```cpp
// include the library code:
#include <LiquidCrystal.h>

// initialize the library with the numbers of the interface pins
LiquidCrystal lcd(7, 8, 9, 10, 11, 12);

const int Pin0 = 6;  // Binary number 2^1 or 1
const int Pin1 = 5;  // Binary number 2^2 or 2
const int Pin2 = 4;  // Binary number 2^3 or 4
const int Pin3 = 3;  // Binary number 2^4 or 8
const int Pin4 = A4; // Binary number 2^5 or 16
const int Pin5 = A3; // Binary number 2^6 or 32
const int Pin6 = A2; // Binary number 2^7 or 64
const int Pin7 = A1; // Binary number 2^8 or 128
const int easyMode = A0; // Easy mode is 0-15, Hard is 0-255

int BinaryValue; // Value for adding up numbers to compare to random number

int correctNumber = 0; // Flag to see if the number was correct
int wrongNumber = 0; // Flag to see if the number was wrong

const int buzzer = 13; //Buzzer pin
int freq; //frequency out
const int buttonPin = 2;     // the number of the pushbutton pin
int buttonState;        // variable for reading the pushbutton status
long randNumber;         // variable for the random number
void setup() {

  lcd.begin(16, 2); // set up the LCD's number of columns and rows

  pinMode(Pin0, INPUT_PULLUP);
```

```arduino
pinMode(Pin1, INPUT_PULLUP);

pinMode(Pin2, INPUT_PULLUP);

pinMode(Pin3, INPUT_PULLUP);

pinMode(Pin4, INPUT_PULLUP);

pinMode(Pin5, INPUT_PULLUP);

pinMode(Pin6, INPUT_PULLUP);

pinMode(Pin7, INPUT_PULLUP);

pinMode(easyMode, INPUT_PULLUP);

pinMode(buttonPin, INPUT_PULLUP);


pinMode(buzzer, OUTPUT); // Set buzzer pin as OUTPUT

// if analog input pin 5 is unconnected, random analog

// noise will cause the call to randomSeed() to generate

// different seed numbers each time the sketch runs.

// randomSeed() will then shuffle the random function.

randomSeed(analogRead(5));


if (digitalRead(easyMode) == HIGH)

{

  randNumber = random(0, 15);

}

else

{

  randNumber = random(0, 255);

}


// Print a message to the LCD.

lcd.print("Your number is");

// set the cursor to column 0, line 1

// (note: line 1 is the second row, since counting begins with 0):

lcd.setCursor(0, 1);
```

```
    lcd.print(randNumber); // Print the random number
}
void checkNumber() // Check switches for correct number
{
  if (digitalRead(Pin0) == HIGH)
  {
    BinaryValue = 1;
  }
  else
  {
    BinaryValue = 0;
  }
  if (digitalRead(Pin1) == HIGH)
  {
    BinaryValue = BinaryValue + 2;
  }
  if (digitalRead(Pin2) == HIGH)
  {
    BinaryValue = BinaryValue + 4;
  }
  if (digitalRead(Pin3) == HIGH)
  {
    BinaryValue = BinaryValue + 8;
  }
  if (digitalRead(Pin4) == HIGH)
  {
    BinaryValue = BinaryValue + 16;
  }
  if (digitalRead(Pin5) == HIGH)
  {
    BinaryValue = BinaryValue + 32;
```

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  }
  if (digitalRead(Pin6) == HIGH)
  {
    BinaryValue = BinaryValue + 64;
  }
  if (digitalRead(Pin7) == HIGH)
  {
    BinaryValue = BinaryValue + 128;
  }
  if (BinaryValue == randNumber) // Check if switches match random number
  {
    correctNumber = 1;
  }
  else
  {
    wrongNumber = 1;
  }
}


void printBinary() // Displays status of switches
{
  if (digitalRead(Pin7) == LOW)
  {
    lcd.print("0");
  }
  else
  {
    lcd.print("1");
  }

  if (digitalRead(Pin6) == LOW)
```

```
  {
  lcd.print("0");
  }
  else
  {
  lcd.print("1");
  }
  if (digitalRead(Pin5) == LOW)
  {
  lcd.print("0");
  }
  else
  {
  lcd.print("1");
  }
  if (digitalRead(Pin4) == LOW)
  {
  lcd.print("0");
  }
  else
  {
  lcd.print("1");
  }
  lcd.print(" ");
  if (digitalRead(Pin3) == LOW)
  {
  lcd.print("0");
  }
  else
  {
  lcd.print("1");
```

```
  }
  if (digitalRead(Pin2) == LOW)
  {
    lcd.print("0");
  }
  else
  {
    lcd.print("1");
  }
  if (digitalRead(Pin1) == LOW)
  {
    lcd.print("0");
  }
  else
  {
    lcd.print("1");
  }
  if (digitalRead(Pin0) == LOW)
  {
    lcd.print("0");
  }
  else
  {
    lcd.print("1");
  }
}

void loop() {
  attachInterrupt(digitalPinToInterrupt(buttonPin), checkNumber, FALLING); // Wait for
pushbutton to be pressed, when pressed check to see if correct number is inputted
  lcd.setCursor(7, 1);
```

```arduino
printBinary(); // Display status of switches
if (wrongNumber == 1)
{
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Try again");
  lcd.setCursor(0, 1);
  lcd.print(randNumber);
  tone(buzzer, 200); // Play wrong answer tone
  delay(400);
  noTone(buzzer);     // Stop sound...
  wrongNumber = 0;
  correctNumber = 0;
}
if (correctNumber == 1)
{
  tone(buzzer, 600); // Play correct answer tone
  delay(100);
  tone(buzzer, 1000);
  delay(100);
  tone(buzzer, 800);
  delay(100);
  noTone(buzzer);     // Stop sound...
  lcd.clear();
  lcd.setCursor(0, 0);
  lcd.print("Correct!");
  lcd.setCursor(0, 1);
  lcd.print(randNumber);
  lcd.print(" is ");
  printBinary(); // Display status of switches
  delay(3000);
```

```
lcd.clear();

lcd.setCursor(0, 0);

// Print a message to the LCD.

lcd.print("Your number is");

// set the cursor to column 0, line 1

// (note: line 1 is the second row, since counting begins with 0):

lcd.setCursor(0, 1);


if (digitalRead(easyMode) == HIGH)

{

  randNumber = random(0, 15);

}

else

{

  randNumber = random(0, 255);

}

lcd.print(randNumber);


correctNumber = 0;

wrongNumber = 0;

 }

}
```