**Software Development Environment**

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| **Concept / Topic** | **Reference (Module or Worksheet)** | **Located (Checkmark)** | **Understood**  **(Checkmark)** |
| Difference between “Terms of Service” and “Privacy Policy” | Module A.2 GitHub Part 1 |  |  |
| Efficient File & Folder Structure | Module C.1 File System Organization |  |  |
| File & Folder Synchronization | Module C.1 File System Organization |  |  |
| Features of an Integrated Development Environment (IDE) | Software Environment Worksheet |  |  |
| Features of Version Control System | Software Environment Worksheet |  |  |

Practice Questions:

1. List 5 main features of a “Terms of Service” agreement.
2. List 3 main features of a “Privacy Policy” agreement.
3. List 4 main features of a “Software IDE” agreement.
4. List 4 main features of a “Version Control System” agreement.
5. Anna has a bunch of recipe files on her home computer. (listed below) She has asked you to suggest an efficient folder and file structure to organize her recipes. What do you suggest?
   * Sugar cookies
   * Cupcakes
   * Chocolate cake
   * Chocolate chip cookies
   * Vegetable curry
   * Carrot Cake
   * Beef Curry
   * Ginger Cookies
6. Anna also wants to make sure her recipes are securely backed up and available on her smart phone or when she is visiting friends. What solution do you recommend? Explain what features she will receive.
7. Explain what she should do to synchronize her home if she makes a change to a recepe while she is visiting a friend.

**Computer Hardware & Software**

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| **Concept / Topic** | **Reference (Module or Worksheet)** | **Located (Checkmark)** | **Understood**  **(Checkmark)** |
| Main Computer Components  (Diagram / Location) | Module A.4 Computing History  Module C.2 Component Presentation |  |  |
| Main Computer Components  (Function) | Module A.4 Computing History  Module C.2 Component Presentation |  |  |
| Main Computer Components  (History) | Module A.4 Computing History  Module C.2 Component Presentation |  |  |
| Main Computer Components  (Capacity) | Component Capacities Worksheet |  |  |
| Difference between “Cache Memory” and main memory. | Cache Memory Worksheet |  |  |
| Different types of “Cache Memory” | Cache Memory Worksheet |  |  |
| Bits and Powers of 2 | Bits & Bytes Worksheet |  |  |
| Computer Memory Organization  (Bytes and Words) | Bits & Bytes Worksheet |  |  |
| Computer Memory Organization  (Integers, Negative Numbers, etc.) | Bits & Bytes Worksheet |  |  |
| ASCII Characters & Strings | Bits & Bytes Worksheet |  |  |

Practice Questions:

1. List 5 main components of a desktop computer
2. For each computer component listed above, explain its function and capacity
3. Explain how a Processor Cache Memory is similar to a Hard Disk Cache memory.
4. List and explain 4 ways that a Processor Cache Memory is different than RAM memory.
5. Explain the relationship between a “bit” a “byte” a “word” and a “Long Word” of computer storage.
6. Explain how negative integers are stored in computer memory.
7. Google ASCII characters and explain how the string “Midterm” would be stored in computer memory.

**Software Design**

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| **Concept / Topic** | **Reference (Module or Worksheet)** | **Located (Checkmark)** | **Understood**  **(Checkmark)** |
| Input-Output Analysis  (Input objects, output objects, actions) | Module A.1 Simon Icebreaker |  |  |
| Flowchart Symbols & Conventions | Module A.1 Simon Icebreaker |  |  |
| Syntax Error  (Definition and example) | Software Environment Worksheet  Module B.1 Arduino Web IDE |  |  |
| Logic Error  (Definition and example) | Software Environment Worksheet  Module B.1 Arduino Web IDE |  |  |
| Run-Time Error  (Definition and example) | Software Environment Worksheet  Module B.1 Arduino Web IDE |  |  |
| External Documentation  (Arduino Language Reference) | Module B.1 Arduino Web IDE |  |  |

Practice Questions:

*Program Specification – For Use With The Questions In This Section*

The sample Arduino program reads commands from the serial monitor, flashes a red and a green LED, and writes information back to the serial monitor. The details are as follows:

* If the user types “red” the program turns the red LED on and prints “Red On” to the serial monitor.
* If the user types “green” the program turns the green LED on and prints “Green On” to the serial monitor.
* If the user types “off” the program turns both LEDs off and prints “LEDs Off” to the serial monitor.
* If the user types a number the program flashes the current LED (red or green) the specified number of times.

1. List the “input objects” mentioned in the program specification above.
2. List the “output objects” mentioned in the program specification above.
3. List the “actions” mentioned in the program specification above.
4. Draw and label the main flowchart symbols.
5. Create a flowchart for one of the action sequences you listed in question #3 above.
6. Create and list a small segment of Arduino code (not a whole program) that would show a “Syntax Error” for the program specification above. Explain your error.
7. Create and list a small segment of Arduino code (not a whole program) that would show a “Logic Error” for the program specification above. Explain your error.

**Arduino Programming**

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| **Concept / Topic** | **Reference (Module or Worksheet)** | **Located (Checkmark)** | **Understood**  **(Checkmark)** |
| Structure of a basic program | Module B.1 Arduino Web IDE |  |  |
| Stricture of basic statements  (Built-in procedures and assignments) | Module B.1 Arduino Web IDE |  |  |
| Structure of comments (Line & block comments) | Module B.1 Arduino Web IDE |  |  |
| “for” Loop (Definition and Use) | Module B.2 More Arduino Projects |  |  |
| “if” statement  (Definition and use) | Module B.2 More Arduino Projects |  |  |
| Comparitors “<”, “<=”, etc. | Module B.2 More Arduino Projects |  |  |
| Incrementors “++”, “=+”, etc. | Module B.2 More Arduino Projects |  |  |
| Serial Console Output  (Serial.println, etc.) | Module B.3 Arduino Serial Monitor |  |  |
| Serial Condole Input  (Serial.parseInt, etc.) | Module B.3 Arduino Serial Monitor |  |  |
| Global Constants & Variables  (Definition and Use) | Module B.4 Simple Procedure |  |  |
| Code Block  (Definition and Use) | Module B.4 Simple Procedure |  |  |
| Local Variable (in a Code Block)  (Definition and Use) | Module B.4 Simple Procedure |  |  |
| Custom Procedure Code  (Definition & Use) | Module B.4 Simple Procedure |  |  |
| Meaning & Use of “void”, “int” etc. | Module B.4 Simple Procedure |  |  |
| Procedure Variables  (Definition & Use) | Module B.4 Simple Procedure |  |  |

Practice Questions:

1. Write a block of computer code defines an integer variable called “blinkTimes” and assigns it an initial value of 6.
2. Write a block of computer code that uses an “if’ statement that checks the value of “blinkTimes” and turns on a LED if the value is less than or equal to 4.
3. Modify your “if’ statement to turn on a LED only if the value is greater than 2 or less than or equal to 8.
4. Add a line comment to your code for question #3 to explain your changes.
5. Write a block of computer code that uses an “for’ statement that checks the value of “blinkTimes” and blinks a LED the specified number of times.
6. Write a block of computer code that defines a procedure called “blink” that contains computer code to blink a LED.
7. Modify your procedure to add an integer parameter called “times”. Add code to your procedure to use a “for” loop to blink the LED the specified number of “times”.
8. Modify your procedure to add a local integer variable called “threshold” and assign it a value of 3. Add code to your procedure to use an “if” statement to blink the LED only if the specified number of “times” is greater than “threshold”.
9. Explain what happens if there is a second variable called “threshold” declared in another part of the program.

**Topic**

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Practice Questions: