

GAME DESIGN DOCUMENT

Drawer Blocks

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1. Executive Summary, Quick overview

The world that you see around you is three dimensional, including all the man-made objects: they have height, length, and depth or whatever you call it. But the instructions on how to make those objects are usually written on a plane simple paper or computer screen with the limited abilities of the two-dimensional space using different shortcuts. Engineering drawings have been using these shortcuts for ages to implement the instructions correctly, but one need a certain skill to be able to read the drawings. This skill might look like a magic to some, but in reality, it is just like a puzzle that needs to be solved and one can train the brain to solve these problems on the fly.

This game is a puzzle that includes two main modes: the first one for building the 3D objects based on their 2D axonometric projections and the second one for building the 2D axonometric projections from the given 3D objects. This puzzle is perfect for developing the perspective vision and understanding the shapes of the objects in a simple, yet engaging, manner.

2. Target Audience

Target audience for this puzzle is anyone interested in Mathematics, Geometry and other STEM disciplines. However, the game does not require prior knowledge of any complicated concepts, as it uses cubes as building blocks and grid to assist the object placement. This game can be recommended as teaching materials for basic geometry or technical drawing courses.

3. Main Characters

The main character of this game is the Time Traveller – player configured character that appears either in 3D or 2D depending on the mode selected. The Traveller is collecting the objects in order to restore the path to their homeland.

4. Main Features

4.1 Main mechanics

The main mechanics is placing the cubic blocks to the correct locations or highlighting the correct cell in the axonometric grid. The actions are complemented with simple animations. The views, by default, are limited to 30° isometric for 3D objects and axonometric left, right and top for 2D objects. The points are given based on the time spent completing the puzzle and the precision (points are deducted for incorrectly places objects).

4.2 Movement

In 3D mode, the player drags the cubes from the side panel to the axonometric grid and places them to reconstruct the shape presented on the left, right, and top planes. The cubes are anchored to the grid if they are located within the cell, but the placement is confirmed only after the cube is released. The cubes can be returned to the side panel by double-click. In 2D mode, the player clicks the cells on the 2D grids to create the axonometric representation of the 3D object given. The highlighted cells obtain the colour of the object given, and the cell selection is removed by double-clicking it.

4.3 Physics

The blocks used in the game are assumed to be solid and weightless and the whole game is happening in vacuum. The blocks are anchored to the given grid and cannot overlap. As mentioned before, the default view is 30° isometric for 3D objects and axonometric left, right, and top views for the 2D, but the future updates or in-app purchases can allow for free camera movements.

4.4 Multiplayer mode

Multiplayer mode allows two players to compete in either 3D or 2D mode. The fastest player wins.

5. Genre, Setting, Concept Art book

This game is a puzzle set in minimalistic “indie-game” environment. The colours are mainly mellow, so they do not steal attention from the main objects of the game.

The levels look approximately as depicted below:

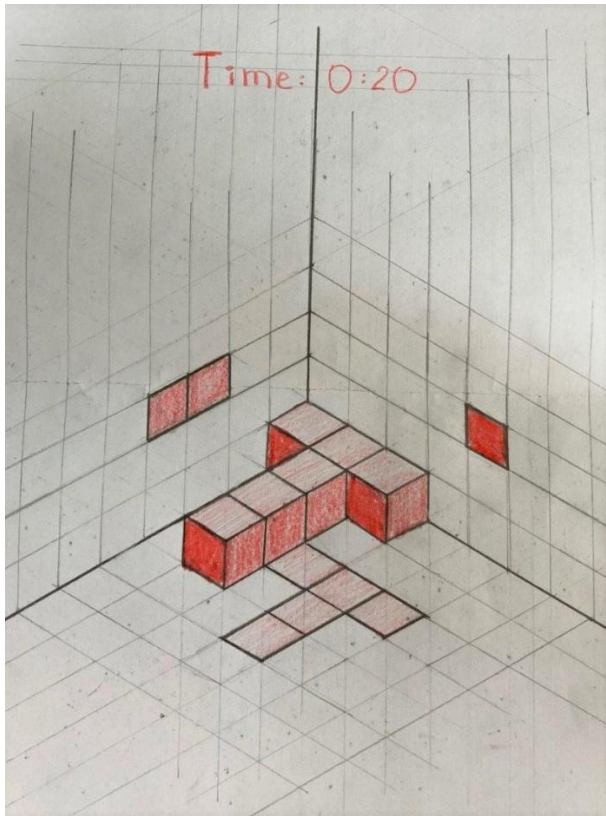


Figure 1. Game progress in 3D to 2D mode

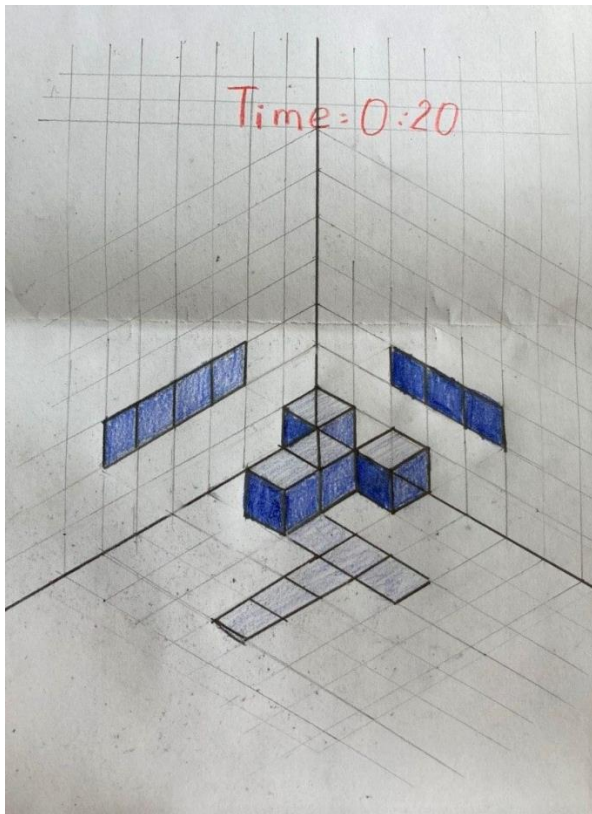


Figure 2. Game progress in 3D to 2D mode

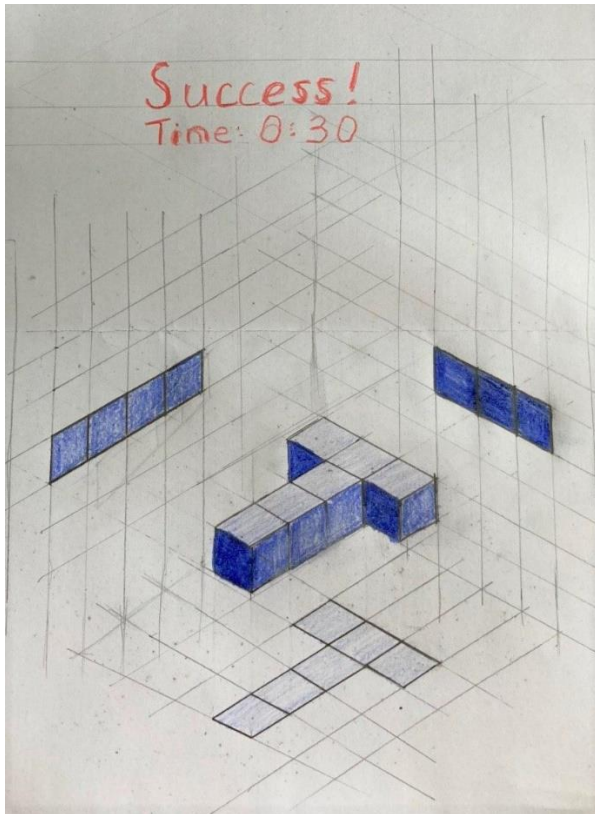


Figure 3. Successfully completed level in 2D to 3D mode

6. Enemies, NPCs, Other objects

The game does not have enemies or NPCs per se: the only enemy is time. The player can obtain in-game currency by completing the puzzles to obtain new skins for the character, temporary free camera mode, lossless undo, and so on.

7. Story board, script

The story behind the game is pretty simple: the Time Traveller makes their way through the timeline of human history, which is indicated by the changes in the background of level selection. Upon the progress, the historic facts about the geometry and technical drawing appear on the side-lines of the levels map. The player may choose to share those facts as a screenshot on a social media with link for game download.

Due to the limited time to implement the game, the main periods in the game are:

- Ancient times
- Middle ages
- Renaissance
- The 18th century
- The 19th century
- The 20th century
- Modern times

Each period includes between 5-20 levels of increasing complexity with stylised level numbers and background images.

8. Technical definitions, Tech guide

8.1 Platforms, versions

The game is developed using Unity game engine, Blender for 3D graphics, Adobe Photoshop and Illustrator for 2D graphics, and Audacity for audio editing.

The ideal platform for this game would be mobile: Android and iOS, especially for the tablets with bigger screen, but due to the limitations of the course and available equipment, the game will be presented as browser version using HTML5.

8.2 Control Scheme

The mouse is used as the main controller. 3D objects are dragged and dropped to the desired location with the mouse. The cells on 2D grid are selected by single click. The 2D and 3D objects are removed with double-click. Holding mouse wheel and moving the cursor controls free camera similarly to 3D modelling software, if the feature is enabled. ESC is used to leave the level, go one level down in menu or exit the game. Letter characters are used to type the player's name.

8.3 Limitations

The game is set to exist only in isometric or axonometric projections. The game field is limited with 10x10x10 cube, as bigger field will make the details too small to recognise. The puzzles have one unique accepted solution. The main modes are limited to 2D->3D and 3D->2D.

9. Business definitions

The game is initially free-2-play with built-in ads after completing certain amount of levels.

9.1 In-app purchases

Possible in-app purchases:

- Remove ads
- Sandbox mode: create your own 3D objects or their projections, save them on your device to use as puzzles in the future or share them with the other players
- Time trial mode: solve as many puzzles as possible in the given time
- Multiplayer mode: connect to your friend with Bluetooth and compete in solving

- Game skins: changes the colour scheme of the game
- Free rotation: enable free rotation of the 3D object

9.2 DLC packs

N/A?

10. Outsourced/Bought Assets

- Sounds
- Fonts
- Textures
- Historic facts