ESE 111 – Intro to Electrical/Computer/Systems Engineering

Post-Lab: Wireless Communication using XBees

Use the following code from the lab for questions 1-2

```cpp
int inputChar;
int inputNumber;
inputNumber = 0;
if Serial.available() > 0 {
  delay(5);
  while Serial.available() > 0 { // build the number as long as there are characters
    inputChar = Serial.read();
    // “build number from left to right, shifting left by multiplying by 10
    inputNumber = inputNumber * 10 + (inputChar - '0');
    // why inputChar - ‘0’? Make sure you understand this!
  }
}
```

1. For the above code segment, trace the value of inputNumber if the following numbers are inputted:
   a. 101
   b. 524

2. Explain why (inputChar - ‘0’) is included.

3. Decode this phrase from Decimal using the Ascii Table:
   69 83 69 49 49 49       82 79 67 75 83 33

4.
Transmitter:

```cpp
void setup(){
    Serial.begin(9600);
}
void loop(){
    Serial.print('E');
    delay(500);
    Serial.print('S');
    delay(500);
}
```

Receiver:

```cpp
int incomingByte;
const int led;
void setup(){
    Serial.begin(6900);
}
void loop(){
    if (Serial.available() > 0){
        if(incomingByte == 'E'){
            pinMode(led, OUTPUT);
        }
        else if (incomingByte == 'S'){
            pinMode(led, INPUT);
        }
    }
}
```

The code above is loaded onto two separate Arduinos that are communicating with each other. However, the Arduinos do not behave as intended.

a. What is the program supposed to do?

b. Indicate what lines could be changed or fixed so that the program operates as intended. (Mark the code above -- There are 3 errors above).

5. From Section 5 of the lab:
   a. What is pulse width modulation (PWM)?
6. From Section 6 of the lab: Thinking Further - Biomedical Application
   a. What are some factors that might interfere with the quality of the transmitted signal?
   
   b. Do you think that this could be an effective system for remote patient monitoring?
   
   c. Could a similar type of system be used by a doctor to remotely treat a patient?