Practical no: 1

Title: Study of Raspberry-Pi, Beagle board, Arduino and other micro controller (History& Elevation)

Name: Aditi Dinesh Mulay

Class: T.E. Computer

Subject: ES&IOT

Div: A

Roll no: 02

PRN No. 71918146B

ESIOT

Practical 1.

Aditi Dinesh Mway
T.E. Comp. Div: A
Roll no: 1

Aim: Study of Raspberry -Pi, Beagle Board, Arduino & other micro controller (History & Elevation)

Theory

Study of Raspberry Pi3

The Raspberry Pi is a series of small single-board computers developed in the UK by the Raspberry Pi foundation to promote the teaching of basic computer science in schools and in developing countries. The original model became far more popular than anticipated, selling outside of its target market for uses such as robotics. Over 5 million Raspberry Pi have been sold before Feb 15, making it best-selling British computer. By Nov 2016 they had sold 11 million units.

The first generation was released in Feb 2012 followed by the simpler and cheaper Model A. In 2014, the foundation released a board with an improved design, Raspberry Pi 1 Model B+. These board are approx. credit-card sized & represent the std mainline form-factor. Improved A+, B+ models were released a year later.

Raspberry Pi 3 Model B

Fig.1. Raspberry Pi3 Kit

History & Elevation:

In 2006, early concepts of Raspberry Pi were based on the Atmel ATmega 644 microcontroller. Its schematics and PCB layout are publically available. Foundation trustee Eben Upton assembled a grp of teachers, academics and computer enthusiasts to devise a computer to inspire children. The first ARM prototype version of computer was mounted in a package the same size as a USB memory sticks. It had a USB port on one end & an HDMI port on the other.

Study of Beagle Board.

The Beagle Board is low power open source single board computer produced by Texas Instruments in association with Digi-key and Network element 14. The Beagle Board was also designed with open source software developement in mind, and as way of Demonstrating the Texas Instrument's OMAP3530 system on-a-chip. The board was developed by a small team of engineers as an educational board that could be used in colleges around the world to teach open source hardware & software capabilities. The board was designed using Cadence OrCAD for schematics & Cadene Allegro for PCB manufacturing no simulation software was used.

Fig.2.Beagle Bone Kit

Study of Arduino:

The Arduino project started at the Interaction Design Institute Ivrea in Ivrea, Italy. The wiring platform consisted of a printed circuitboard with an ATmega168 microcontroller, an IDE based on processing and library functions to easily program the microcontroller. In 2003, Massimo Banzi, with David Mellis, another IDII student, & David Cuartielles, added support for the cheaper ATmega8 micro controller to wiring. But instead of continuing the work on wiring they forked the project and renamed in Arduino.

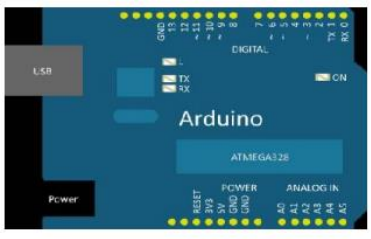
Ardunio kit:

Arduino Kit Fig.3.

Introduction to Arduino Board.

1. It is an Open Source Software & hardware.
2. The brain of Arduino Board is the microcontroller. IC ATMEGA328 present on the bottom right corner of board.
3. There are total 20 GPIO pins mounted on board.
4. From these, on top side of board, 14 are digital pins denoted by 0, 1, 2, ...13. This pins can be set as digital i/p or digital o/p pins.
5. Remaining 6 pins, at the bottom right side of the board are the Analog pins, denoted by A0, A1, ... A5.
6. From 14 digital pins, 6 pins are denoted by '~'

Introduction to Arduino Board



sign called as PWM pin. These pins are used to write the analog pi signal.

7. Arduino board can be connected to PC using USB cable, it has two connectors at its two ends. One type-A (PC side) & other is type-B (Arduino)

8. Power is given to Arduino Board by two ways
1. Through USB cable 2. By external adapter

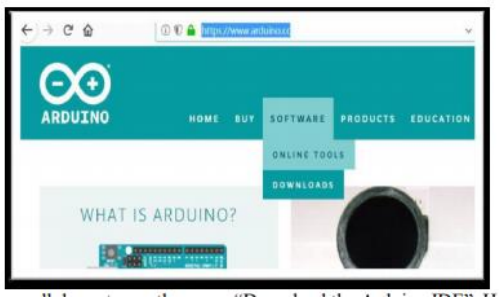
Introduction to Arduino IDE.

9. The latest version of Arduino IDE is Arduino 1.8.5.

10. It can be downloaded freely from website Arduino.cc.

11. It is an exe file.

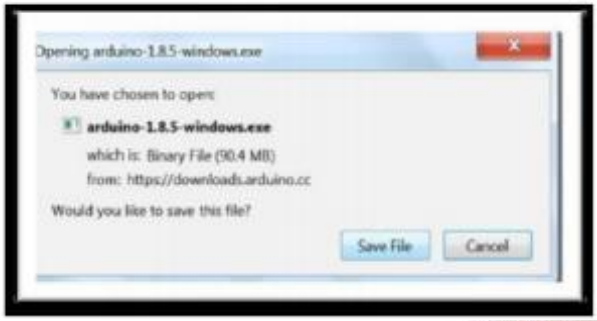
12. Click Software & then Downloads to download the software.



13. On the next screen, scroll down to see the menu "Download the Arduino IDE". Here, in the left side of window, you can see latest version of Arduino IDE. On right side of window, different options are given. To download exe for windows o.s. clicks on option, "Windows Installer, for windows xp and up". for other os, clicks appro. os.

14. On the next screen, click on option 'Just Download' to download the exe.

15. On the next screen, click on save file option.



16. After the downloading is completed, "Arduino-1.8.5-windows.exe" can be seen in the downloads folder.

17. Double click on the exe file to install.

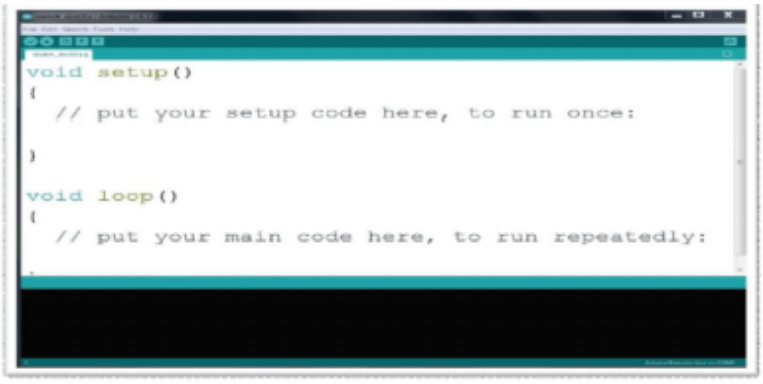
18. On the next screen, click on Run option.

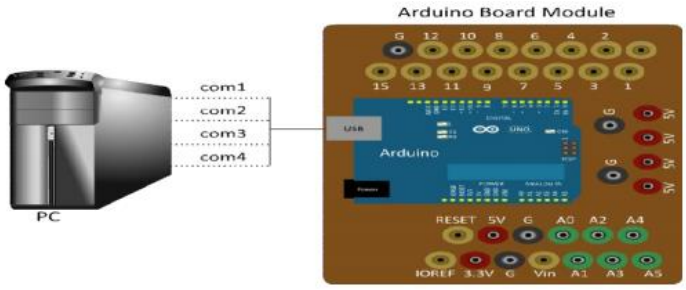
19. On the next screen, tick all options & click next.

20. On next, click 'Install' option.
21. After this, multiple times you will be asked to click on Install option, don't ignore any option otherwise installation will not be completed.
22. After completion of Installation, Arduino IDE icon will be seen on desktop.

Using Arduino IDE,

It has following options.
1) .Text Editor
2) Toolbar
3) Compiler
4) Serial Monitor.





Procedure:

1. Write the prg as per the algo.
2. Save & compile the prg.
3. Connect with Arduino board to PC using USB cable.
4. Upload the compiled prg & check the o/p.

Algorithm:

1. Start IDE:
2. Configure the pin no. '13' as 'OUTPUT' pin.
3. Make the 'OUTPUT' as 'HIGH'.
4. Give delay of 1 second.
5. Make the 'OUTPUT' as 'Low'.
6. Give delay of 1 second.

Observation:

1. Observe the LED near the pin no' 13', it starts blinking as soon as prg is uploaded.

Conclusion:

Thus, we have studied history of Raspberry Pi, Beagle bone & Arduino and its IDE also, other History & Elevation of other microcontroller.