3.6 Types of Arduino:

Arduino board is an open-source platform used to make electronics projects. It consists of both a microcontroller and a part of the software or Integrated Development Environment (IDE) that runs on your PC, used to write & upload computer code to the physical board. The platform of an Arduino has become very famous with designers or students just starting out with electronics, and for an excellent cause.

Fig: Types of Arduino Boards

Unlike earlier programmable circuit boards, the Arduino does not require a separate part of hardware in order to program a new code onto the board you can just use a USB cable. As well, the Arduino IDE uses a basic version of C++, making it simpler to learn the program. At last, the Arduino board offers a typical form factor that breaks out the functions of the microcontroller into a more available package.

Different Types of Arduino Boards

The list of Arduino boards includes the following such as

- Arduino Uno (R3)
- Arduino Nano
- Arduino Micro
- Arduino Due
- LilyPad Arduino Board
- Arduino Bluetooth
- Arduino Diecimila
- RedBoard Arduino Board
- Arduino Mega (R3) Board
- Arduino Leonardo Board
- Arduino Robot
- Arduino Esplora
- Arduino Pro Mic
- Arduino Ethernet

- Arduino Zero
- Fastest Arduino Board

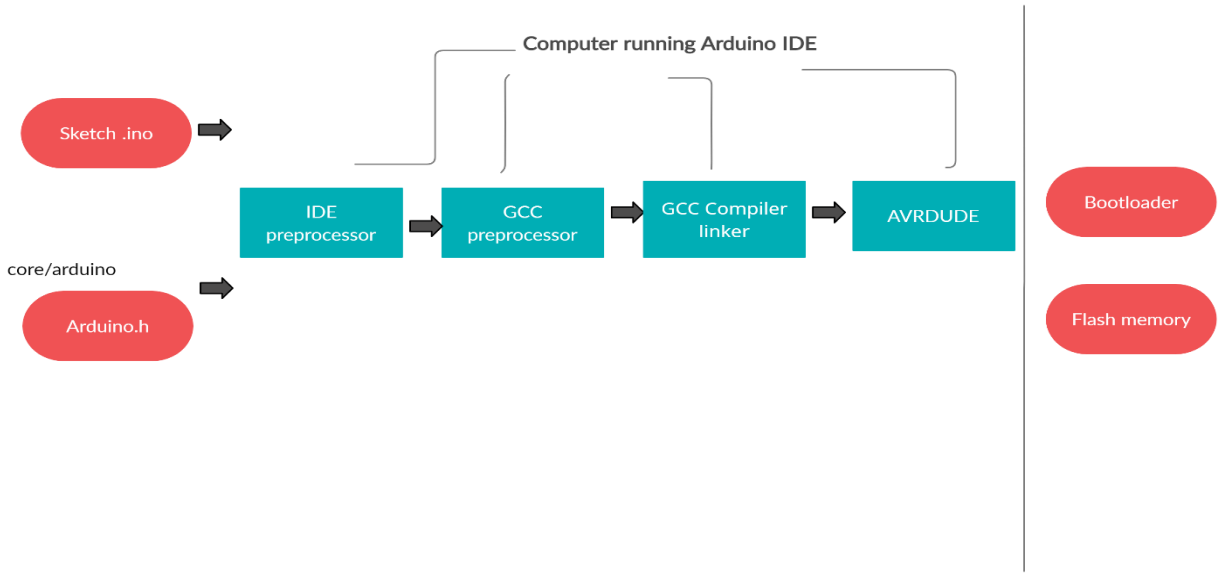
Features of Different Types of Arduino Boards

The features of different types of Arduino boards are listed in the tabular form.

Arduino Board	Processor	Memory	Digital I/O	Analogue I/O
Arduino Uno	16Mhz ATmega328	2KB SRAM, 32KB flash	14	6 input, 0 output
Arduino Due	84MHz AT91SAM3X8E	96KB SRAM, 512KB flash	54	12 input, 2 output
Arduino Mega	16MHz ATmega2560	8KB SRAM, 256KB flash	54	16 input, 0 output
Arduino Leonardo	16MHz ATmega32u4	2.5KB SRAM, 32KB flash	20	12 input, 0 output

3.7 Arduino Toolchain:

A toolchain is a set of programming tools that is used to perform a complex set of operations. In the Arduino Software (IDE) the toolchain is hidden from the user, but it is used to compile and upload the user Sketch. It includes compiler, assembler, linker and Standard C & math libraries.



- Sketch code press upload button. The Arduino toolchain is ran to perform the uploading of the code.
- Arduino sketches held the file in **.ino** extension in a folder with same name.
- Arduino IED starts to perform the following tasks
- Arduino IDE preprocessor assembles the files on the sketch. 1 file is found in the folder.
- As there are many boards with different pins layout, there is a folder /hardware/arduino/variant folder that kept all other type of Arduino pin setup.
    - Combining all the files, GCC compiler (which is open source C++ compiler) bundled part of Arduino distribution.
    - Preprocessor interprets all the #if and #define commands and determines what actually goes into the build.
    - Next, the code is compiled and linked into a single executable file for type of proessor used by board.
    - After compiler finished, another piece open source called avrdude actually sends the executable code saved as hexadecimal binary to the board over USB serial interface.
    - There is a program called bootloader on Arduino board runs every briefly when Arduino is reset.
    - When serial communication starts, the hardware serial link forces a reset to give the bootloader chance to check for any incoming sketches.
    - If sketch exist, Arduino programs will unpack the hexadecimal into binary.
    - It stores the sketch in the flash memory.