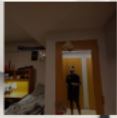


## Introduction

- Welcome to "The Enchanted Dungeon: Medieval MR Escape Room"
- Purpose: To immerse players in a realm where the real world and virtual world are one and the same



Meet the team behind the adventure:  
Project Lead: Anyath Ghosh  
Design: Wilsaiah Anyath Ghosh  
Code: Akkashin Anyath Ghosh  
Public Architecture: Anyath Ghosh

## Project Background

How can we utilize real-world problem spaces to create immersive experiences that can be used for education and culture preservation?



## From Lore to Virtuality

- Story: A dark fantasy world where a group of adventurers must solve a series of puzzles to escape a cursed dungeon.
- Design: Based on the game "The Elder Scrolls V: Skyrim" and the book "The Hobbit" by J.R.R. Tolkien.
- Tools: Unity 3D engine, Unreal Engine 4, and Blender 2.8.
- Goal: To create a virtual world that is both immersive and educational.



## Methodology

- Conceptual Design: Overview of the 3D game world
- Design: 3D, 2D, and 1D
- Development: Real-time, 3D, and 2D
- Evaluation: 3D, 2D, and 1D



## Data Analysis

- Experimental V. Control
- Data
- Data Collection

## Making the Escape (and failing)

### Building the Room

- Noise function on walls
- Procedural Generation
- Ambience



### Populating the Room

- Making the games
- Visualization
- User experience



## Data

- Completion Time
- Puzzle Solving
- User Satisfaction



## Conclusion

# PROJECT ROADMAP

Mixed Reality Escape Room

# Introduction

- Welcome to "The Enchanted Dungeon: Medieval MR Escape Room"
- Purpose: To immerse players in a realm where the real world and virtual world are one and the same



Meet the team behind the adventure:

Project Lead: Aayush Ghosh

Design Wizards: Aayush Ghosh

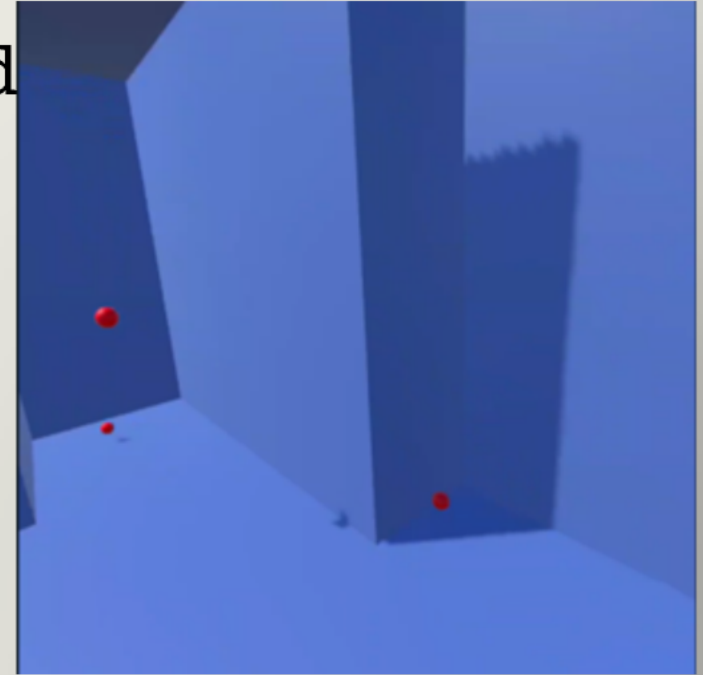
Code Alchemists: Aayush Ghosh

Puzzle Architects: Aayush Ghosh



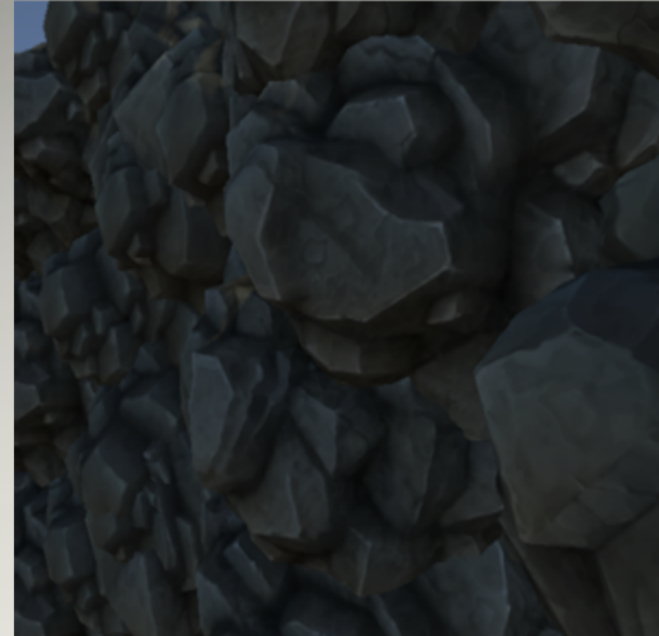
# Project Background

- Games as an artform need to update
- Problem Importance: Lessons from here could be carried over into academia and culture preservation



# From Lore to Virtuality

- Story-driven Gaming (Smith et al., 2018)
- Escape Room Dynamics (Brown & Harris, 2020)
- User Experience in VR (Chen et al., 2020)
- Build Believable Mixed Reality Experiences with Mesh API and Depth API
- Legend of Zelda
- Procedural Generation





# Methodology

- Conceptual Design: Overview of the 3 games in the dungeon
- Depth API - Scene API
- Scanning Real Items into Virtual World
- Interacting with real objects and their virtual version in the game world

```
For each puzzle in the escape room
  Present clue to the player
  If player interacts with correct object
    Provide feedback
    Unlock next puzzle or reward
  Else
    Offer subtle hint after timeout
EndFor
```

```
function GenerateJaggedWallMesh(wallMesh):
  noiseScale = Define the scale of the noise
  noiseIntensity = Define how much the noise affects the displacement

  for each vertex in wallMesh.vertices:
    perlinValue = PerlinNoise(vertex.x * noiseScale, vertex.y * noiseScale, vertex.z *
noiseScale)

    vertex.position += vertex.normal * perlinValue * noiseIntensity

  RecalculateNormals(wallMesh)
  UpdateMeshCollider(wallMesh)

  return wallMesh
```

```
Define interaction interface for all game objects
For each interactable object in the game:
  If object is within interaction range of the player:
    Listen for player input (e.g., grab, push, pull)
    Respond to input with the appropriate action (e.g., pick up,
move, activate)
  If real-world object:
    Use Scene API data to match virtual interaction points
```





# Making the Escape (and failing)

## Building the Room

- Noise function on walls
- Procedural Generation
- Ambience



## Populating the Room

- Making the games
- Virtualization
- User experience





# **Data Analysis**

- Experimental V Control
- Tasks
- Data Collected







# Data

- Completion Time
- Puzzle Errors
- User Satisfaction

Completion Time (minutes)

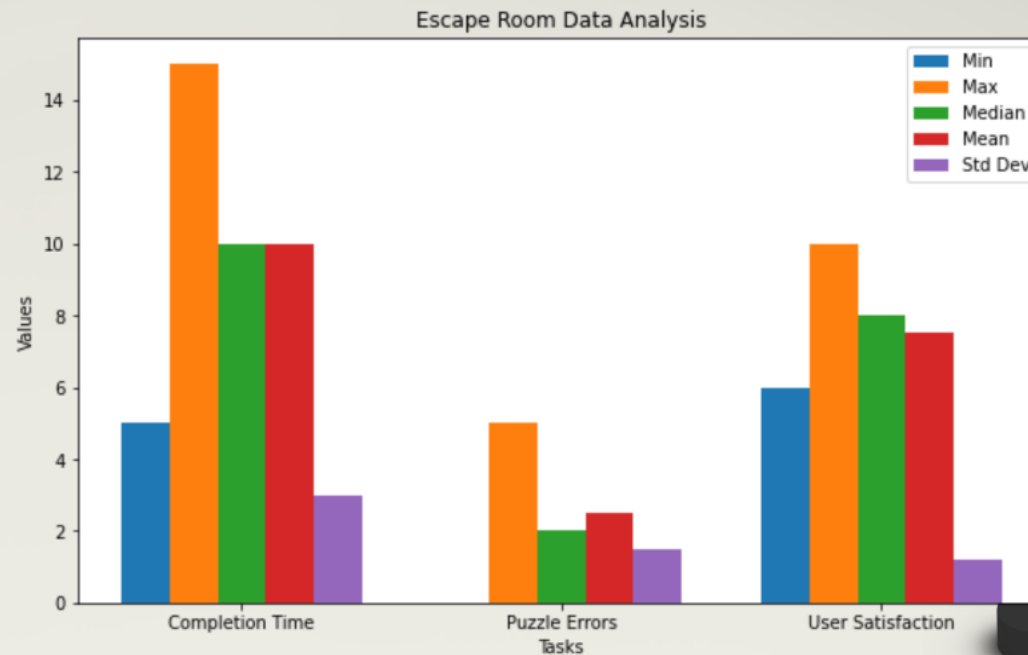
- Minimum: 5
- Maximum: 15
- Median: 10
- Mean: 10
- Standard Deviation: 3

Puzzle Errors (number of incorrect attempts)

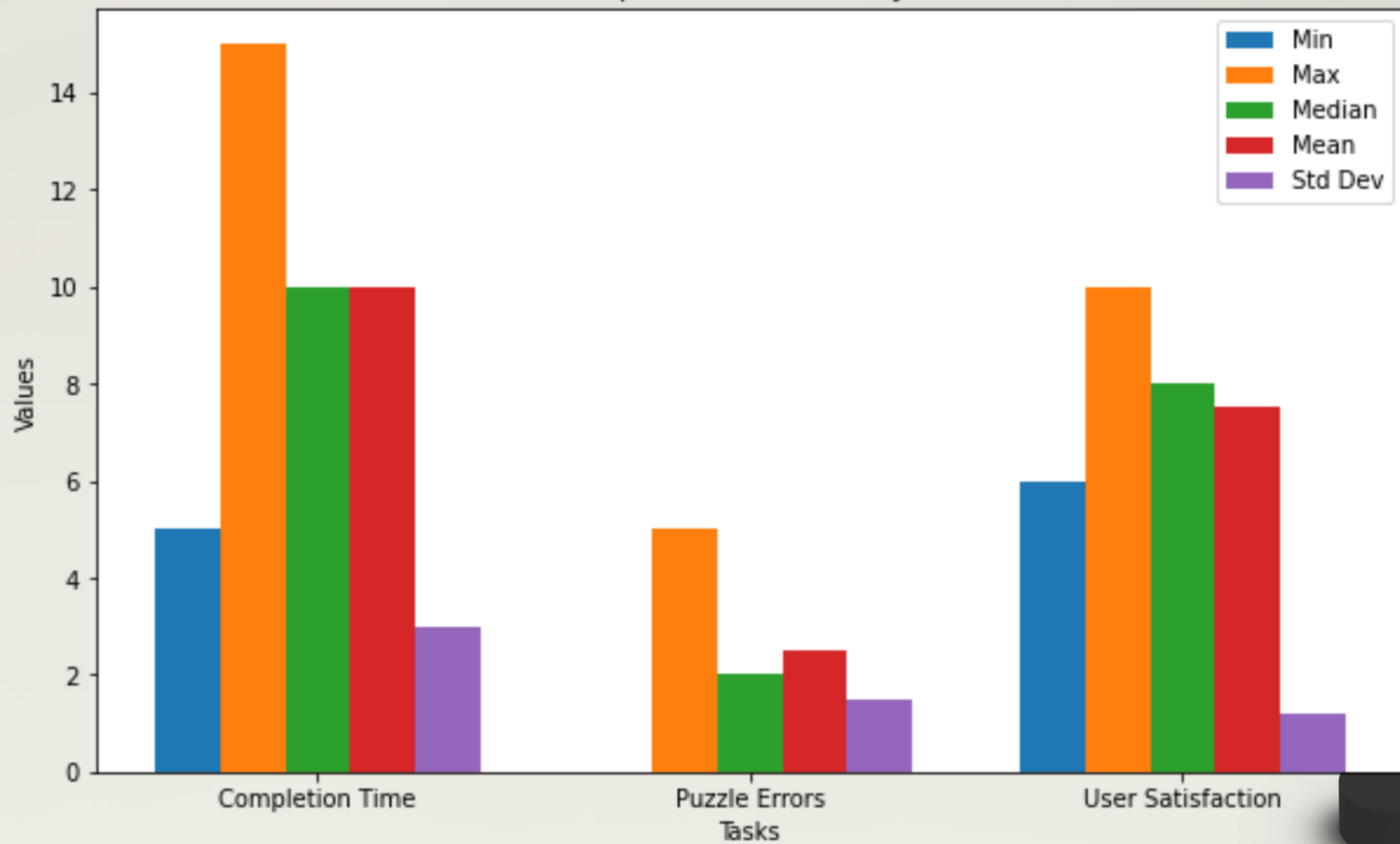
- Minimum: 0
- Maximum: 5
- Median: 2
- Mean: 2.5
- Standard Deviation: 1.5

User Satisfaction (scale 1-10)

- Minimum: 6
- Maximum: 10
- Median: 8
- Mean: 7.5
- Standard Deviation: 1.2



## Escape Room Data Analysis



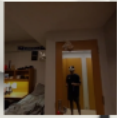


# **Conclusion**



## Introduction

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- Purpose: To immerse players in a realm where the real world and virtual world are one and the same



Meet the team behind the adventure:  
Project Lead: Anyath Ghosh  
Design Wizard: Anyath Ghosh  
Code Alchemist: Anyath Ghosh  
Puzzle Architect: Anyath Ghosh

## Project Background

Where the virtual and real worlds  
collide, the escape room experience  
can be redefined and enhanced.



## From Lore to Virtuality

- From Lore to Virtuality: A journey from the written word to the digital realm.
- Designing the virtual world: A process of creating a believable and immersive environment.
- From Lore to Virtuality: A journey from the written word to the digital realm.



## Methodology

- Conceptual Design: Overview of the 2 phases to the design.
- Design 1: Initial Design
- Design 2: Final Design
- Iterative Design: A process of refining and improving the design.



## Data Analysis

- Experimental V. Control
- Data
- Data Collection

## Making the Escape (and failing)

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### Populating the Room

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## Data

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## Conclusion

# PROJECT ROADMAP

Mixed Reality Escape Room