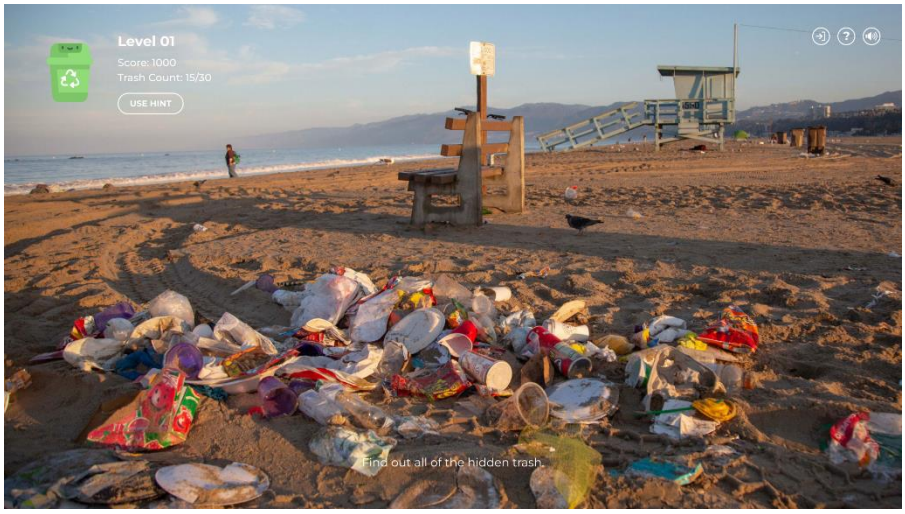
2. Rules



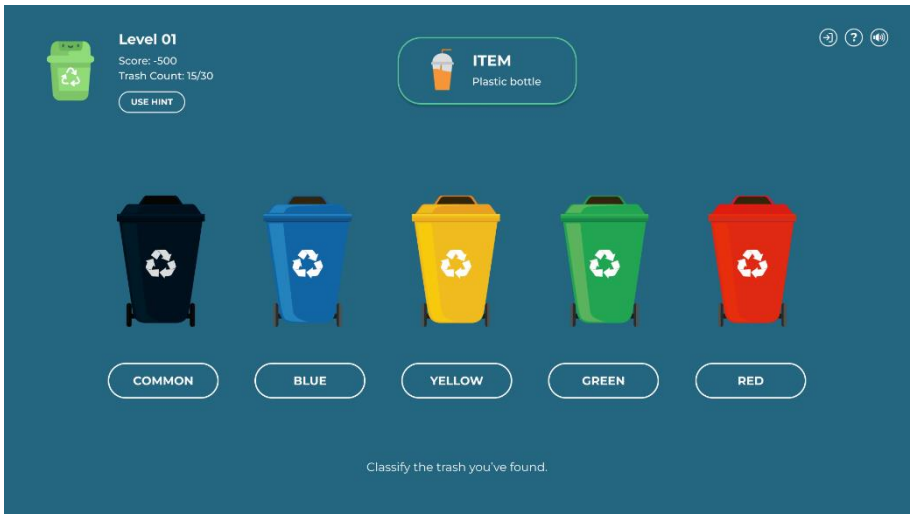
3. About



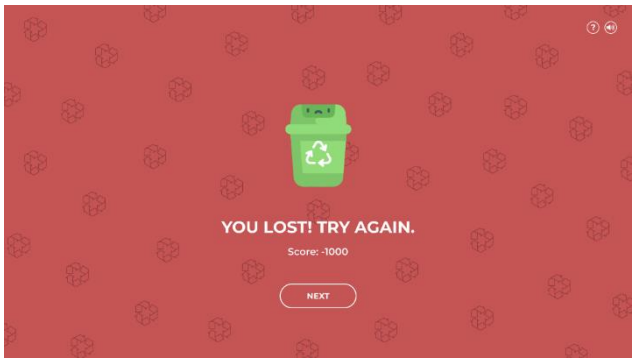
4. Levels Menu

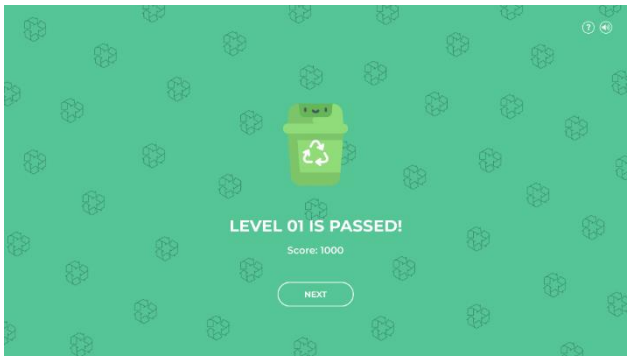


5. Chosen Level (Part I: Find the trash)

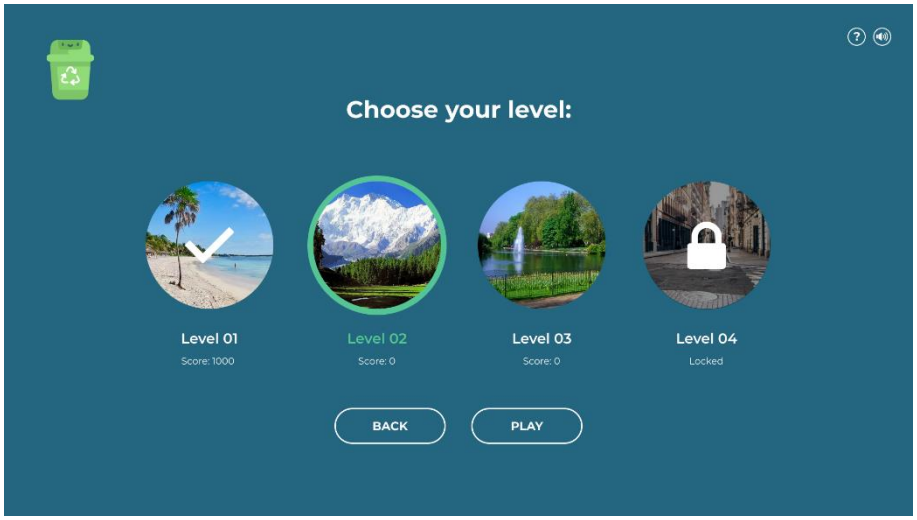


6. Chosen Level (Part II: Classify the trash)

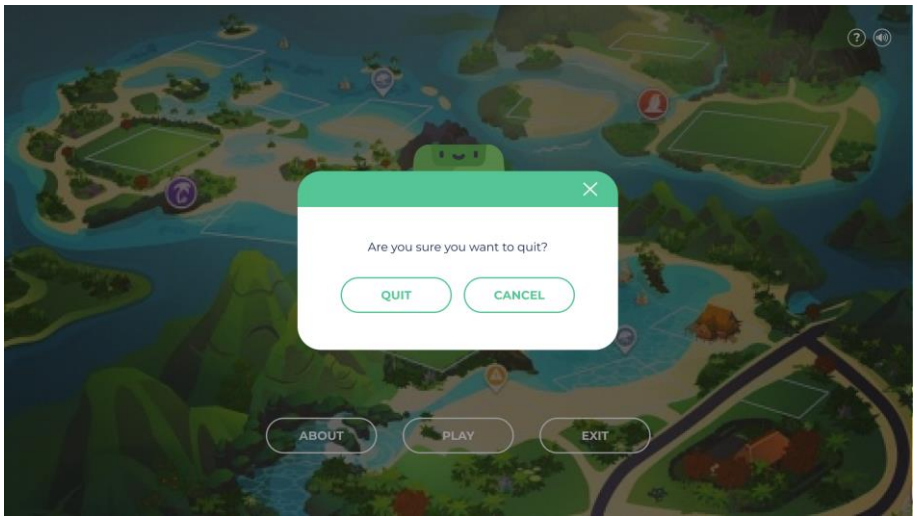




7. You Lost and You Win Screens

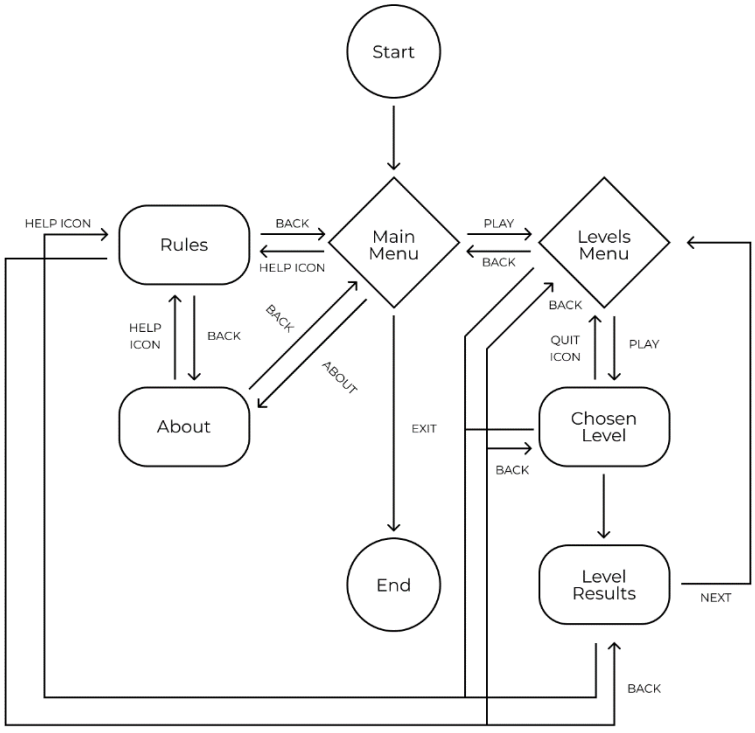


8. Levels Menu after playing one level (Level 01)



09. Quit Popup (Example of a Popup)

The Flowchart of the game is presented below:



10. TrashPoints' Flowchart

The game's controls are simply the mouse/touchpad.

4. Schedule and Deliverables

10/05/2022 D1.1. Scope document (version 1.0)

27/05/2022 D2.1. Game Design Document (version 1.0)

D2.2. First Prototype

20/06/2022 D2.1. Game Design Document (version 2.0)

D3.1. Final prototype

5. Functional and Non-functional requirements

5.1. First Prototype

Functional Requirements:

- About
  - The player must be able to access the about menu from the main menu.
  - The player must be able to back out to the main menu.
- Rules
  - The player must be able to access the rules information from the main menu.
  - The player must be able to view the rules at any time by using the help button.
  - The player must be able to back out of this section, going back to whichever menu they were in before.
  -
- Levels
  - The maximum score for Level 01 must be visible.
  - The player must be able to select Level 01 to play.
  - The player must be able to see Level 01 completed if he has completed it.
  - The player must be able to back out to the main menu.
- Playing a Level
  - The player must be able to click on a piece of trash to collect it for later recycling.
  - The game must deduct score from the player should they be clicking away at random.
  - A counter should inform the player of how much trash has been found and how much trash is in the scene.
  - Information about the current level and the score should be shown.

    - A hint button should be shown for the player to use should they need it.
    - A hint should be shown on the screen when clicking the "Use hint" button.
    - When passing the mouse over the game's logo, information about the trash items to find must be shown.
    - A "Bonus Score Time Remaining" timer should be shown.
    - After collecting all the trash in the level, the recycling phase of the level should be shown.
    - The current item being recycled should be shown.
    - The player must be able to separate the trash through the different bins by clicking on them, gaining score for correct choices, and losing score for wrong choices.
    - The level must be considered as passed should the score be positive.
    - The level must be considered as failed should the score be negative, requiring the player to try again.
    - The player must be able to back out of the level at any time by clicking the exit icon on top right.
- Game
    - The player must be able to leave the game.

Non-functional Requirements:

- The game is played on PC.
- It is recommended to have the recommended specifications to play the game.

5.2. Final Prototype

Functional Requirements:

- General
    - The game has background music and diverse sounds;
    - The sound toggle button is functional: the player can decide to hear the game's sound or not.
- About
    - The player must be able to read and understand the "About" section.
- Rules
    - The player must be able to read and understand the "Rules" section.
- Levels
    - The last unlocked level should be selected by default.
    - The maximum score for each of the levels must be visible.
    - All levels must be playable if they are unlocked.

    - The player must be able to select the level they wish to play, as long as all conditions are met (level is unlocked).
    - The player must be able to see which levels have been completed.
    - The levels must have a slider to navigate between them (more than one page).
- Playing a Level
    - The score should be influenced by the use of hints – hints must be limited, if the player uses more hints than the limit, his score should be penalized.

6. References

Icons used in the game's UI were retrieved from https://www.flaticon.com/

Images used in the game's UI were retrieved from https://images.google.com/ and https://pixabay.com/