

## Arduino Project

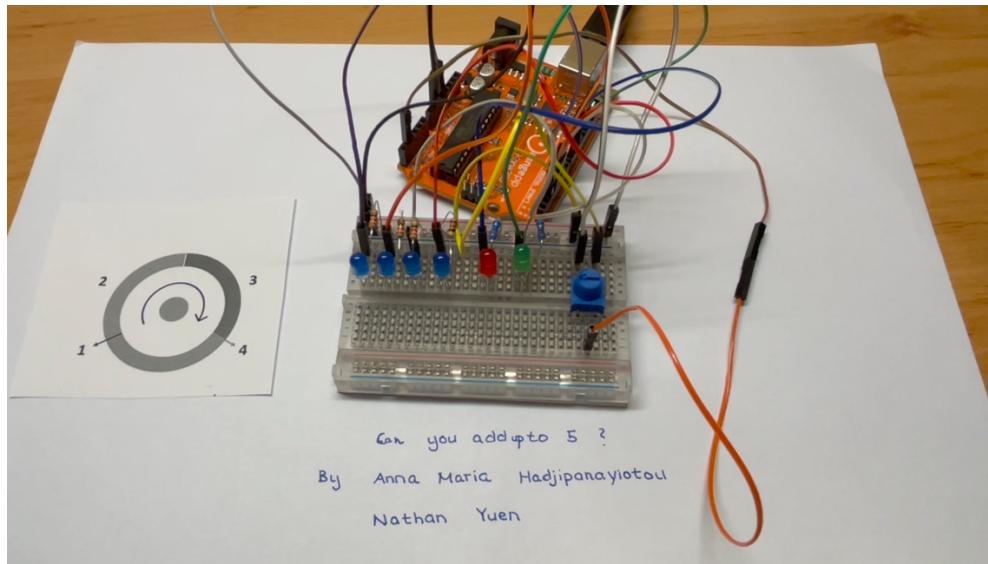


Figure 1: Arduino System

### Arduino:

The Arduino system is shown in Figure 1 above. The system is a game where the objective is to add to 5.

When the system is started, the blue LEDs will light up, indicating a number according to the number of blue LEDs lit up. Within 5 seconds, the player would need to input a value, so the sum of the input value and the number indicated by the blue LEDs is equal to 5. To input a number, the potentiometer on the right side is turned. The key is on the left, where the value inputted is corresponding to the direction the arrow on the potentiometer is pointing at, e.g. if the arrow is turned all the way anti-clockwise, the input would be 1.

After the 5 seconds is up, if the answer is correct, the green LED will be lit up. If the answer is incorrect, the red LED will be lit up.

The process is looped infinitely.

The resistors are connected in between the output of the Arduino and the LEDs to limit the current passing through.

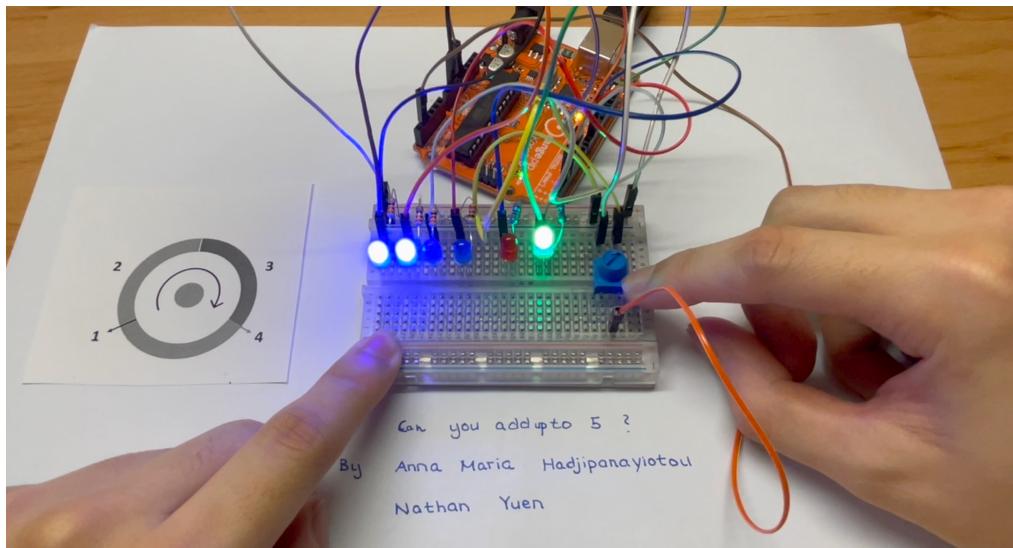


Figure 2: Two blue LEDs lit up. The arrow is pointing towards the top-right direction, indicating an input of 3. Since the answer is correct, the green LED is lit up.

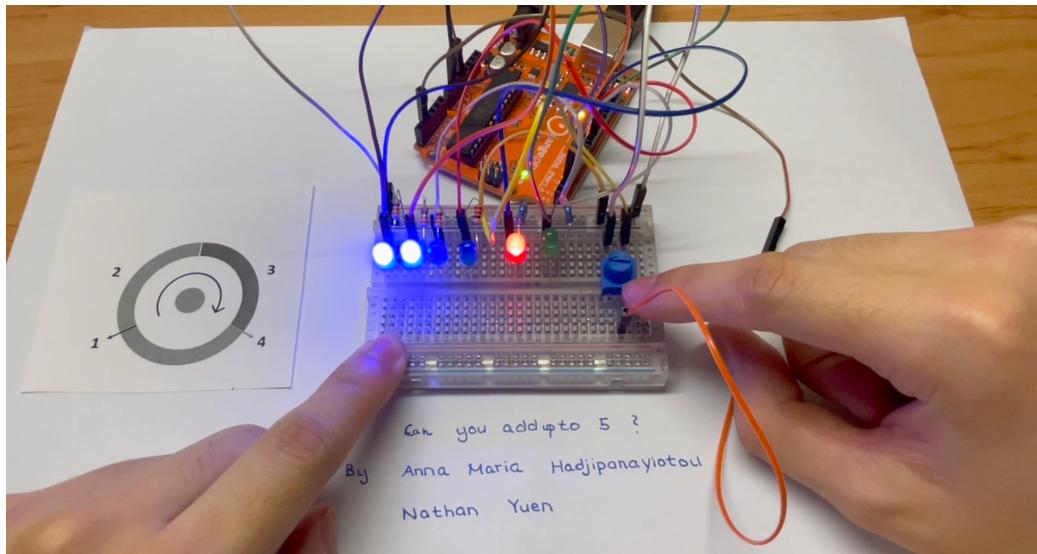


Figure 3: Two blue LEDs lit up. The arrow is pointing towards the top-left direction, indicating an input of 2. Since the answer is incorrect, the red LED is lit up.

### Arduino Code:

```
int One = 2;
int Two = 3;
int Three = 4;
int Four = 5;

int Correct = 9;
int Incorrect = 10;

void setup() {
    for (int i = One; i <= Four; i++) {
        pinMode(i, OUTPUT);
        pinMode(Correct, OUTPUT);
        pinMode(Incorrect, OUTPUT);
    }
}

void showNumber(int number) {
    digitalWrite(One, HIGH);
    if (number >= 2) {
        digitalWrite(Two, HIGH);
    }
    if (number >= 3) {
        digitalWrite(Three, HIGH);
    }
    if (number == 4) {
        digitalWrite(Four, HIGH);
    }
}

void setAllLEDs(int value) {
    for (int i = One; i <= Four; i++) {
        digitalWrite(i, value);
    }
    digitalWrite(Correct, LOW);
    digitalWrite(Incorrect, LOW);
}

int randomNumberGenerator() {
    int randNumber = random(1, 5);
    Serial.println(randNumber);
    return randNumber;
}

void loop() {
    int potReading;

    delay(1500);
    int number = randomNumberGenerator();
    showNumber(number);
    delay(5000);
```

```
if (number == 1) {
    potReading = analogRead(A4);
    Serial.println(potReading);
    if (potReading == 0) {
        digitalWrite(Correct, HIGH);
        delay(3000);
    } else {
        digitalWrite(Incorrect, HIGH);
        delay(3000);
    }
} else if (number == 2) {
    potReading = analogRead(A4);
    Serial.println(potReading);
    if (potReading >= 1 && potReading <= 500) {
        digitalWrite(Correct, HIGH);
        delay(3000);
    } else if (potReading == 0 || potReading >= 501) {
        digitalWrite(Incorrect, HIGH);
        delay(3000);
    }
}

else if (number == 3) {
    potReading = analogRead(A4);
    Serial.println(potReading);
    if (potReading >= 501 && potReading <= 1022) {
        digitalWrite(Correct, HIGH);
        delay(3000);
    } else if (potReading <= 500 || potReading == 1023)
        digitalWrite(Incorrect, HIGH);
        delay(3000);
}

else if (number == 4) {
    potReading = analogRead(A4);
    Serial.println(potReading);
    if (potReading == 1023) {
        digitalWrite(Correct, HIGH);
        delay(3000);
    } else {
        digitalWrite(Incorrect, HIGH);
        delay(3000);
    }
}

setAllLEDs(LOW);
}
```

## C Program:

Below is a C program with the same function as the Arduino system.

```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>

int randNumber;
int answer;
int lower = 1, upper = 5;

void answeranalysis(void) {
    scanf("%d", &answer);
    if (answer == 5 - randNumber) {
        printf("That is correct!\n\n");
    } else {
        printf("That is incorrect!\n\n");
    }
}

int main(void) {
    printf("System by Anna Maria Hadjipanayiotou and Nathan Yuen\n\n");
    sleep(2);
    printf("Add up to 5\n");
    sleep(2);

    for (;;) {
        randNumber = rand() % (upper - lower) + lower;
        printf("%d\n", randNumber);

        if (randNumber == 1) {
            answeranalysis();
        } else if (randNumber == 2) {
            answeranalysis();
        } else if (randNumber == 3) {
            answeranalysis();
        } else if (randNumber == 4) {
            answeranalysis();
        }
    }
    return 0;
}
```

System by Anna Maria Hadjipanayiotou and Nathan Yuen

Add up to 5

4

1

That is correct!

3

2

That is correct!

2

3

That is correct!

4

1

That is correct!

2

2

That is incorrect!

4

■

Figure 4: Output of the C Program