Modular & Interactive Sculpture

CS6042 – INTERACTIVE MEDIA PROJECT/WORKSHOP 2 2024/5 SEM2

Devikala Boominathan | 24050717
Jojy Saju Joseph | 24070769
Ishita Baluni | 24131406
Shonal Maria Biju | 24164003
Sumanth Manoharan | 24149225

UNIVERSITY OF LIMERICK
**OLLSCOIL LUIMNIGH**

1. Project Overview

This project involves the creation of a modular interactive sculpture made of laser-cut cuboid modules, each designed by team members. The sculpture reacts sonically and visually to audience interactions, using internal resistor networks to capture voltage changes. These changes are processed by an Arduino and linked to a Unity-based system that generates corresponding audio and visuals. Inspired by the dynamic relationships found in nature, specifically the Earth's oceans, each cube represents one of the five oceans, reflecting their environmental traits and emotional tones.

The project's objective is to explore interactivity through modular structures, using physical touch points (cube faces) to drive digital output. It aims to translate voltage changes into expressive sound and visuals while raising ecological awareness. The project also fosters collaboration across disciplines, combining physical computing, visual design, fabrication, and interaction design.

Modular interactive sculpture
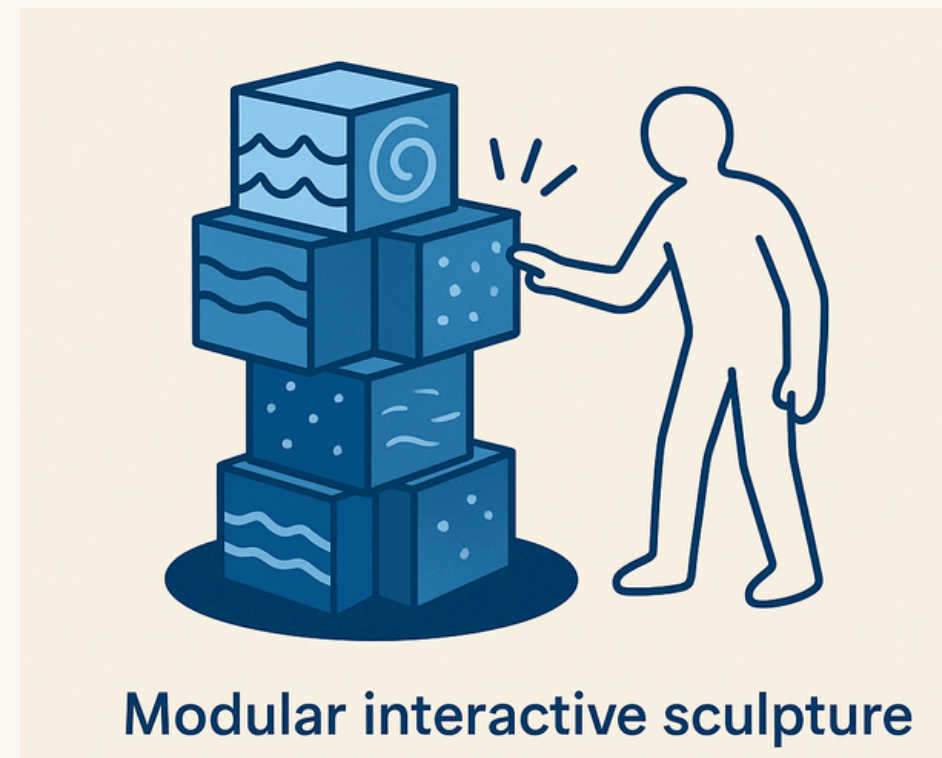
2. Brainstorming

In our brainstorming session, we wanted to create a product that resonates with nature and tells a story. After considering various natural elements, we chose the ocean because of its deep connection to ecosystems and its symbolic balance of life. The five oceans Pacific, Atlantic, Indian, Southern, and Arctic were selected for their unique traits and emotional resonance. We decided that modular cubes could represent these oceans, allowing viewers to interact and explore their interconnectedness. This approach led us to create a tactile and thought-provoking experience, highlighting the oceans' beauty and the impact of human actions.
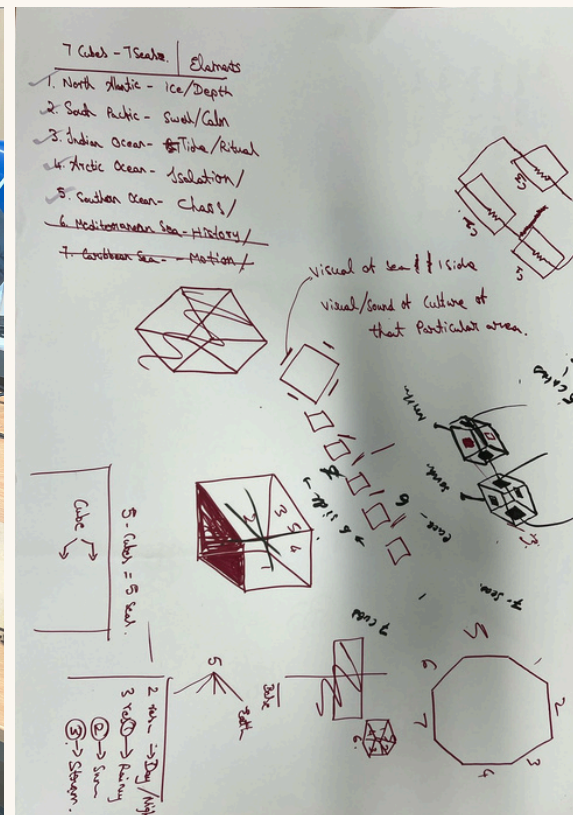
3. Concept Development

- **Chosen Theme: The Five Oceans**

The sculpture features five cubes, each representing one of the oceans—Pacific, Atlantic, Indian, Southern, and Arctic. The theme highlights the oceans' unique traits and their interconnectedness, allowing viewers to explore how they influence each other when rearranged.

- **Oceanic Symbolism & Modular Metaphor**

Each cube symbolizes an ocean, with modular movement reflecting the interconnectedness of water systems. Rearranging the cubes creates new sonic and visual interactions, representing the dynamic flow of nature.

- **Philosophical Reflection on Interactivity**

The sculpture encourages viewers to reflect on human impact and environmental balance, using touch-based interactions to explore how sensory changes shape our understanding of ecosystems.

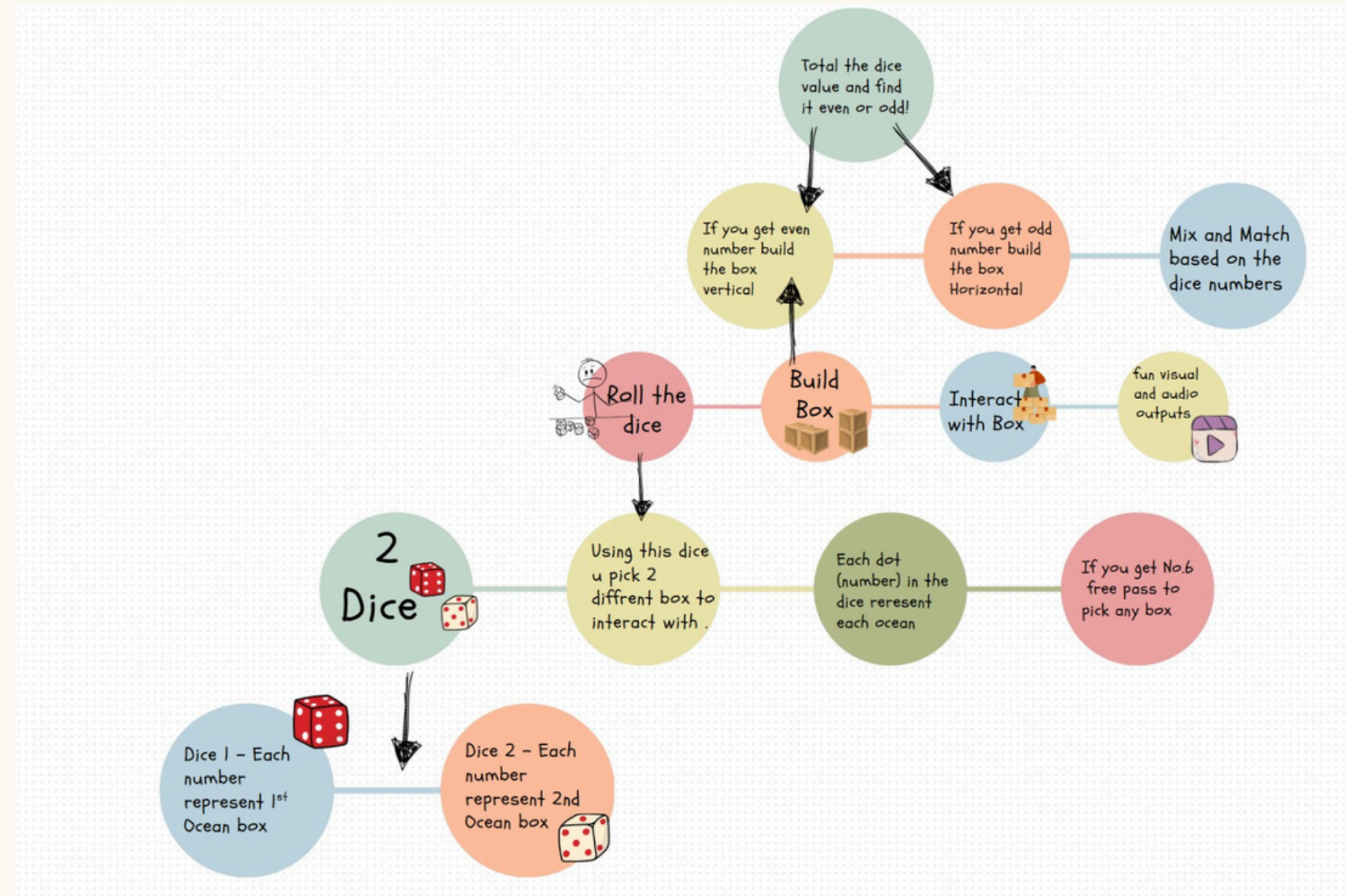- **Mood Mapping (Audio + Visual + Tactile Interactions)**

Each cube features three elements: audio (marine sounds), visuals (ocean movements), and printed graphics. These combine to create a unique "mood" for each ocean, like aurora visuals for the Arctic or monsoon drums for the Indian Ocean.
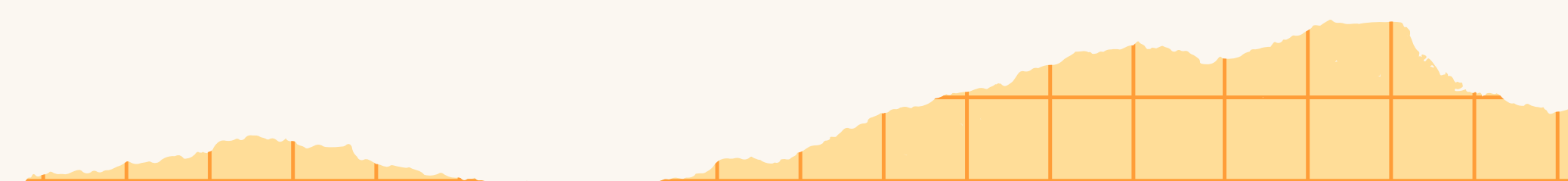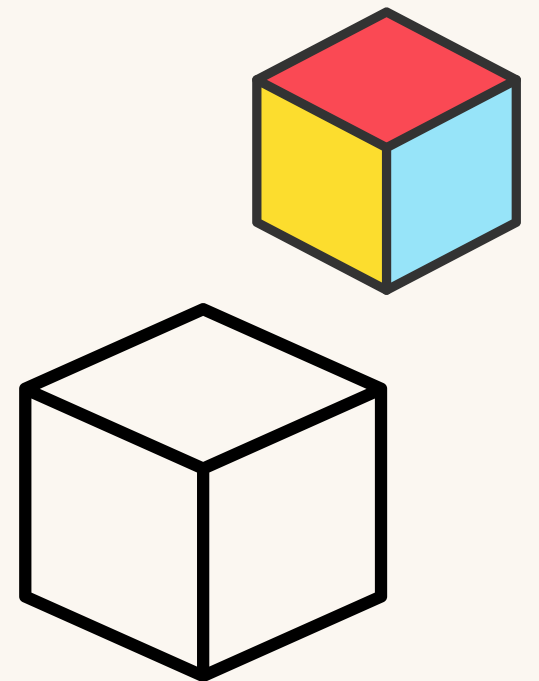
3. Concept Development

- **The Game:**
We designed an interactive game called "Oceanic Harmony," where players roll dice to randomly stack two ocean cubes. The cubes are then combined to create a new, interactive experience, allowing players to explore how different ocean environments interact.

Total the dice value and find it even or odd!

If you get even number build the box vertical

If you get odd number build the box Horizontal

Mix and Match based on the dice numbers

Roll the dice

Build Box

Interact with Box

fun visual and audio outputs

2 Dice

Using this dice u pick 2 diffrent box to interact with

Each dot (number) in the dice reresent each ocean

If you get No.6 free pass to pick any box

Dice 1 – Each number represent 1st Ocean box

Dice 2 – Each number represent 2nd Ocean box

3. Concept Development

- **The Output:**

Each combination of cubes is selected through a dice game, where the dice roll determines which cube is activated, symbolizing the unpredictable nature of our interaction with the environment. This metaphorical game reflects the idea that when we play with nature, the consequences can lead to disaster. Each cube triggers a unique poem written by our group members, addressing the environmental challenges the oceans are facing. These poems raise awareness in a fun and engaging way, encouraging players to reflect on the delicate balance of oceanic life and the impact of human activity on these vital ecosystems. Through this interaction, players gain a deeper understanding of the urgent issues affecting marine environments.

sample of output poem-

"The Pacific sighs beneath plastic skin,
Southern storms rage deep within.
Once they danced with moonlit grace,
Now they drift, displaced in space.
Icebergs break like promises made,
Reefs go quiet, colors fade.
The sea still moves — but not the same.
It carries grief, and knows our name."

4. Process Behind the "Oceanic Resonance" Project:

1. **Brainstorm:** This initial phase involved collaborative discussions to define the scope and vision for the interactive sculpture. The team explored different themes, materials, and technologies, deciding to represent the five oceans through a modular design that communicates through sound and visuals.

2. **Ideate:** In this stage, we brainstormed specific ideas for the design and interaction of the sculpture. The team explored various methods to make each cube respond to touch in a unique way, deciding on using Arduino for processing voltage changes and Unity for generating the corresponding audio-visual effects. The ideation phase set the groundwork for the physical and technical aspects of the sculpture.

3. **Designing the Boxes:** We created five cubes, each representing a different ocean (Pacific, Atlantic, Indian, Southern, Arctic). These cubes were made using laser cutting and MDF, with images that reflect the unique characteristics of each ocean.
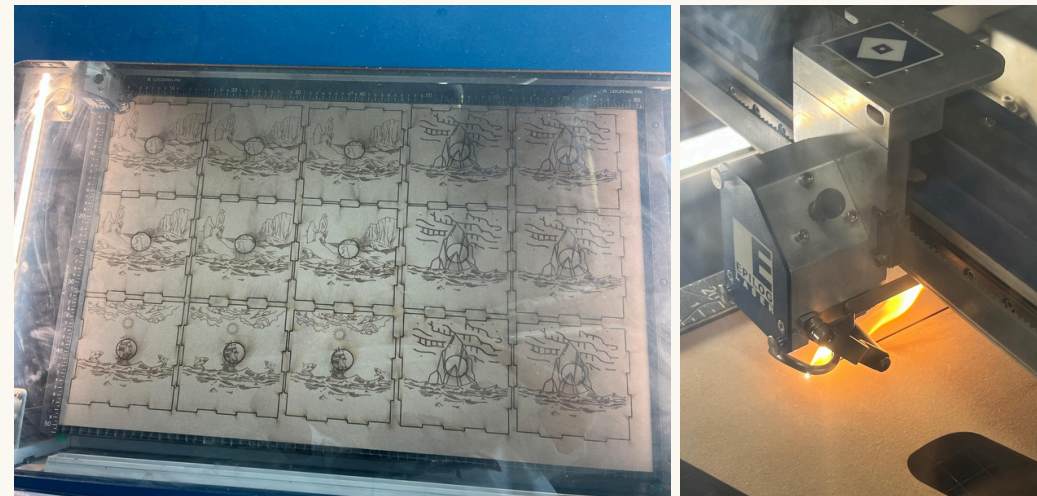
4. Process Behind the "Oceanic Resonance" Project:

4. *Hardware*: We soldered the necessary components and set up the electronics to connect each cube to an audio-visual system. This involved integrating sensors and resistors to detect interactions and trigger the corresponding outputs. The cubes were then wired to an Arduino, which captures voltage changes and passes them into the system.

5. *Software*: We used Unity to handle the audio-visual output because it provides a powerful, flexible platform for creating interactive experiences. Unity allowed us to easily map the voltage changes from each cube to unique visual effects and soundscapes, enabling a dynamic and responsive interaction. Its real-time rendering capabilities were key in creating the immersive, sensory-rich environment we envisioned for the sculpture.

5. Statement

Oceanic Resonance is an interactive installation designed to immerse participants in a multisensory exploration of the world's five oceans. Crafted from natural wood, each individual box symbolizes one ocean, uniquely embedded with copper plates and resistors that translate physical interactions into captivating audiovisual experiences. By touching and connecting these ocean boxes, participants unlock distinct sounds, visuals, and poetic narratives, highlighting the interconnectedness and beauty of our planet's oceans. Through playful interaction, this installation fosters awareness, emotional connection, and deeper appreciation of marine ecosystems and their delicate symbiosis.

MODULAR INTERACTIVE SCULPTURE