



CUP & BALL GAME

User Manual



COMP 9032 FINAL PROJECT
YU HAN Z5219071
2018.10.23

Initial Interface Stage

By default, the game board is in initial interface stage, whereby the screen is displaying the status and LED shows the ball position. In this stage, game is ready and waiting for press PB0 button to start the game.

| Initial Interface Stage | | |
|-------------------------|--------------------------------|--|
| | Status | Description |
| LCD | Displaying "Ready... Score: #" | Display status and your score |
| LED | Cup LED with the ball is on | Indicate shuffle the ball from which cup |
| Keypad | - | - |
| Motor | Stationary | Indicate the ball is not shuffling |
| PB0 | - | Once pressed PB0, start stage 2 |
| PB1 | - | - |

Shuffle Ball Stage

Once you pressed the PB0 button, as you can see that motor starts to spin and LED changed to dimmed light which means that the ball under the cup starts to shuffle. In this stage, you can press PB0 at anytime to stop shuffle the ball.

| Shuffle Ball Stage | | |
|--------------------|--|--|
| | Status | Description |
| LCD | Displaying "Start... Score: #" | Display status and your score |
| LED | Three cup LEDs turn on with dimmed light | Indicate the ball has covered under the cups and we cannot see where it is |
| Keypad | - | - |
| Motor | Start Spinning | Indicate the ball starts shuffling |
| PB0 | - | Once pressed PB0, stop shuffle the ball and start stage 3 to make a guess |
| PB1 | - | - |

Make a Guess Stage

The motor will stop, and LEDs remain dimmed light in this stage, which means that the ball stop shuffle and you can make a guess where it is. Try to use keypad by press 1-3 to input your guess.

| Make a Guess Stage | | |
|--------------------|---|--|
| | Status | Description |
| LCD | Displaying "Start... Score: #" | Display status and your score |
| LED | Three cup LEDs turn on with dimmed light | Indicate the ball is covered under one of the three cups |
| Keypad | Keypad is enabled now, start make a guess | 1-3 means the cup number, input your guess on the keypad |
| Motor | Stop Spinning | Indicate the ball stop shuffling |
| PB0 | - | - |
| PB1 | - | - |

Make a Guess Stage

According to your guess, the game will automatically restart if your score is less or equal than 0. Otherwise, the LCD will increase or decrease one point and LED will show you where is the ball. You can press PB1 button to restart a game.

| Indicate Result Stage | | |
|-----------------------|---|---|
| | Status | Description |
| LCD | Displaying "Start... Score: #" | Display your new score (increase or decrease one point) based on the result |
| | Displaying "Ready... Score: #" | Automatically start a new game if your new score is equal or less than 0 |
| LED | Show the cup position and flashing if guess correct | The cups are removed, the ball position is uncovered |
| | Show the cup position without flashing if guess wrong | The cups are removed, the ball position is uncovered |
| Keypad | - | - |
| Motor | Stationary | Indicate the ball is not shuffling |
| PB0 | - | - |
| PB1 | - | Pressed PB1 to start a new game |

Wiring

The components of the Cup and Ball Game connected as follows using the AVR Lab board provided.

KEYPAD

R0-R3 => PL7-PL4

C0-C3 => PL3-PL0

LED BAR

LED2-LED9 => PC0-PC7

LCD

BE-RS => PA4-PA7

D0-D7 => PF0-PF7

MOTOR

Mot => PE3

INPUTS

PB0 => RDX4

PB1 => RDX3