**Outline**

Learn the Arduino IDE and basic Arduino programming by implementing the basic blink program and modifying it to blink external LEDs.

**Objectives**

* Use constants and variables,
* Explain the difference between syntax, logic, and run-time errors in computer programs;
* Demonstrate the ability to correct syntax, logic, and run-time errors in computer programs;
* Design a simple program from a program template or skeleton (e.g., teacher-supplied skeleton, Help facility code snippet);
* Use Help documentation as a guide to designing and writing programs.
* Use the features of a software development environment to debug programs and create functioning computer programs;
* Work independently, using the Help function, to resolve syntax issues while programming;
* Work independently, using reference materials (e.g., code snippets, sample programs, APIs, tutorials), to design and write functioning computer programs.
* Describe the functions and features of a software development environment and use it to write and run a computer program;

**Prerequisites**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Prerequisite Module(s)** | **Level** | **Student Initial** | **Teacher Initial** | **Date** |
| None |  |  |  |  |

**Materials**

* Arduino Development Environment (IDE)
* Arduino proto board
* Web Documentation: <https://mega.nz/#F!E0oUEZja!8_GPWcQmaenlSYaTuvVdoQ>
  + Getting started guide.pdf
  + Public\_materials🡪Ebook🡪Arduino book.pdf
  + Lessons🡪Lesson1-LED blink

**Level 0: Code & Run Basic Program**

1. Read the documentation to become familiar with the Arduino IDE.
2. Create a project on the network drive for this module.
3. Code and run the program to make the onboard LED (port 13) blink.

**Level 1: Use External Documentation**

1. Identify each program command and program statement in your blink program.
2. Use the on-line documentation to make notes on each command so you understand and can explain every part of your program.
3. Explain the difference between a constant and a variable.
4. Explain the following:
   1. Syntax error
   2. Logic error
   3. Run-time error
5. Demonstrate and explain your blink program to your teacher.

**Level 2: Extend Blink Pattern**

1. Modify the blink program to produce two short blinks followed by one long blink.
2. Use a variable to control the blink time.

**Level 3: Add External LED**

1. Add a second external LED (using components on the prototype board) and make it blink in sync with the on-board LED.
2. Modify your program so that the external LED blinks following a different pattern than your on-board LED.

**Level 4: Add Sequence of LEDs**

1. Add at least 4 external LEDs to your project.
2. Modify your program so that all the LEDs blink with different patterns.

**Achievement Record**

|  |  |  |  |
| --- | --- | --- | --- |
| **Attainment Level** | **Student Initial** | **Teacher Initial** | **Date** |
| Level 0: Code & Run Basic Program |  |  |  |
| Level 1: Use External Documentation |  |  |  |
| Level 2: Extend Blink Pattern |  |  |  |
| Level 3: Add External LED |  |  |  |
| Level 4: Add Sequence of LEDs |  |  |  |