

Exercise 1 Rory Lange

Be 1200 Assignment 12

a) A 0 A
 $1010 \quad 0000 \quad 1010$
 101000001010

b) 5 D 1 B
 0101110100011011
 $2^2 \times 1 + 2^1 \times 0 + 2^0 \times 1 = 0001$
 $2^3 \times 1 + 2^2 \times 0 + 2^1 \times 1 + 2^0 \times 1 = 1011$
 $2^4 \times 0 + 2^3 \times 1 + 2^2 \times 1 + 2^1 \times 0 + 2^0 \times 1 = 1101$

c) 8 C D 3 4 6
 $1000 \quad 1001 \quad 0100 \quad 0110$
 $2^3 \times 1 + 2^2 \times 1 + 2^1 \times 0 + 2^0 \times 1 = 1101$
 $2^3 \times 1 + 2^2 \times 1 + 2^1 \times 0 + 2^0 \times 0 = 1100$
 10001100110100101000110

d) F a b e 6 4 4 2 = 0010
 $0110 \quad 0100 \quad 0100$
 11111011011110
 $11111011011100110010001000010$

2) a) 1100
 C

b) 0011 1100
 $3 \quad 12$
 $3C$

c) 1010 0110 1101
 $10 \quad 6 \quad 13$
 ACD

53

Exercise 4

3) a) 1100

4) a) 7

$2^2 \times 1 + 2^1 \times 1 + 2^0 \times 1$
 $\boxed{111}$

c) 6104
 $\begin{array}{c} 100 \\ 110 \quad 001 \quad 000 \end{array}$
 $\boxed{110001000100}$

b) 25

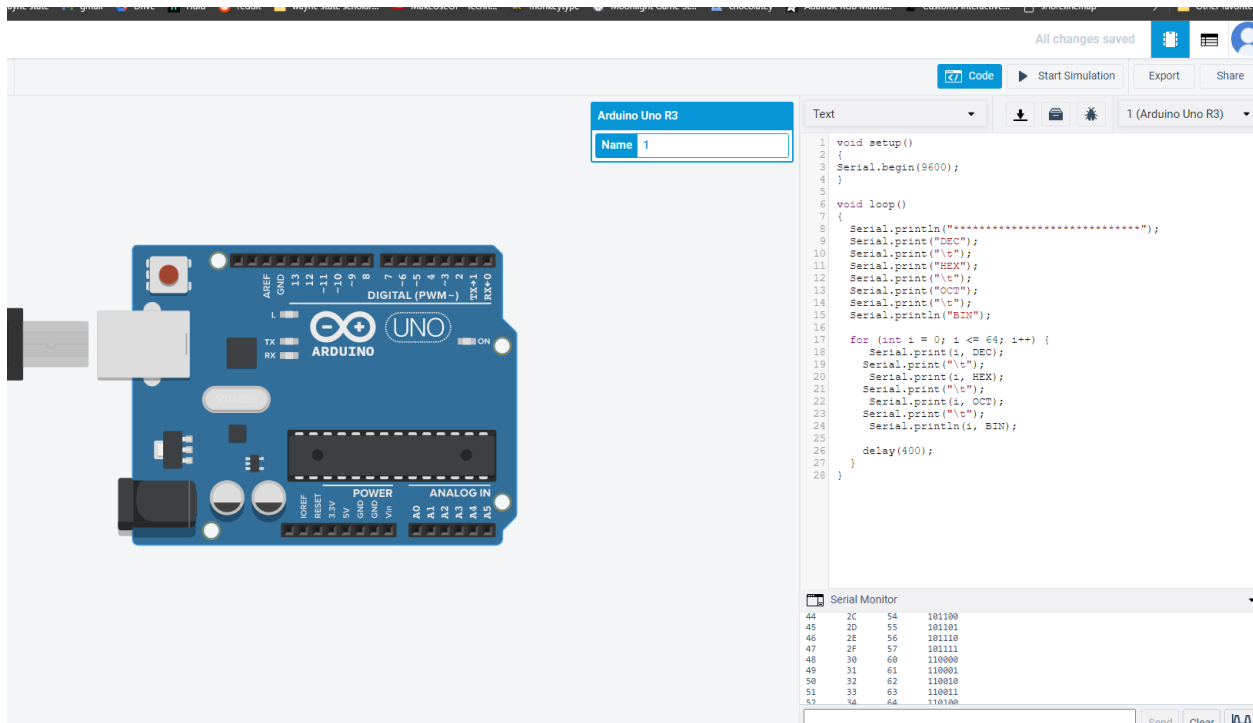
$\begin{array}{c} 010 \quad 101 \\ \boxed{010101} \end{array}$

5) a) 47
 $\begin{array}{c} 111 \\ \boxed{7} \end{array}$

b) 04
 $\begin{array}{c} 000 \quad 100 \\ 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1 \\ \boxed{4} \end{array}$

c) 106
 $\begin{array}{c} 001 \quad 000 \quad 110 \\ 256 \quad 128 \quad 64 \quad 32 \quad 16 \quad 8 \quad 4 \quad 2 \quad 1 \\ \boxed{72} \end{array}$

Exercise 6



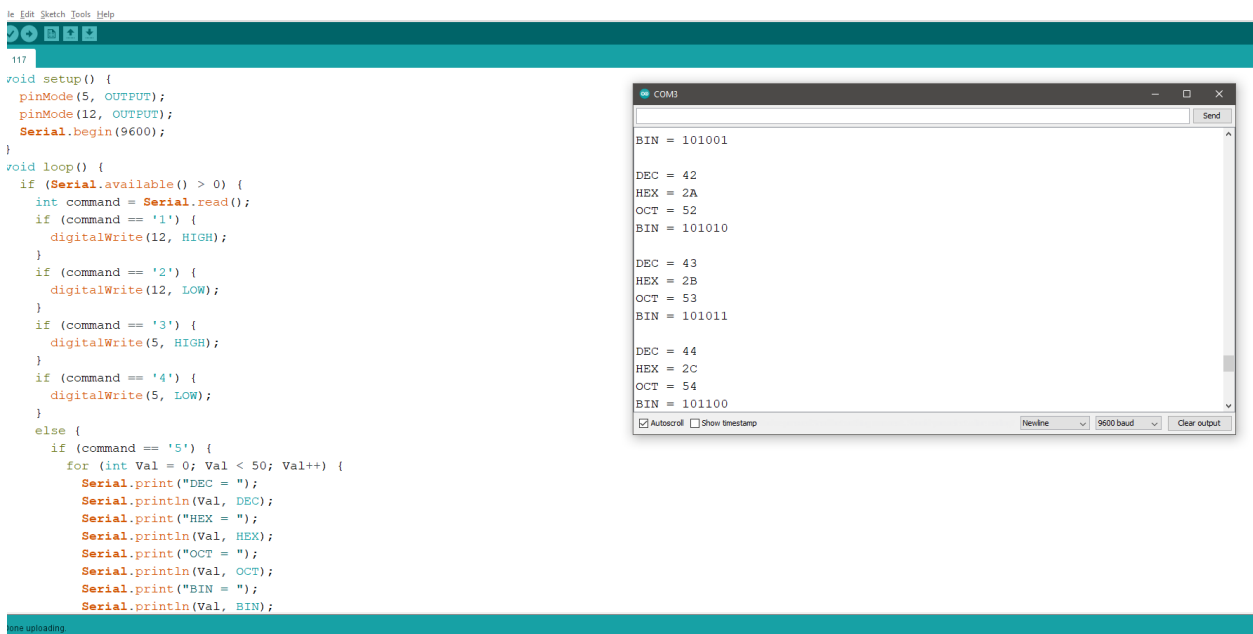
The screenshot shows the Arduino IDE interface. On the left is a 3D model of an Arduino Uno R3 board. On the right is the code editor with the following C++ code:

```
1 void setup()
2 {
3   Serial.begin(9600);
4 }
5
6 void loop()
7 {
8   Serial.println("*****");
9   Serial.print("DEC");
10  Serial.print("\t");
11  Serial.print("HEX");
12  Serial.print("\t");
13  Serial.print("OCT");
14  Serial.print("\t");
15  Serial.println("BIN");
16
17  for (int i = 0; i <= 64; i++) {
18    Serial.print(i, DEC);
19    Serial.print("\t");
20    Serial.print(i, HEX);
21    Serial.print("\t");
22    Serial.print(i, OCT);
23    Serial.print("\t");
24    Serial.println(i, BIN);
25
26    delay(400);
27  }
28 }
```

Below the code editor is the Serial Monitor window, which displays the output of the program:

Line	2C	54	101100
44	2C	54	101100
45	2D	55	101101
46	2E	56	101110
47	2F	57	101111
48	30	60	110000
49	31	61	110001
50	32	62	110010
51	33	63	110011
52	34	64	110100

Exercise 7



The screenshot shows the Arduino IDE interface. On the left is the code editor with the following C++ code:

```
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void setup() {
  pinMode(5, OUTPUT);
  pinMode(12, OUTPUT);
  Serial.begin(9600);
}
void loop() {
  if (Serial.available() > 0) {
    int command = Serial.read();
    if (command == '1') {
      digitalWrite(12, HIGH);
    }
    if (command == '2') {
      digitalWrite(12, LOW);
    }
    if (command == '3') {
      digitalWrite(5, HIGH);
    }
    if (command == '4') {
      digitalWrite(5, LOW);
    }
    else {
      if (command == '5') {
        for (int Val = 0; Val < 50; Val++) {
          Serial.print("DEC = ");
          Serial.println(Val, DEC);
          Serial.print("HEX = ");
          Serial.println(Val, HEX);
          Serial.print("OCT = ");
          Serial.println(Val, OCT);
          Serial.print("BIN = ");
          Serial.println(Val, BIN);
        }
      }
    }
  }
}
```

On the right is the Serial Monitor window, which displays the output of the program:

```
BIN = 101001
DEC = 42
HEX = 2A
OCT = 52
BIN = 101010
DEC = 43
HEX = 2B
OCT = 53
BIN = 101011
DEC = 44
HEX = 2C
OCT = 54
BIN = 101100
```

