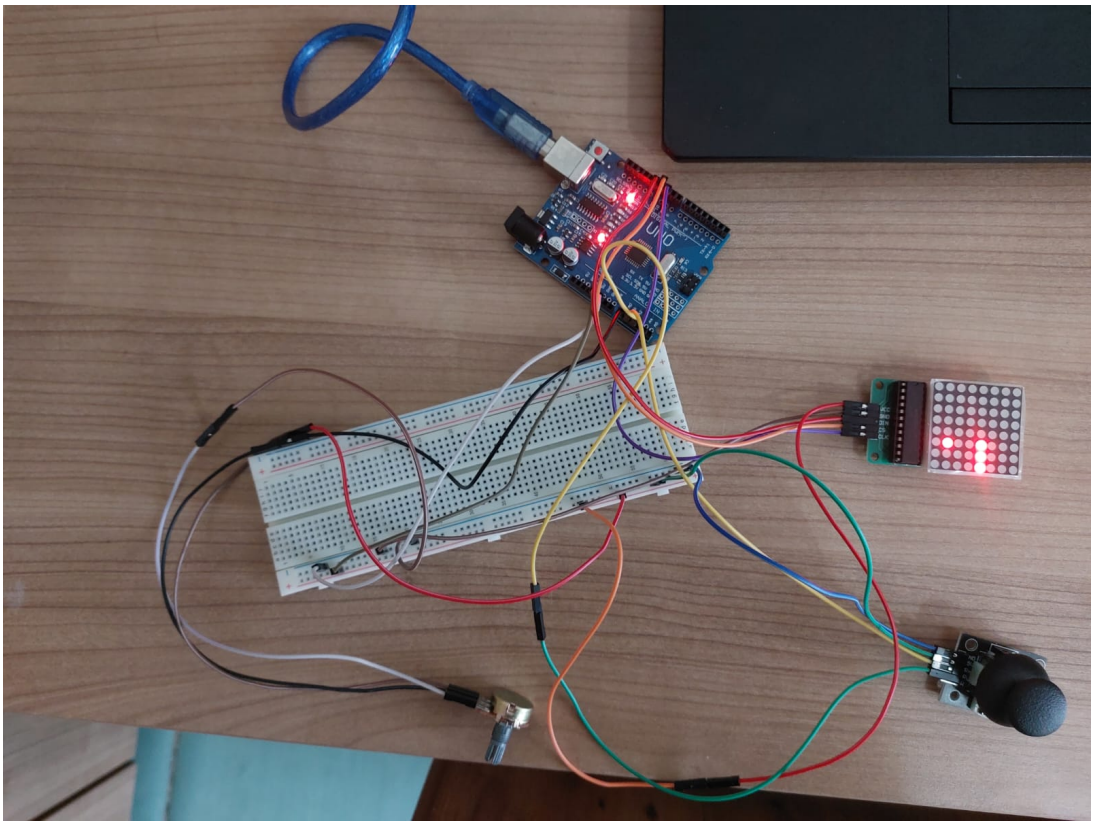
CSE 101 SNAKE GAME PROJECT



Group Members:

Burak Ersoy
Bayer Ortak
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SNAKE GAME PROJECT

GROUP 1 TEAM

SNAKE GAME

The Snake Game Arduino Project serves as a captivating showcase of the Arduino Uno's prowess in conjunction with a tailored set of components to create an immersive and interactive gaming experience. This project ingeniously integrates an 8x8 matrix display, a joystick, a breadboard, and jumper cables, harnessing their collective potential to breathe life into the classic arcade-style game.

By leveraging the processing capabilities of the Arduino Uno, users can engage with the game through the joystick, dynamically navigating the snake across the LED matrix display. The 8x8 matrix becomes the canvas upon which the virtual snake, food, and obstacles unfold, providing a visually compelling and interactive interface.

The amalgamation of the joystick for user input, the LED matrix for visual representation, and the Arduino Uno for executing the game logic showcases the project's versatility and underscores the Arduino platform's adaptability beyond conventional applications. This project not only brings the joy of gaming to the Arduino realm but also exemplifies the potential for creating tailored and engaging user experiences by synergizing hardware components with intelligent software design. The subsequent sections will delve into the technical intricacies of the project, offering insights into its architecture, implementation details, and the challenges surmounted during its development.

SNAKE GAME

Why the Snake Game Project is Important

The Snake Game Arduino Project is crucial for its impact on education, promotion of Arduino's versatility, and facilitation of interactive learning. This initiative bridges theoretical knowledge with practical skills, inspiring interest in STEM fields. By showcasing Arduino's adaptability in recreational applications, the project encourages innovation and challenges traditional perceptions. The gamified, hands-on approach fosters intuitive learning and contributes to a collaborative community of makers and learners. In summary, the project plays a vital role in innovative education, expanding Arduino's applications, and fostering interactive and collaborative learning experiences.

Solution

The Snake Game Arduino Project is implemented using Arduino Uno, an 8x8 matrix display, a joystick, and associated components. The project's solution is encapsulated in the provided Arduino code, which employs the LedControl library for interfacing with the LED matrix.

Components Used:

Arduino Uno: The main microcontroller board that executes the game logic.

8x8 LED Matrix : Used for visualizing the game environment, including the snake and food.

Joystick: Provides input for controlling the snake's direction.

Potentiometer: Adjusts the speed of the snake, enhancing user control.

Breadboard and Jumper Cables: Used for circuit connections.

Code Structure:

Point Structure: Defines a structure to represent a point on the LED matrix, including coordinates (row, column) and additional properties (x, y).

Initialization: Initializes the hardware components, including the LED matrix, potentiometer, and joystick.

Game Logic Functions:

ProduceFood(): Generates food on the LED matrix.

ScanJoystick(): Scans joystick input to determine snake movement.

GetNewSnake(): Updates the snake's position based on user input.

IsTheGameOver(): Checks if the game is over and handles reset logic.

Utility Functions:

CalculateSpeed(float x, float input_min, float output_min, float input_max, float output_max): Computes the snake's speed based on potentiometer input.

FixOvershoots(): Handles scenarios where the snake exceeds the LED matrix boundaries.

PLAN AND TIMELINE

WEEK 1

- Project ideas discussion
- Identifying the project
- Determining the materials to be used in the project
- List essential features and functionalities.
- Gather required components (Arduino Uno, LED Matrix, Joystick, Potentiometer, Breadboard, Jumper Cables).
- Set up hardware connections on the breadboard.

WEEK 2

- Set up the Arduino IDE.
- Create basic functions for initializing components.
- Develop functions for snake movement based on joystick input.
- Implement food generation on the LED matrix.
- Develop code to handle game over scenarios.
- Incorporate the potentiometer input to control the snake's speed.
- Fine-tune speed adjustments based on user input.
- Testing and Debugging.

WEEK 3

- Finalize Code
- Create Project Documentation. Document the project, including component connections and code explanations.
- Prepare a presentation showcasing the project.

Breakdown of Group Members' Contributions

YASİR ŞEKERCİ

- Project Idea
- Write Arduino code
- Material supply
- Creating Circuit Board

Burak Ersoy

- Material supply
- Preparing the project report
- Code optimization
- Organize meetings

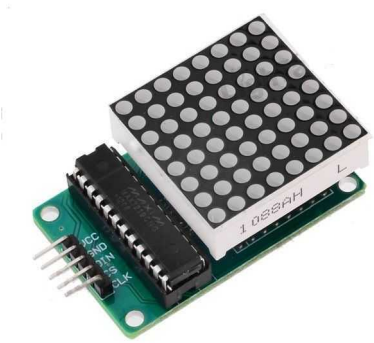
Bayer Ortak

- Determining the materials to be used in the project
- Revise code
- Test and debugging
- Preparing the project presentation

EQUIPMENTS WE USED

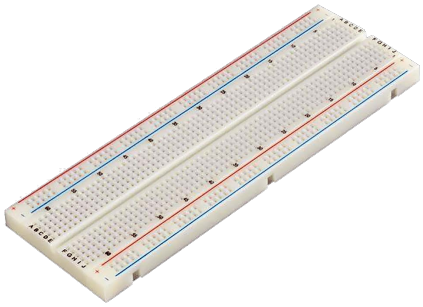
- ARDUINO UNO

- 8X8 LED MATRIX DISPLAY



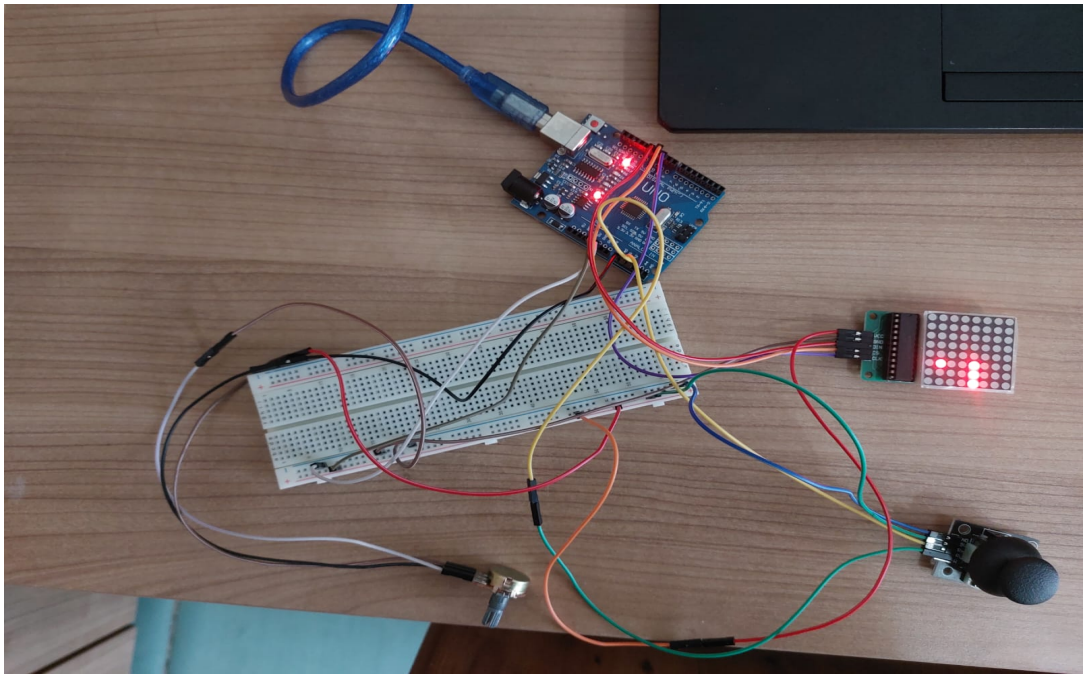
- JOYSTİCK

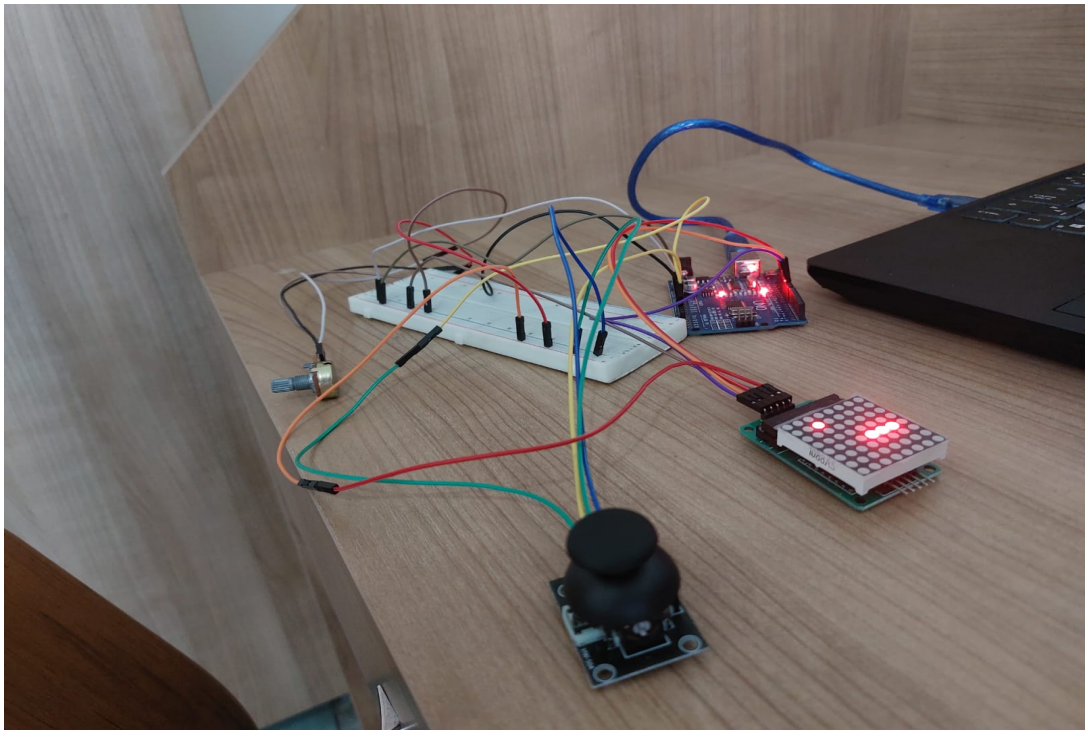
- BREADBOARD



- JUMPER CABLES

SNAKE GAME





DEMO VIDEO LINK: https://youtu.be/K4FHoUDmebo?feature=shared