INSTITUTO SUPERIOR TÉCNICO

Departamento de Engenharia Informática

Computer Graphics for Games

MEIC / METI 2020-2021 – 1st Semester

Team Project Proposal

Authors

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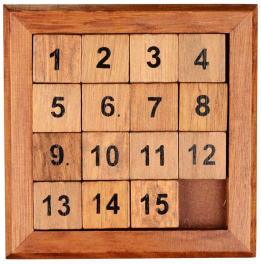
The Concept

Our concept idea revolves around a sliding puzzle game, like this one:



Since this is a type of puzzle that is challenging but at the same time fun and visually appealing, we decided to recreate it on OpenGL but with a few tweaks.

Like in the physical puzzle game, we would have the cubes arranged in the correct order, but, once we start the game, the cubes would be shuffled randomly and the player would only be able to move a cube at a time.

To move a cube, the player would drag it with the mouse or use the keyboard arrow keys to move the piece in the direction he desires. It is possible to look at the puzzle from every angle, since we will be using a spherical camera, and to do so, the player would use the mouse.

The frame, the cubes and the backboard of the frame would be each made of different materials. These are the materials we chose:


Wood


Marble


Stone

The game would have a HUD menu, where the player could choose between starting a new game, loading a previous game, save the current state of the game and take a snapshot of it. The snapshot can be taken from any angle, and will be saved in a known image format.

To add a little of customizability to the game, we plan to let the player upload an image of it's own choice to the game and instead of having numbered cubes, the cubes would have the image displayed on them, so that the player could resolve it's own custom puzzle.
Similar to these physical versions of the game:

Technical Challenges

1) **Generic scene graph handling hierarchical drawing (1.5) :** We will need to create a scene composed of multiple 3D objects (platform w/ borders, tiles) with parent/children relationships : we need the tiles to stay put when we move the platform around !

   In charge: Daniel Correia

2) **Picking and manipulating objects with mouse and keyboard (1.0) :** To move the tiles around (most likely with the arrow keys), one at a time. We also want to be able to look at the whole thing from every possible angle.

   In charge: Bernardo Pinto

3) **Creating a format allowing to save / load the full scene, meshes and materials (1.0) :** Through the use of the HUD (see below), we want to save the progression (mainly the placement of the tiles, but possibly the angle of the camera as well) with the click of a button, but also to load it back just as easily.

   In charge: Bernardo Pinto

4) **A realistic or stylised solid material for the objects of your scene (1.0 * 3) :** We want to create three different solid materials : one for the tiles, one for the border of the platform, and one for the bottom (the “floor” the tiles will sit on). We will create and use the stone, wood and marble materials.

   In charge: André Santos (x1) and Antoine Pontallier (x2)

5) **Saving a snapshot of the application to a known image file format (0.5) :** With the press of a key (or option in the HUD, see below), we want to save a picture of the current state of the game (while displaying or not the HUD) into a common format (PNG, JPEG,...)

   In charge: Daniel Correia

6) **Head-Up Display (HUD) or transparent overlays (1.0) :** On the side of the game screen, we want to display three options : new game, saving/loading game, and taking a snapshot. Another button at the bottom should also allow the user to close the game.

   In charge: André Santos

Preliminary Weekly Plan

Week 1 (28/11 - 4/12) :

- Setup Git and a code base for everyone to be able to start working
- Generic scene graph handling hierarchical drawing - Start
- Other Challenges

Week 2 (5/12 - 11/12) :

- Generic scene graph handling hierarchical drawing - Finish
- Create game frame and pieces - Start
- Other Challenges

Week 3 (12/12 - 18/12) : Checkpoint

- Create game frame and pieces - Finish
- Apply 1 material
- Render image texture on the pieces : Numbers
- Other Challenges

Week 4 (19/12 - 25/12):

- Picking and manipulating objects with mouse and keyboard - Start
- Other Challenges

Week 5 (26/12 - 01/01) :

- Picking and manipulating objects with mouse and keyboard - Finish
- Draw numbers on pieces
- Other Challenges

Week 6 (02/01 - 08/01):

- Creating a format allowing to save / load the full scene, meshes and materials - Start
- Game logic - Start
- Applying created materials - Finish

Week 7 (09/01 - 15/01):

- Creating a format allowing to save / load the full scene, meshes and materials - Finish
- Head-Up Display (HUD) - Finish
- Saving a snapshot of the application to a known image file format - Finish
- Game logic - Finish

Week 8 (16/01 - 22/01):

- Final tweaks and report
- Last 3 days: report