



## Report on Arduino workshop

Poornima Institute of Engineering & Technology, Jaipur department of Electrical Engineering conducted a Technical talk on Renewable Energy Application by Dr. A P Vishnu, Asst. Engg. RVPNL on 21th of Oct 2015. The Technical talk was based on the recent applications of Renewable Energy.

Arduino is an open source microcontroller which can be easily programmed, erased and reprogrammed at any instant of time. Introduced in 2005 the Arduino platform was designed to provide an inexpensive and easy way for hobbyists, students and professionals to create devices that interact with their environment using sensors and actuators. Based on simple microcontroller boards, it is an open source computing platform that is used for constructing and programming electronic devices.

It is also capable of acting as a mini computer just like other microcontrollers by taking inputs and controlling the outputs for a variety of electronics devices. It is also capable of receiving and sending information over the internet with the help of various Arduino shields, which are discussed in this paper. Arduino uses a hardware known as the Arduino development board and software for developing the code known as the Arduino IDE (Integrated Development Environment). Built up with the 8-bit Atmel AVR microcontroller's that are manufactured by Atmel or a 32-bit Atmel ARM, these microcontrollers can be programmed easily using the C or C++ language in the Arduino IDE.

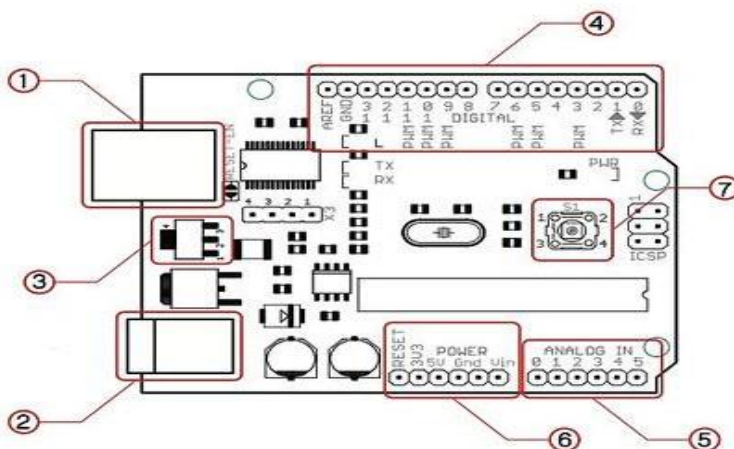
### TYPE OF ARDUINO BOARDS

Arduino boards are available with many different types of built-in modules in it. Boards such as Arduino BT come with a built-in Bluetooth module, for wireless communication. These built-in modules can also be available separately which can then be interfaced (mounted) to it. These modules are known as Shield.

Some of the most commonly used Shields are:

- Arduino Ethernet shield: It that allows an Arduino board to connect to the internet using the Ethernet library and to read and write an SD card using the SD library.
- Arduino Wireless shield: It allows your Arduino board to communicate wirelessly using Zigbee.
- Arduino Motor Driver Shield: It allows your Arduino boards to interface with driver of a motor etc.

### Hardware



The most important parts on the Arduino board high lighted in red:

- 1: USB connector
- 2: Power connector
- 3: Automatic power switch
- 4: Digital pins
- 5: Analog pins
- 6: Power pins
- 7: Reset switch

## Software

The program code written for Arduino is known as a sketch. The software used for developing such sketches for an Arduino is commonly known as the Arduino IDE. This IDE contains the following parts in it:

- Text editor: This is where the simplified code can be written using a simplified version of C++ programming language.
- Message area: It displays error and also gives a feedback on saving and exporting the code.
- Text: The console displays text output by the Arduino environment including complete error messages and other information
- Console Toolbar: This toolbar contains various buttons like Verify, Upload, New, Open, Save and Serial Monitor. On the bottom right hand corner of the window there displays the Development Board and the Serial Port in use.

## Features of Arduino IDE

- The project file or the sketches for a project are saved with the file extension .ino
- Features such as cut / copy / paste are supported in this IDE.
- There also is a facility for finding a particular word and replacing it with another by pressing the Ctrl + F buttons on the keyboard
- The most basic part or the skeleton of all Arduino code will have two functions.

## APPLICATIONS

### 1. Arduino Satellite (ArduSat)

ArduSat is an open source satellite completely based on Arduino to create a stage for space discoveries. Built by Spire previously known as NanoSatisfi, ArduSat collects various types of information's from the space environment, with the help of numerous sensors that includes temperature sensors, pressure sensors, cameras, GPS, spectrometer, and magnetometer etc with its programmable Arduino processors This platform also allows common public to experiment their projects in space. ArduSat can be used for photography from space, making a spectrograph of the sun, detecting high energy radiation, compiling temperature readings and observing meteors etc.

### 2. ArduPilot (ArduPilotMega - APM)

ArduPilot is an unmanned aerial vehicle (UAV) based on the open source platform and built using Arduino Mega which is able to control independent multicopters, fixed-wing aircraft, traditional helicopters and ground rovers. It was created by the DIY Drones community in 2007 and was also an award winning platform of 2012.

### 3. LilyPad Arduino

Just like the Google wearable's, LilyPad Arduino is a wearable version of Arduino developed and designed by Leah Buechley and SparkFun Electronics with the aim of building interactive electronic textiles or e-textiles . This is an example of such designs, here is a jacket with turn signals that will let people know where you're going when on a bike.