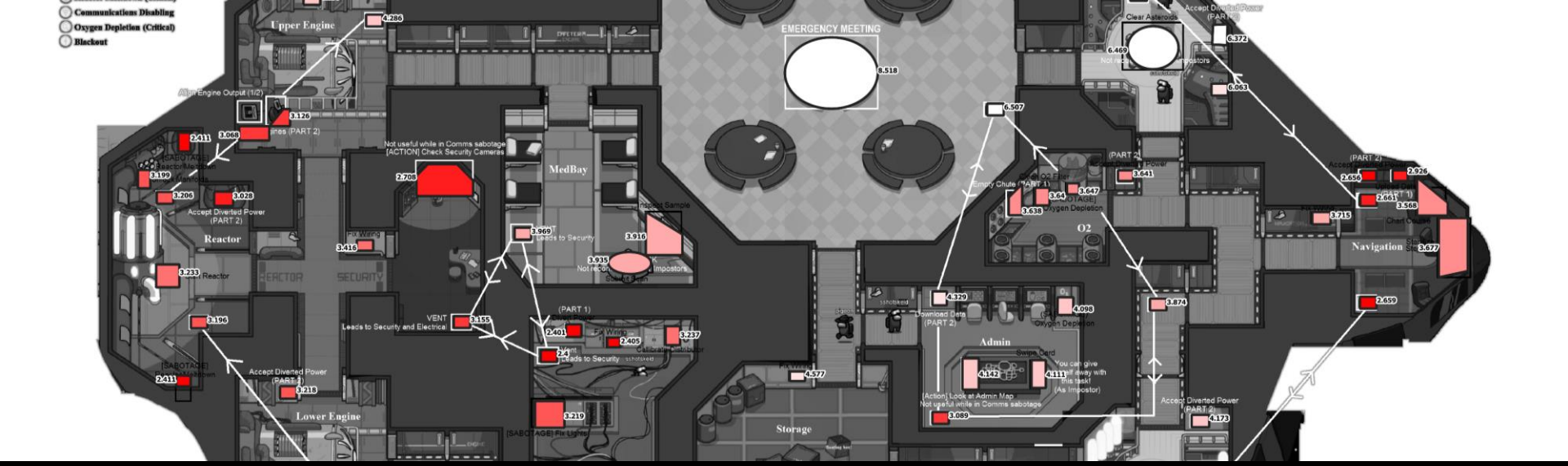

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Week 02 Part 1: **Recap**

Spatial Concepts in Virtual Game Spaces

Genevieve Shaun Lin (Associate Lecturer)
Ryan Tan (Co-Lecturer)

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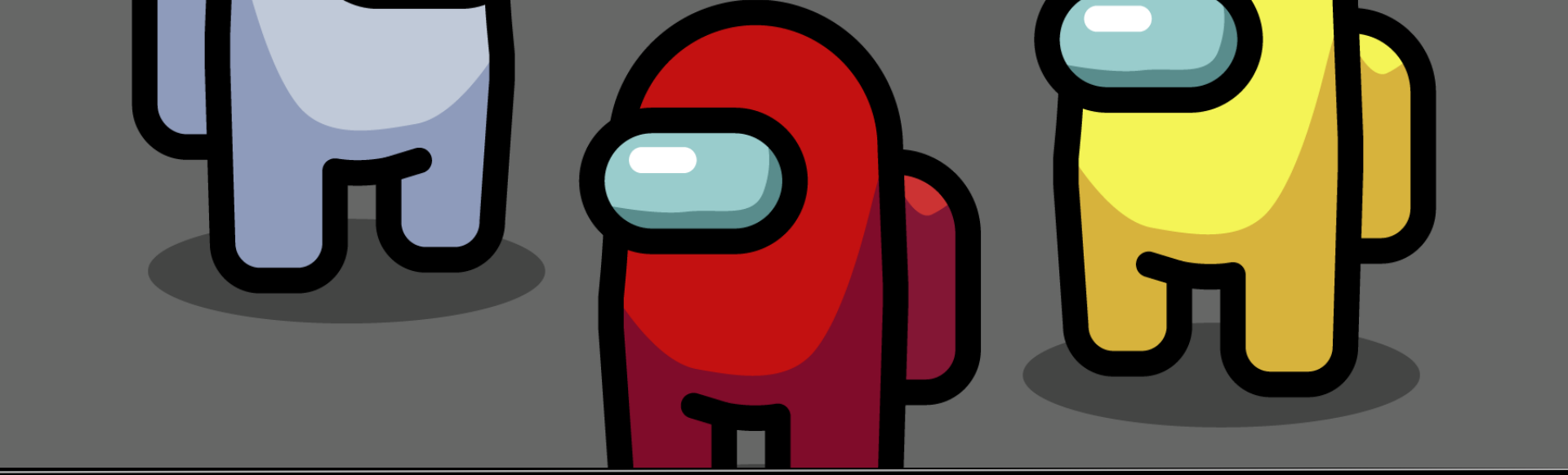

Introduction to Spatial Concepts

1. Visibility
2. Accessibility
3. Convex Spaces
4. Topological Depth/Steps

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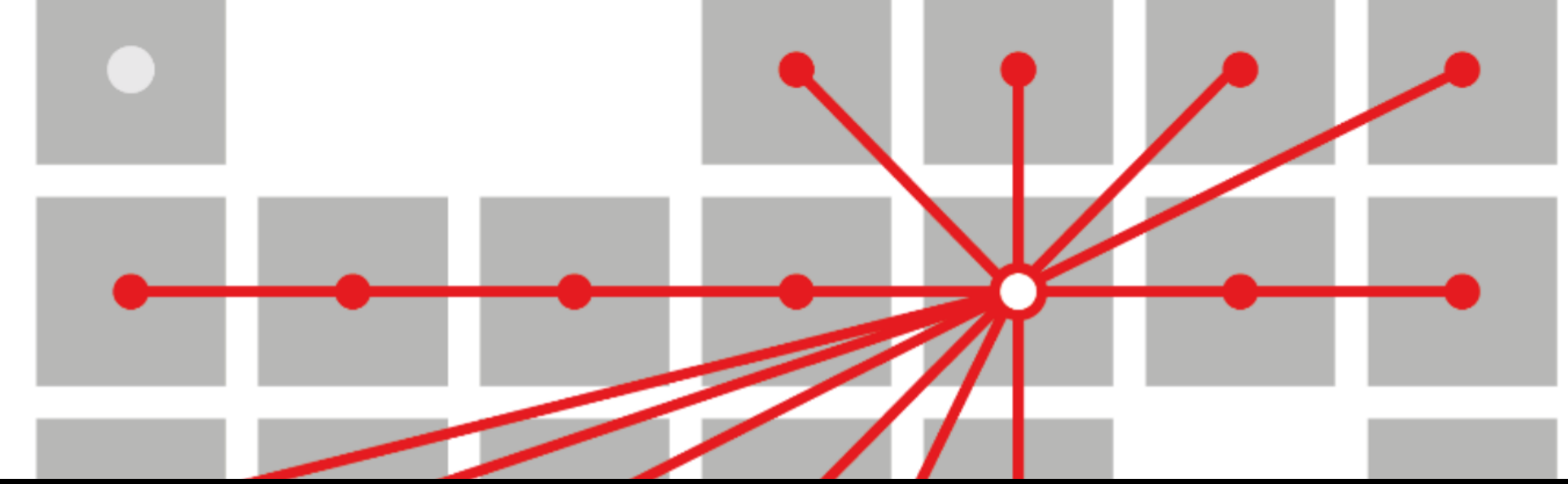
Ryan Tan



(1) Visibility

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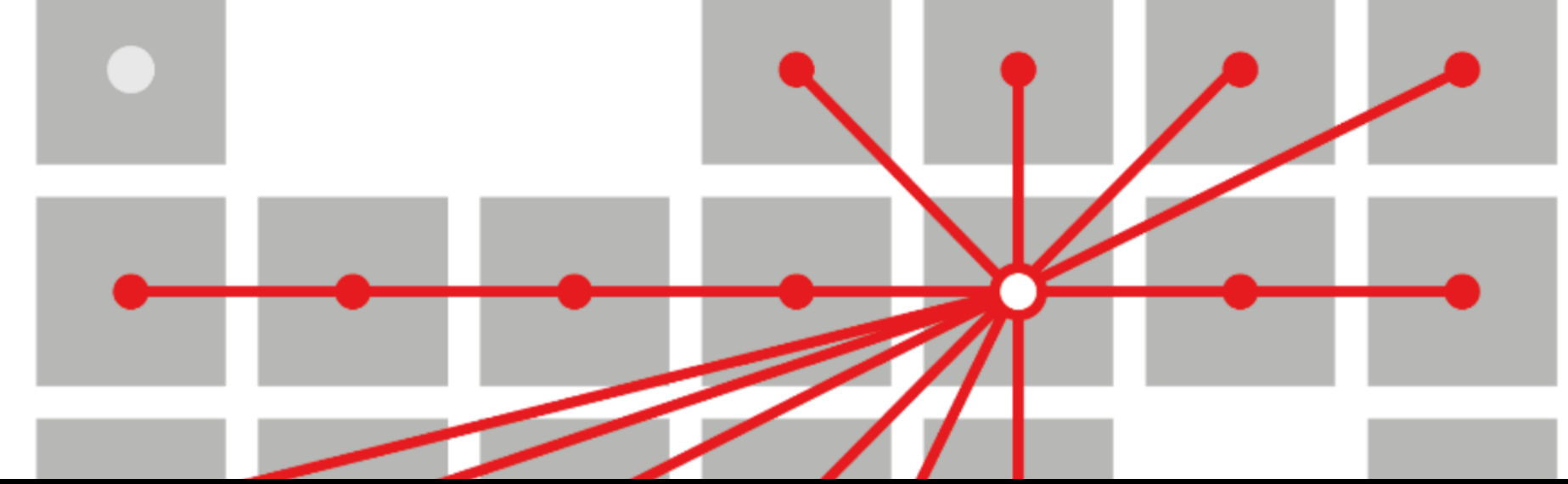
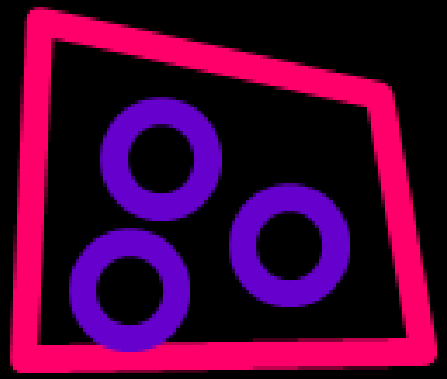
Ryan Tan

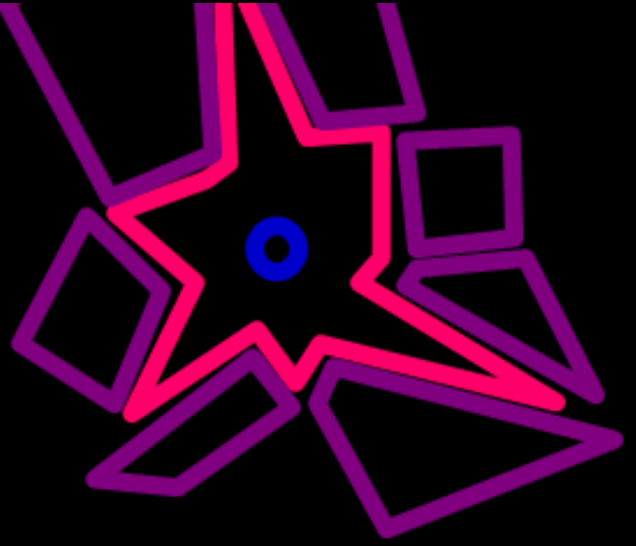
Game Examples



(2) Accessibility

Game Examples





(3) Convex Spaces

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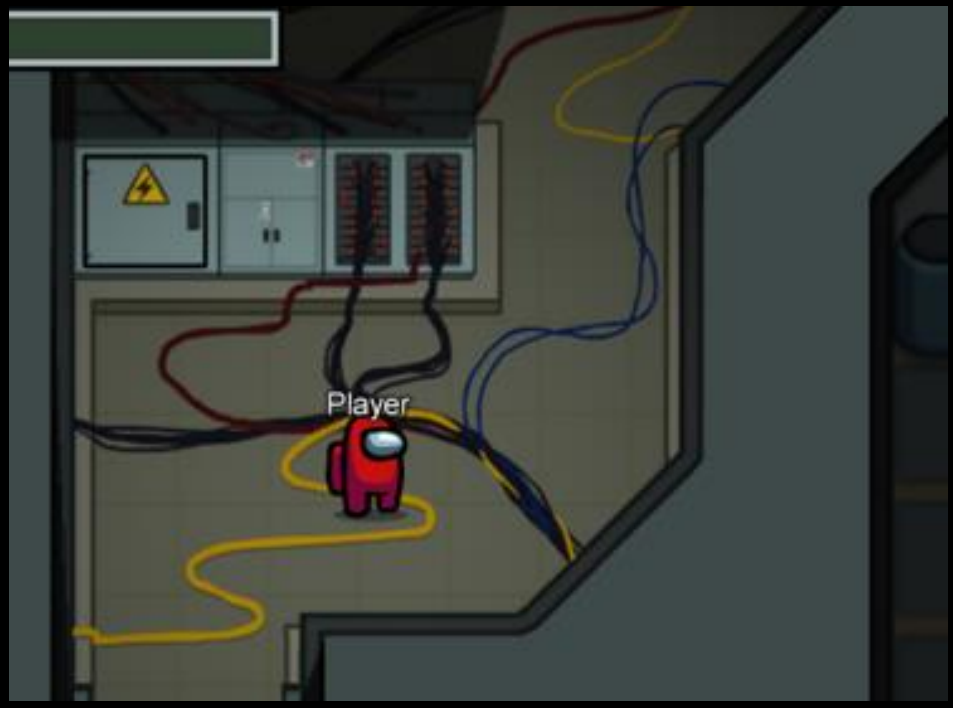
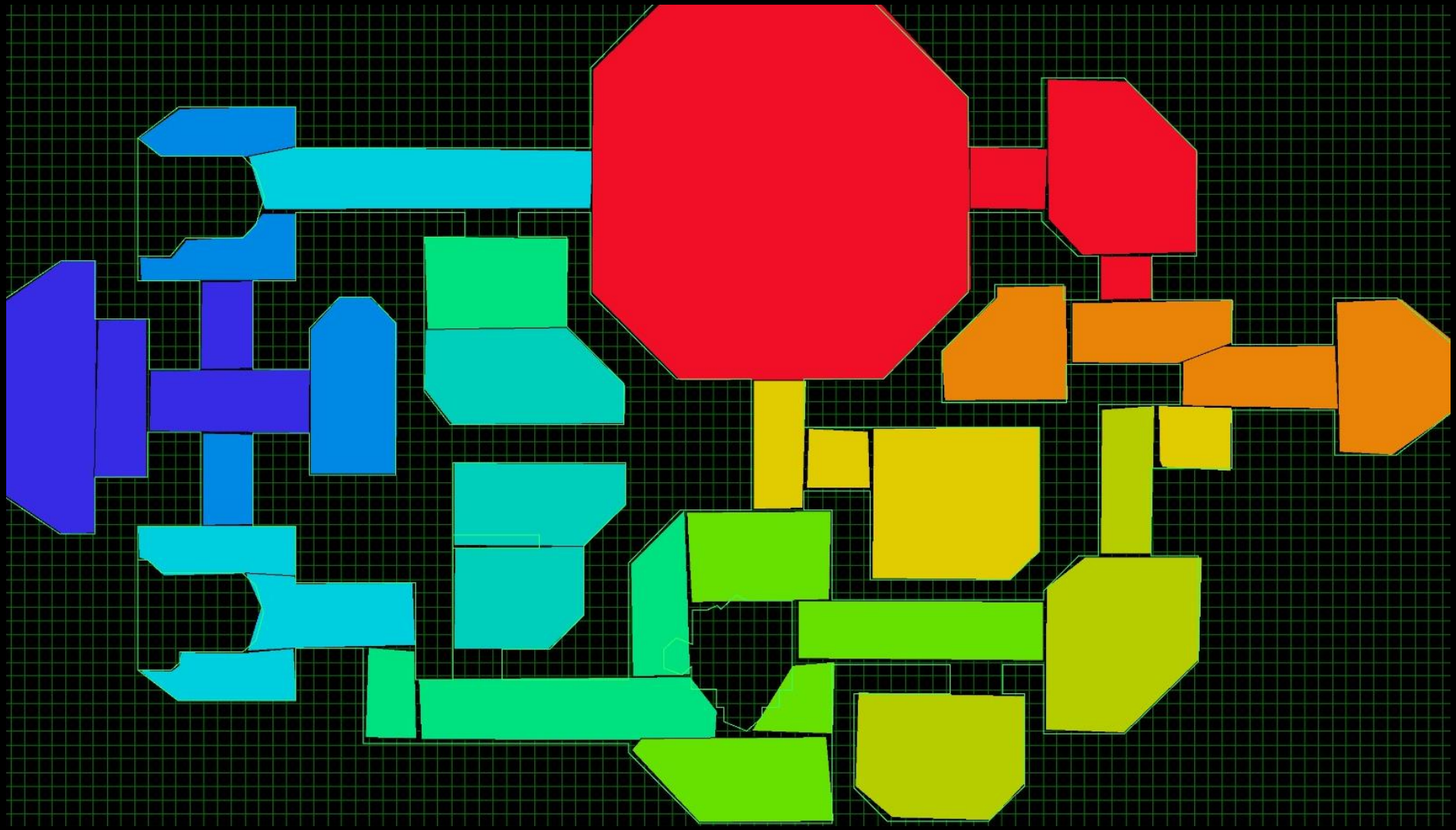
Ryan Tan

Game Examples



Partitioning



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(4) Topological Steps

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Ryan Tan

Game Examples

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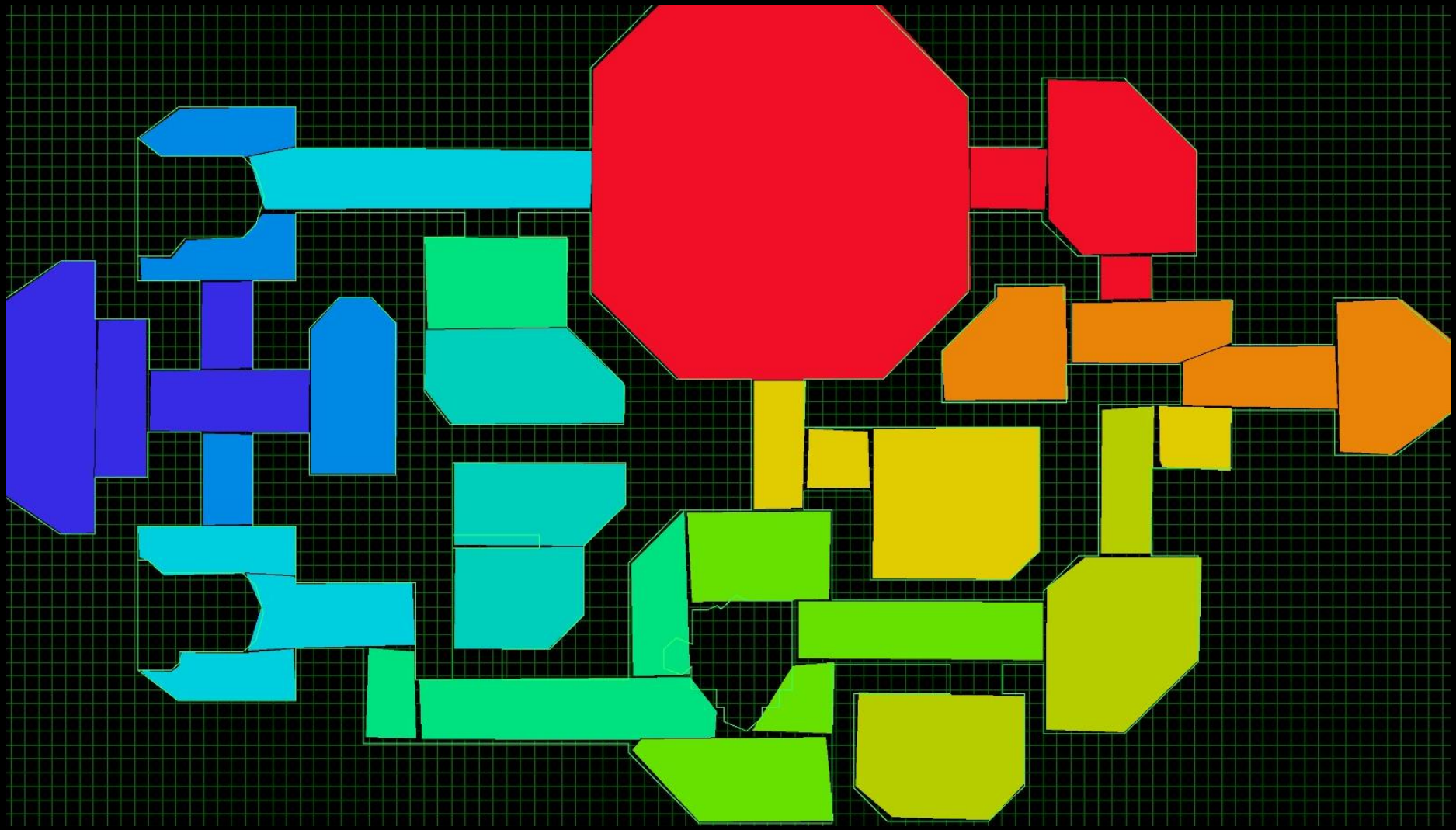
>Topological Steps

In Relation to Convex Spaces



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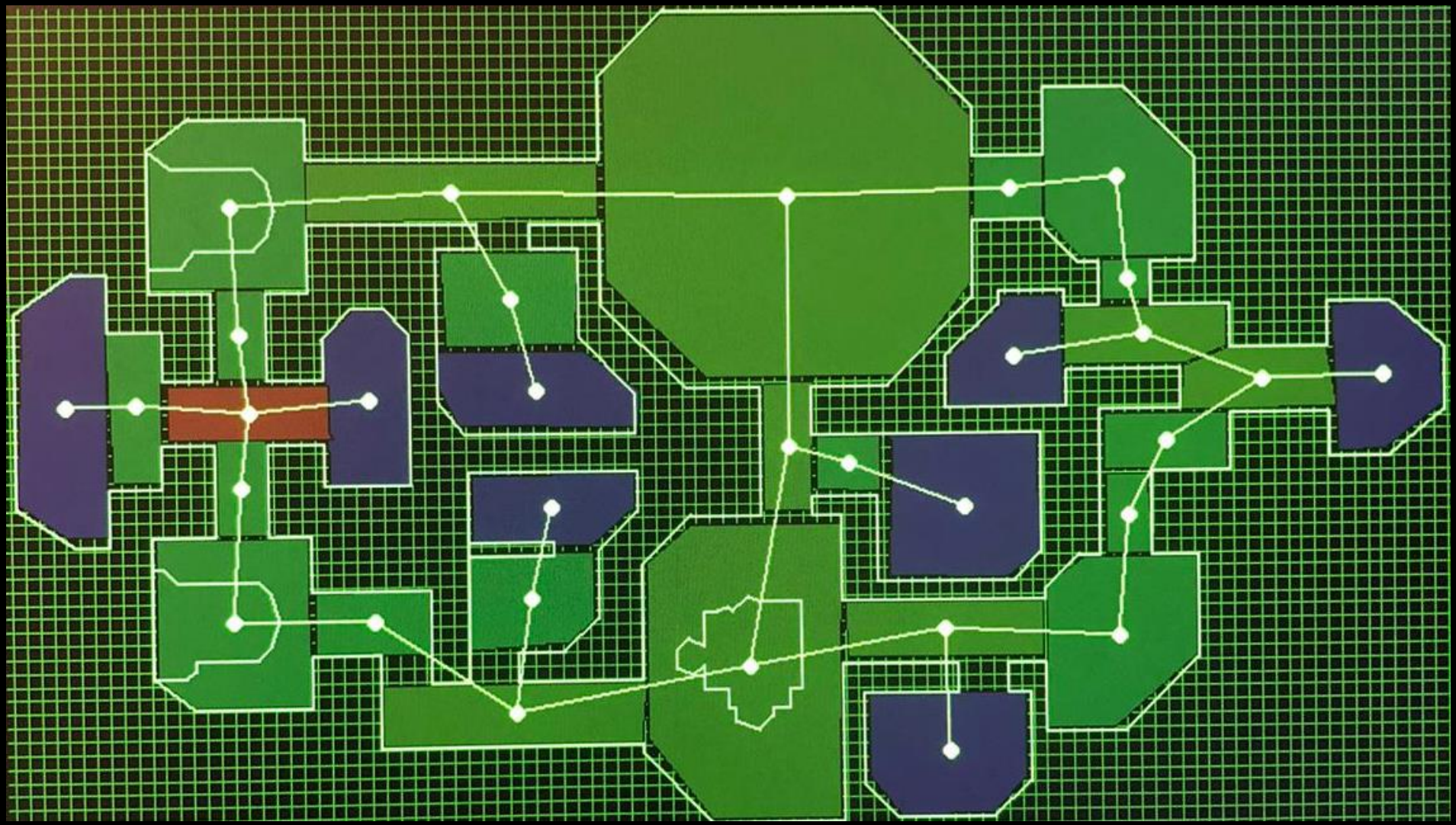
>Topological Steps

In Relation to Convex Spaces



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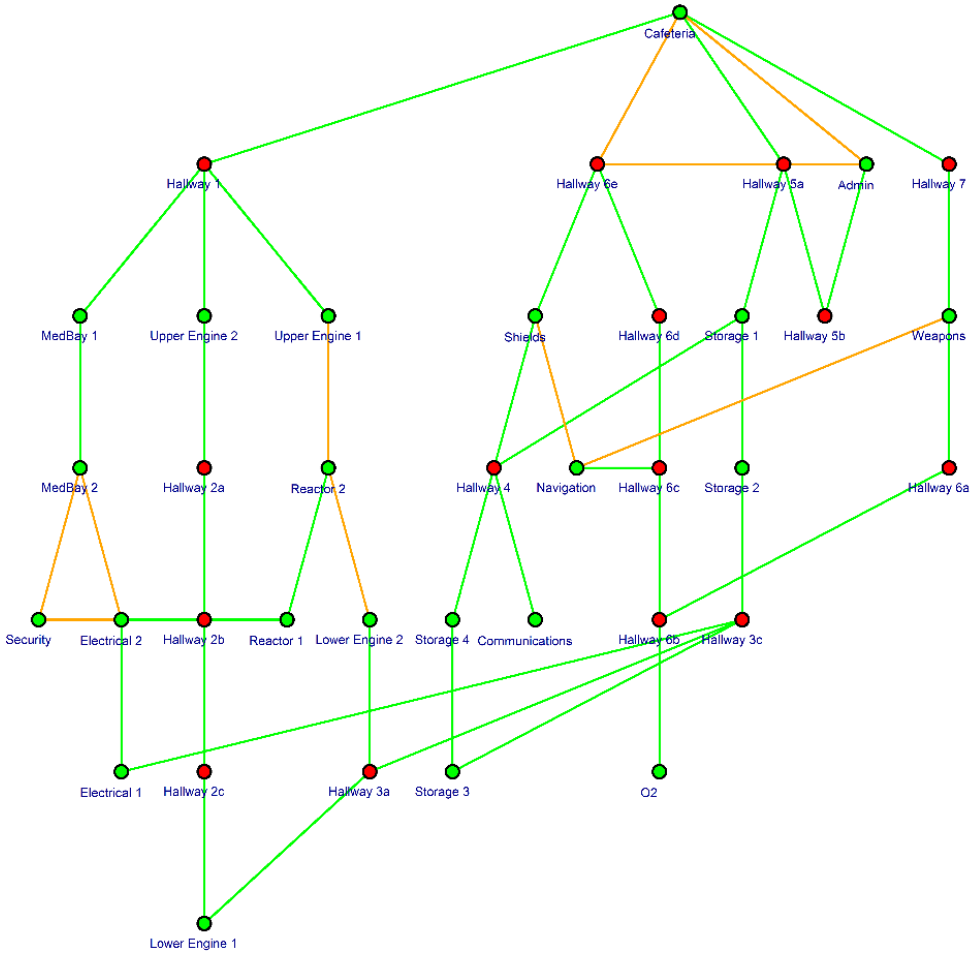
>Topological Steps

In Relation to Convex Spaces



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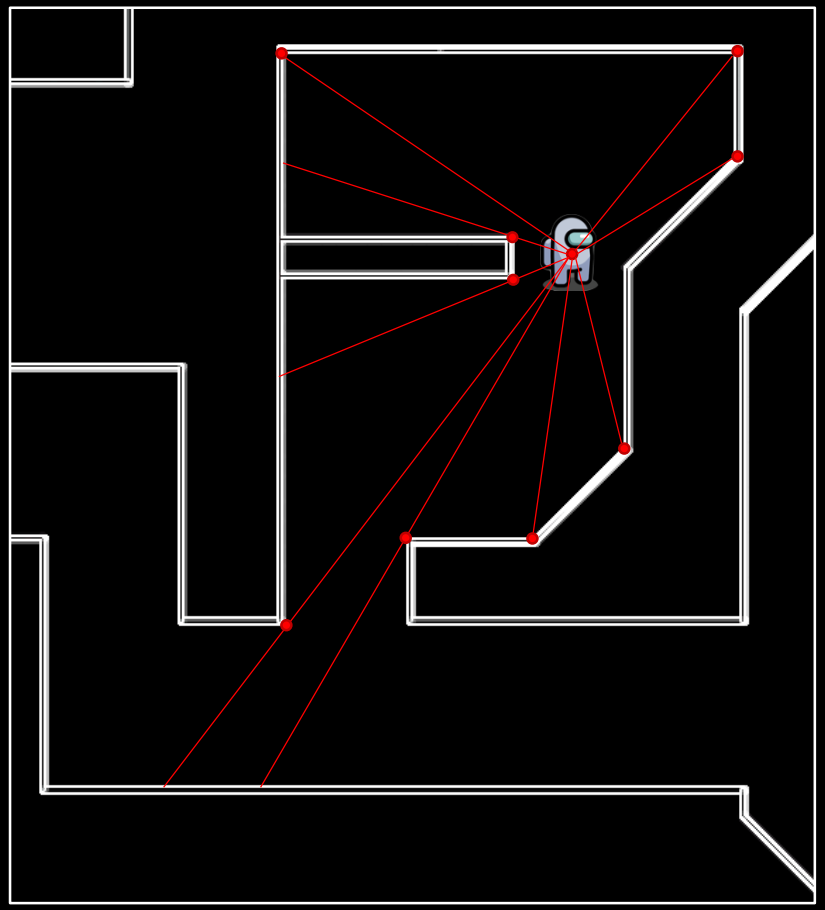
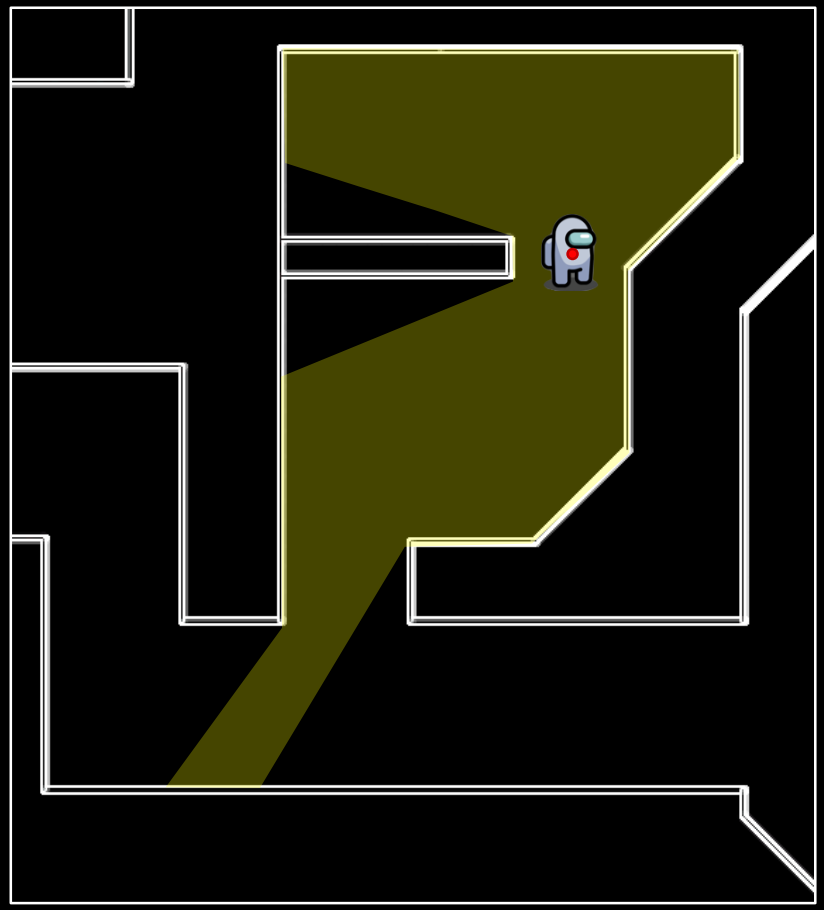
Ryan Tan

Exercise

Class Exercise



Line Sketches
(Centroid to Corners)

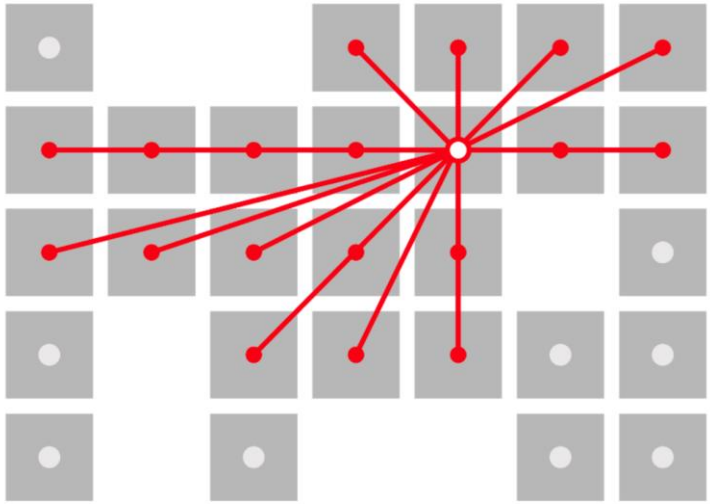


Isovist Drawing
(Filled Polygon)

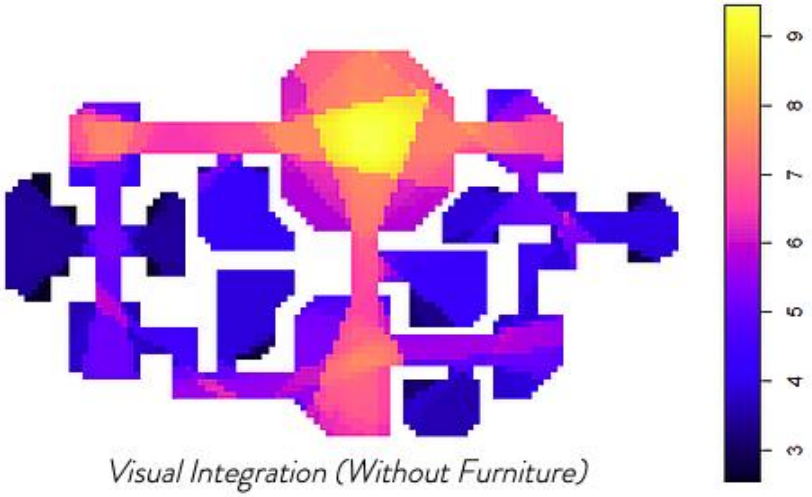
Exercise

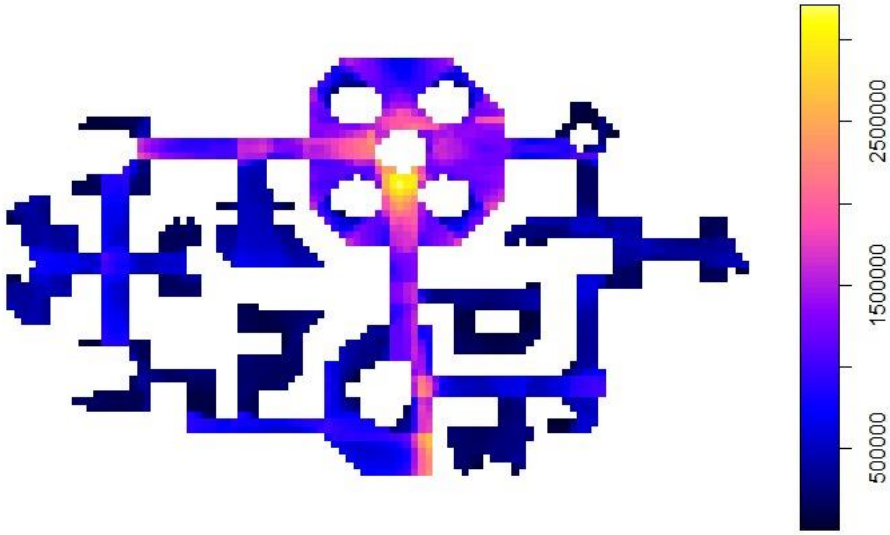
SPATIAL ANALYSIS - CONCEPTS

1. Isovists
2. **Visual Graph Analysis**
3. Convex Spaces
4. Spatial Network Graph



Visual Graph Analysis (VGA)





Visibility
- Where you can see (eye-level)

Accessibility
- Where you can go (knee-level)

METRIC

TOPOLOGICAL

ISOVISTS

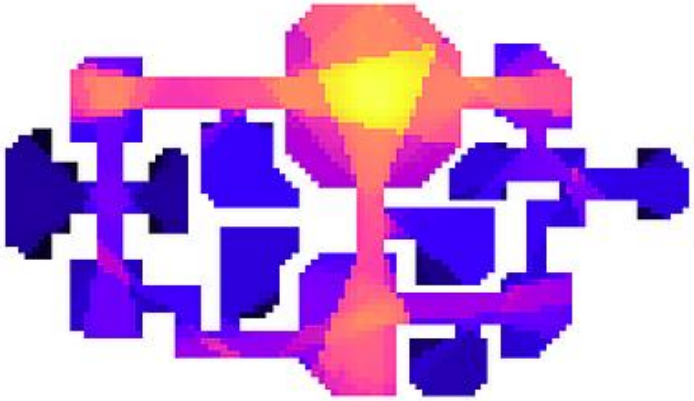
CONVEX SPACES

LOCAL

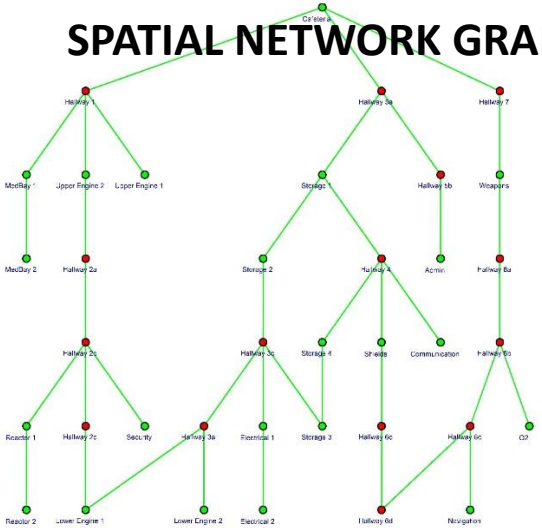
GLOBAL

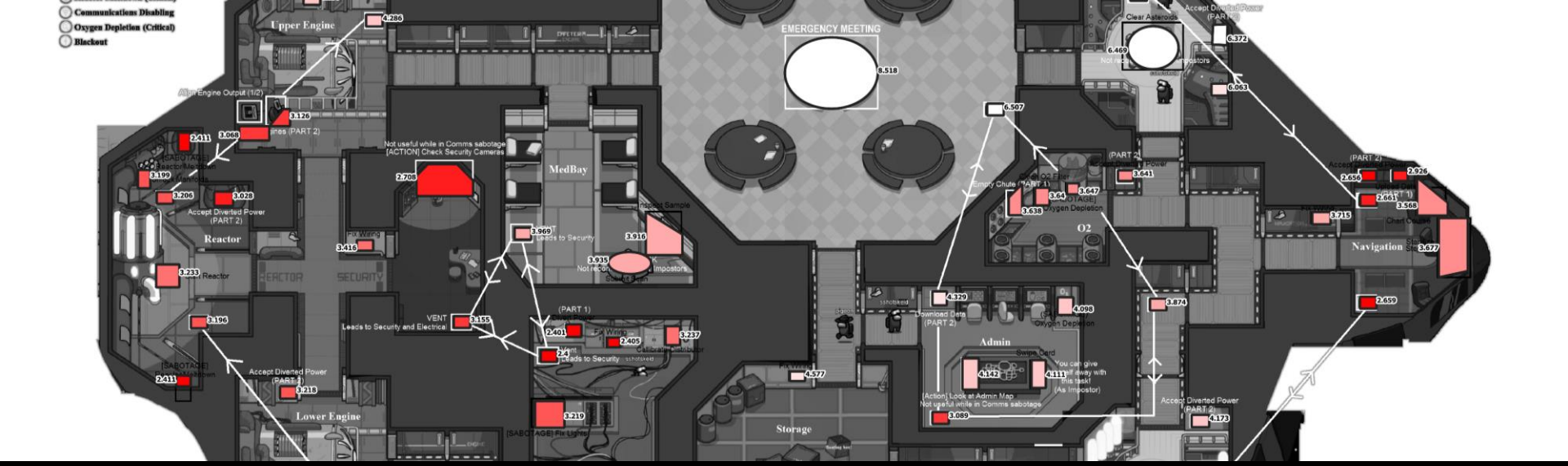
VISUAL GRAPH ANALYSIS

SPATIAL NETWORK GRAPH



Visual Integration (Without Furniture)





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Week 02 Part 2: **Analysis of Among Us**

How Among Us can help us understand Space and its relation to drivers of human interactions/movements

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Ryan Tan (Co-Lecturer)

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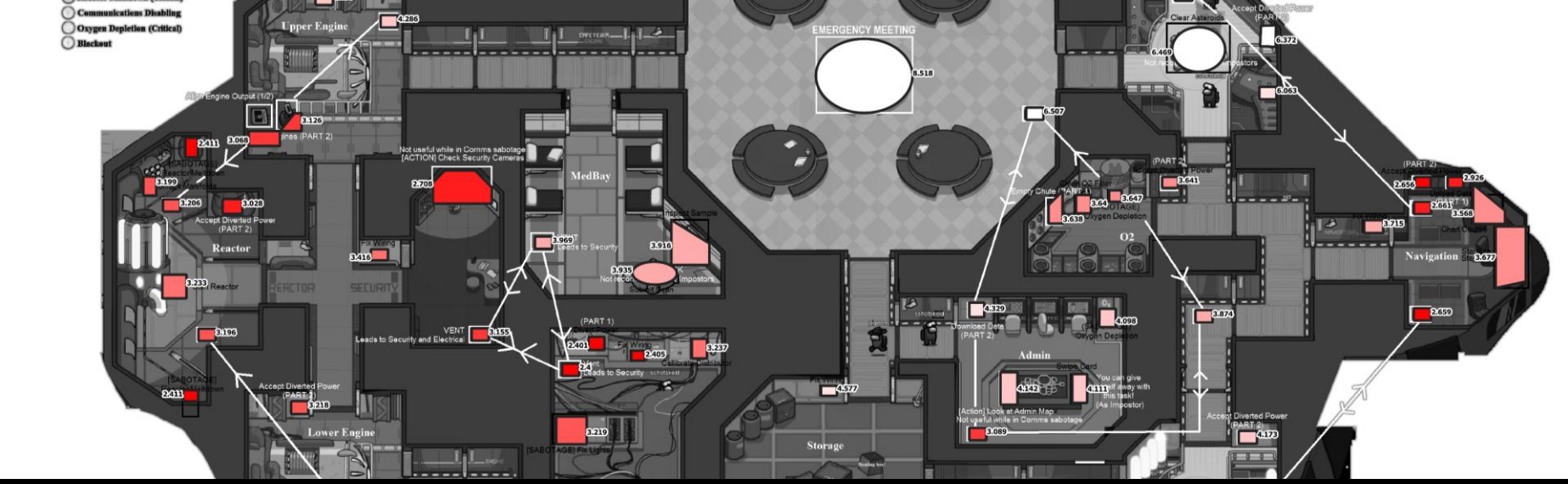

Analyses of Among Us

1. Do you think crewmates die “**Evenly**” around this map?
2. How do **Tasks** affect the gameplay?
3. How do **Sabotages** affect the gameplay?

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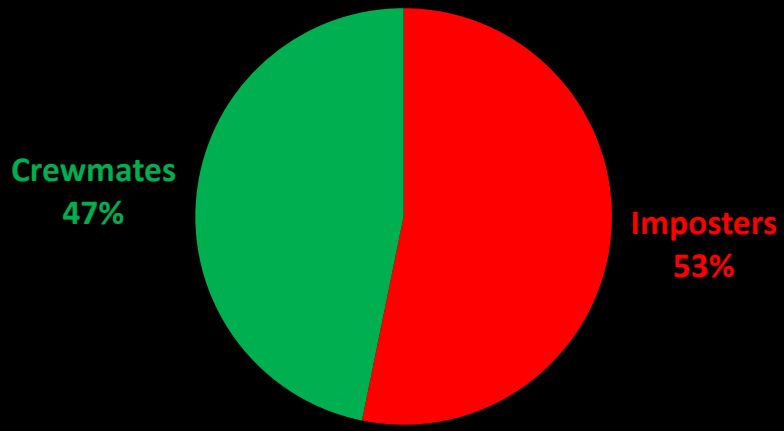
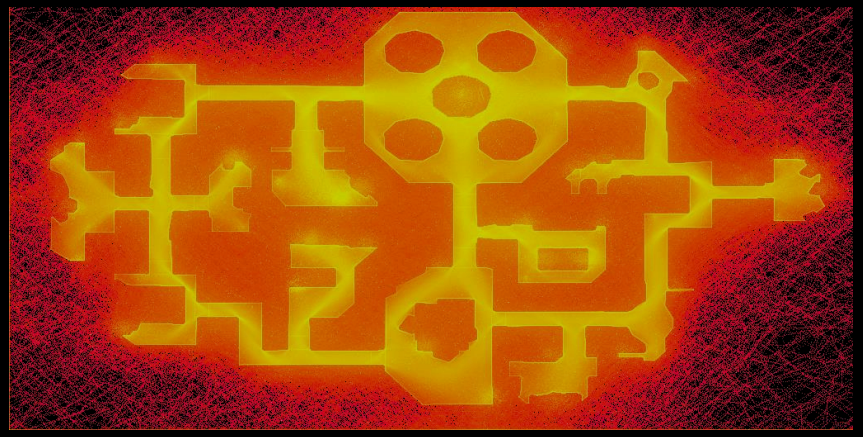
Ryan Tan

Analyses of Among Us

Successful Game Design



Win Rate



Movement Map

Game Developer's Interest:

> Balancing the Gameplay in a Multi-Player Game

Kill Map

https://innersloth.itch.io/among-us/devlog/50755/the-data-among-us

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Ryan Tan

“Balancing” the Game

/r/AmongUsMemes: “When the kill cooldown is too low”

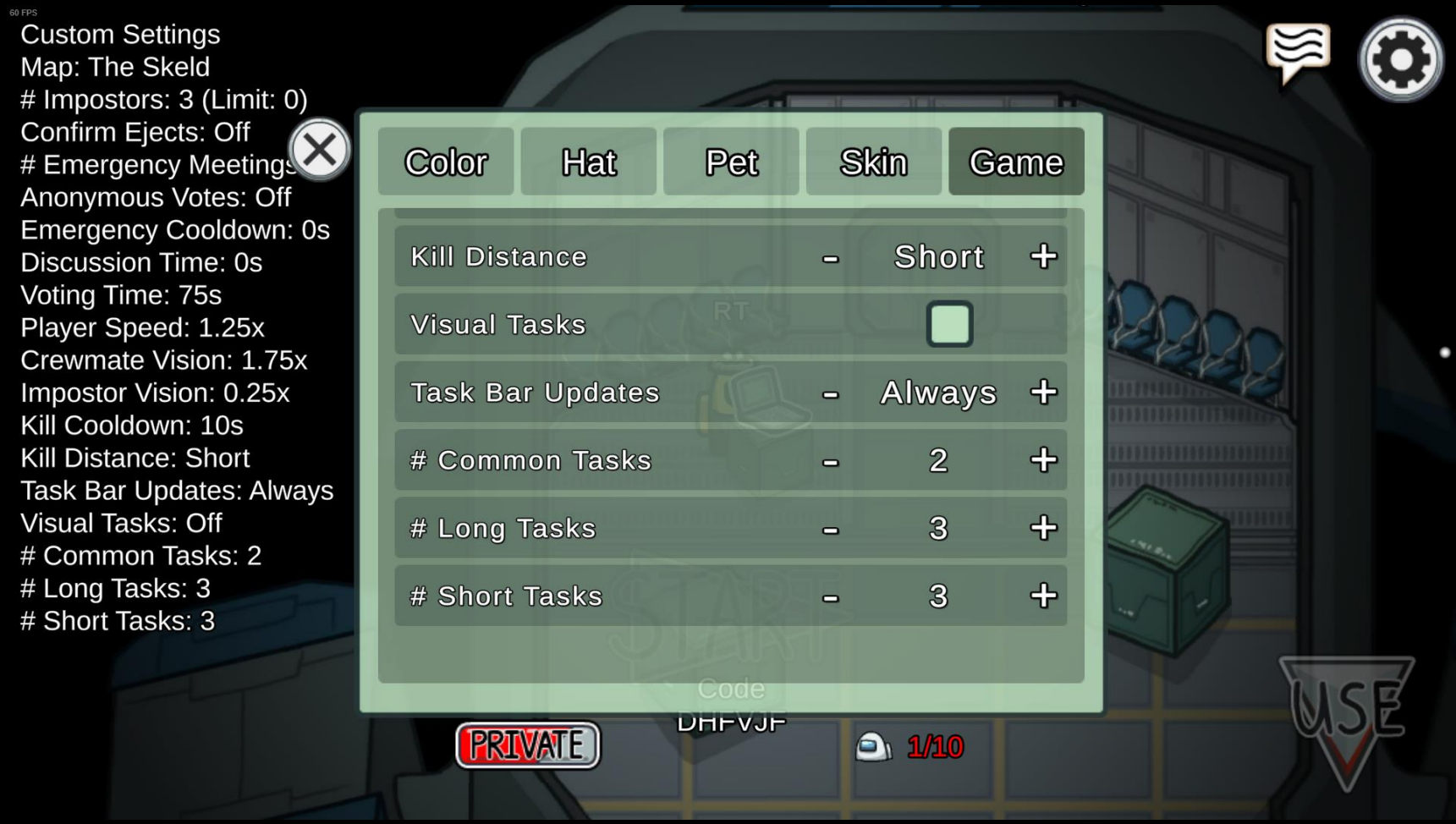
Why is Game Balancing Important?

- There will always be asymmetry in a multiplayer game (crewmates and imposters)
- Each and every Player want an equal chance of winning
- It’s not fun when its too easy to win

https://innersloth.itch.io/among-us/devlog/50755/the-data-among-us

Analyses of Among Us

“Balancing” the Game



Game Mechanisms for Players to Self-Regulate

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Ryan Tan

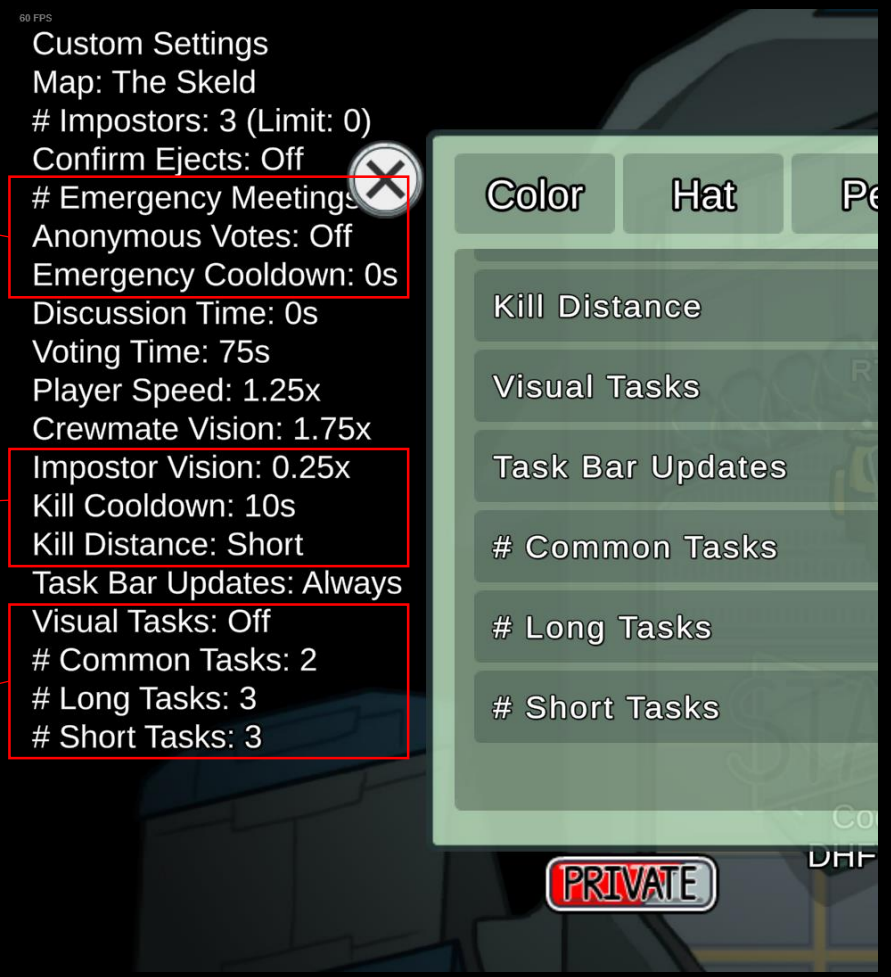
Analyses of Among Us

“Balancing” the Game

Unique Game Settings

Less Vision, Longer Cooldowns
> More difficult for Imposters

More Tasks
> More difficult for Crewmates



Game Mechanisms for Players to Self-Regulate

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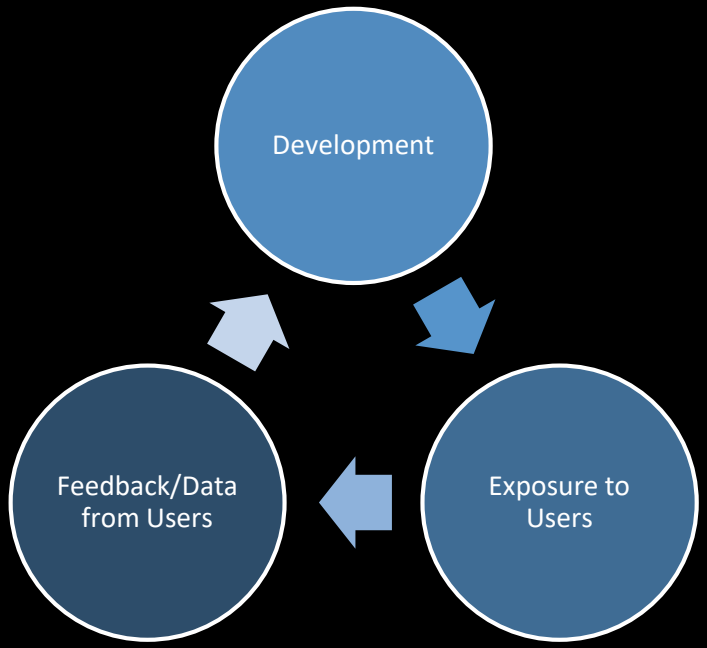
Ryan Tan

Analyses of Among Us

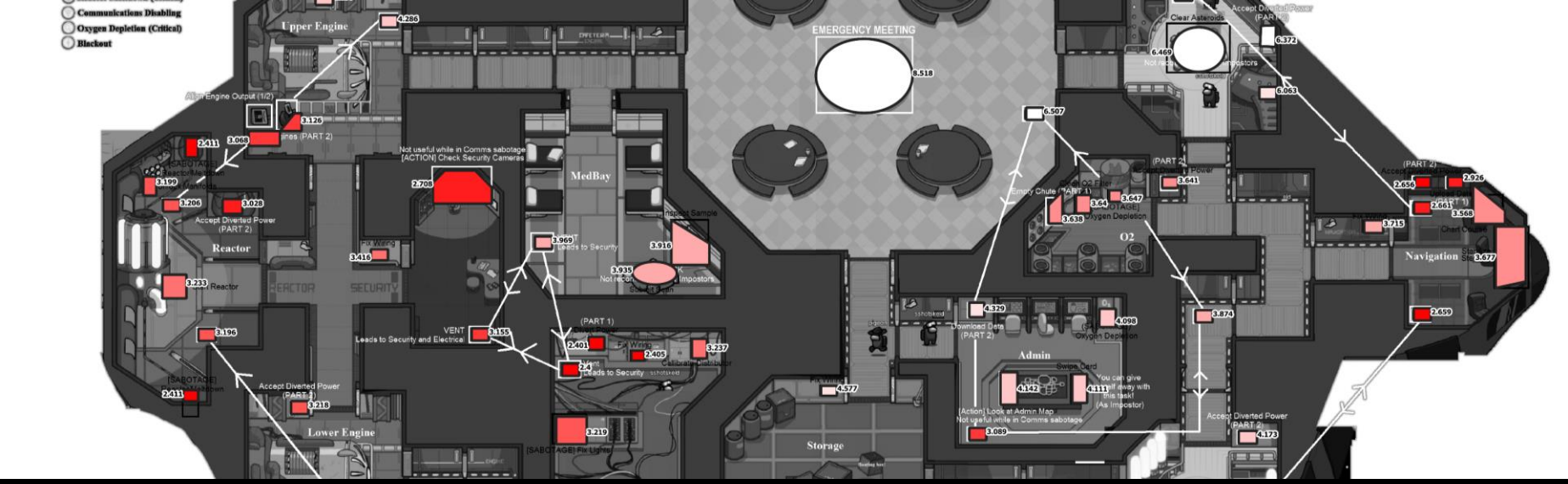
Inspiration



Game Developers focus mainly on ***how*** to balance the game

My Interests are more exploratory:

Why do these spatial characteristics of the game map affect the Gameplay?



Analyses of Among Us

1. Do you think crewmates die “**Evenly**” around this map?
2. How do **Tasks** affect the gameplay?
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Ryan Tan

0. Why… why do I need Spatial Analysis?

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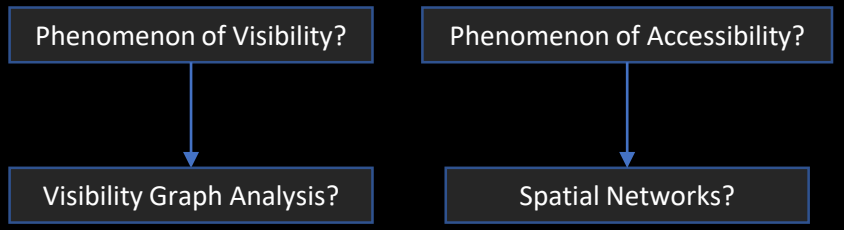
Ryan Tan

How do I answer these Question using Spatial Analysis?

1. Question → Difficult why's and how's that makes a difference to how you would plan your design

2. Hypothesis (Guess) →



3. Simulate (Explore)

4. Analyse (Understand) → The exercise of modelling is probably more important than the results

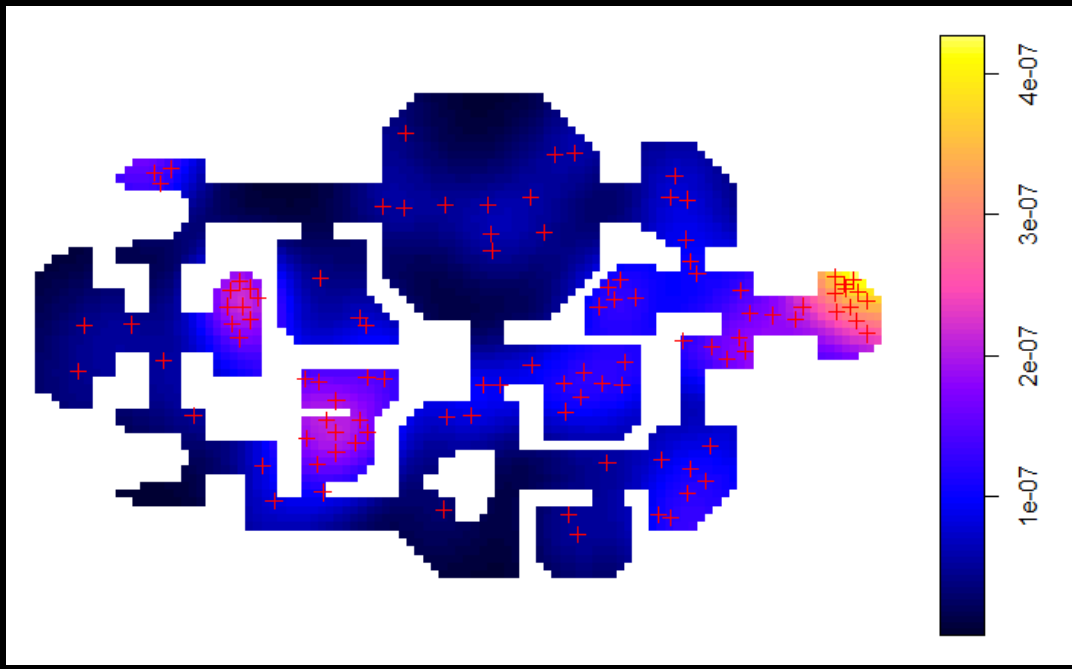
**Computational work is ¼ of your process,*
but the other ¾ relies on <u>your</u> understanding of theories and design thoughts.

1. Do you think crewmates die “**Evenly**” around this map?

Genevieve Shaun Lin
Ryan Tan

“Evenly”?

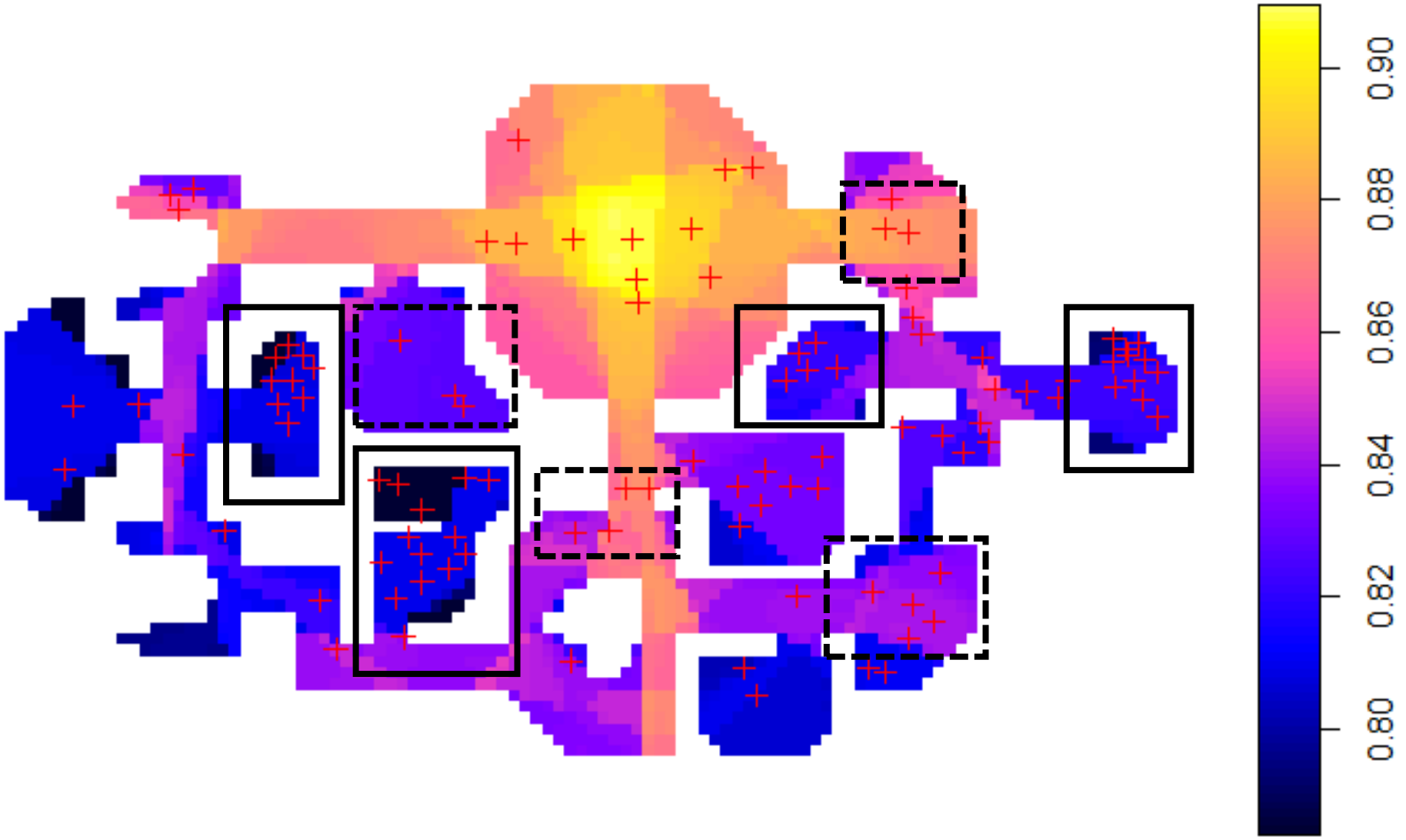
Do crewmates die “evenly” around this map?



Source: Reddit; Sample Size: 100

“Evenly”?

Visibility implies “Safety”



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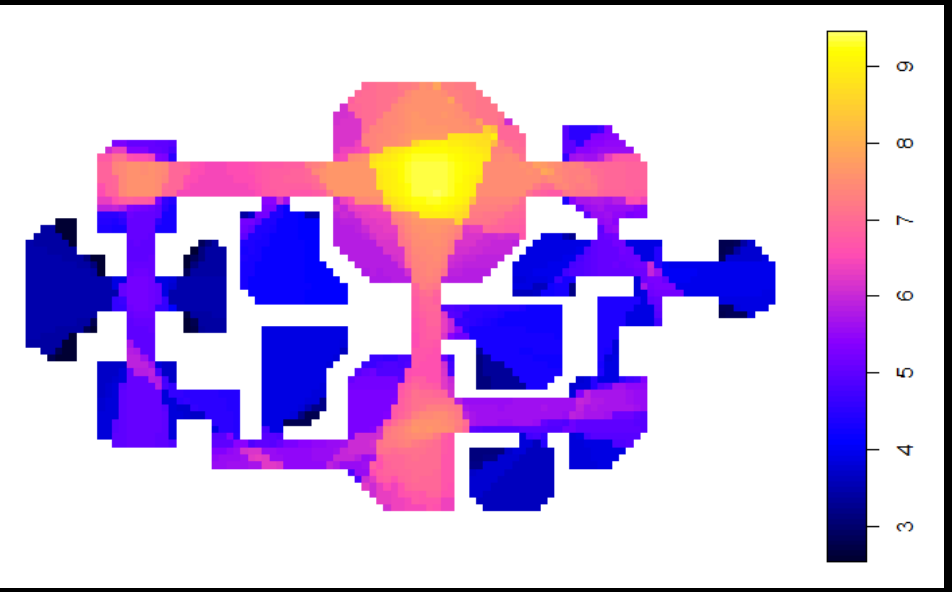
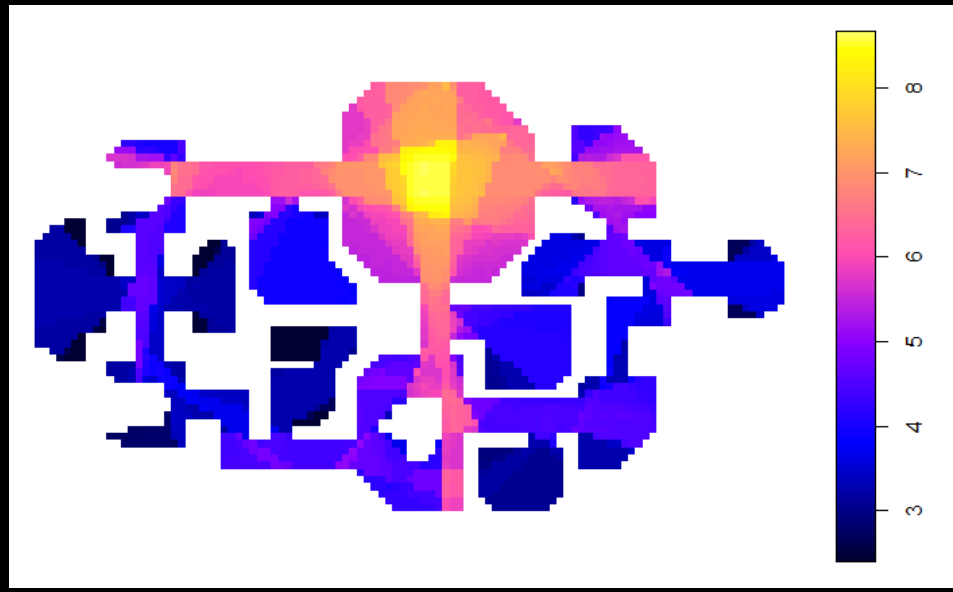
Ryan Tan

“Evenly”?

Could it have been worse?



(Hypothetical) Visibility Map Without Obstacles



(Original) Visibility Map With Obstacles

The “Distribution of Visibility” is more balanced out.

Hence, the death rate is likely to be more “Balanced Out”.

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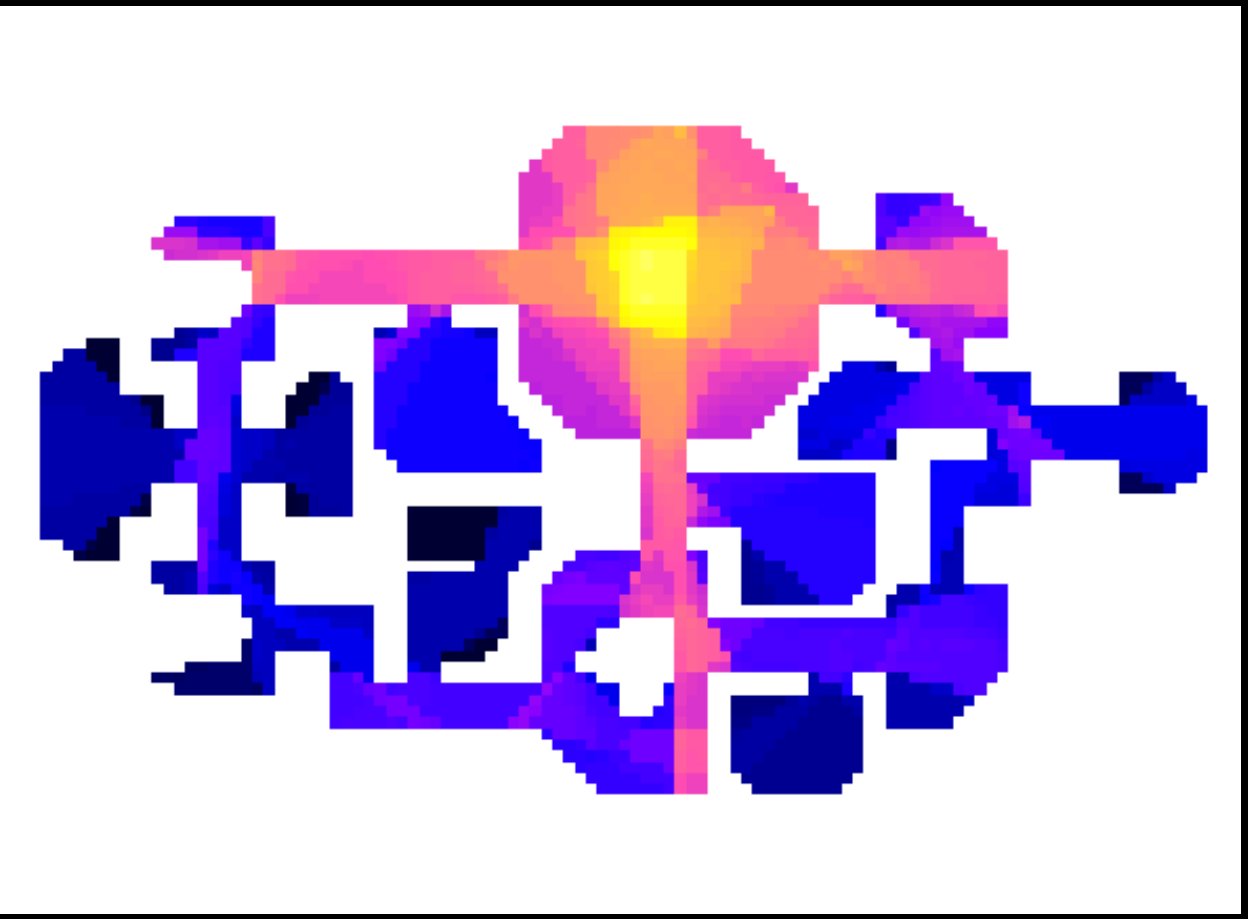
Ryan Tan

2. How do **Tasks** affect the gameplay?

How Visible are these Tasks?

Visual Integration of Map



Visibility can be used to understand “Safety”

Is there a logic to why Some Tasks are placed at its corresponding locations?

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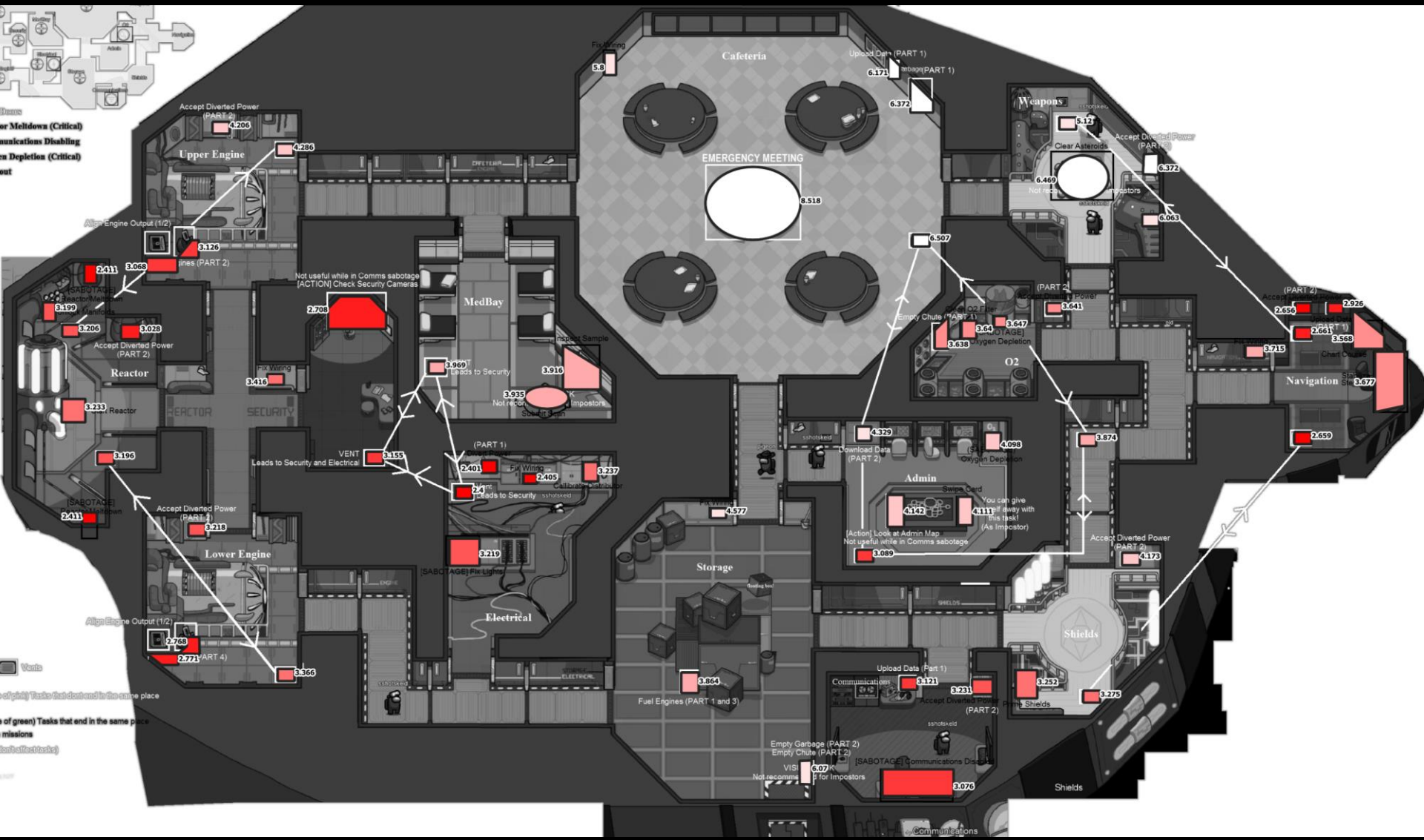
Tasks?

How Visible are these Tasks?



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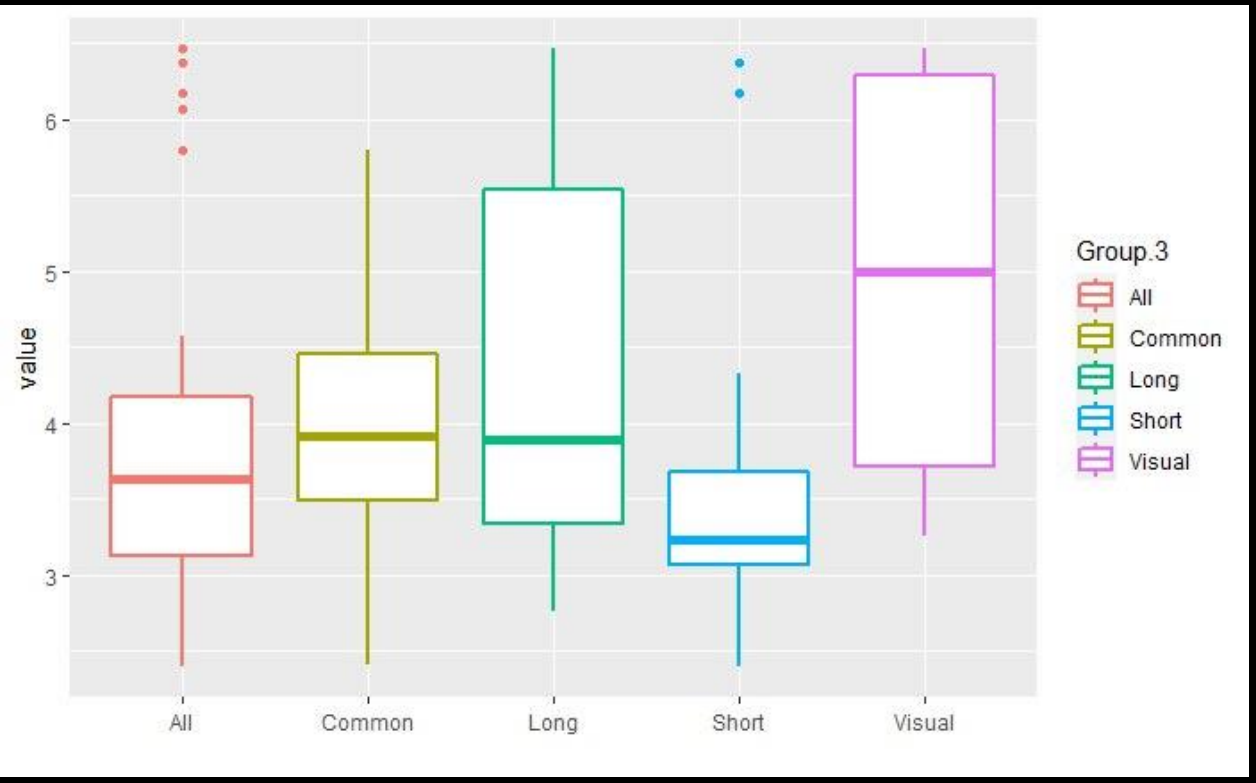
Tasks?

How Visible are these Tasks?

Plot of Visibility by Task Category



Long Tasks are quite Visible

Short Tasks are less Visible

Visual Tasks are very Visible

What these tasks are used for?

Example of Long Tasks

Dwelling Time -> More Dangerous

The longer you spend in one spot,
the more vulnerable you become

Location -> More Safe

Spaces around Tasks are extremely Visible

Tasks?

What these tasks are used for?

Plot of Visibility by Task Category

Long Tasks are quite Visible

Short Tasks are less Visible

Visual Tasks are very Visible

The Role of each Task Category

Long Tasks are located at safer areas
> but time spent makes it more dangerous

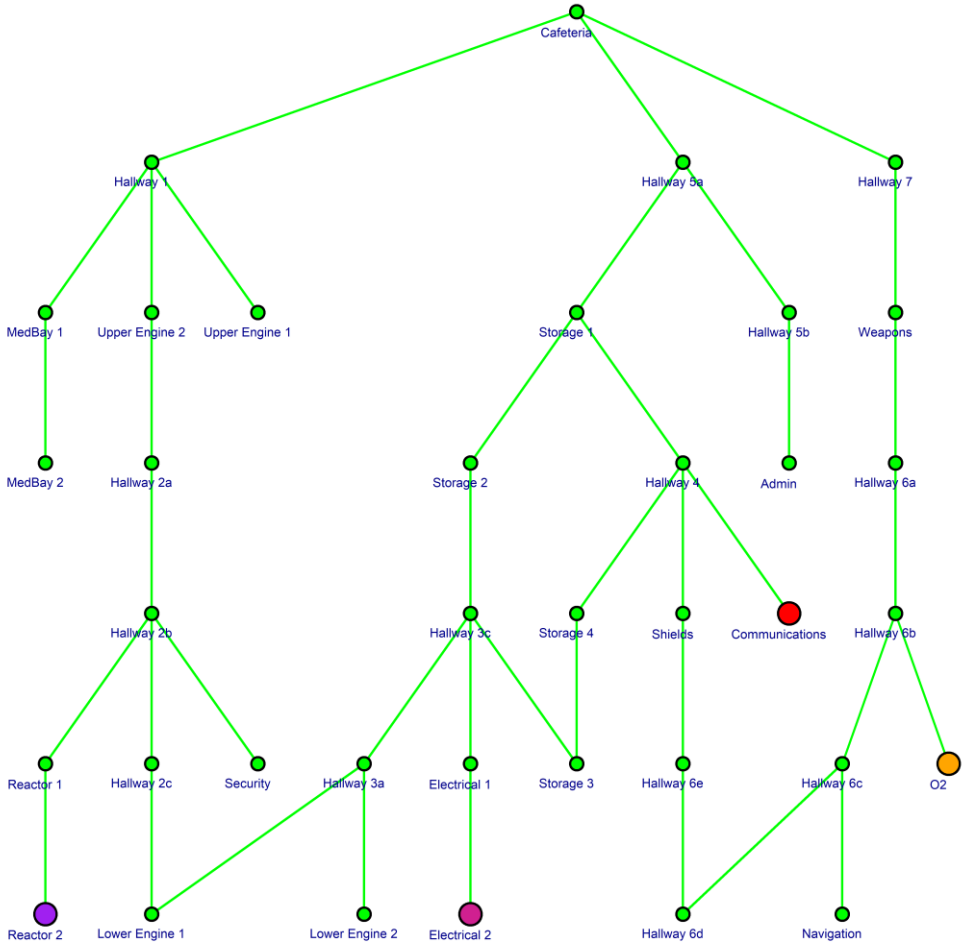
Short Tasks are located at dangerous areas
> but time spent makes it more safe

Visual Tasks are located at central areas
> serve a unique function in the game, beyond “safety”

Genevieve Shaun Lin
Ryan Tan

3. How do **Sabotages** affect the gameplay?

Display of Topological Steps



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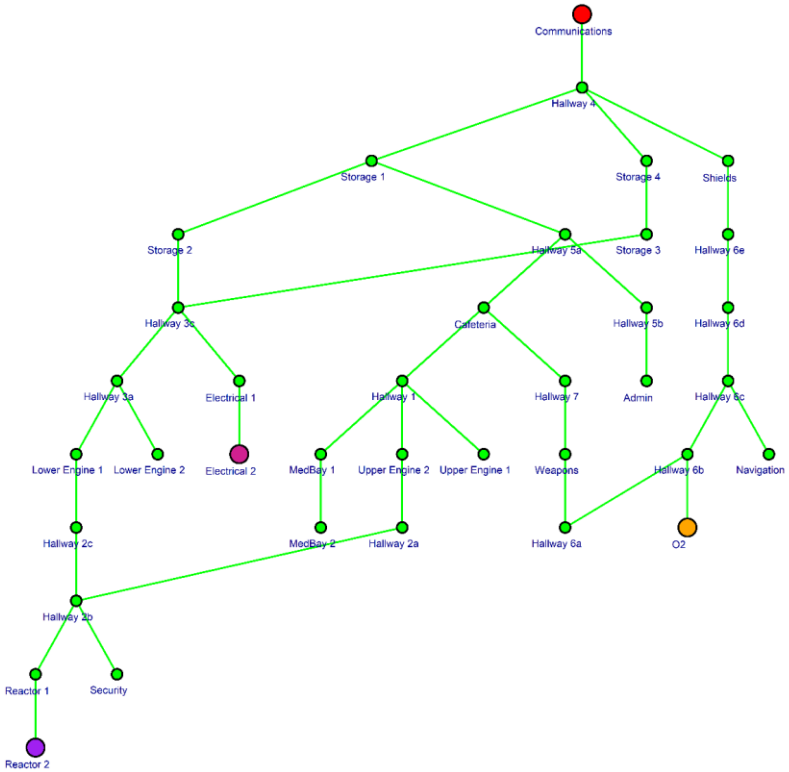
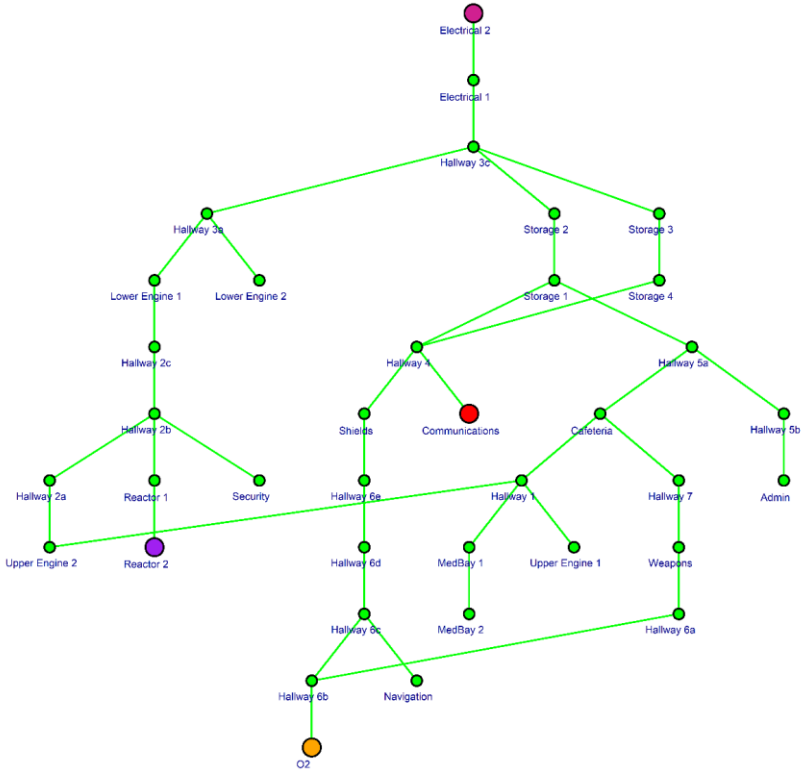
Sabotages

Communications/ Lights





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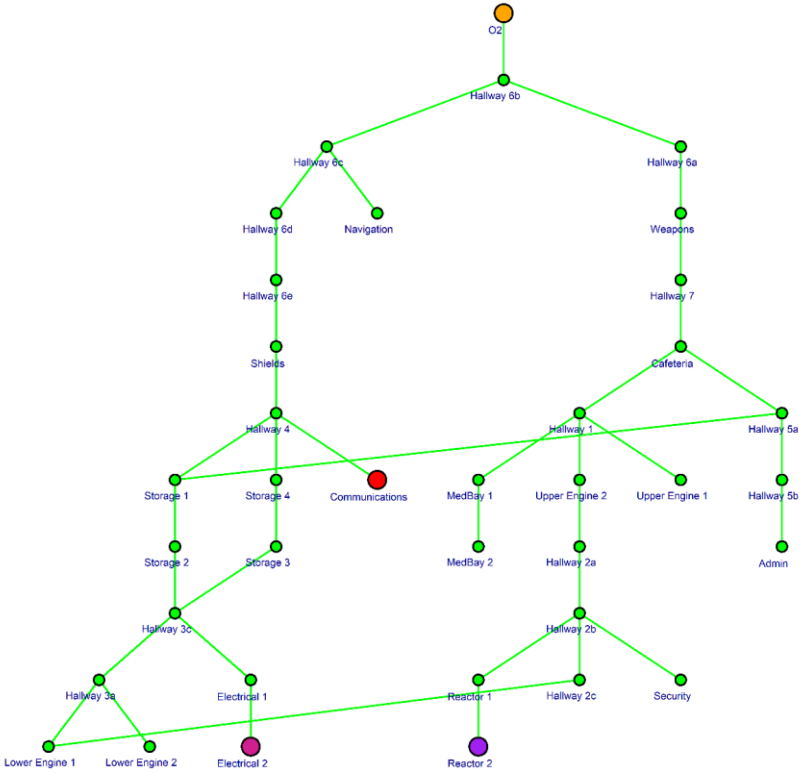
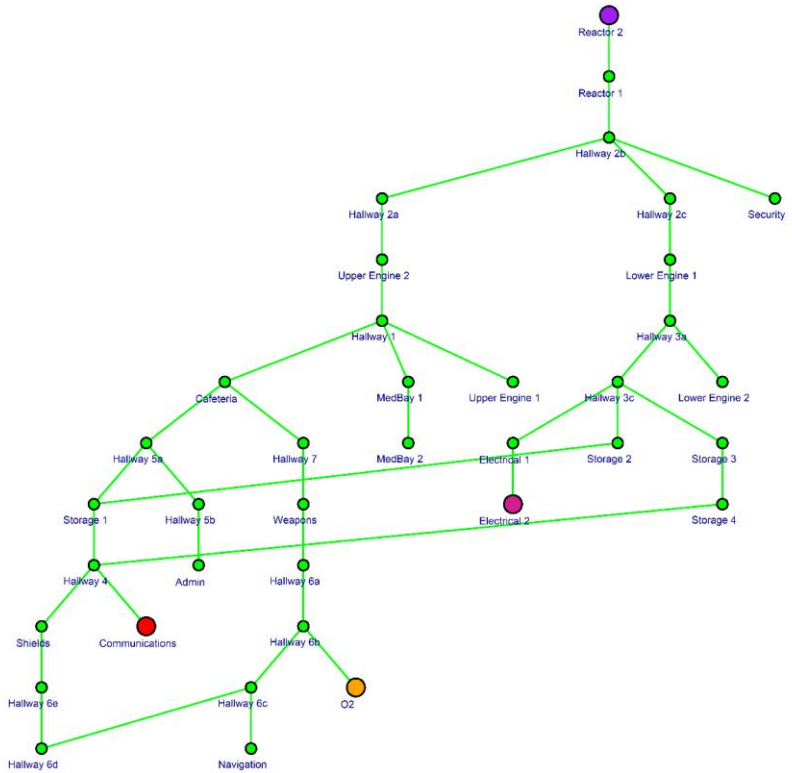
Ryan Tan

Sabotages

O2/ Meltdown





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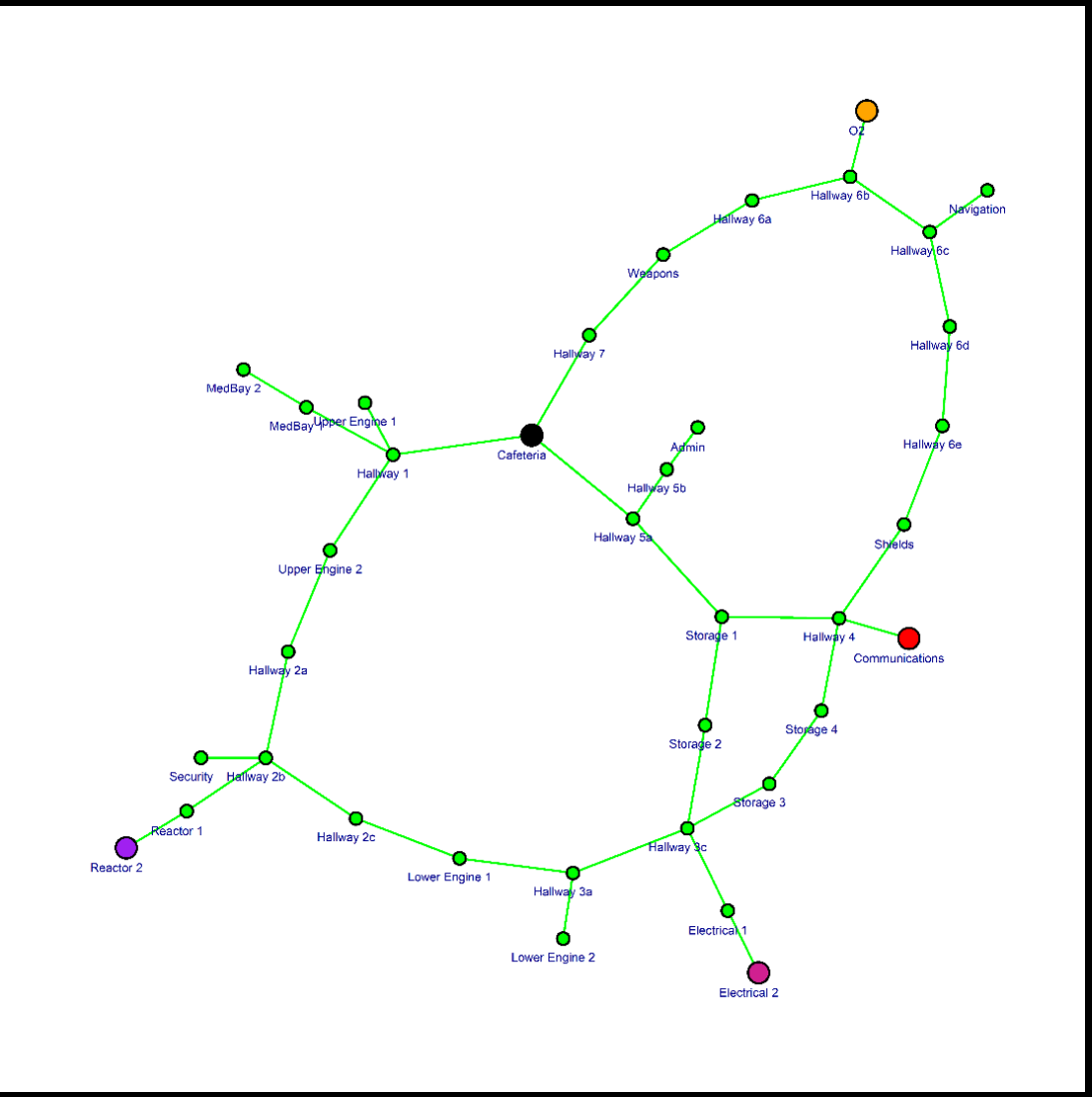
Ryan Tan

Role of Sabotages



Sabotages are strategically placed at the furthest corners of the Map

Imposters utilizes them to manipulate players to move in a very specific pattern

Genevieve Shaun Lin
Ryan Tan

Resources and Diagrams (Feel free to reference)

https://github.com/RyanTanYiWei/AmongUsVGA for VGA
https://github.com/RyanTanYiWei/AmongUsJGraph for Spatial Networks