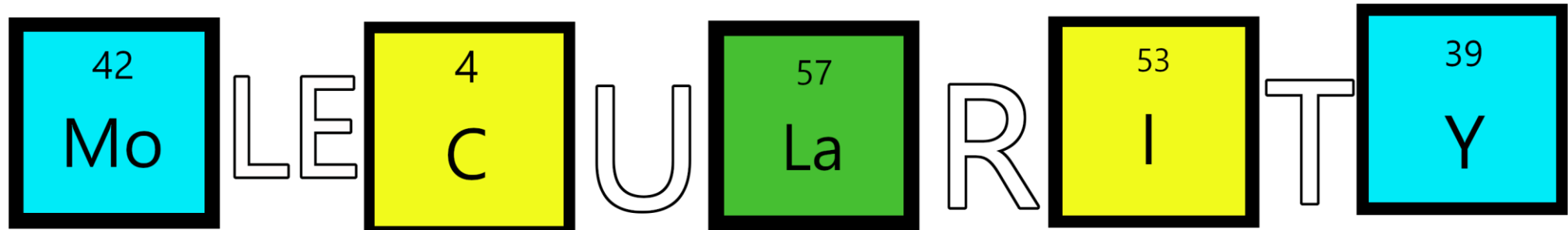


Good Team Name

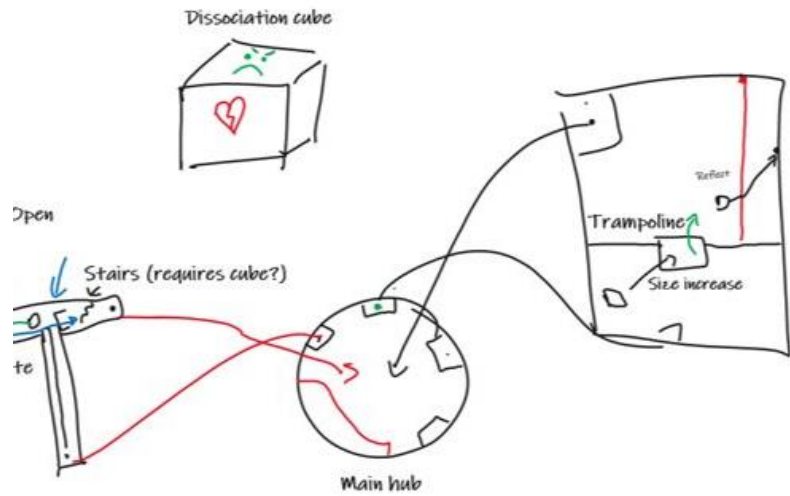
By Kyle Robinson, Ben Shaw, Thomas Millard, Daniel
Wilson, Jacob Dexter



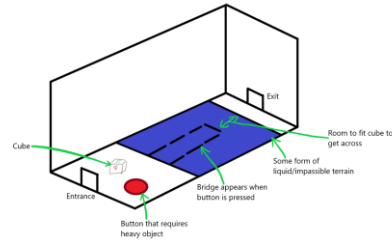
Idea

- Puzzle Game
- Centred around moving specific objects within a level by changing their properties
- Manipulation of object properties:
 - Gravity
 - Size / Density (weight)
 - Burnable
 - Bounciness
 - Conductivity
 - Reflective
- Basic physics like drag / push





Mass/Density Tutorial



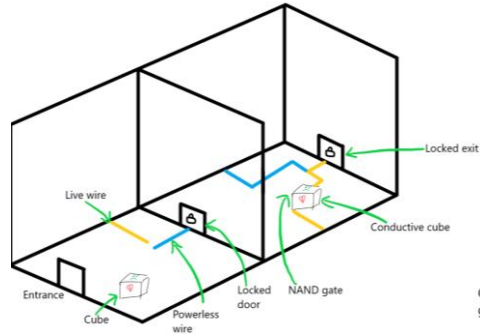
Summary:
 1) Increase mass/density of cube
 2) Place it on button which can activate button
 3) The bridge isn't long enough need to use the cube again
 4) Decrease mass/density of cube so it floats and you walk over it

Idea: Could possibly utilise fans similar to move objects if too light

Idea: Design

- Levels
- UI

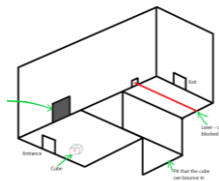
Conductivity Tutorial



Summary:
 1) Place the cube on the powerless wire
 2) This opens the next area
 3) Need to use the NAND gate to lock the cube to be on the live wire
 4) This causes the door to open and you can exit

Could mess around with gates in some way

Bounciness Tutorial



Summary:
 1) Set the cube to minimum bounciness so it doesn't move when hit and the pusher
 2) Proceed past the pusher and cube
 3) Increase the bounciness of the cube and drop it down the hole for it to go up to the other side
 4) Cube blocks the laser or some detection to register the cube is there and creates a pathway or hole

Don't know how I feel about moving but just a possibility



The Game

- DirectX 11
- C++
- Engine

- Title: Molecularity
- A puzzle game where you change cubes to complete the levels

The Tool

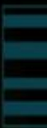
- This tool allows for the player to manipulate the cube to complete the levels.
- Current tool modes:
 - Convert – changes the material which affects mass/density
 - Size – enlarges or shrinks a cube which changes its hitbox and mass
 - Magnetism – either brings a single or all the cubes to the player
 - Bounce – whether the cube bounces
 - Conductivity – changes a cube's conductivity

The aim for you is to puzzle you wa
through the rooms that are given to
press ENTER to continue



Level 1

- Puzzle: Hit the button on the other side
- Solution:
 1. Throw the cube
 2. Change the material
 3. Change the size

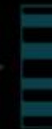


Conver



Level 2

- Puzzle: Hit the button on the other side
- Solution:
 1. Change the cube to bounce
 2. Throw the cube
 3. Change the material of the cube
 4. Change the size of the cube



Conver



Level 3

- Puzzle: open the door and make the button have power
- Solution:
 1. Pick up one cube place it between wires and make it conductive
 2. Pick up one cube place it between wires through the door and make it conductive
 3. Change the material of the cube
 4. Change the size of the cube
 5. Place cube on button



Resiz

The aim for you is to puzzle you way through the rooms that are given to you.

press enter to continue

Level 4

- Combined Elements from all previous puzzles to work together
- Puzzle: Open the side doors and bounce a cube onto the pressure plates that are revealed by the doors. Which opens the middle door (not shown in background)
- Solution
 - 1 cube placed connecting the live wire to the left side neutral wire
 - 1 cube placed connecting the live wire and now charged neutral wire charging the last wire
 - Door opens which allows the player to bounce a cube onto a button
 - 1 cube placed connecting the live wire to the right side neutral wire
 - Door opens which allows the player to bounce a cube onto a button
 - Door opens allowing the player to put 1 cube onto a button
 - Resizing and property replacement are required for different steps and multiple cubes are used for the level



Con

System Architecture

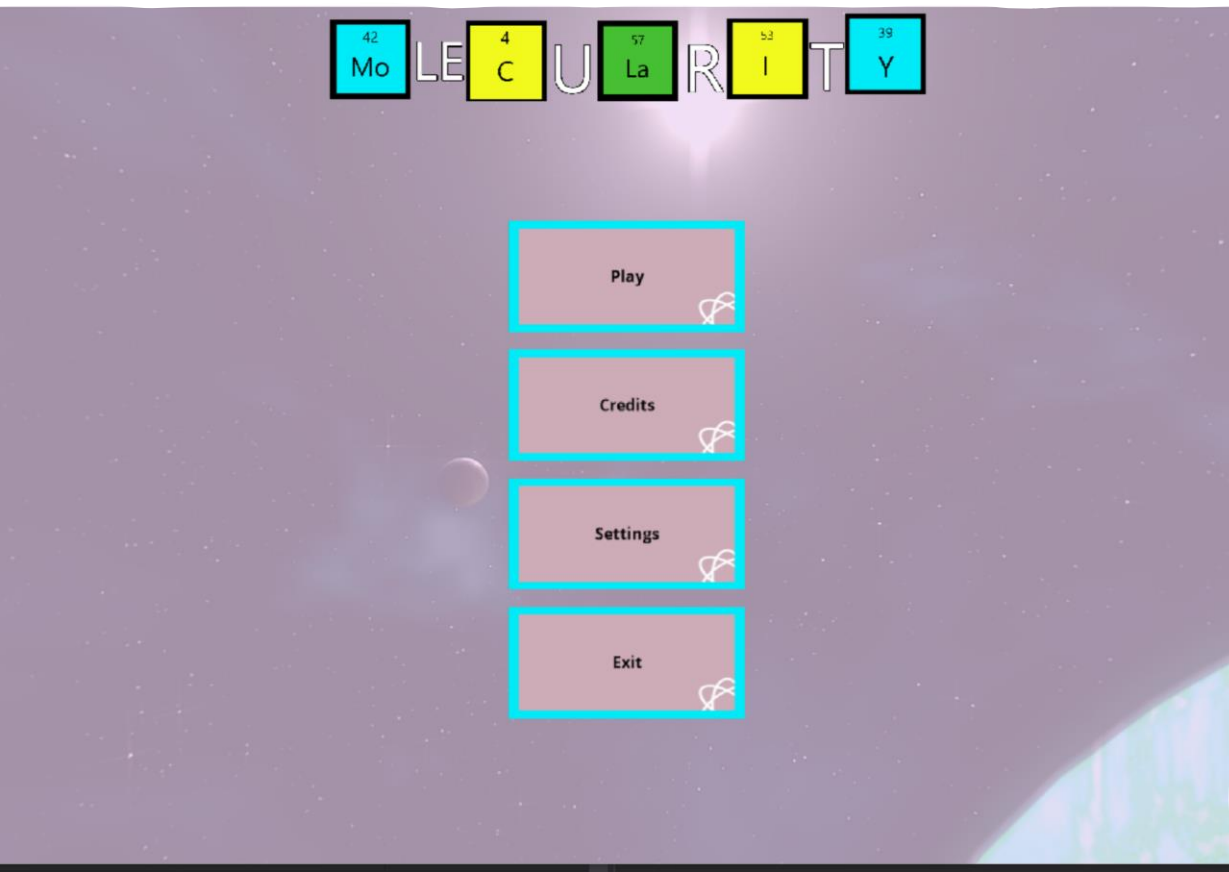
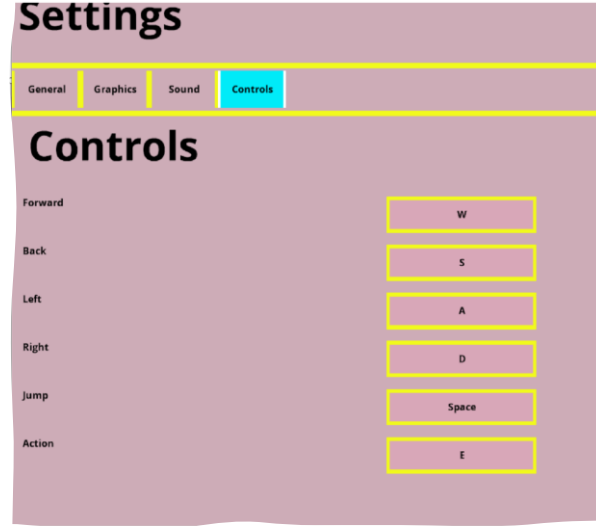
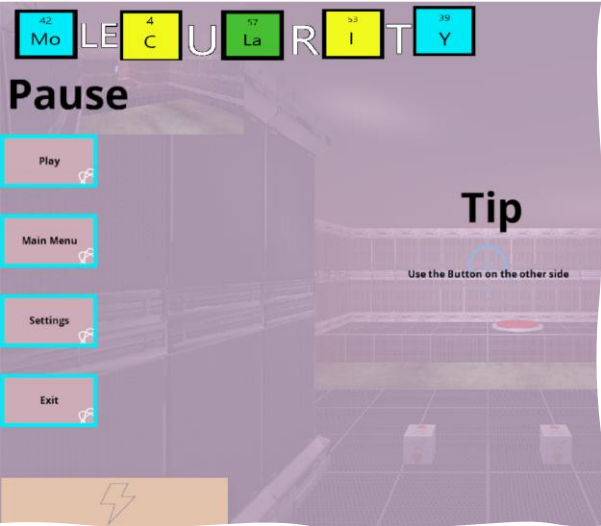
- **Event System:** Allowed for the decoupling of all the main systems.
 - Graphics, Sound, Physics, UI
- **Level State Machine:** Used to separate the levels into different classes.
 - Multi-threading was used to improve speeds when loading to a new level.
 - The models for a level are only loaded when it is switched to.
- **Entity-Component System:** Decoupled models from each other once loaded.
 - Templating meant models of different file types could be loaded.
 - World data for models would be loaded in from a JSON file for initialization.
 - Provides each model with a list of modifiable parameters according to what type of object it is.

Graphics

- **Lighting:** A full lighting model was used to light the scene.
 - Directional, point and spot lighting were used.
- **Stencil Outlining:** A system created to apply a colour outline to models in the game.
 - Used in-game to outline the cubes when hovering over them.
 - Used to replace the gun should it clip through the wall.
- **Render-to-Texture:** Used to render a second viewport to the screen.
 - Used by the security camera to show the position of the player from a different perspective.
- **Post-Processing:** A system that applies overlay effects to the scene.
 - Used in the final level to create a “blackout” effect.
- **Fog:** A simple fog system used to add more colour to the scene, making it more visually complex.

Sound

- Sound design based on a sci-fi theme to match the rest of the game
- Background music for different levels and menu screens
- Uses both 2D and 3D sounds
- Separate volume control for master, music and sounds



UI

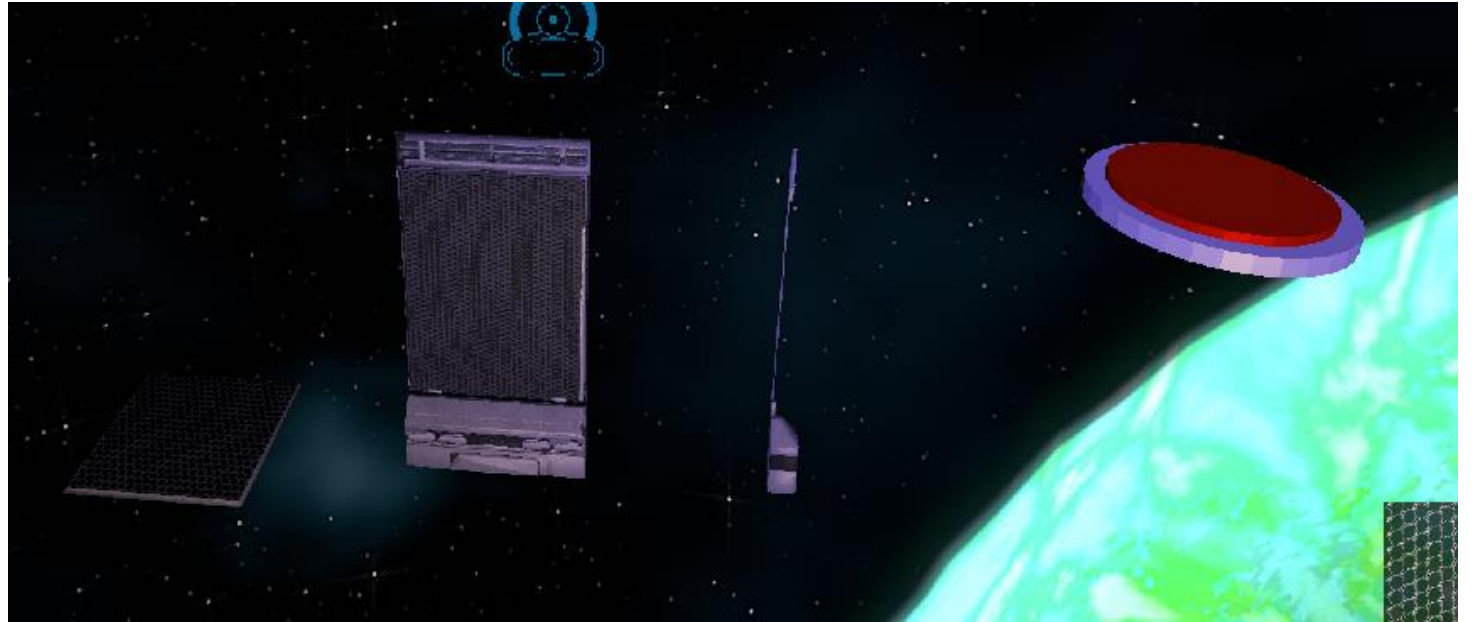
- HUD
- Main Menu
- Tutorial
- Credits
- Pause
- Settings

Physics

- Object physics
 - Gravity
 - Friction
 - Drag
 - Velocity
 - Acceleration
- Cube Attributes
 - Bounce
 - Magnetism
 - Mass
 - Size
 - Collisions

Models

- Modular Building blocks
- Low poly and basic
- Fits the overall theme of the game
- Obvious what objects within a scene are



How the team has worked

- Kyle Robinson - lead programmer
- Ben Shaw - sound / engine programmer
- Thomas Millard - UI / engine programmer
- Daniel Wilson - 3d models / engine programmer
- Jacob Dexter - physics code / engine programmer

The future

- More Puzzles – making use of multiple tools per level
- More Tool States – i.e. burnable and reflective
- More Levels
- Multiple Puzzle Levels
- Different ways to complete levels instead of just buttons
- Loading screens

End slide

- GitHub Repository: <https://github.com/kyle-robinson/directx-game>
- Commit History: <https://github.com/kyle-robinson/molecularity/commits/master>
- Team Contributions: <https://github.com/kyle-robinson/molecularity/graphs/contributors>
- Trello Board: <https://trello.com/b/V0FSI5Hy/molecularity-progress-board>