CUBIX: 3D Block Matching Puzzle Game

Graphics Features:

- Fully 3-dimensional movements and block placement.
- Customized 3D meshes
- Camera follows user block cursor
- Block cursor emits different colored light depending on if it can place a block
- Two directional lights: one is aimed in the direction of the camera view, the other aims in the opposite direction to the view, and moves with some irregularity to light the rear of the block mass in the secondary view.

Game Features:

- Blocks adjacent to similar blocks pulse
- 5 or more adjacent blocks form a match
- Matches are eliminated and earn the player 100 points per block
- Randomized 1-dimensional planes called "slices" will rotate in a random direction on randomized axis to both help and hinder the player in forming matches.
- Normal mode gives the player more time to form matches, and has less frequent slice pivots. Hard mode allows for less time, and the player must contend with much more frequent slice pivots.
- Game Controls:
    - Left & Right arrows: move along x-axis
    - Up & Down arrows: move along y-axis
    - Home & End keys: move along z-axis
   - Left Control or Numpad 0: place block

Technical Challenges:

We attempted to implement a number of features into our game. Due to the performance characteristics of the UWB_SceneNode class in adding & removing child nodes, we opted to draw the blocks direct using an overridden draw function within the CBlockGroup. This decision however made integrating pixel shading much more difficult and we were not able to complete it in time. Additionally, one significant unresolved issue the camera will fail if the cursor is moved to any position directly in the center y-axis of the block mass. The cause of this is well understood to be the up vector direction of the camera and the view vector direction coincide and cause the camera to fail. This issue is unresolved because we were unable to determine an appropriate up vector for the camera in all cases.
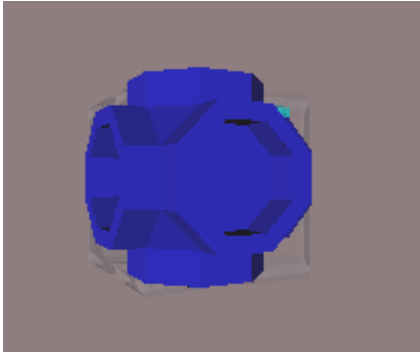
Main game display
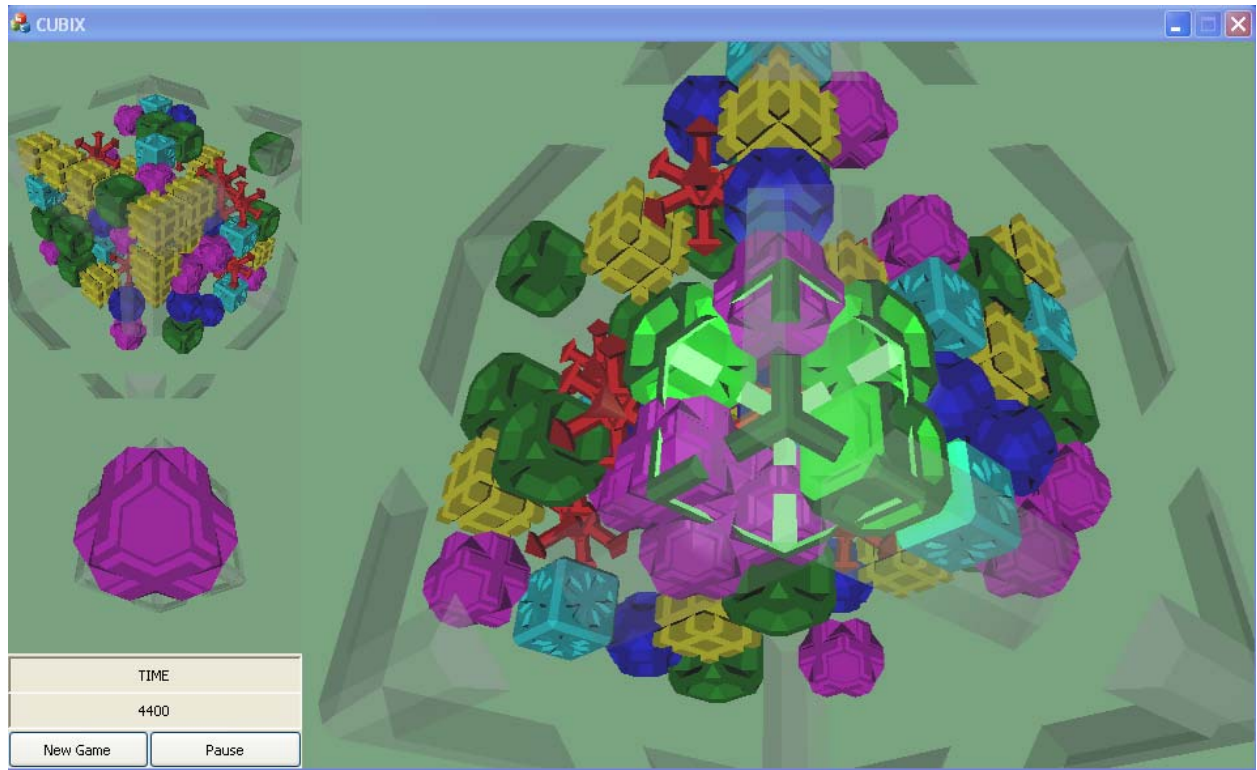
Block Cursor
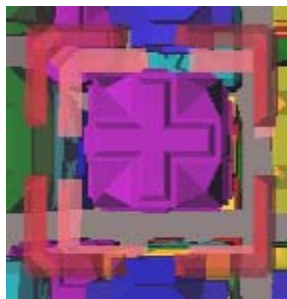
New Block Window: This block will be added to the position of the cursor in the Cubix
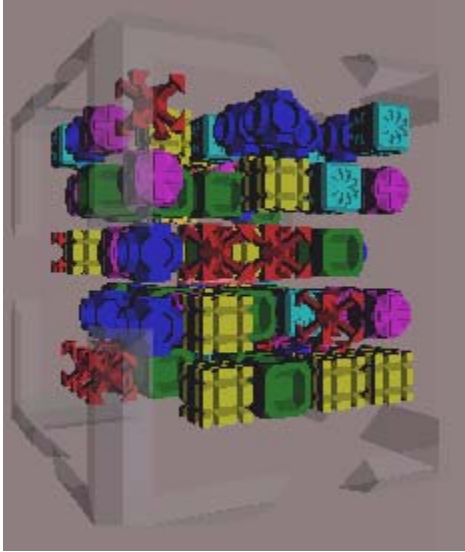

Time:

Score:

New Game: Start a new game

Pause: Pause the game

Assistant window: This view shows the opposite side of the main window.