SOFTWARE USED

5.3.1 Arduino IDE tool

Arduino IDE is the software used to prepare the project. It is simple to write code and upload it to the board using the open-source software Arduino (IDE).

The board of the Arduino UNO has a microcontroller that can be programmed and accepts code in the form of bits or codes.

The Arduino IDE is compatible with both C and C++ languages. We used the programming language C for our project, and programs written with the Arduino software are called sketches.

The Arduino Coordinated Improvement Climate (IDE) is a product instrument used to create and transfer code to Arduino microcontroller sheets. Users can write, compile, and upload code to the Arduino board through the graphical user interface (GUI) provided by the IDE.

1. Code supervisor: A code editor with syntax highlighting and auto-completion is part of the Integrated Development Environment (IDE). This makes writing and editing code easier.
2. Compiler: The IDE includes a compiler that can turn Arduino-language code into machine code that can be run on the microcontroller.
3. Uploader: The compiled code can be uploaded to the Arduino board using the USB connection provided by the IDE's uploader.
4. Libraries: The IDE incorporates an assortment of pre-fabricated libraries that can be utilized to broaden the usefulness of the Arduino board. A wide variety of sensors, actuators, and other peripherals are supported by these libraries.
5. Monitor in series: Users can send and receive data between the Arduino board and a computer thanks to the IDE's serial monitor. For code testing and debugging, this is useful.

C and C++ are two of the programming languages supported by the IDE. The IDE's code editor has syntax highlighting, code completion, and error checking features for writing code.Using the IDE, you can compile your code into machine code that can be uploaded to your Arduino board after you have written it. You can also upload your code to the board using a USB cable thanks

to the IDE's built-in uploader.You are able to send and receive data between your computer and the Arduino board thanks to the serial monitor that is included in the IDE. This is useful for connecting to sensors and other devices connected to the board and debugging your code.The IDE likewise incorporates a library director that makes it simple to download and introduce extra libraries. Pre-written code for common tasks like controlling motors, reading sensors, and communicating with other devices is provided by these libraries.

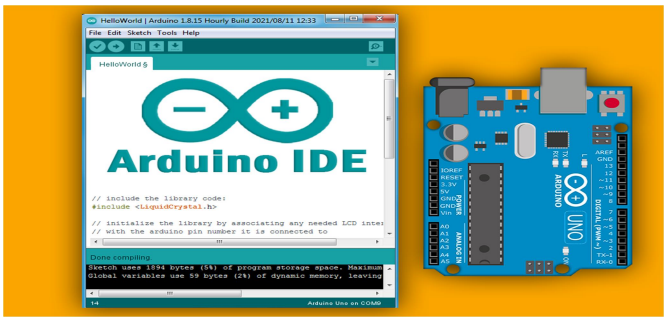

Fig 32:- Arduino IDE Tool

5.3.2 PROTEUS

The difficulty in comprehending the teaching material is what makes traditional electronics experimentation and teaching challenging; the absence of strong connections between courses; the experimental equipment's low use rate; the absence of standard experiment with programming and content; the lack of a suitable teaching platform for MCU software;the absence of extensive tests and inventive trial implies .Preparing large is troublesome quantities of qualified applied abilities. From product concept to design completion, Proteus is a complete development platform. Among its advantages are PCB automatic layout and wiring, single-chip software debugging, accurate hybrid circuit simulation and analysis, intelligent principle layout, and co-simulation of single-chip and peripheral circuits. Labcenter, an English organization and Proteus programming engineer, has been created all over the planet for almost 20 years. In more than 50 nations, it is currently the most effective and cost-effective EDA tool.

EWW CAD REVIEW ROUNDUP deemed it the best EDA tool. In terms of philosophy, continuous model development, and software upgrade, it is ahead of the competition, ensuring top-notch technology. It depicts the structure of the Proteus software product. Proteus is a platform for the complete simulation of embedded system software and hardware design. Proteus

ISIS is an intelligent schematic input system. The basic platform combines single-chip microcomputer simulation with pSpice circuit simulation. IIt has analogy circuit simulation, digital circuit simulation, system simulation of a single chip microcomputer and its peripheral circuits, RS232 dynamic simulation, I2C debugger, SPI debugger, keyboard and LCD system simulation, and a variety of virtual instruments like an oscilloscope and logic analyzer signal generator, etc. To get signals on and off the PCB you need either connector components or connecting wires.

Terminal pads with soldered circuit pins are the best way to join wires to a prototype PCB; wires can then be soldered to the pins.. Add the Cushion TERMINAL part from the EEE library to permit wires for the V+, V-and GND supplies. There will be internal nets all over your circuit that you need to measure during testing. Add test points to these nets (the PADTESTPOINT component).Testpoints will show up on the schematic as little cushions like terminal cushions - you don't anyway have to bind circuit pins onto test directs 60 Toward get signals on and off the PCB you really want either connector parts or interfacing wires.The most effective way to join wires to a model PCB is through terminal cushions which have circuit pins patched - wires can then be fastened to the pins. Add the Cushion TERMINAL part from the EEE library to permit wires for the V+, V-and GND supplies.There will be internal nets all over your circuit that you need to measure during testing. Add test points to these nets (the PADTESTPOINT component).On the schematic, testpoints will appear as small pads similar to terminal pads; however, you are not required to solder circuit pins to test points.For the Third International Conference on Modern Management, Education Technology, and Social Science (MMETSS 2018), the authors created ARES, a high-level PCB wiring editing software. The publishing house is Atlantis Press. This is an open access article under the CC BY-NC grant (http://creativecommons.org/licenses/by-nc/4.0/).

Progresses in Sociology, Training and Humanities Exploration, volume 215 512 [3]. After confirming that the device is packaged correctly, the ISIS-designed schematic diagram can export the network table automatically. 2D tools can be utilized for PCB format and wiring to plan the PCB outline in the board edge side layer, set the wiring procedure, pick a counterfeit or programmed gadget design for wiring, and perform DRC.

Proteus comprises two principal applications: ISIS and ARES from Proteus. The software for circuit design and simulation is Proteus ISIS, while the software for PCB layout is Proteus

ARES. Proteus ISIS permits you to plan electronic circuits by putting parts on a virtual breadboard and wiring them together utilizing virtual wires. You can see how your circuit behaves under various conditions by simulating it in real time. You can use a library of components that have already been designed to build your circuits in Proteus ISIS, or you can make your own custom components.

You can move your circuit design from the virtual breadboard to a real PCB with Proteus ARES. The components can be placed on the PCB, the connections between them can be routed, and the manufacturing files for making the actual board can be generated.

Proteus includes virtual instruments that enable you to measure and monitor the behavior of your circuit in real-time, as well as a variety of debugging tools that assist you in identifying and fixing problems in your circuit, in addition to circuit design and simulation.

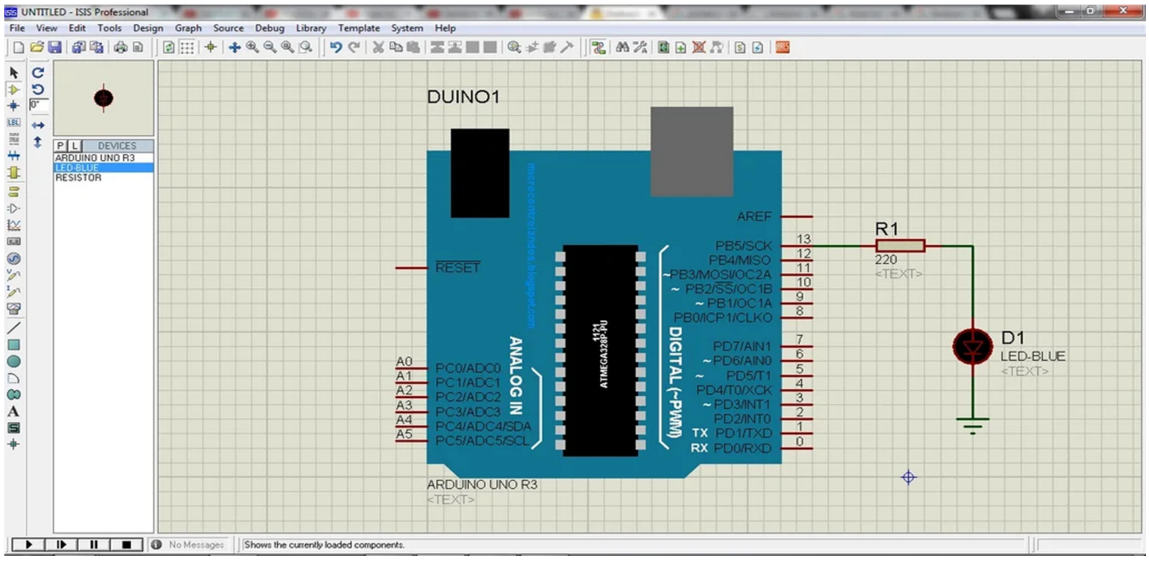

Fig 33:- Proteus Software