Module 3

1. Research two microcontrollers and provide information about them from their datasheets. There are several microcontroller manufacturers that you can investigate including Atmel, Microchip, Freescale, TI, etc. For each microcontroller, report the following information. (Be sure to include a link to an online reference where you found this information.)

* Clock frequency
* Bitwidth of the datapath
* Size of Flash memory
* Number of pins
* Does the microcontroller contain an Analog-to-Digital Converter? If so, how many bits of precision does it have?

Ans:

1. 8-bit AVR Microcontroller with 4/8/16/32K Bytes In-System Programmable Flash

* Clock frequency:  
   – Up to 20 MIPS Throughput at 20 MHz
* Bitwidth of the datapath:  
  – 32 Bits
* Size of Flash memory:  
  – 4/8/16/32K Bytes of In-System Self-Programmable Flash progam memory
* Number of pins:  
  – 23 Programmable I/O Lines   
  – 28-pin PDIP, 32-lead TQFP, 28-pad QFN/MLF and 32-pad QFN/MLF
* Does the microcontroller contain an Analog-to-Digital Converter? If so, how many bits of precision does it have?  
  Yes, it has 10 bits.

2.  MC9S08SC4 8-Bit Microcontroller

* Clock frequency  
  – Up to 40 MHz HCS08 CPU (central processor unit); up to 20 MHz bus frequency.
* Bitwidth of the datapath  
  – 32 bits
* Size of Flash memory  
  – 4 KB of FLASH with read/program/erase over full operating voltage and temperature
* Number of pins  
  –  12 general purpose I/O pins (GPIOs)
* Does the microcontroller contain an Analog-to-Digital Converter? If so, how many bits of precision does it have?  
  – Yes, it has 10 bits.

1. Research the Arduino and Raspberry Pi platforms.
2. Indicate if there are operating systems which can be used on each platform. If there are, list those operating systems
3. State whether the operating systems are open source or not.

Ans:

1.  Raspberry Pi can use Operating System, but Arduino can't. You can use Linux, macOS and Windows on Raspberry Pi platforms.  
  
2.  Linux is open source, but Windows isn't. And macOS is a combination of both. Because the operating system kernel, UNIX subsystem, driver subsystem, and POSIX APIs are all open source, as is the majority of the ancillary UNIX applications, utilities, and services. The higher level macOS application frameworks and window server are all closed-source.