



ITE332L Internet of Things (IoT)

1. Title of Activity

LED Direction Control Using Joystick

2. Group Information

Group Name: i5s

Program/Year/Block: BSIT 3C

Instructor: Mr. Arnie Armada

Date Performed: 6/28/2025

Date Submitted: 6/28/2025

Name of Member	Student ID	Role/Contribution
John Paul Ramos	202211599	Hardware
Ac Gabriel Manalo	202210273	Coding
Aschille De Leon	202210578	Schema
Marc Jian Dasalla	202210423	List of Materials
Vhinz Axl Baja	202210362	Documentation

3. Objectives

Use a joystick module to control the direction of four LEDs:

- Push left, right, up, or down to turn on the corresponding LED.
- Push the joystick button to turn all LEDs off.

4. Materials and Components Used

Activity 1

Quantity	Component	Description / Function
1	Breadboard	A reusable platform for building and testing electronic circuits without soldering.
1	Arduino uno	A microcontroller board used to write and run code that controls electronic components.
1	USB Cable	Connects the Arduino to a computer for power supply and code uploading.



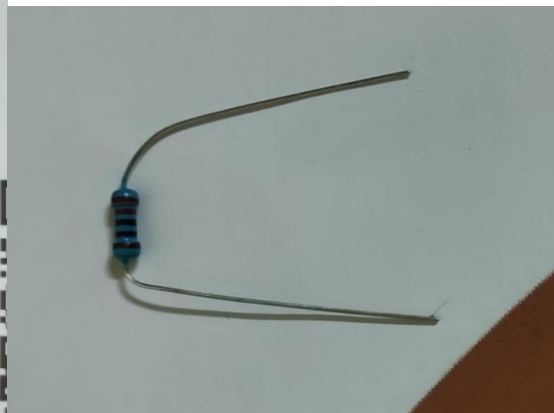
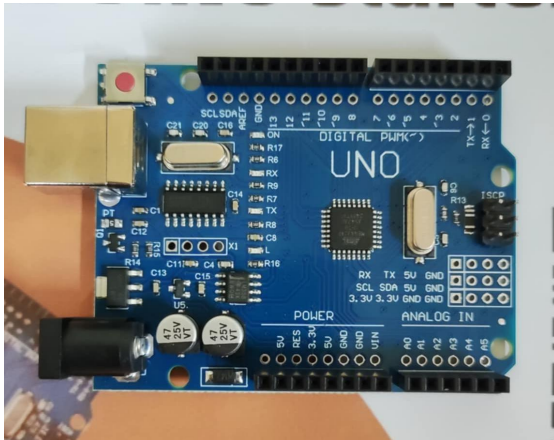
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- | | | |
|---|--|---|
| 4 | 220ohm resistors | Limits the current to protect components. |
| 4 | LEDs (red, green, blue, yellow or any color) | A low-cost microchip with built-in WiFi capability used to connect microcontrollers to wireless networks. |
| 8 | Jumper Wires | Used to connect components in a circuit quickly and easily. |
| 1 | Joystick | A joystick is an input device that uses two potentiometers to detect directional movement (X and Y axes) and often includes a button to send a digital signal when pressed. |

Images of Components used





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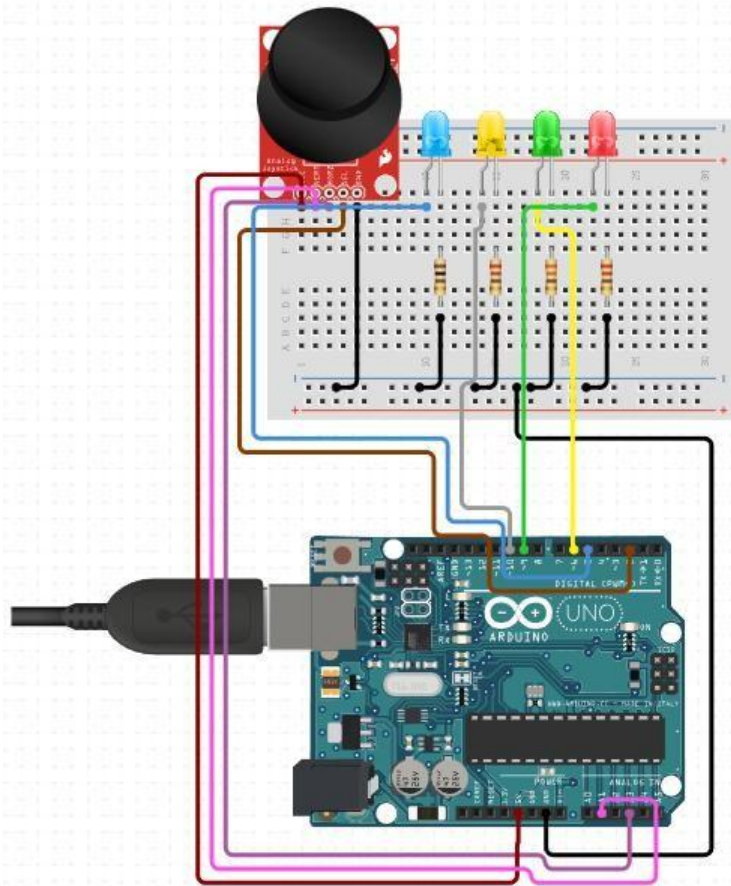
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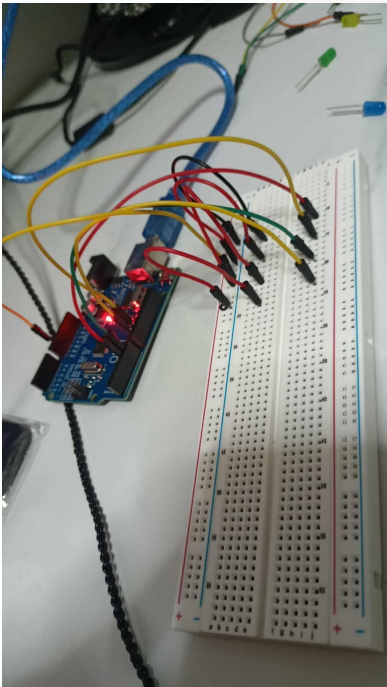
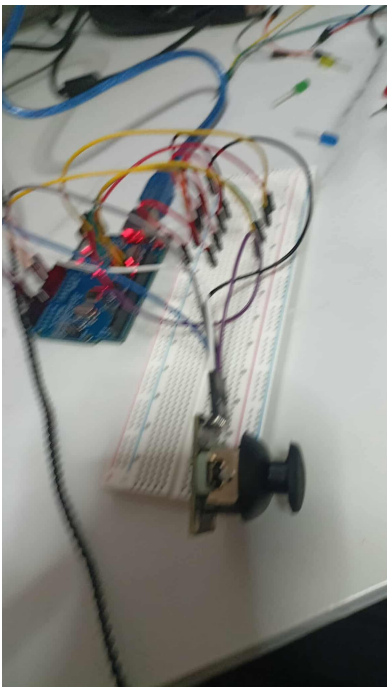
5. Schematic Diagram

Insert a clear schematic diagram of the circuit design below.





6. Wiring and Assembly Steps with Photo Documentation

Step No.	Description of Step	Photo of Step
1.	Insert the jumper wires into the breadboard and connect them to the appropriate Arduino pins for power (5V, GND) and signal.	
2	Place the joystick module onto the breadboard and connect VRx to A0, VRy to A1, SW to D8, VCC to 5V, and GND to GND.	



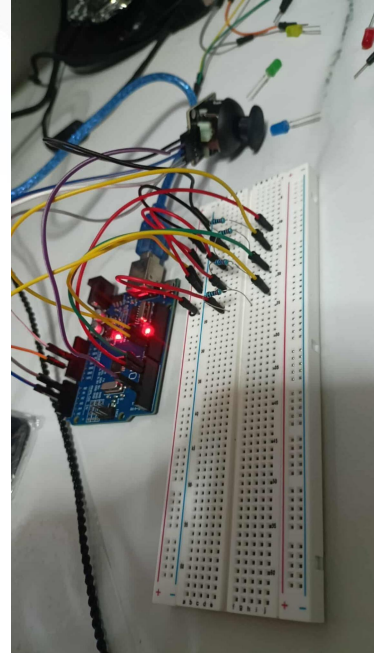
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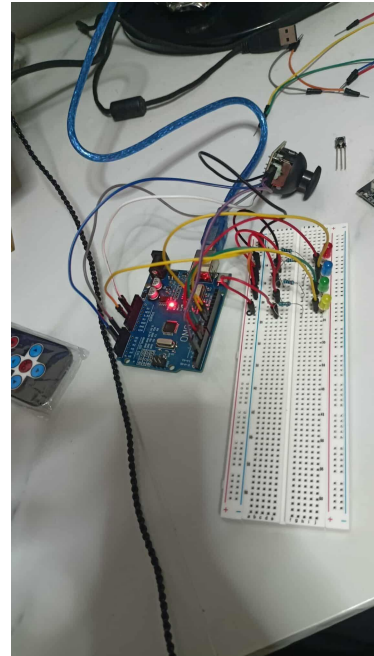
3

Add four 220Ω resistors to the breadboard, each with one end connected to a GND rail.



4

Insert the four LEDs, connect their anodes to D2, D3, D4, and D5, their cathodes to the resistors, then upload the code and test joystick control.





7. Source Code

Paste or link the Arduino source code used for the activity.

```
// Joystick pins
#define VRx A0
#define VRy A1
#define SW 8

// LED pins
#define LED_UP 2
#define LED_DOWN 3
#define LED_LEFT 4
#define LED_RIGHT 5

void setup() {
  pinMode(SW, INPUT_PULLUP);
  pinMode(LED_UP, OUTPUT);
  pinMode(LED_DOWN, OUTPUT);
  pinMode(LED_LEFT, OUTPUT);
  pinMode(LED_RIGHT, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  int xVal = analogRead(VRx);
  int yVal = analogRead(VRy);
  bool buttonPressed = digitalRead(SW) == LOW;

  // Reset all LEDs
  digitalWrite(LED_UP, LOW);
  digitalWrite(LED_DOWN, LOW);
  digitalWrite(LED_LEFT, LOW);
  digitalWrite(LED_RIGHT, LOW);

  if (!buttonPressed)
  {
    if (yVal < 400) {
      digitalWrite(LED_UP, HIGH);
    } else if (yVal > 600)
    {
      digitalWrite(LED_DOWN,
        HIGH);
    }
  }

  if (xVal < 400)
  {
    digitalWrite(LED_LEFT,
      HIGH);
  } else if (xVal > 600)
  {
    digitalWrite(LED_RIGHT,
      HIGH);
  }
}
```



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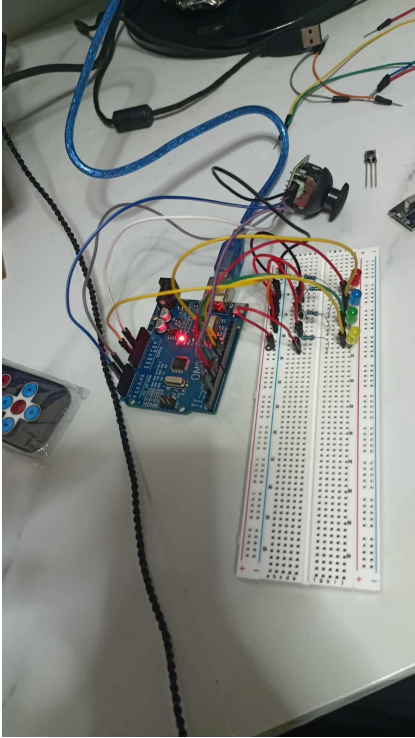
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```
}  
    delay(100); // Simple debounce  
}
```




8. Final Product Photo

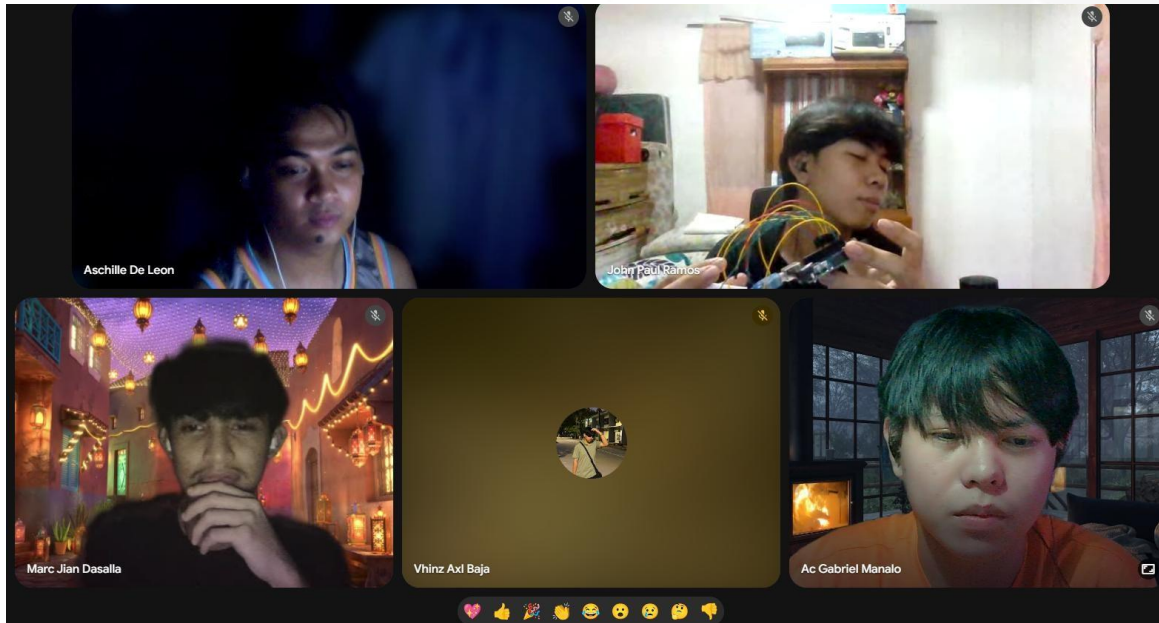
Attach a clear photo of the finished working setup.





9. Group Photo

Attach a group photo of the team with the project setup.



10. Video Demonstration

Link to the uploaded demonstration video (e.g., YouTube, Google Drive):

https://drive.google.com/drive/folders/1SBBhTJ78l2ZaRV8IuxBiIxKsOxeuzznd?usp=drive_link

11. Observations and Results

Summarize what was observed after uploading the code.

After uploading the code, the joystick successfully controlled the direction of the LEDs: moving it up, down, left, or right lit the corresponding LED, while pressing the joystick button turned all LEDs off. The response was consistent, and the short delay helped prevent flickering or unintended behavior.



12. Conclusion and Reflection

Discuss what you learned and how it can be applied.

Through this activity, we learned how to use a joystick module to interact with multiple digital outputs using analog input readings. It introduced the use of analog values from the joystick's X and Y axes and a digital button press to trigger specific actions in the code. This concept can be applied to basic user interface controls in robotics, game controllers, or remote-controlled devices, enhancing interactivity and directional control in embedded systems.

13. References

Cite tutorials, datasheets, or guides used.

Arduino. (n.d.). *Arduino documentation*. Arduino. <https://www.arduino.cc/en/Guide/HomePage>

Makerspaces.com. (n.d.). *15 simple Arduino Uno breadboard projects*.
<https://www.makerspaces.com/15-simple-arduino-uno-breadboard-projects/>

Arduino Project Hub. (n.d.). *Getting started with Arduino*. <https://create.arduino.cc/projecthub>