Assignment 1

Name: Shardul Vikram Dharmadhikari

Roll No: 8016

Class: TE Comp

Aim

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

Theory

Study of Raspberry Pi3

The Raspberry Pi is a series of small single-board computers developed in the United
Kingdom 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 Pis have been sold before February 2015, making it the best-selling British
computer. By November 2016 they had sold 11 million units.

The first generation (Raspberry Pi1 Model B) was released in February 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 boards are approximately credit
card sized and represent the standard mainline form-factor. Improved A+ and B+ models
were released a year later.

A Raspberry Pi Zero with smaller size and reduced input/output (I/O) and general
purpose input/output (GPIO) capabilities was released in November 2015 for US$5. Raspberry
Pi 3 Model B was released in February 2016 and has on-board WiFi, Bluetooth and USB boot
capabilities. By2017, it became the newest mainline Raspberry Pi. On 28 February 2017, the
Raspberry Pi Zero W was launched, which is like Raspberry Pi Zero with Wi-Fi and Bluetooth,
for US$10.Processor speed ranges from 700 MHz to 1.2 GHz for the Pi 3; on-board memory
ranges from 256MB to 1 GB RAM. Secure Digital (SD) cards are used to store the operating
system and program memory in either SDHC or Microcosmic sizes. The boards have one to
four USB ports. For video output, HDMI and composite video are supported, with a standard
3.5 mm phono jack for audio output. Lower-level output is provided by a number of GPO pins
which support common protocols like I2C. The B models have an 8P8C Ethernet port and the
Pi 3 and Pi Zero W have on-board Wi-Fi 802.11n and
Bluetooth. Prices range US$5 to $35.

Raspberry Pi 3 Model B

Fig.1. Raspberry Pi3 Kit

History and Elevation

In 2006, early concepts of the Raspberry Pi were based on the Atmel ATmega644 microcontroller. Its schematics and PCB layout are publicly available. Foundation trustee Eben Upton assembled a group of teachers, academics and computer enthusiasts to devise a computer to inspire children. The computer is inspired by Acorn's BBC Micro of 1981. The Model A, Model B and Model B+ names are references to the original models of the British educational BBC Micro computer, developed by Acorn Computers. The first ARM prototype version of the computer was mounted in a package the same size as a USB memory stick. It had a USB port on one end and an HDMI port on the other.

The Foundation's goal was to offer two versions, priced at US$25 and $35. They started accepting orders for the higher priced Model B on 29 February 2012, the lower cost Model A on 4 February2013. and the even lower cost (US$20) A+ on 10 November 2014.On 26 November 2015, the cheapest Raspberry Pi yet, the Raspberry Pi Zero, was launched at US$5 or £4.

Study of Beagle Board

The Beagle Board is a low-power open-source single-board computer produced by Texas Instruments in association with Digi-Key and Newark element14. The Beagle Board was also designed with open source software development in mind, and as a 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 and software capabilities. It is also sold to the public under the Creative Commons share-alike license. The board was designed using Cadence OrCAD for schematics and Cadence 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 (IDII) in Ivrea, Italy. At that time, the students used a BASIC Stamp microcontroller at a cost of $100, a considerable expense for many students. In 2003 Hernando Barrage created the development platform Wiring as a Master's

thesis project at IDII, under the supervision of Massimo Banzi and Casey Reas, who are known for work on the Processing language. The project goal was to create simple, low cost tools for creating digital projects by non-engineers. The Wiring platform consisted of a printed circuit board (PCB) 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, and 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 it Arduino.

The initial Arduino core team consisted of Massimo Banzi, David Cuartielles, Tom Igoe, GianlucaMartino, and David Mellis, but Barragán was not invited to participate. Following the completion of the Wiring platform, lighter and less expensive versions were distributed in the open-source community.

Adafruit Industries, a New York City supplier of Arduino boards, parts, and assemblies, estimated in mid- 2011 that over 300,000 official Arduinos had been commercially produced,[6] and in 2013 that 700,000 official boards were in users' hands.

In October 2016, Federico Musto, Arduino's former CEO, secured a 50% ownership of the company. In April 2017, Wired reported that Musto had "fabricated his academic record.... On his company's website, personal Linked In accounts, and even on Italian business documents, Musto was until recently listed as holding a PhD from the Massachusetts Institute of Technology. In some cases, his bios also claimed an MBA from New York University." Wired reported that neither University had any record of Musto's attendance, and Musto later admitted in an interview with Wired that he had never earned those degrees.

Around that same time, Massimo Banzi announced that the Arduino foundation would be "a new beginning for Arduino." But a year later, the Foundation still hasn't been established, and the state of the project remains sun clear. The controversy surrounding Musto continued when, in July 2017, he reportedly pulled many Open source licenses, schematics, and code from the Arduino website, prompting scrutiny and outcry. In October 2017, Arduino announced its partnership with ARM Holdings (ARM). The announcement said, in part, "ARM recognized independence as a core

value of Arduino without any lock-in with the ARM architecture."Arduino intends to continue to work with all technology vendors and architectures.

Hardware Comparison

	Raspberry Pi 2	Beaglebone Black Rev C
Processor	900Mhz Quad Core ARM	1Ghz ARM Processor
RAM	1 Gb	512MB DDR3
Storage	Micro SD Card (Required) Expandable via USB	4 GB on board flash storage. Expandable by USB & Micro SD
Audio	Stereo over HDMI or 3.5mm Jack	Stereo over HDMI
GPIO	26/40 Pins	65/92 Pins
HDMI	Full Size HDMI port	Micro HDMI
Peripherals	4 USB ports 1 10/100 Ethernet port	1 USB port 1 10/100 Ethernet port
Power Source	Micro USB	Micro USB or 5VDC connection

Conclusion: Thus we have studied Raspberry-Pi, Beagle board, Arduino and other micro controller.