SIT111: Task 3.2C - Arduino Multi-LED Sequencer

Learning Objective

To build a simple Arduino circuit that sequentially lights up 8 different coloured LEDs. This task combines basic electronics with introductory programming to create a visual LED sequence.

Summary - TL; DR

1. Read through the materials on the unit site.
2. Build and test the Arduino circuit, run experiments.
3. Submit:
    - Summary and reflection
    - Outcome from activities:
        - Photos, codes, videos of the constructed circuit or experiments
        - Describe any additional insights or knowledge learned during the active learning activities

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Your Task

Create an Arduino project that sequentially lights up 8 different coloured LEDs. Program the Arduino to illuminate each LED one by one, using simple code to control the sequence and timing.

Material Required

- Arduino Uno (or similar Arduino board)
- 8 LEDs of different colours (if possible)
- 8 resistors (220-ohm or similar)
- Breadboard
- Jumper wires
- USB cable to connect the Arduino to a computer
- Arduino IDE installed on the computer

Circuit Assembly

- Connect each LED to a different digital pin on the Arduino (e.g., pins 2 to 9) using a breadboard.
- Insert a resistor in series with each LED to protect them.
- Use jumper wires to make connections to the ground and digital output pins on the Arduino.

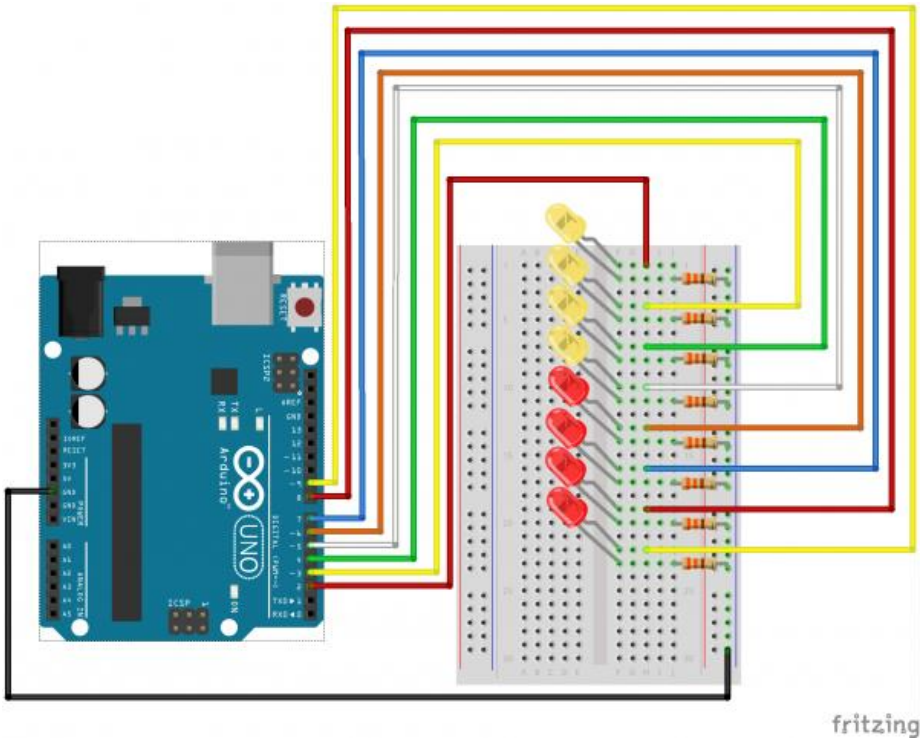

Figure 1: Sample Circuit **Programming**

In this programming exercise for the Arduino, start by defining the pins connected to each of the eight LEDs. In the setup() function, configure these pins as outputs using the pinMode() command. For instance, use pinMode(led1, OUTPUT); to set up the first LED. Repeat this step for each LED.

Next, move to the loop() function. Here, you'll control the LEDs in sequence. Begin by turning on the first LED with digitalWrite(led1, HIGH);, then create a delay using delay(1000); to keep the LED on for a specified time (1000 milliseconds or 1 second in this case). After the delay, turn off the LED with digitalWrite(led1, LOW);.

Continue this pattern for the remaining LEDs. For the second LED, use digitalWrite(led2, HIGH);, followed by a delay(1000);, and then digitalWrite(led2, LOW);. Repeat these steps, sequentially lighting each LED from the first to the eighth.

```
// Define LED pins int led1
= 2;
// Define the rest of the LED pins

void setup() {
  // Initialize each pin as an output pinMode(led1, OUTPUT);
  // Initialize the rest of the pins as outputs
```

```
}

void loop() {
  // Light up the first LED
  digitalWrite(led1, HIGH); delay(1000);
  digitalWrite(led1, LOW);

  // Add code to light up the second LED // ...

  // Continue for the rest of the LEDs // ...

  // Ensure each LED is turned off after being lit
}
```

Uploading and Testing:

- Connect the Arduino to the computer using the USB cable.
- Upload the program to the Arduino board using the IDE.
- Observe the LED blinking and adjust the delay in the code to change the blink rate.

Prepare Your Submission

Once you feel confident that you have achieved the learning goals, you can prepare a submission to demonstrate this. This will contain three sections: summary of what you learnt, reflection on your learning, and evidence of study and practice.

Section 1: Summary

Summarise what you have done and what you have learnt from the experiment. This should be a personal summary, written so that it will be useful to you should you need to quickly revise these concepts and tools in the future. Capture the most important aspects from the materials in the unit site and anything else you find related to this topic.

Section 2: Reflection

Reflect on your learning by responding to the following prompts: - How do you know you have achieved the learning goals? - What is the most important thing you learned from this and why? - How does the content or skills learned here relate to things you already know? - Where or when do you think it will be useful?

Note:: The content for the first two sections should not exceed 500 words or 1 printed page.

Section 3: Evidence of study and practice

This section will contain evidence of your outputs from the learning activities for this task:

- Screenshot of the Arduino IDE successsfully uploading the code
- Your code
- A short video of the working hardware (YouTube or Panopto)

Upload Your Submission

Once you have all the evidence in place, login to CICRA VLE and mark the task as **Ready for Feedback**. The submission process will ask you to upload evidence of completion of the task. For quizzes, please include a screenshot showing your quiz score. For Active Learning Session problems, you must submit evidence that you yourself had completed the activities. While working in groups/pairs is welcome, you must have evidence of your own contributions.

The system will also ask you to reflect on what unit learning outcomes have been achieved by this task.

Engage with Feedback

To get the task marked as **Complete**, you need to engage with the feedback you receive. Your tutor will review your submission and may ask you to clarify aspects of your learning, redo parts of the task, or include aspects you have missed. You may be asked to discuss the task in class or online. Use these discussions as an opportunity to help develop and validate your understanding.

If you are asked to resubmit, *make sure your subsequent submission includes a comment that describes how you have addressed the feedback you received*. This needs to demonstrate how you have addressed all the aspects indicated by your tutor in their feedback on your learning.