PES UNIVERSITY

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100 Feet Ring Road, BSK III Stage, Bengaluru-560 085

Department of Computer Science and Engineering

Session : Aug – Dec, 2021

SEMESTER – 5

UE19CS313: Internet of Things : Assignment-2

Question: Implementation of physical computing project using sensors/actuators/microcontrollers/ microprocessors

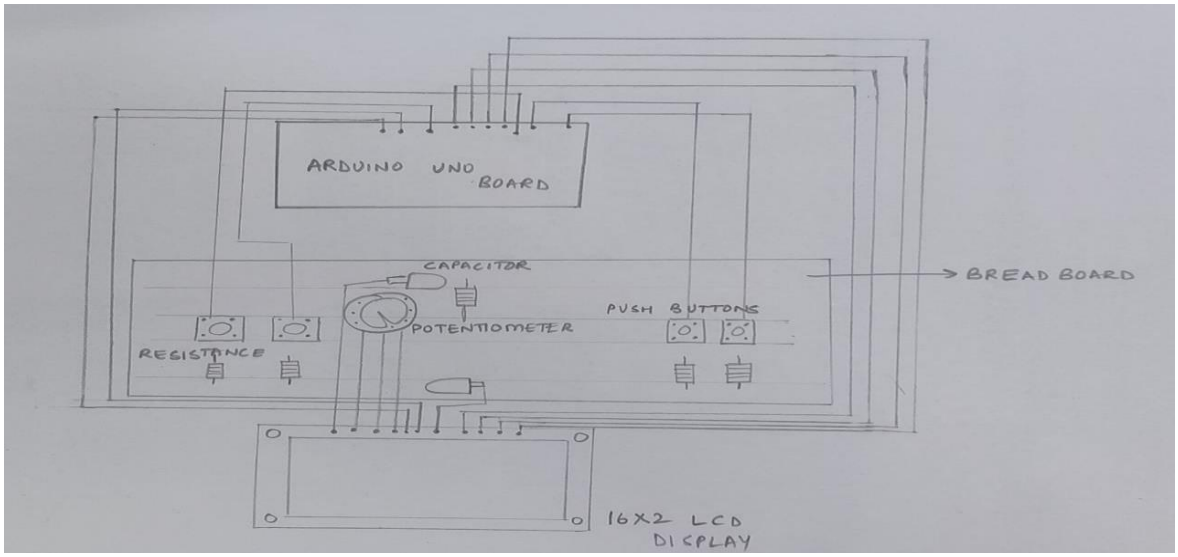
a. Identification of a use case for physical computing project
The PingPong IoT Development Board is an industrial programmable IoT gateway that saves you money and development time.
Firmware developers can quickly and easily create IoT (Internet of Things) solutions for cloud connectivity.
The modular hardware platform consists of a myriad of communication technologies and interfaces—Ethernet, 3G cellular, and GPS, to name a few
This project is a 2-Player PING PONG Game on a 16x2 LCD Display and programmed to an Arduino Uno R3 using Arduino IDE with 4 data lines are used to print to LCD Display

b. Listing the features planned
- The Middle position of the paddles is used as reference to move the paddles.
- Each player uses their respective "UP" and "DOWN" push-buttons to move their paddles.
- We have a score board where the scores of both the players are displayed
- we also have the winner display board where the Name of the Winner is displayed

c. Listing the requirements of SW and HW components to realise the project
Hardware components
- Pins RS and E are respectively connected to digital pins 12 & 11.
- Both GND & RW are connected to Ground. Vcc is connected to 5V.
- VO is connected to the Output of potentiometer to adjust brightness of the LCD Display.
- The pins D7, D6, D5 and D4 of the LCD Display are connected to digital pins 6, 7, 8 and 9 of the Aduino.
- “UP” and “Down” push-buttons of Player 1 are connected to digital pins 5 and 10 respectively.
- “UP” and “Down” push-buttons of Player 2 are connected to digital pins 2 and 3 respectively.

Software component
AutoCAD Tinker cad Simulation

d. Coming up with the circuit design for the project



e. Coming up with the necessary logic to implement all the listed features in (b)

- The Ball has a dimension of single LCD pixel.
- The Paddles of Players are 3 LCD Pixel in height and single LCD Pixel Column in width.
- The Middle position of the paddles is used as reference to move the paddles.
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- Game Title appears as the simulation is started and the game starts when any one of the four Pushbuttons is pressed.
- Each player uses their respective "UP" and "DOWN" push-buttons to move their paddles.
- A point is scored by the other Player each time the ball crosses the vertical Column path of the Paddle of the First Player.
- Scores of both the players are displayed for 2 seconds each time a point is scored.
- Ball and both the paddles are reset to initial positions after a point is scored by any player.
- The First Player to achieve 10 points wins the game.
- The Name of the Winner is Printed on Display for 5 seconds and the game resets

f. Testing and Packaging the circuit