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// C++ code
//File: Binary Clock
//History:
//          Eileen Xiao 2/21/23
//          Joel Mariscal 2/21/23
//          https://forum.arduino.cc/t/decimal-to-binary-conversion-with-led/964644/6
//Final
int Binary_H[4] = {0, 0, 0, 0};
int BinaryList_H[4][13]; //List with all of the binary numbers
int decNumber_H;

int Binary_M[6] = {0, 0, 0, 0, 0, 0};
int BinaryList_M[6][60]; //List with all of the binary numbers
int decNumber_M;

bool isAm= true;

void setup()
{
  Serial.begin(9600);
  for(int x=2; x<14; x++)

  {
    pinMode (x, OUTPUT);
    digitalWrite(x, LOW);

  }

  //binary numbers for refernece
  for(int decCount=0;decCount<60;decCount++)
  {
    decNumber_M=decCount;
    if (decCount<13)
      decNumber_H=decCount;

    decToBinary(decNumber_H, decNumber_M);
    Serial.println ("");
    Serial.print ("Decimal: ");
    Serial.println (decCount);
    Serial.print ("Double: ");

    for(int y=0; y<6; y++)

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{
  BinaryList_M[y][decCount]=Binary_M[y];
  Serial.print(BinaryList_M[y][decCount]);
  if (y<=3 && decCount<13)
  {
    BinaryList_H[y][decCount]=Binary_H[y];
    Serial.print(BinaryList_H[y][decCount]);
  }
}
Serial.println("");
Serial.print("-----");
}
}

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void loop()
{
  Serial.print("Start Loop");
  //check all LED functional
  for (int blinks=0;blinks<4;blinks++)
  {

    Serial.print("All on");
    //all on
    for(int i=2; i<14; i++)
    {
      delay(50);
      digitalWrite(i, HIGH);
    }
    Serial.print("All off");
    delay(50);
    //all off
    for(int i=2; i<14; i++)
    {
      digitalWrite(i, LOW);

    }
  }
  delay(1000);

  digitalWrite(7, HIGH);

  //clock starts @ 12am
  digitalWrite(5, HIGH);
  digitalWrite(4, HIGH);

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int b_hours=0;
int y_hours=0;

for (int B=0; B<60;B++)
{

    for (int y=0; y<6;y++)
    {

        Serial.print(BinaryList_M[y][B]);
        if (BinaryList_M[y][B]==1)
        {
            digitalWrite(y+8, HIGH);
        }
        else
        {
            digitalWrite(y+8, LOW);
        }

        //hours

    }
    Serial.println("");
    delay(60000);//one minute 60000, use 500 for testing
    Serial.println("loop ends/we updated");
    if(B+1==60)
    {
        updateHours(++b_hours);
        B=0;
    }

}

}

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void updateHours(int & b)
{
    if(b>12)
    {
        b=1;
        isAm= ! isAm;
    }
}

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if(isAm)
{
    digitalWrite(7, LOW);
    digitalWrite(6, HIGH);
}
else
{
    digitalWrite(7, HIGH);
    digitalWrite(6, LOW);
}

}
for(int i=2; i<6; i++) digitalWrite(i, LOW);
switch(b)
{
    case 1:
        digitalWrite(2, HIGH);
        break;

    case 2:
        digitalWrite(3, HIGH);
        break;

    case 3:
        digitalWrite(3, HIGH);
        digitalWrite(2, HIGH);
        break;

    case 4:
        digitalWrite(4, HIGH);
        break;

    case 5:
        digitalWrite(4, HIGH);
        digitalWrite(2, HIGH);
        break;

    case 6:
        digitalWrite(4, HIGH);
        digitalWrite(3, HIGH);
        break;

    case 7:
        digitalWrite(4, HIGH);
        digitalWrite(3, HIGH);
        digitalWrite(2, HIGH);
        break;

    case 8:
        digitalWrite(5, HIGH);
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        break;
    case 9:
        digitalWrite(5, HIGH);
        digitalWrite(2, HIGH);
        break;
    case 10:
        digitalWrite(5, HIGH);
        digitalWrite(3, HIGH);
        break;
    case 11:
        digitalWrite(5, HIGH);
        digitalWrite(3, HIGH);
        digitalWrite(2, HIGH);
        break;
    case 12:
        digitalWrite(5, HIGH);
        digitalWrite(4, HIGH);
        break;
}

}

void decToBinary(int& decNum_H, int& decNum_M)
{
    int remainder_H, remainder_M;
    for(int i=5; i>=0; i--)
    {
        remainder_M= decNum_M%2;
        decNum_M= decNum_M/2;
        Binary_M[i]=remainder_M;
        if(i<=3)
        {
            remainder_H=decNum_H%2;
            decNum_H= decNum_H/2;
            Binary_H[i]= remainder_H;
        }
    }
}
}

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