Pre-lab Quiz

Try your best to answer these questions and please DO NOT GOOGLE any of the answers. This quiz is graded based only on whether you attempted it or not (your answers only help us to test how much knowledge you have going into the assignment, your particular answers won't affect your course grade at all). However, this quiz will be a good guidance for you to finish up the lab later. Please carefully read through the questions and provide answer based on your current understanding.

Let's get to the next page if you are ready!

* Indicates required question

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Arduino Programming and Component Details

This part we will be testing you based on basic understanding of Arduino programming syntax and jumping into details of some of the critical components.

Arduino IDE consists of 2 functions. What are they? *

- ◯ build() and loop()
- ◯ setup() and loop()
- ◯ setup() and build()
- ◯ loop() and build() and setup()

What is the output of “pin1” if “pin2” is sent “1011” bit by bit where 1 is 5V and 0 is 0V? *

```
int pin1 = 12;
int pin2 = 11;
void setup() {
    pinMode(pin1, OUTPUT);
    pinMode(pin2, INPUT);
    Serial.begin(9600);
}
void loop() {
    if(digitalRead(pin2)==1) {
        digitalWrite(pin1,LOW);
    }
    else if(digitalRead(pin2)==0) {
        digitalWrite(pin1,HIGH);
    }
}
```

- ○ 0100
- ○ 1011
- ○ 1110
- ○ 1111

What are the two modes that are used in the pinMode() method to set for a particular pin? *

- ○ DIGITAL and ANALOG
- ○ INPUT and OUTPUT
- ○ TX and RX
- ○ READ and WRITE

Given analogRead(A0), convert analog sensor data to temperature degrees. *

- ◯ analogRead(A0)/(1024*5*100)
- ◯ analogRead(A0)/(5*100)
- ◯ analogRead(A0)/100
- ◯ analogRead(A0)/1023
- ◯ analogRead(A0) can directly represent temperature read in degrees

Read the following sentences and decide whether those are true or false about GPS pins (here use Adafruit Ultimate as an example): *

	True	False
We could supply a voltage of 25V to GPS VCC pin.	◯	◯
GPS GND pin doesn't necessarily need to be connected for powering GPS.	◯	◯
GPS TX and RX pins are used for serial communication. They need to connect to RX and TX pin on Arduino respectively.	◯	◯
3.3 V pin on GPS is the power pin for GPS	◯	◯

Choose true or false for the following description: *

	True	False
Arduino: It's like a tiny computer. It has memory and a processor. It also has a bunch of pins you can connect wires to.	○	○
GPS: This is a sensor that relies on the signal from satellites instead of internet connectivity to determine location.	○	○
Ultrasonic distance sensor: It measures how far away objects are by bouncing sound waves off objects.	○	○
LED: It is an acronym standing for Light Emitting Diode. It has two legs: the longer one is cathode and the shorter one is anode.	○	○
MQ-135 air quality sensor: It helps your device know the chemical makeup of the surrounding air. It contains both digital and analog outputs.	○	○
Resistor: It is an electrical component that reduces current flow. It is used to protect circuits from too much electricity going through them.	○	○
Capacitor: It stores electricity. Just like a battery, it is used as normal storage units.	○	○
AA battery: It stores		

electrical energy, supplying 1.5 volts as standard.	○	○
Temperature sensor: It is a sensor that uses digital output value (voltage) to determine temperature.	○	○
Humidity sensor: It measures how much water vapor there is in the air with an internal capacitor.	○	○
LDR: It is a light sensor to help your device sense how bright its environment is. It increases its resistance when there is more light.	○	○
PulseOximeter: It measures the blood oxygen level (oxygen saturation) and heart beat rate.	○	○

heart beat rate.

How many times does the setup() function run after startup of the Arduino System? *

- ○ 4
- ○ it runs repeatedly
- ○ 2
- ○ 1

Back Next Clear form

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Given the scenario that you are researcher in Africa Savanna and you are planning to build an Arduino based IoT application to track and monitor the animals' health status, please answer the following questions.

Select **4 components** you would most likely use for building the IoT device to track a certain animal's location and health status? (Don't add components that are used for debugging in this question, choose the ones that would be needed for the device to function operationally in the field) *

- [ ] Ultrasonic distance sensor
- [ ] LED
- [ ] MQ-135 air quality sensor
- [ ] Resistor
- [ ] Arduino
- [ ] Capacitor
- [ ] AA battery
- [ ] Temperature sensor
- [ ] Humidity sensor
- [ ] GPS
- [ ] LDR
- [ ] PulseOximeter

Among all the options, which way is the best practice to build your IoT application? (Note: "Test" here means checking if circuit is connected properly, and "Debug" means troubleshooting based on serial monitor and simulator) *

- Design -> Build -> Test -> Code -> Debug -> Deploy -> Collect data and analyze
- Design -> Build -> Code -> Test -> Deploy -> Debug -> Collect data and analyze
- Design -> Test -> Build -> Code -> Deploy -> Debug- > Collect data and analyze
- Design -> Build -> Code -> Test -> Deploy -> Collect data and analyze -> Debug
- Design -> Build -> Test -> Code -> Deploy -> Collect data and analyze -> Debug

Which of the following are true about networking your devices? *

	True	False
Each deployed device only needs to know the data collected from the object that it is deployed on	○	○
One way to implement a robust replication scheme is to use gossip protocol	○	○
Communication between devices could accomplish by using Zigbee, which is a wireless communication protocol that delivers messages as far as cellular network	○	○
If anything goes wrong, researcher would consider go out there and replace the device right away as one of the optimal solution	○	○
A traditional GPS could directly communicate to each other, like sending messages, without the help of another networking component	○	○

For the following options, what are the realistic behaviors about animals? *

	True	False
Zebras use facial expression to communicate	○	○
Zebras value their family members and like to live in large groups	○	○
Zebras have specific territory that they reside	○	○
Usually, lions hunt 2-3 hours a day and they spend the rest of the time lazing/resting	○	○
Lions rub their bodies against one another when they try to challenge each other.	○	○

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