Whack-a-Mole

OMKAR KUMAR (160464)
YASH DIXIT (160820)
Sec- D

PROJECT MOTIVE AND DESCRIPTION

- We had to design a game which involves an arrangement comprising of LEDs and push buttons wherein the participant had to press the button corresponding to the LED which is lit up at that moment.
- This arrangement carried out on a breadboard is the electronic equivalent to the classic and evergreen game “Whack-a-Mole”, where, as the name suggests, one had to whack the mole which pops out of the corresponding hole, and the score would depend on how many times this operation is done successfully.

COMPONENTS USED

- Breadboard
- Arduino Nano (ATmega328 microprocessor)
- HC-05 Bluetooth Module for Arduino
- Push Buttons
- LEDs
- Resistances and wires

DESCRIPTION OF SOLUTION

- There is a push button placed in front of each LED. We were to light up LEDs in a random order so that the player can press the corresponding button.
- Since each button is linked to a pin in the Arduino and each pin has a unique identity while programming it, the Arduino will read the ID of the button which is pressed.
- Next step would be to check whether the pin corresponding to the push button and LED are complementary, meaning matched.

- Now, there are two cases:
  - If the pins match, it’s correct move by the player and hence the score has to be implemented, which is stored in a corresponding variable. The new score also has to be displayed on the screen in the mobile application, which is linked to the Arduino through a bluetooth module, also linked to the Arduino pins and the rest of the breadboard circuit. The time gap to press the button will decrease after each successive correct step, thereby making it difficult.
  - If the pins don’t match, it’s an incorrect move. Since the game has to be terminated then and there, all the LEDs would start to blink, as a symbol of the same.

PROTOTYPING

- In a bid to deconstruct the project, we had to first design the basic framework of the game itself and then inculcating the aspect of scoring in the game afterwards.

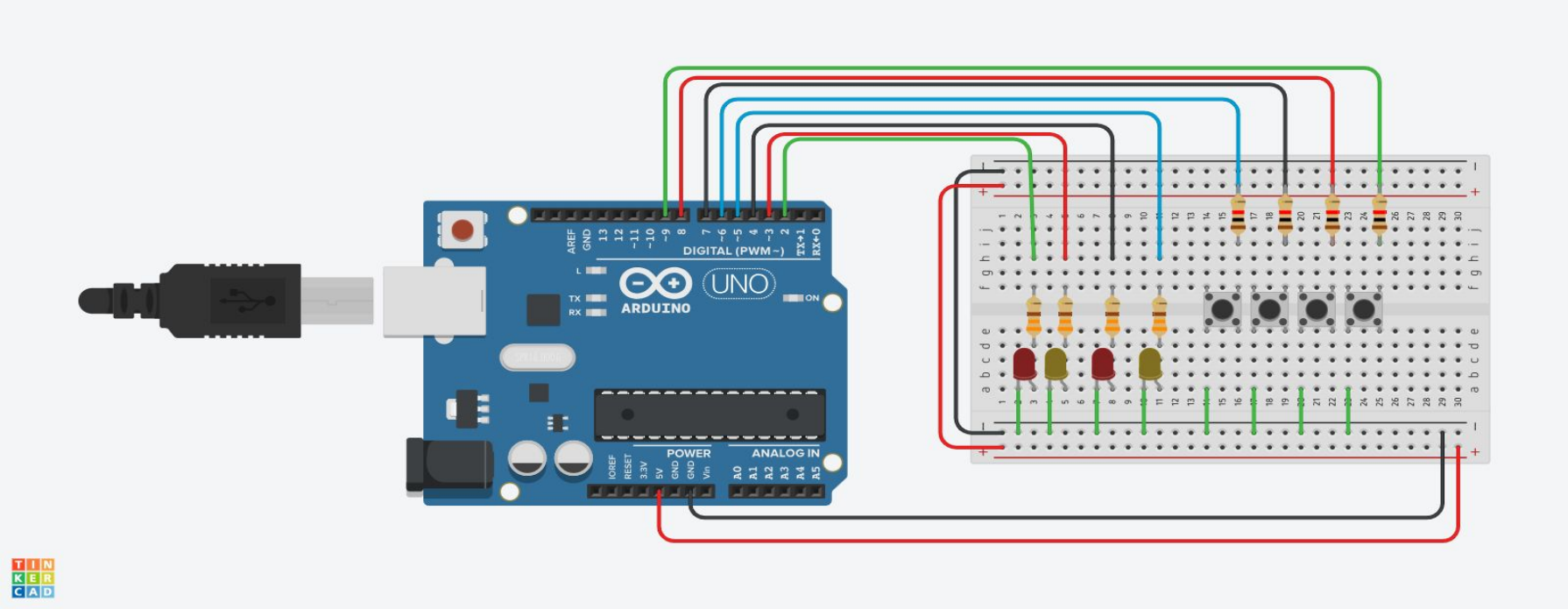
THE GAME:

- We had to connect the LEDs(4) and push buttons(4) to the Arduino pins in a standard arrangement, which involves connecting LED to a resistance(220Ω) in series, and in a similar fashion for buttons.

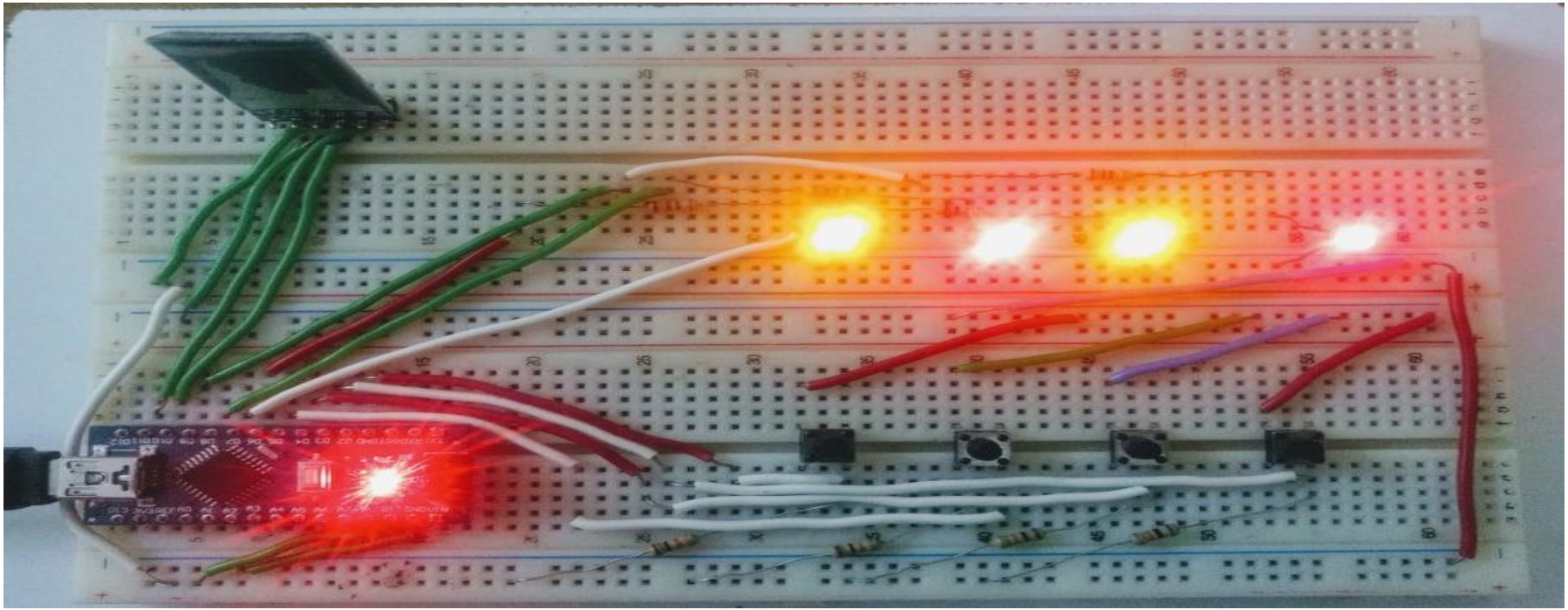
THE SCORING:

- Scoring involved connecting the Arduino to a mobile application, so that the score can be displayed on the screen of the mobile.
- Involved use of a mobile application which receives data from the microprocessor; basically reading the value of a variable which stores the desired value, as handled by the code built into the microprocessor.
- The module, and hence the hardware on the breadboard, is connected to the user interface platform through Bluetooth technology, hence the module termed as ‘Bluetooth Module’.

SIMULATED CIRCUIT



WORKING CIRCUIT



RESULTS AND INFERENCES

- The arrangement works successfully, with all the components working as desired and expected, as in, a random LED lights up, the score increments upon pressing the correct push button (note that score starts from 0), and all the LEDs start blinking high and low periodically.
- This result leads to further developments and scope of innovations as discussed in the next slide.

POSSIBLE IMPROVEMENTS AND INNOVATIONS

- We can develop an arrangement, in which before starting the game, we can choose a ‘difficulty level’, such that in addition to the decreasing time gap after each successive step, we will also have varying initial time gap.
    - For example, if we have options between 1-5 for setting the difficulty, selecting a bigger number would mean lesser starting time gap, and vice-versa.

- We can have more LEDs and accordingly push buttons to make the game more unpredictable and provide the user a more engaging experience.
- We can also vary the time interval between pressing a correct button and glowing up of the next LED. For instance, in one case, an LED will glow up as soon as the button for previous LED is pressed, and in other scenario the next LED may take more than usual time to glow up, making the game more random and less predictable.

REFERENCES

- **ArduTooth app:** An android application which reads desired data from the microprocessor and display the data is a user-friendly interface.
  - We modified it accordingly to show ‘Current Score’ and ‘Highest Score’.

THANK YOU