**Integrated Development Environment**

1. List five main features of a software integrated development environment (IDE)

* The Explorer

## The Source Editor

## The Debugger

## The Compiler

## The Data File Viewer

1. For each main feature listed in #1 above, explain the feature and how the Arduino Create environment provides this feature.

* **The Explorer** - Presents a hierarchical view of directories and files that have been mounted for use in Net Beans.
* **The Source Editor** - A modern programmer's text editor that is optimized for writing BASIC source code.
* **The Debugger** - Incorporates debugging and editing tools into the Net Beans environment, adding the ability to work with multiple files and manage projects.
* **The Compiler** - Allows the compiling of BASIC source code into different token formats.
* **The Data File Viewer** - Provides a convenient way to view the contents of database files.

**Version Control System**

1. List five main features of a software version control system.

* Backup and Restore
* Synchronization
* Traceability
* Branching
* Long-term and short-term change

1. For each main feature listed in #3 above, explain the feature and how the Git Hub environment provides this feature.

* **Backup and Restore** - Files are saved as they are edited.
* **Synchronization** - Causing a set of data or files to remain identical in more than one location.
* **Size** – Unlimited space to include or upload file into repositories.
* **Branching** - Keeps multiple streams of work independent from each other.
* **Long-term and short term change** - The creation and deletion of files as well as edits to their contents in different periods.

1. Explain any version control features that we have not made use of in the class so far but that would be useful in the future.

* Branching

**Programming Errors**

1. Define and explain a “syntax error” when programming code.

* **Syntax Error** - A character or string incorrectly placed in a command or instruction that causes a failure in execution.

1. Create a sample Arduino program that has a syntax error. Answer this question by copying and pasting your sample code below and by providing an explanation.

void setup()

punMode(LED\_BUILTIN, OUTPUT);{

}

void loop() {

digitalWrite(LED\_BUILTIN, HIGH);

delay(1000);

digitalWrite(LED\_BUILTIN, LOW);

delay(1000);

* Spelled pin mode wrong
* Did not include a bracket at the end of the program to end the loop.

Fixed Program -:

void setup() {

pinMode(LED\_BUILTIN, OUTPUT);

}

void loop() {

digitalWrite(LED\_BUILTIN, HIGH);

delay(1000);

digitalWrite(LED\_BUILTIN, LOW);

delay(1000);

}

1. Define and explain a “runtime error” when programming code.

* **Runtime Error** - A program error that occurs while the program is running.

1. Create a sample Arduino program that has a runtime error. Answer this question by copying and pasting your sample code below and by providing an explanation.

int GreenLED = 12;

int RedLED = 11;

void setup()

{

pinMode(GreenLED, OUTPUT);

pinMode(RedLED, OUTPUT);

}

void loop()

{

dot(); dot(); dash();blank(); // U

dash(); dot(); dot(); blank(); //D

dot();dot(); blank(); //I

dot();dot();dot(); blank(); //S

dash(); blank(); //T

dot(); dash();blank(); //A

dash(); dot(); blank(); //N

}

int dash() {

digitalWrite(GreenLED, HIGH);

delay(750);

digitalWrite(GreenLED, LOW);

delay(750);

}

int dot() {

digitalWrite(RedLED, HIGH);

delay(250);

digitalWrite(RedLED, LOW);

delay(250);

}

int blank() {

digitalWrite(GreenLED, LOW);

digitalWrite(RedLED, LOW);

delay(1000);

}

* The following program verified, but it did not work when uploading. This is because the program did not include all the prerequisites for the program to be uploaded to the motherboard.

1. Define and explain a “logic error” when programming code.

* **Logic Error** - A bug in a program that causes it to operate incorrectly, but not to terminate abnormally or crash.

1. Create a sample Arduino program that has a logic error. Answer this question by copying and pasting your sample code below and by providing an explanation.

void setup() {

}

void loop() {

digitalWrite(LED\_BUILTIN, HIGH);

delay(1000);

digitalWrite(LED\_BUILTIN, LOW);

delay(1000);

}

* Missing variable initializations.

Fixed Program -:

void setup() {

pinMode(LED\_BUILTIN, OUTPUT);

}

void loop() {

digitalWrite(LED\_BUILTIN, HIGH);

delay(1000);

digitalWrite(LED\_BUILTIN, LOW);

delay(1000);

}