



# ARDUINO UNO

WORKSHOP

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# BLINKING LED

- WHAT YOU WILL LEARN?
  - HOW TO CONNECT LED TO ARDUINO
  - HOW TO WRITE PROGRAM FROM SCREATCH

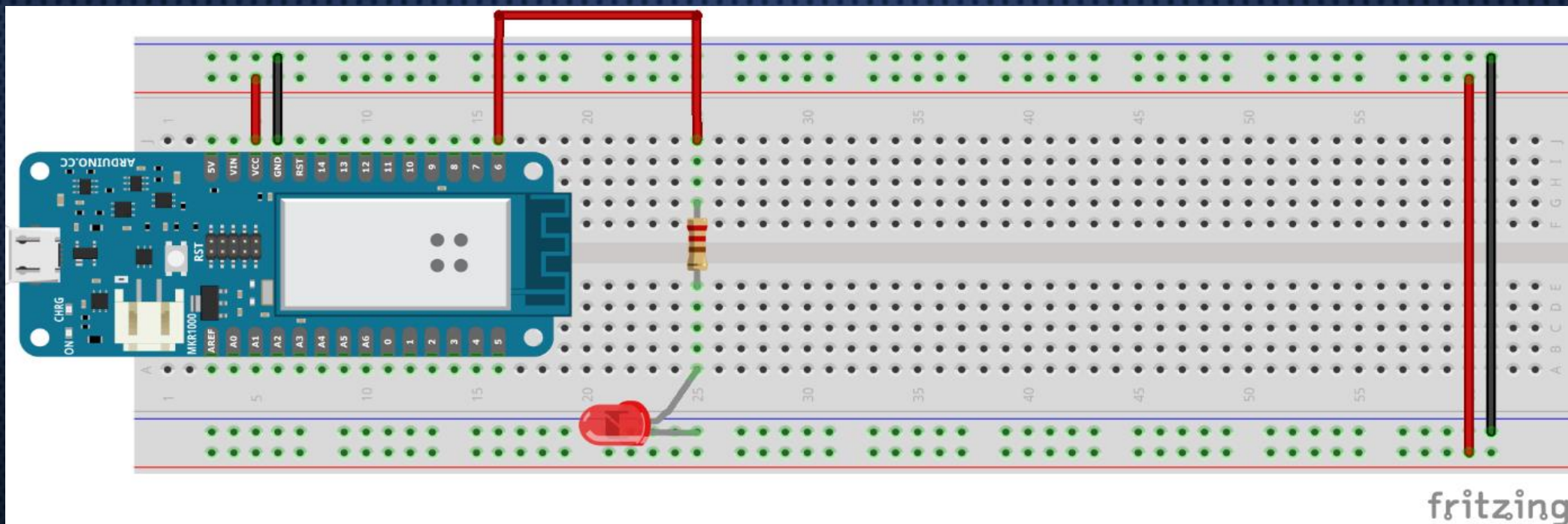


# BLINKING LED - TASK

- CONNECT LED TO PIN 6 ARDUINO BOARD
- WRITE PROGRAM THAT WILL TURN OFF/ON LED FOR 300MS CONTINUOUSLY

# BLINKING LED - CONNECTING

- CONNECT ARDUINO WITH BREADBOARD
- CONNECT RESISTOR AND LED AS SHOWN





# BLINKING LED – ARDUINO CODE

- `INT LEDRED = 6; //DETERMINE PIN NUMBER`
- `VOID SETUP () {`
- `PINMODE (LEDRED, OUTPUT); //SET PIN LEDRED(6) OUTPUT`
- `}`
  
- `VOID LOOP () {`
- `DIGITALWRITE (LEDRED, HIGH); //SET PIN LEDRED TO HIGH - TURN ON LED`
- `DELAY (300); //WAIT 300 MS`
- `DIGITALWRITE (LEDRED, LOW); //SET PIN LEDRED TO LOW – TURN OFF LED`
- `DELAY (300); //WAIT 300 MS`
- `}`

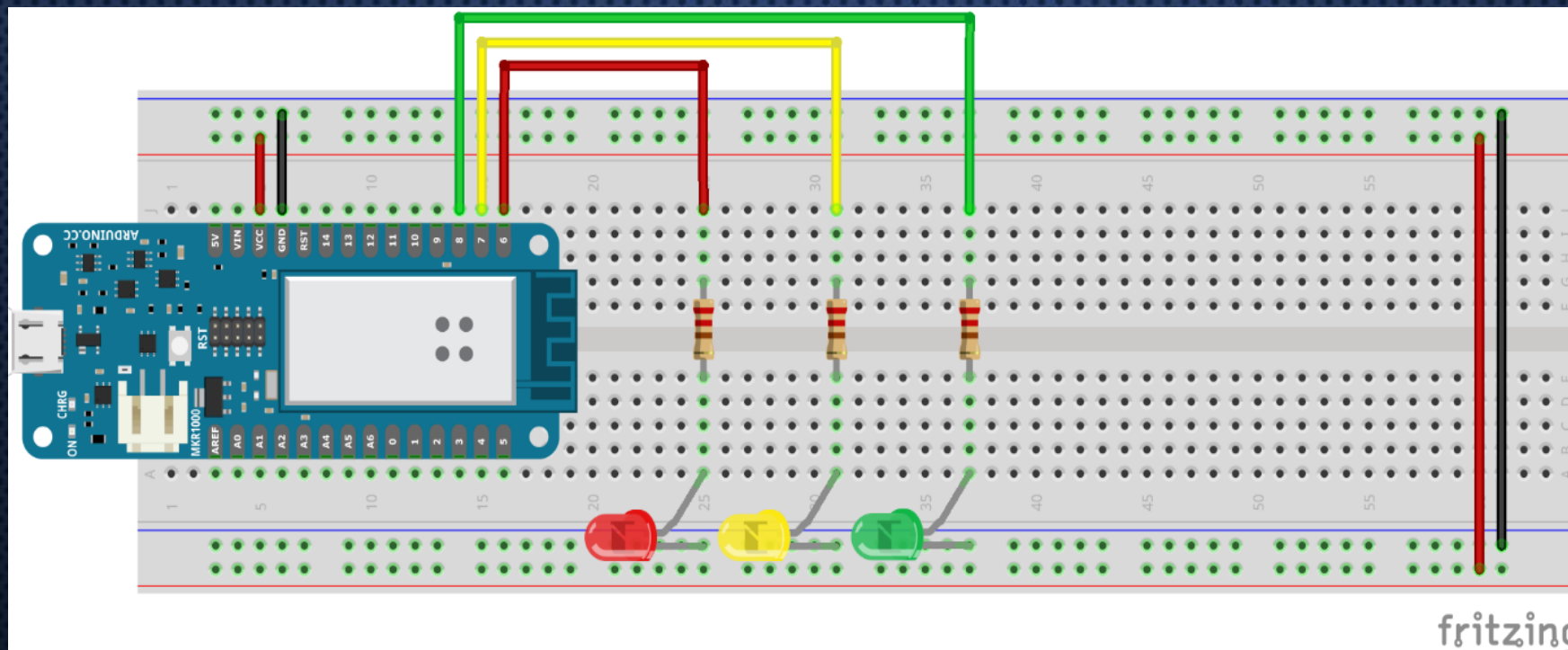


# TRAFFIC LIGHTS

- WHAT YOU WILL LEARN?
  - WE NEED TO KNOW HOW TRAFFIC LIGHTS WORK
  - USE VARIABLE TO STORE VALUE

# TRAFFIC LIGHTS - TASK

- CONNECT 3 LEDs (RED, YELLOW AND GREEN) WITH RESISTORS ON PINS 6, 7, 8



# TRAFFIC LIGHTS – HOW PROGRAM WORKS

- THE RED LIGHT IS ON FOR 3s
- AFTER THAT- RED LIGHT AND YELLOW ARE ON FOR 1s
- AFTER THAT – GREEN LIGHT IS ON FOR 3s
- AND THE LAST – YELLOW LIGHT IS ON FOR 1s.

THE CYCLE REPEATS FROM THE BEGINNING





# TRAFFIC LIGHTS – ARDUINO CODE

- `INT LEDRED = 6; //INITIALIZE THE RED LED TO PIN 6`
- `INT LEDYELLOW = 7; //INITIALIZE THE YELLOW LED TO PIN 7`
- `INT LEDGREEN = 8; //INITIALIZE THE GREEN LED TO PIN 8`
- 
- `VOID SETUP () {`
- `PINMODE(LEDRED, OUTPUT); //SET LEDRED (6) AS OUTPUT`
- `PINMODE(LEDYELLOW, OUTPUT); //SET LEDYELLOW (7) AS OUTPUT`
- `PINMODE(LEDGREEN, OUTPUT); //SET LEDGREEN (8) AS OUTPUT`
- `}`



# TRAFFIC LIGHTS – ARDUINO CODE

- `VOID LOOP() {`
- `//RED LIGHT IS ON FOR 3s`
- `DIGITALWRITE(LEDRED, HIGH);        //TURN ON RED LED`
- `DIGITALWRITE(LEDYELLOW, LOW);     //TURN OFF YELLOW LED`
- `DIGITALWRITE(LEDGREEN, LOW);     //TURN OFF GREEN LED`
- `DELAY(3000);                        //WAIT FOR 3s`
- `//RED AND YELLOW LIGHTS ARE ON FOR 1s`
- `DIGITALWRITE(LEDRED, HIGH);        //TURN ON RED LED`
- `DIGITALWRITE(LEDYELLOW, HIGH);    //TURN ON YELLOW LED`
- `DIGITALWRITE(LEDGREEN, LOW);     //TURN OFF GREEN LED`
- `DELAY(1000);                        //WAIT FOR 1s`



# TRAFFIC LIGHTS – ARDUINO CODE

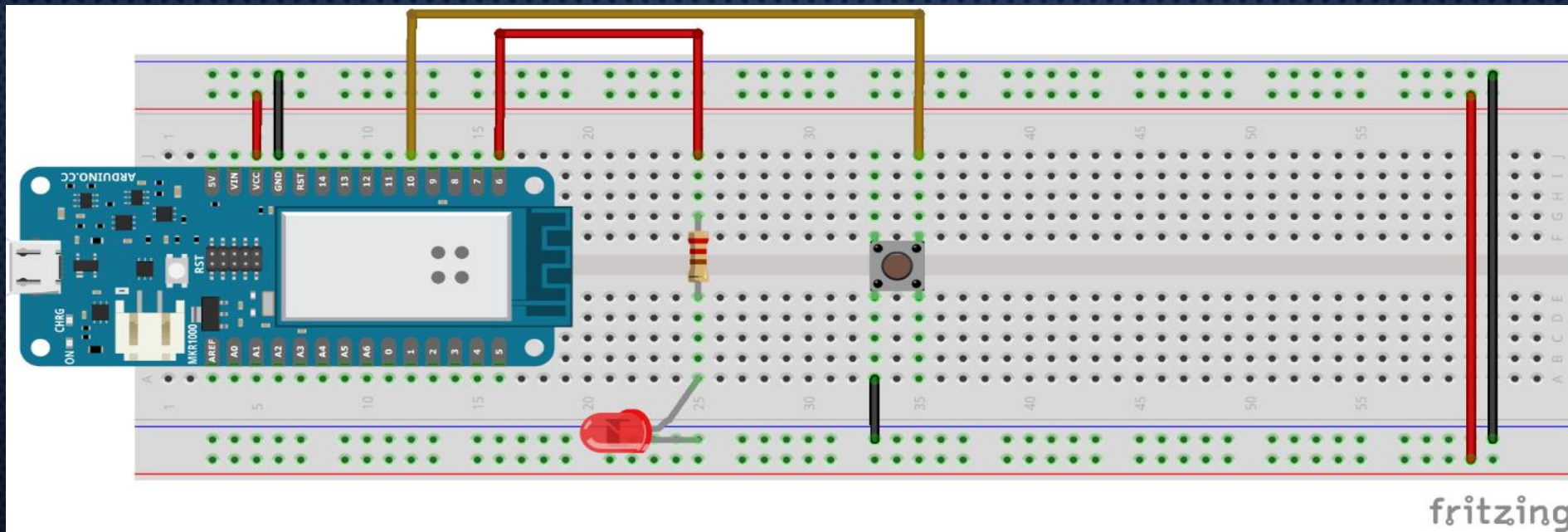
- `//GREEN LED IS ON FOR 3 S`
- `DIGITALWRITE(LEDRED, LOW); //TURN OFF RED LED`
- `DIGITALWRITE(LEDYELLOW, LOW); //TURN OFF YELLOW LED`
- `DIGITALWRITE(LEDGREEN, HIGH); //TURN ON GREEN LED`
- `DELAY(3000); //WAIT FOR 3S`
- 
- `//YELLOW LED IS ON FOR 1S`
- `DIGITALWRITE(LEDRED, LOW); //TURN OFF RED LED`
- `DIGITALWRITE(LEDYELLOW, HIGH); //TURN ON YELLOW LED`
- `DIGITALWRITE(LEDGREEN, LOW); //TURN OFF GREEN LED`
- `DELAY(1000); //WAIT FOR 1S`
- `}`

# SINGLE LED CONTROL

- WHAT YOU WILL LEARN?
  - HOW TO USE PUSHBUTTON
  - IF-ELSE CODITION

# SINGLE LED CONTROL - TASK

- CONNECT ONE PUSHBUTTON AND ONE LED WITH RESISTOR TO THE ARDUINO. PUSHBUTTON CONNECT TO PIN 10 AND LED ON PIN 6.
- WHEN THE BUTTON IS PRESSED LED IS SWITCHED ON, AND WHEN THE BUTTON IS RELEASED LED IS SWITCHED OFF.





# SINGLE LED CONTROL – ARDUINO CODE

- `INT LEDRED = 6;`
- `INT PUSHBUTTON= 10;`
- 
- `INT STATEPUSHBUTTON;`
- 
- `VOID SETUP() {`
- `PINMODE(LEDRED, OUTPUT); //SET LEDRED(6) AS OUTPUT`
- `PINMODE(PUSHBUTTON, INPUT_PULLUP); //SET PUSHBUTTON (10) AS INPUT PULL-UP`
- `}`



# SINGLE LED CONTROL – ARDUINO CODE

- VOID LOOP() {
- STATEPUSHBUTTON = DIGITALREAD(PUSHBUTTON); //READ THE STATE AND WRITE IT IN STATEPUSHBUTTON
- IF (STATEPUSHBUTTON == LOW) { //IF PUSHBUTTON IS PRESSED
- DIGITALWRITE(LEDRED, HIGH); //LEDRED IS SWITCH ON
- } ELSE { // ELSE
- DIGITALWRITE(LEDRED, LOW); //LEDRED IS SWITCH OFF
- }
- }

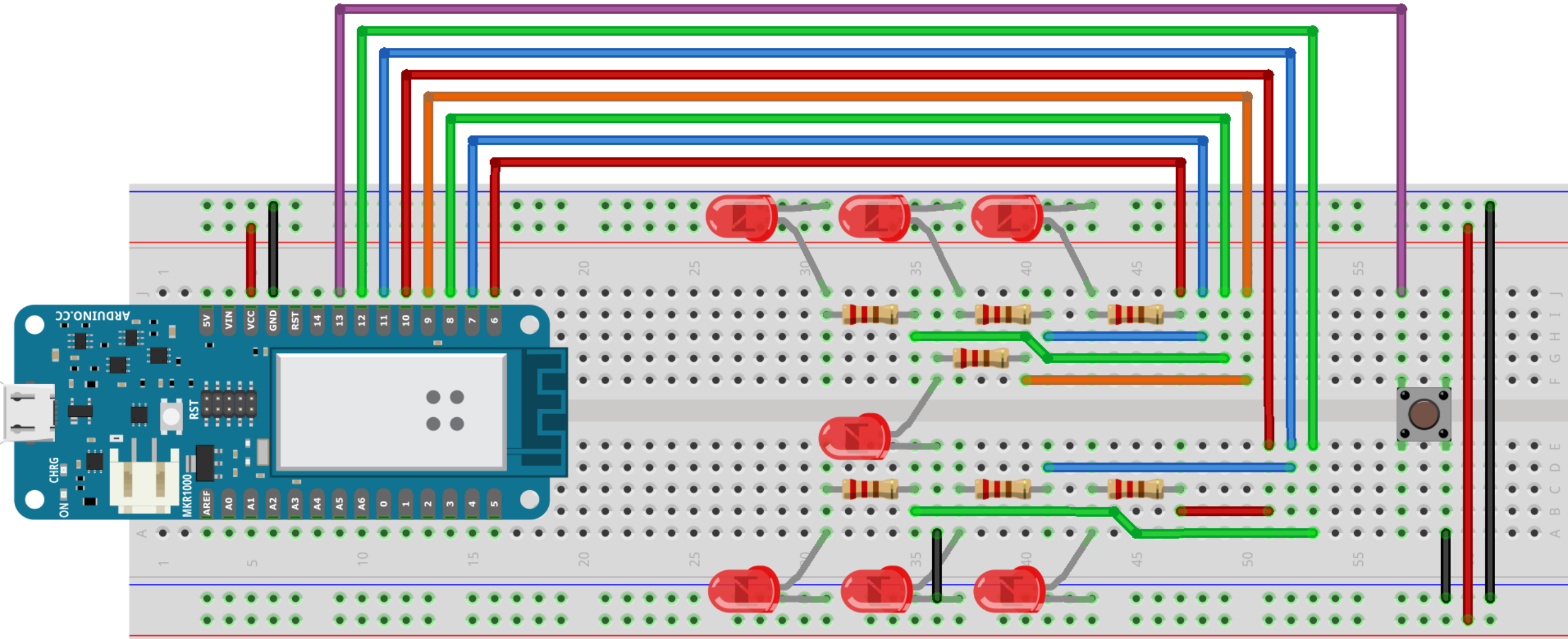


# ELECTRONIC DICE - TASK

- CONNECT 7 LEDs AND 1 PUSHBUTTON.
- CONNECT THE LEDs SO THAT THEY LOOK LIKE DOTS ON DICE FOR GAMBLING.
- WRITE A PROGRAM THAT WILL SHOW THE NUMBERS 1 TO 6 ON THE LEDs AS THEY ARE SHOWN ON REAL DICE.
- RANDOMNESS OF NUMBERS IS ACHIEVED IN SUCH A WAY THAT WHILE THE USER HOLDS THE PUSHBUTTON THE PROGRAM COUNTS DOWN FROM 1 TO 6 AT HIGH SPEED AND DISPLAYS IT ON THE LEDs.
- WHEN THE USER RELEASES THE BUTTON, THE COUNTING STOPS AND THE LAST NUMBER REMAINS DISPLAYED ON THE LEDs.



# ELECTRONIC DICE - SCHEME





# ELECTRONIC DICE – ARDUINO CODE

- `INT LED1 = 6;`                    `//DEFINE PIN NUMBER FOR LED1 = 6`
- `INT LED2 = 7;`                    `// DEFINE PIN NUMBER FOR LED2 = 7`
- `INT LED3 = 8;`                    `// DEFINE PIN NUMBER FOR LED3 = 8`
- `INT LED4 = 9;`                    `// DEFINE PIN NUMBER FOR LED4 = 9`
- `INT LED5 = 10;`                    `// DEFINE PIN NUMBER FOR LED5 = 10`
- `INT LED6 = 11;`                    `// DEFINE PIN NUMBER FOR LED6 = 11`
- `INT LED7 = 12;`                    `// DEFINE PIN NUMBER FOR LED7 = 12`
- `INT PUSHBUTTON = 13;`            `// DEFINE PIN NUMBER FOR PUSHBUTTON = 13`
- `INT COUNTER = 0;`                `// DEFINE COUNTER = 0`



# ELECTRONIC DICE – ARDUINO CODE

- `VOID SETUP() {`
- `PINMODE(LED1, OUTPUT);           //SET LED1 AS OUTPUT`
- `PINMODE(LED2, OUTPUT);           //SET LED2 AS OUTPUT`
- `PINMODE(LED3, OUTPUT);           //SET LED3 AS OUTPUT`
- `PINMODE(LED4, OUTPUT);           //SET LED4 AS OUTPUT`
- `PINMODE(LED5, OUTPUT);           //SET LED5 AS OUTPUT`
- `PINMODE(LED6, OUTPUT);           //SET LED6 AS OUTPUT`
- `PINMODE(LED7, OUTPUT);           //SET LED7 AS OUTPUT`
- `PINMODE(PUSHBUTTON, INPUT_PULLUP); //SET PUSHBUTTON AS INPUT`
- `}`



# ELECTRONIC DICE – ARDUINO CODE

- `VOID TURNOFFALLLED() {`
- `DIGITALWRITE(LED1, LOW); //TURN OFF LED 1`
- `DIGITALWRITE(LED2, LOW); // TURN OFF LED 2`
- `DIGITALWRITE(LED3, LOW); // TURN OFF LED 3`
- `DIGITALWRITE(LED4, LOW); // TURN OFF LED 4`
- `DIGITALWRITE(LED5, LOW); // TURN OFF LED 5`
- `DIGITALWRITE(LED6, LOW); // TURN OFF LED 6`
- `DIGITALWRITE(LED7, LOW); // TURN OFF LED 7`
- `}`



# ELECTRONIC DICE – ARDUINO CODE

- `VOID LOOP() {`
- `IF (DIGITALREAD(PUSHBUTTON) == LOW) {       // IF PUSHBUTTON IS PRESSED`
- `COUNTER = COUNTER + 1;       //INCREMENT COUNTER`
- `IF (COUNTER > 6) {       //IF COUNTER > 1`
- `COUNTER = 1;       //SET COUNTER TO 1`
- `}`
- `}`



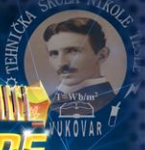
# ELECTRONIC DICE – ARDUINO CODE

```
• IF (COUNTER == 1) {           //IF COUNTER = 1
•   TURNOFFALLLED();           //TURN OFF ALL LEDs
•   DIGITALWRITE(LED4, HIGH);   //SHOW NUMBER 1
• }
• ELSE IF (COUNTER == 2) {     //IF COUNTER = 2
•   TURNOFFALLLED();           //TURN OFF ALL LEDs
•   DIGITALWRITE(LED1, HIGH);   //SHOW NUMBER 2
•   DIGITALWRITE(LED7, HIGH);   //SHOW NUMBER 2
• }
• ELSE IF (COUNTER == 3) {     //IF COUNTER = 3
•   TURNOFFALLLED();           //TURN OFF ALL LEDs
•   DIGITALWRITE(LED3, HIGH);   // SHOW NUMBER 3
•   DIGITALWRITE(LED4, HIGH);   // SHOW NUMBER 3
•   DIGITALWRITE(LED5, HIGH);   // SHOW NUMBER 3
• }
```



# ELECTRONIC DICE – ARDUINO CODE

```
• ELSE IF (COUNTER == 4) { //IF COUNTER = 4
•     TURNOffAllLed(); //TURN OFF ALL LEDS
•     DIGITALWRITE(LED1, HIGH); //SHOW NUMBER 4
•     DIGITALWRITE(LED3, HIGH); // SHOW NUMBER 4
•     DIGITALWRITE(LED5, HIGH); // SHOW NUMBER 4
•     DIGITALWRITE(LED7, HIGH); // SHOW NUMBER 4
• }
• ELSE IF (COUNTER == 5) { //IF COUNTER = 5
•     TURNOffAllLed(); //TURN OFF ALL LEDS
•     DIGITALWRITE(LED1, HIGH); // SHOW NUMBER 5
•     DIGITALWRITE(LED3, HIGH); // SHOW NUMBER 5
•     DIGITALWRITE(LED4, HIGH); // SHOW NUMBER 5
•     DIGITALWRITE(LED5, HIGH); // SHOW NUMBER 5
•     DIGITALWRITE(LED7, HIGH); // SHOW NUMBER 5
• }
• ELSE IF (COUNTER == 6) { //UKOLIKO JE COUNTER = 6
•     TURNOffAllLed(); //TURN OFF ALL LEDS
•     DIGITALWRITE(LED1, HIGH); // SHOW NUMBER 6
•     DIGITALWRITE(LED2, HIGH); // SHOW NUMBER 6
•     DIGITALWRITE(LED3, HIGH); // SHOW NUMBER 6
•     DIGITALWRITE(LED5, HIGH); // SHOW NUMBER 6
•     DIGITALWRITE(LED6, HIGH); // SHOW NUMBER 6
•     DIGITALWRITE(LED7, HIGH); // SHOW NUMBER 6
• }
• ELSE { //IF COUNTER = 0
•     TURNOffAllLed(); //TURN OFF ALL LEDS
• }
• }
```



Time  
for  
lunch

