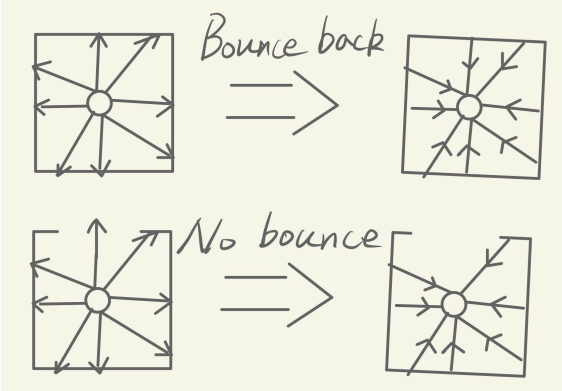
The Rubik's Cube of Memories

- **Inspirations**
  - Non-Euclidean space
    - What you see may not be the truth
      - some place that seems to be passable might actually be a dead end
      - some place that seems to be a dead end might actually be passable
      - Some passageways may not lead you to the place you see through it
  - Sound
    - The directionality of sound can be a clue
      - Sound behind a visual obstacle can give clue of where to go
      - Some hidden space can be revealed by checking the source of the sound
    - Sound waves bounce when they hit an physical obstacle
      - Use sound wave to detect the real physical form of the environment
- **Mechanisms**
  - Non-Euclidean space
    - Use render target and portal point to build deceptive visual environment
      - e.g.
        - A Corridor that looks like leading to another place is actually a wall that cannot pass through
        - A wall that blocks the way is actually a gate that leads to other place
      - The fake passed through view actually comes from a camera that captures view of real environment somewhere else
  - Sound radar
    - Use sound wave to detect physical form of the environment

- Sound bounce back when hit physical obstacle, and pass through if there are no physical blockage in it's way

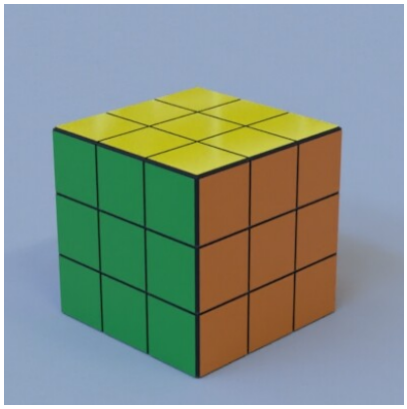


  - e.g
    - Identify fake doors because sound waves bounces back at its entrance
    - Find real passageways because sound waves go through the wall

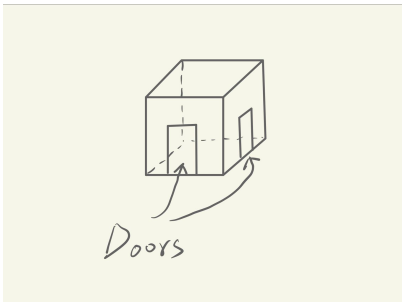
- Sound hint
  - The volume and direction of the sound can tell users the direction and distance of the sound source.
    - After pass through an Non-Euclidean passageway, you need to use sound hint to re-locate your physical position relative to the sound source, so that you know where you are now and what is the next move
      - e.g
        - Before pass through the hidden door, the hint sound is very loud and on your left, after pass through, the hint sound volume become much lower and on your right
  - If the 2 rooms are not directly connected in terms of their spatial relation, the sound cannot be heared
    - optional, just for increasing difficulty

- **Game settings**

- 27 square rooms like a Rubik's cube



  - Every room has 4 walls plus ceiling and floor, some of the 6 faces have gates, but the gates might be fake or hidden. Every room also contains a box with 1 digit number of the final password, some of the boxes are visible, some are hidden by non-Euclidean methods



- 4 types of rooms
  - Corner
  - Edge
  - Middle
  - Center
- Every room has a theme of memory
  - Emotional memories
    - Angry
    - Happy
    - Sad
    - ...
  - Memory of dreams
    - Under ocean fantasy
    - Nightmare
    - ...

- Use projector to show the room physically
  - TBD if practicle
- Non-Euclidean connection of rooms
  - In real world's Rubik's cube, Conner cube must connect to an edge cube, but in Non-Euclidean space, the connection of cubes are twisted into a mysterious way
    - You have no idea where you gonna go after entering a door
- Level up of Difficulties
  - Invisible doors or walls
  - Specific walls decorated by Noise reduction sponge
    - Sounds from other rooms will be blocked by such walls
  - Paired rooms that keep switching position repeatedly
    - Give alternative sequence of your collected passwords

Estimated works

- Environment building
  - Level design
  - Environment Assets
    - Model
    - Texture
    - VFX
- Narrative and visual design
  - Visual decoration of each room
- Mechanism programing
  - Render target
    - Use camera and mesh render
  - Teleport
    - Set blueprint object to trigger teleport
  - Sound bounce
    - Use collision detection and VFX as visual feedback
  - Spatial audio

- Use a set of multiple speakers to form a spatial audio effect
- Sound source direction and distance detection
  - player and object position math + arrow head visual feedback
- Sound design
  - Theme music for each room
  - Sound radar and Sound anchor design

Narrative

- Discover your memory to find the peaceful inner mental world

Gameplay

- goals
  - Maze escape
  - Objective collection
  - Explore the environment to form a real map
- methods
  - Pick whatever entrance to explore the next room
  - Use the rebound effect of the sound waves to determine the physical structure of the room
    - Find the hidden password objective
    - Determine the true type of your room
  - Anchor your position by listening to the spatial sound
    - Leave a sound source in your previous room, get through the door to the next room, listen to the sound source and tell its relative position comparing to your current room
      - sounds coming from left upper side
        - Means your are in a room that is on the right lower side of your previous room
  - Extend the map of known rooms
- Tools
  - Sound radar
    - Generate sound waves to detect physical environment nearby

- Detect the volume of a sound source to determine the distance and direction between the player and the sound source

- Sound anchor
  - Device that keeps playing specific sounds, can be left on the floor as a sound source to determine relative position of the player and this device

Game type

- Puzzle-solving game
  - Non-VR for easier development
  - VR is troublesome, but acceptable to do
  - Find the conflicts between visual and auditory, to solve the puzzle