Summer internship report on

PractiSc Learning Innovation Pvt Ltd.

Submitted by

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B.Tech – ELECTRONICS AND COMMUNICATION ENGINEERING

NATIONAL INSTITUTE OF TECHNOLOGY

MEGHALAYA

(NIT MEGHALAYA)

CERTIFICATE

PRACTISC LEARNING INNOVATION PVT. LTD.

This is to certify that Ediga Ajay Goud (B21EC010) is the bonified student of **National Institute of Technology Meghalaya**, studying as a part of her academic course undergraduate degree in **ELECTRONICS AND COMMUNICATION ENGINEERING** has undergone practical training at **PractiSc Learning Innovation Ltd.** from 03-06-2024 to 20-07-2024. During the above period her conductance and performance was found to be good.

ACKNOWLEDGEMENT

The success and final outcome of these projects required significant guidance and assistance from several individuals, and I am extremely fortunate to have received their support throughout the process. Whatever I have accomplished is a result of their valuable guidance and encouragement, and I would like to take this opportunity to express my gratitude.

I sincerely thank the management and my mentors at **PractiSc Learning Innovations Pvt. Ltd.** for giving me the opportunity to work on these innovative projects. I extend my heartfelt thanks to all the team members, engineers, and colleagues who provided their support, technical insights, and encouragement, enabling me to successfully complete these projects. I am deeply grateful for their time, expertise, and collaboration, which helped transform these ideas into practical, impactful learning tools.

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PRACTISC COMPANY PROFILE

PractiSc Learning Innovations Pvt. Ltd. specializes in designing and developing interactive educational tools aimed at simplifying complex concepts for children. The company is located in India and operates with the mission of making education engaging and hands-on for students across diverse age groups.

Established to revolutionize traditional learning methods, PractiSc focuses on blending technology with education. The company develops innovative products like interactive books, activity kits, and learning maps to foster curiosity and understanding among children.

The company's product portfolio includes tools like the Interactive Human Skeleton, Logic Gates Book, India Map, and the Electronics Passport, all designed using embedded systems and technology components like Arduino, LEDs, and sensors. These products aim to make abstract concepts easier to grasp through interactive and fun approaches.
PractiSc Learning Innovations is committed to delivering high-quality, impactful learning experiences by leveraging cutting-edge technology and innovative design principles.

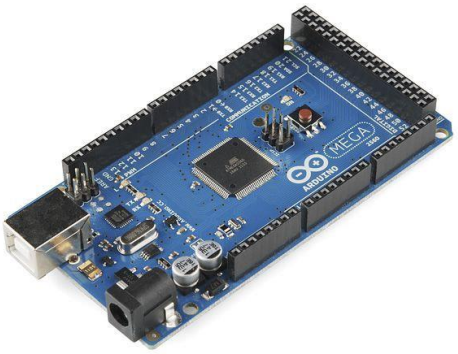
ACHIEVEMENTS OF PRACTISC LEARNING INNOVATIONS LTD.

- Revolutionary Educational Tools: Introduced interactive and embedded-based learning products that promote STEM education for children.
- Simplifying Complex Concepts: Successfully designed educational kits that simplify subjects like anatomy, geography, and digital electronics.
- Integration of Technology in Education: Developed products like the Electronics Passport, which bridges the gap between theoretical knowledge and practical application.
- Recognition for Innovation: Recognized for innovative contributions to educational product design and development in India.
- Commitment to Quality: Ensures that all products are safe, user-friendly, and adhere to high-quality standards.

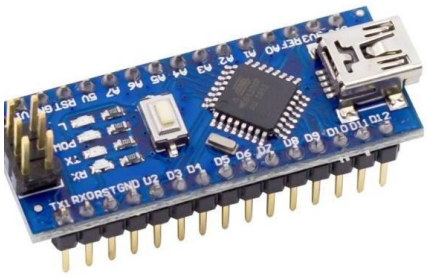
MAIN COMPONENTS

The following components were used across the interactive projects:

- **Arduino Mega**
  A powerful microcontroller board used to manage multiple inputs and outputs, ideal for complex projects like the Interactive Human Skeleton and India Map.



- **Arduino Nano**
  A compact microcontroller board, perfect for smaller projects like the Logic Gates Book, where space is a constraint.



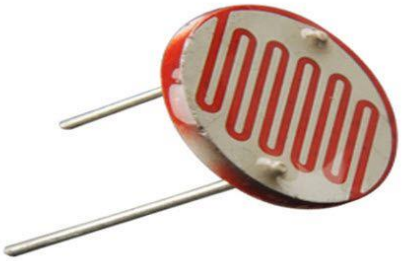
- **Copper Wire (5m Length)**
  Used for making electrical connections between components in the circuit setup.

- **Lithium Battery and Battery connector**
  Provides portable power for projects, ensuring consistent performance without relying on external power sources.

- **Speakers**
  Used to provide audio feedback, such as naming body parts in the Human Skeleton or states in the India Map.

- **Light Emitting Diode (LEDs)**
  Serve as visual indicators, lighting up specific areas in response to user interaction (e.g., glowing state or body part).

- **Light Dependent Resistors (LDRs)**
  Detect light intensity to determine specific operations in the Logic Gates Book, enabling gates like NOT, OR, and NAND.

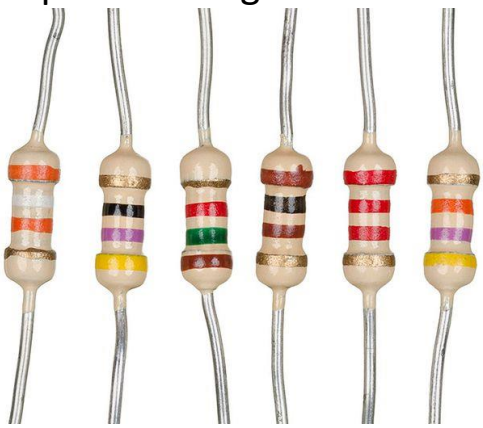


- **Push Buttons**
  Allow users to interact with the projects by triggering specific functions, such as lighting LEDs or activating audio.

- **Arduino Power Adapter**
  Supplies a steady power source for the Arduino boards during operation and testing.

- **SD Card Reader**
  Used to store and retrieve data, such as audio files for the speaker system in interactive projects.

- **Resistors**
  Control the flow of electrical current, ensuring that components like LEDs and speakers receive the appropriate voltage and current for safe operation.



These components were crucial in developing interactive, embedded-based tools that made learning more engaging and hands-on for children.

INTERACTIVE HUMAN SKELTON

Components Used:

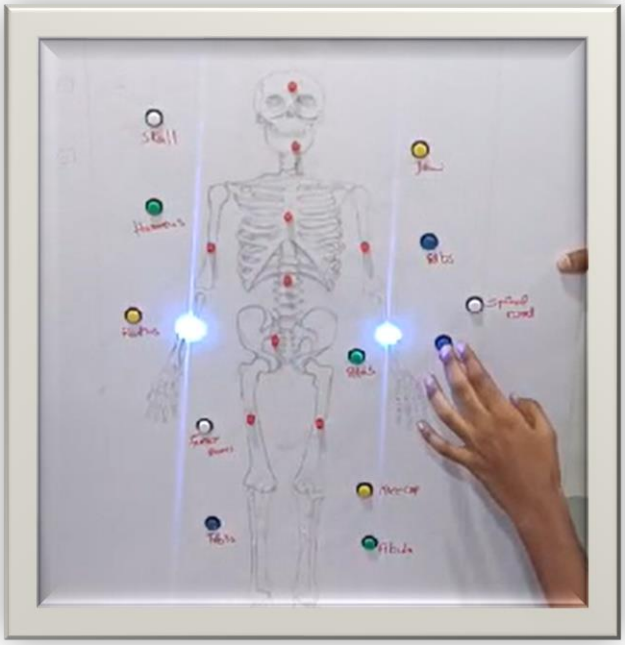
- **Arduino Mega:** Acts as the brain of the system, controlling inputs and outputs.
- **LEDs:** Highlight specific body parts when a button is pressed.
- **Push Buttons:** Enable users to select specific body parts.
- **Speakers:** Provide audio feedback, announcing the name of the body part.
- **Copper Wires:** Connect components to ensure smooth electrical communication.
- **Resistors:** Regulate the current to prevent damage to the LEDs.
- **Arduino Power Adapter:** Supplies consistent power to the system.
- **SD Card Reader:** Stores pre-recorded audio files for the speakers.

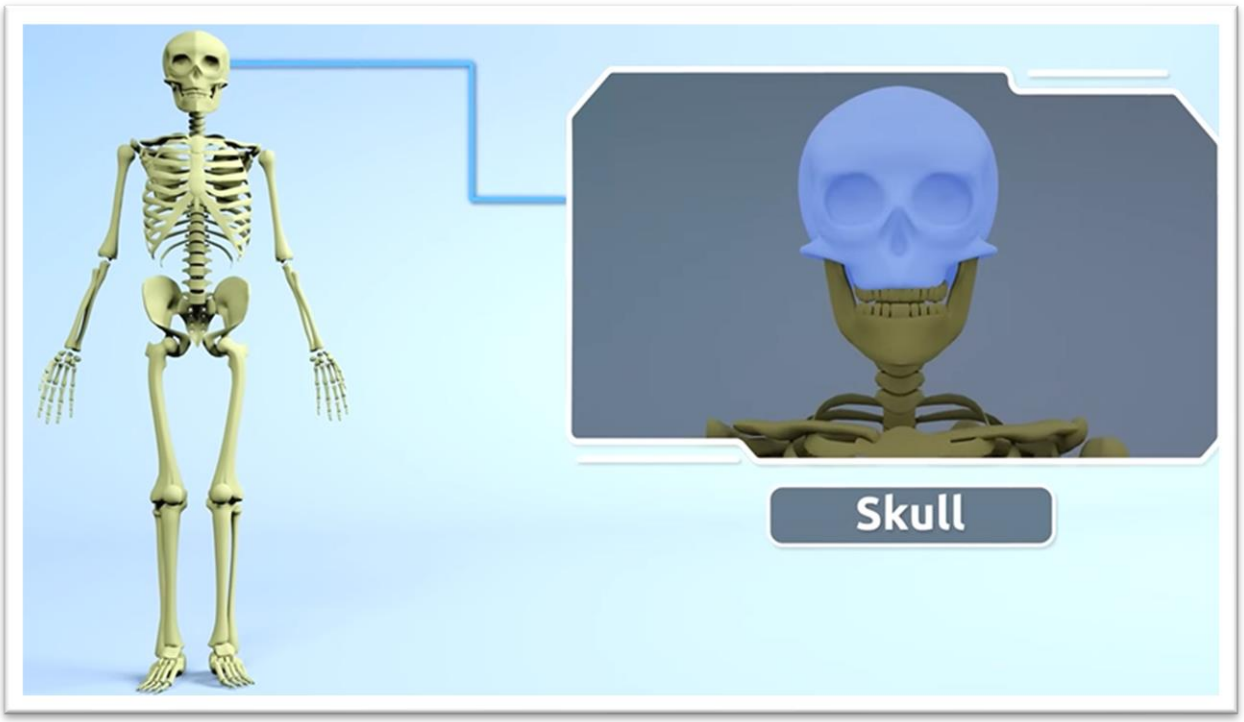
Description

The Interactive Human Skeleton is an educational tool designed to simplify the study of human anatomy for children. The setup consists of a skeletal model embedded with LEDs at key locations, representing different parts of the body, such as the skull, ribs, and femur.

When a user presses a specific button, the Arduino Mega processes the input and activates the corresponding LED, illuminating the selected body part. Simultaneously, the speaker plays a pre-recorded audio file announcing the name of the highlighted part. For example, pressing the "Skull" button lights up the LED in the skull area, and the speaker says "Skull."

This interactive design provides a hands-on and engaging way for children to learn anatomy. By combining visual and auditory cues, it makes the learning process intuitive and memorable.





INTERACTIVE LOGIC GATES BOOK

Components Used:

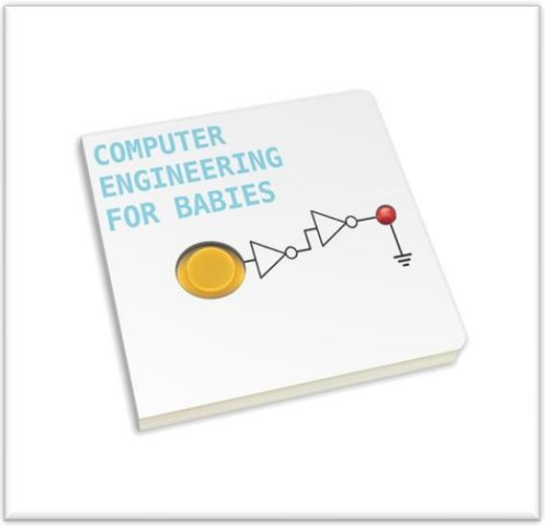
- **Arduino Nano:** Acts as the microcontroller to process inputs and control the LEDs.
- **LEDs:** Indicate the output of the logic gate based on the user's selection.
- **Push Buttons:** Allow users to select different logic gates (AND, OR, NOT, etc.).
- **Light Dependent Resistors (LDRs):** Detect the light intensity to decide the gate operation.
- **Resistors:** Protect the components and regulate the current flow.
- **Lithium Battery:** Powers the entire system, ensuring mobility and ease of use.
- **Copper Wires:** Connect all the components, creating the necessary circuits.

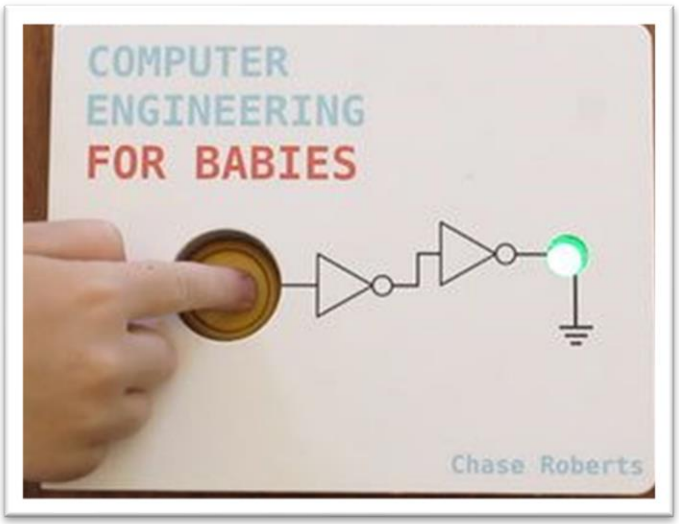
Description

The Interactive Logic Gates Book is designed to help children understand the fundamentals of digital electronics, specifically logic gates. The book contains circuits and components connected to an Arduino Nano, which processes user input and provides real-time feedback.

When a user presses a button corresponding to a specific logic gate (such as AND, OR, NOT, NAND), the Arduino Nano processes the input and activates the appropriate LED(s) to show the output. The Light Dependent Resistors (LDRs) are used to detect light intensity, simulating inputs for the gates. Based on the light levels detected, the corresponding logic gate performs the operation, and the output is displayed through the LEDs.

For example, when the user selects the AND gate, the LEDs will only light up if both LDRs receive enough light. The interactive nature of the book allows students to experiment with different gates, deepening their understanding of how digital circuits work in a simple and engaging way.





INTERACTIVE INDIA MAP

Components Used:

- **Arduino Nano:** Acts as the microcontroller to process inputs and control the LEDs.
- **LEDs:** Illuminate the respective states on the map when a button is pressed.
- **Push Buttons:** Allow users to select different states in India.
- **Speakers:** Provide audio feedback, announcing the name of the selected state.
- **Copper Wires:** Connect all components, forming the necessary circuits.
- **Resistors:** Protect the components and regulate current flow.
- **Arduino Power Adapter:** Provides a steady power source for the system.
- **Keypad Technique (4x4 Matrix):** Reduces the number of connections by organizing the buttons in rows and columns. Only 8 connections (4 rows + 4 columns) are required for 16 buttons.

Description:

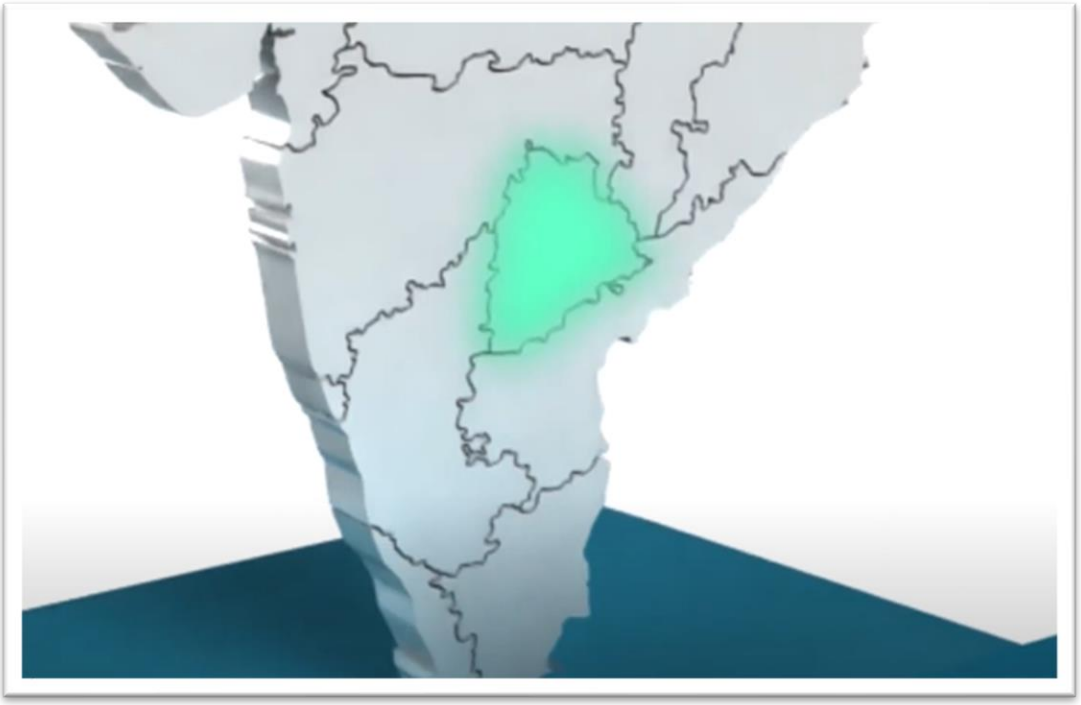
The Interactive India Map is an educational tool designed to help children learn the geography of India in an engaging and interactive way. The map is embedded with LEDs that represent different states of India.

To reduce the number of connections, a keypad technique is used, where 16 buttons are arranged in a 4x4 matrix (4 rows and 4 columns). This configuration requires only 8 connections to the Arduino Nano, instead of 16 individual connections, making the setup simpler and more efficient.

When a user presses a button corresponding to a particular state, the Arduino Nano processes the input, lights up the respective state's LED on the map, and plays the state's

name through the speaker. For example, pressing the button for "Maharashtra" will light up the LED for Maharashtra and announce its name.

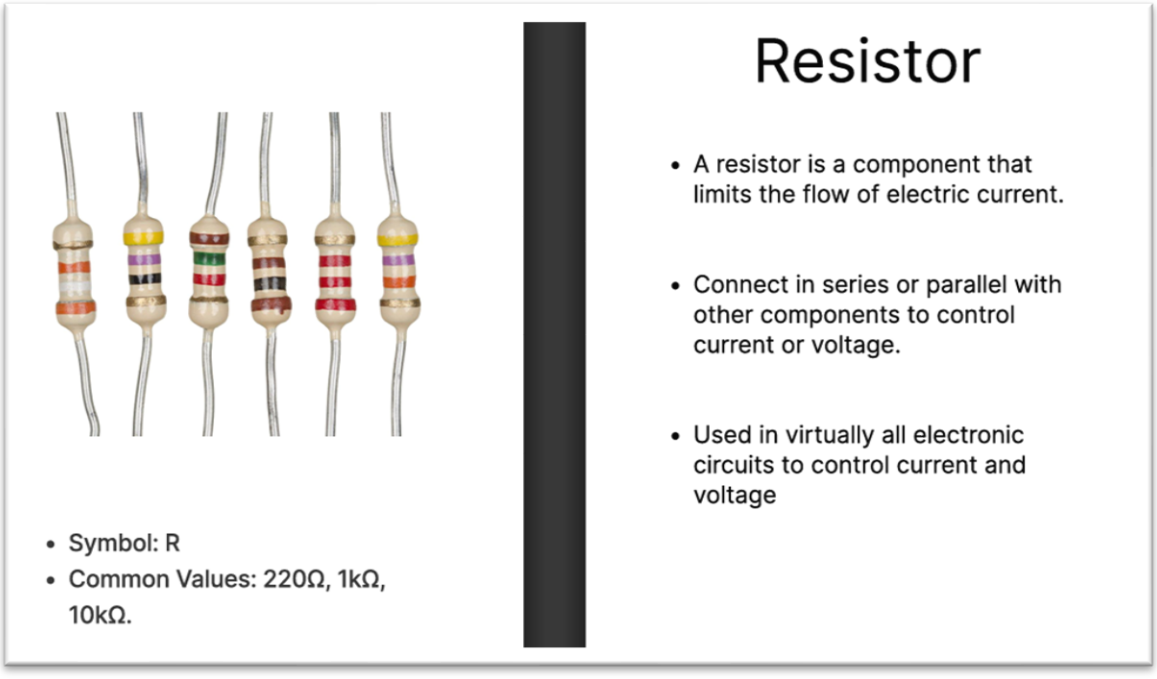
This interactive map encourages children to explore the states of India, making learning fun and memorable by combining visual and auditory feedback.



ELECTRONICS PASSPORT

The Electronics Passport is an innovative educational tool designed to introduce children to basic electronic components and their functions. It serves as an interactive guide that provides detailed explanations about various components such as resistors, capacitors, diodes, and transistors, along with practical applications. The project aims to simplify complex electronics concepts and make them accessible to young learners.

The Electronics Passport allows students to explore how different components work together in a circuit, helping them understand the fundamental principles of electronics. By combining theoretical knowledge with hands-on interaction, it encourages children to experiment and learn through a series of engaging activities, fostering creativity and critical thinking skills.



SOFTWARE AND SIMULATION TOOLS UTILIZED

TinkerCAD & Proteus :

TinkerCAD and Proteus were used to simulate and test circuit designs before moving to the physical implementation stage. These tools allowed for virtual experimentation, enabling the testing of connections for LEDs, buttons, and sensors. By using these platforms, the functionality of circuits in projects like the Interactive Human Skeleton and Logic Gates Book was verified.

SolidWorks (3D Printing) :

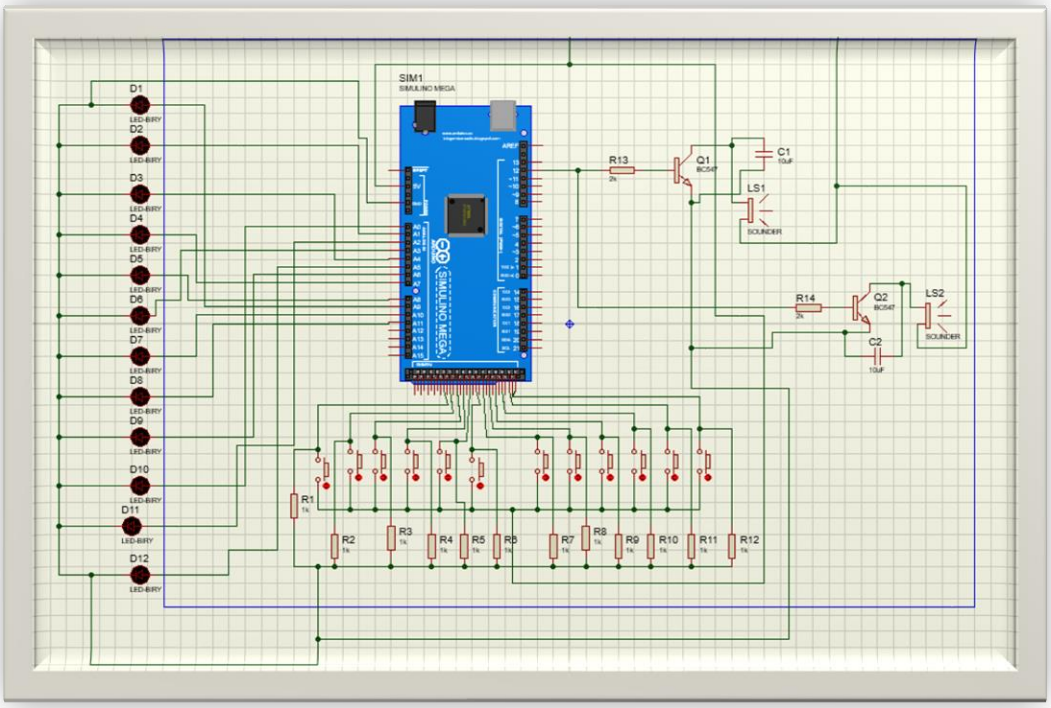
SolidWorks was utilized for creating 3D models of the physical components needed for the projects. This included designing the framework for the Interactive Skeleton, the book cover for the Logic Gates Book, and the structural base for the Interactive India Map. The 3D models were printed to provide a functional and visually appealing prototype.

Audacity Software :

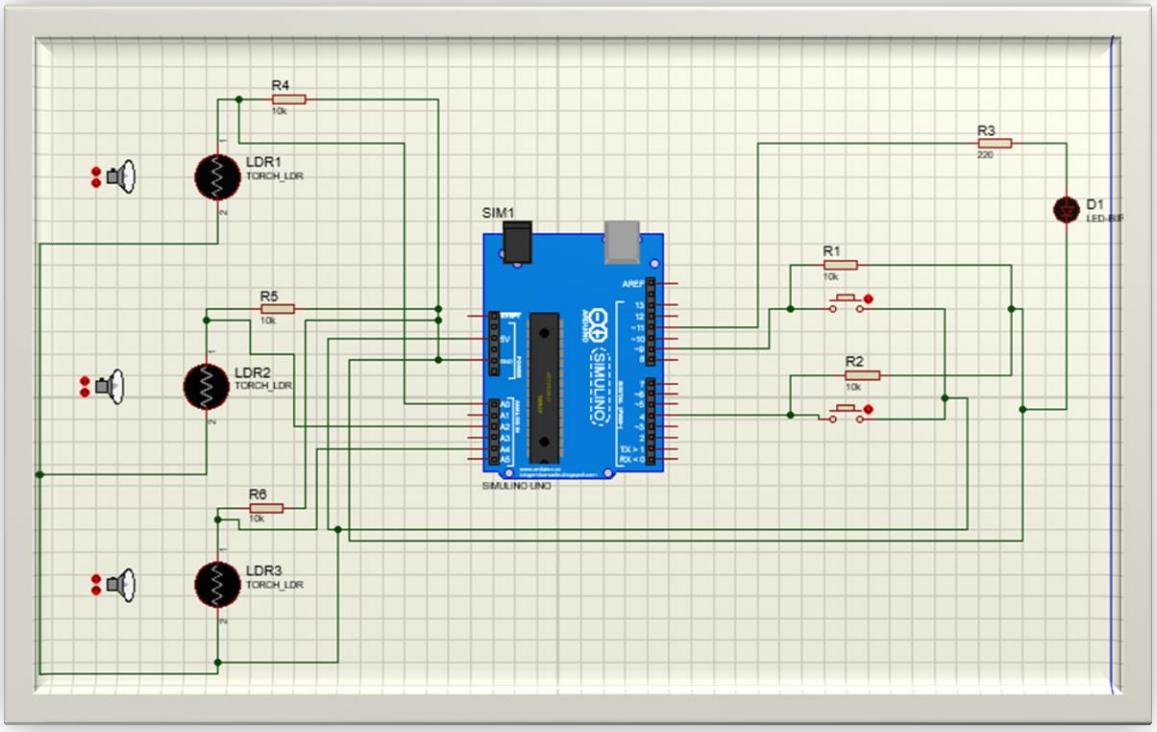
Audacity software was used to record and edit audio files in .wav format for auditory feedback in the projects. The audio files were created to enhance the user experience by providing verbal cues when a button was pressed. For example, in the Interactive Skeleton, the software was used to generate high-quality audio announcing body part names, making the tool both engaging and educational. The edited audio files were later integrated into the microcontroller system via an SD card.

SIMULATED CIRCUITS IN PROTEUS

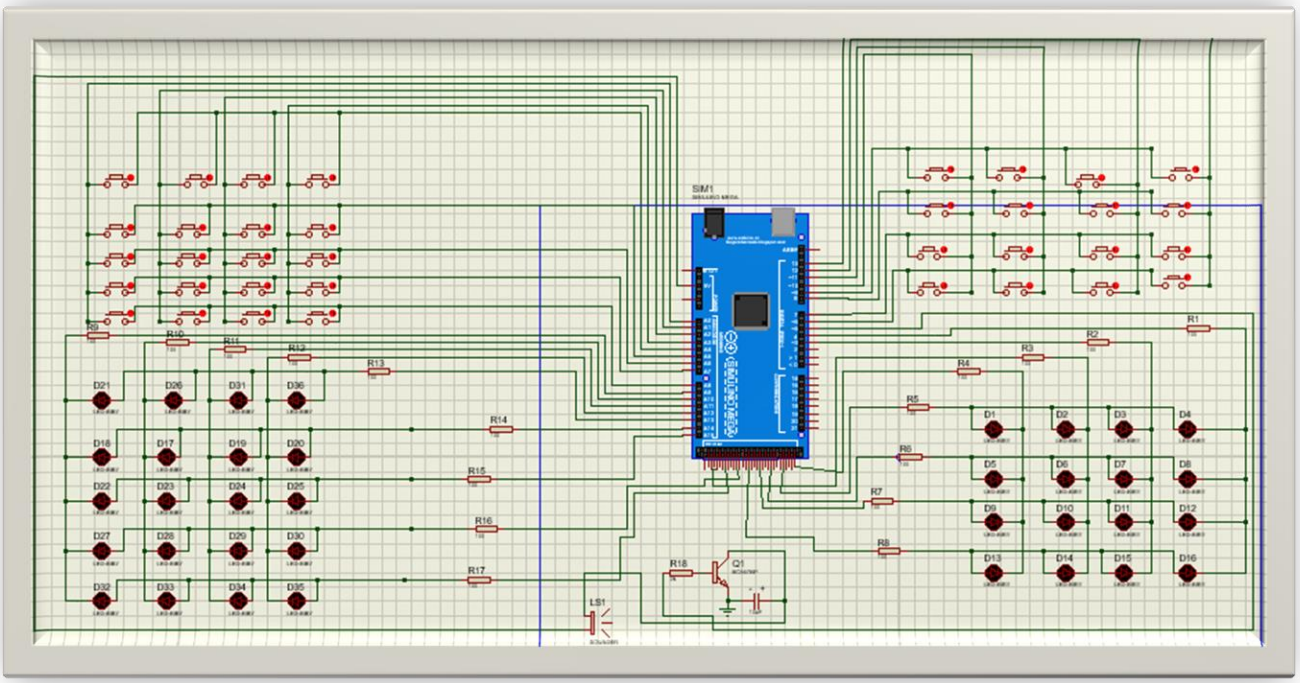
Interactive Human Skelton:



Interactive Logic Gates Book :



Interactive India Map :



THANK YOU