



# Hands-on Internet of Things

## Specialization

### IoT Devices

### Week 4

#### Question 1:

What are the names of the 2 methods that the Arduino libraries expose for developers to write custom code for their Arduino?

**setup() and loop()**

#### Question 2:

In the context of the Arduino platform what is a bootloader?

**Code that is run before the main program is executed.**

#### Question 3:

You just bought a fancy new X-Carve CNC machine, and want to use an Arduino to drive the stepper motors of the X-Carve. After reading the documentation, you see that the baudrate of the X-Carve is 115200. What snippet of code would set the baudrate of Arduino's "primary" serial port?

**mySerial.begin(115200);**



# Hands-on Internet of Things

## Specialization

### IoT Devices Week 4

#### Question 4:

You are working with analog signals on an Arduino, and you need to use 4.2V to indicate the maximum voltage of an analog signal. (This question has two parts. You can separate your answers with a comma.)

First part: Which physical pin on the Arduino should you connect a 4.2 voltage to?

Second Part: What function do you need to call in your sketch to set the reference analog voltage to 4.2? (You only need to give the function's name.)

**5v , analogReference()**

#### Question 5:

You have an Arduino sketch that uses interrupts such that when someone hits a button, an interrupt handler is called that increments a global variable numButtonPresses. Why should numButtonPresses be declared volatile?

**The compiler might think numButtonPresses can't be incremented, and optimize it out.**

#### Question 6:

How many interrupt handlers can run concurrently on an Arduino Uno?

**1 (only one ISR can run at a time).**



# Hands-on Internet of Things Specialization

## IoT Devices Week 4

### Question 7:

How can you ensure that your Arduino reboots if it takes longer than 4 seconds to process some data?

```
void setup() { wdт_enable(WDTO_4S); wdт_reset(); } void  
loop() { wdт_reset(); while(1) { //user loop } }
```

### Question 8:

Refer to this US Frequency allocation chart (use ctrl+F or the find function in your pdf reader to search). You're driving in your car on a long road trip and turn the knob of the FM radio to "95.1". What electromagnetic frequency is your FM radio tuning to?

**95.1MHz**

### Question 9:

Why might you want to generate a square wave with a variable frequency but a fixed duty cycle out a digital pin?

**To generate a varying tone out a speaker**

### Question 10:

What is the purpose of having different sleep modes?

**To trade off between available functionality and power savings.**



# Hands-on Internet of Things

## Specialization

### IoT Devices

### Week 4

#### Question 11:

What are some examples of locations where an Arduino Uno can store data on-board?

**EEPROM**

**Flash memory**

**SRAM**

#### Question 12:

What are some example on-chip functions of the ATMega328 microcontroller?

**Timing**

**I/O and Communication**

**SRAM**

#### Question 13:

What are "shields", in the context of Arduino-like platforms?

**Add-on boards which can be plugged directly into the main Arduino board.**