Write a BRIEF definition for each of the following terms relevant to Computer Engineering:

* ADC:
* PWM:
* Microcontroller:
* Arduino:
* Computer:
* LED:
* Servo:
* High-Level coding:
* Low-level coding:
* Serial-Monitor Window:
* Syntax (remember, I want a coding definition for syntax ☺):
* C/C++
* Compile (remember, I want a coding definition for compile ☺):
* Function (remember, I want a coding definition for function ☺):
* Script (remember, I want a coding definition for script ☺):
* Float vs integer variables:

**Binary – Converting to ASCII and 8-bit/10-bit conversion**

1. What is the ASCII value of 48?
2. What is the ASCII value of 65?
3. The maximum 10 bit binary number is 11111111 and has a decimal value of 1024. What is the maximum 8 bit binary number and its corresponding decimal value?

**ADC and PWM questions:**

1. What does ADC stand for?
2. What does PWM stand for?
3. As it relates to inputting/outputting info from a microcontroller, when are ADC and PWM used?
4. The Arduino code command for ADC is:
5. The Arduino code command for PWM is:
6. Remember that Arduino’s ADC converter is 10-bit and PWM is 8-bit (meaning ADC has 10 bits of 0/1’s and PWM has 8 bits of 0/1’s).
   1. If the Arduino is to read an ADC value of 100 from a voltage source, what PWM value would it need to output to produce the same value voltage?
   2. If the Arduino is to read an ADC value of 1023 from a voltage source, what PWM value would it need to output to produce the same value voltage?
7. You wish to make a 5 volt motor move at half speed. First you could connect the motor’s wires to pin 11 and ground on the Arduino Uno and then write what line of code: (Assume any setup lines of code are already written in the script)
   1. analogRead(512);
   2. analogWrite(11, 512);
   3. anaogRead(11,125);
   4. analogWrite(11, 125);
8. You wish to turn an LED connected to pin 11 on to 1/4 brightness for one second, then off for a second, then full brightness for one second, then off for a second. Which of the following code blocks could accomplish this?

|  |  |
| --- | --- |
| a | b |
| c | d |

1. You wish to turn to read a voltage from a sensor. To do this, you could first connect the sensor to a ground pin and pin A3 on the Arduino Uno and then write which of the following lines of code?

|  |  |
| --- | --- |
| a | b |
| c | d |

Matching – Match the coding term with the code blocks which best demonstrates its execution:

**A.**.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1. For Loops: \_\_\_\_\_\_ | 1. While Loops: \_\_\_\_\_\_ | | 1. Conditional Statements: \_\_\_\_\_\_\_ | 1. Logical   Operators: \_\_\_\_\_\_ | |
|  | **B.**. | | **C.**. |  | |
| **D.**. | | |  | | |  | |
|  | | |

**Logical & Conditional Operations – For each of the logical operations, state what the final value of the variable n is:**

|  |  |
| --- | --- |
| 1. The final value of n is: \_\_\_\_\_ | 1. The final value of n is: \_\_\_\_\_\_ |

For the four following code blocks, three do not compile. Identify which of the four is the code which DOES compile and for the three which do not compile, why.

|  |  |
| --- | --- |
| 1. Does this code compile? If not, why? | 1. Does this code compile? If not, why? |
| 1. Does this code compile? If not, why? | 1. Does this code compile? If not, why? |

1. Write a code script which does one of the following: (This will be a bonus question)

* Reads a voltage from an analog sensor and then prints this value into the Serial Monitor Window.
* Turns an LED either on or off depending on what key(s) you press on the computer keyboard