Lesson 3
Programming Arduino Examples 9.1 and 9.2

Examples 9.1 and 9.2

- Programming the functioning of GPIO pins

- Usages of serial monitor at the IDE (for computer screen display) using Arduino IDE C/C++

LEDs at 12 ports connected for four pathways traffic-lights

- Each pathway has red, yellow and green lights represented by three LEDs ledR, ledY and ledG for each of the 4 pathways

- 12 Variables used in the declaration program, ledR0, ledY0 and ledG0, ledR1, ledY1 and ledG1, ledR2, ledY2 and ledG2 and ledR3, ledY3 and ledG3

- Computer connects to the board using serial pins

Example 9.1 Traffic-lights Switching ON and OFF

• Each pathway has red, yellow and green lights represented by three LEDs ledR, ledY and ledG for each of the 4 pathways

• The port LEDs at twelve ports be On-Off programmed

• North and south pathways directed roads and traffic is switched ON and east and west pathways traffic switched OFF

Example 9.1

- Declaring the data types, constants, variables and functions used.

- Second and third steps are coding for setup() and loop().

Declaring Port numbers

- Port numbers assigned 2 to 12 and 14
- ledR0 = 2; ledY0 = 3; ledG4 = 4; ledR1 = 5; ledY1 = 6;ledG1 = 7;
- ledR2 = 8; ledY2 = 9; ledG2 = 10; ledR3 = 11; ledY3 = 12; ledG3 = 14;
- Pin 13 connects the board LED, and be used for indicating successful running of the developed codes during testing phases.*/
- **int internalLED = 13;**

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Declaring Functions

- Declare functions

- void north_south_Green(); 2 Green N, S LEDs ON, 4 Yellow and Red LEDs N, S OFF,

- void east_west_Red(); ; 2 RED E, W LEDs ON, 4 Yellow and Green LEDs E, W OFF

Setup ( )

- Ports 2 to 12 and 14 pin-modes set as OUTPUT

- Port 13 pin-mode set as OUTPUT

- Serial output baud rate set at 9600 baud per sec.

- Initial output sent to display current status of port settings usages

- Display shows up at the computer screen

loop ( )

- Run the following functions to make north_south pathways lights Green *ON* and east_west Red *ON*.

- north_south_Green();

- east_west_Red ();

Example 9.2

- Complete program for switching ON and OFF of north and south pathways and east and west paths ways, after intervals of 10 s each.

- The LEDs in ON states remain so for 30 s period.

- Function delay() provides the period of 30 s

- Add additional functions for east and west pathways green and north south red

Example 9.2

- Program the intervals of 10 s between switching ON of traffic along north and south pathways and

- Switching intervals of 10 s ON of traffic along east and west pathways.

- Test LED switch OFF for 6s between the successive repeat cycles to indicate working of the circuit.

Example 9.2 Declaring Functions

- Declare data types, ports same as in Example 9.1

- Add new functions

- void north_south_Red(); 2 Red N, S LEDs ON, 4 Yellow and Green LEDs N, S, OFF,

- void east_west_Green(); ; 2 Green E, W LEDs ON, 4 Yellow and Red LEDs E, W OFF

- void north_south_Yellow () and void east_west_Yellow ()

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Example 9.2 Setup ( ) and loop ( )

- setup ( ) unchanged

- loop ( ) changes as follows:

- Use delay (30000); //Wait for 30 second after NW Green and EW Red

- delay (10000); //Wait for 10 second after switch NW Yellow

Summary

We learnt

- Programming Ports High and Low to control the traffic lights along 4 pathways and presetting the delays between the states

- Testing using internal LED at the Arduino

End of Lesson 3 on
Programming Arduino Examples 9.1 and 9.2