Experiment No.: 05

Aim: To study and Install Raspberry Pi
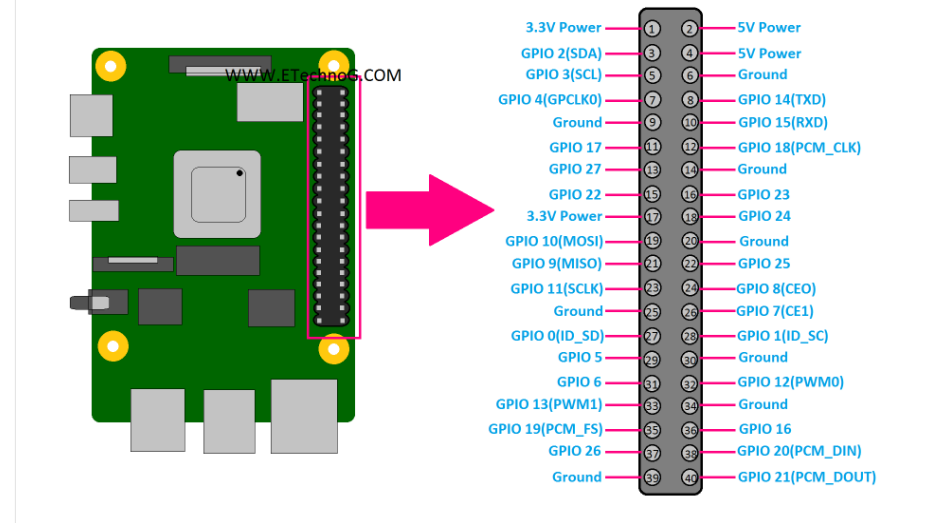
Objective: To study Raspberry Pi

Outcome: Able to install Raspberry Pi and use it.

Theory:

The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python. It's capable of doing everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spreadsheets, word-processing, and playing games.

- The main difference between them is: Arduino is a microcontroller board, while Raspberry Pi is a microprocessor based mini computer (SBC).
- The Microcontroller on the Arduino board contains the CPU, RAM and ROM. All the additional hardware on the Arduino Board is for power supply, programming and IO Connectivity. Raspberry Pi SBC has all features of a computer with a processor, memory, storage, graphics driver, connectors on the board.
- Raspberry Pi needs an Operating System to run. Arduino doesn't need any operating system. All you need is a binary of the compiled source code.
- Raspberry Pi comes with a fully functional operating system called Raspberry Pi OS (previously known as Raspbian OS). Although Pi can use different operating systems, Linux is preferred by Raspberry Pi Foundation. You can install Android, if you want. Arduino does not have any operating system. You just need a firmware instructing the Microcontroller what task to do.
- The clock speed of Arduino is 16 MHz while the clock speed of Raspberry Pi is around 1.2 GHz.

Pin diagram and Architecture:

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3.3V Power	1 2	5V Power
GPIO 2(SDA)	3 4	5V Power
GPIO 3(SCL)	5 6	Ground
GPIO 4(GPCLK0)	7 8	GPIO 14(TXD)
Ground	9 10	GPIO 15(RXD)
GPIO 17	11 12	GPIO 18(PCM_CLK)
GPIO 27	13 14	Ground
GPIO 22	15 16	GPIO 23
3.3V Power	17 18	GPIO 24
GPIO 10(MOSI)	19 20	Ground
GPIO 9(MISO)	21 22	GPIO 25
GPIO 11(SCLK)	23 24	GPIO 8(CE0)
Ground	25 26	GPIO 7(CE1)
GPIO 0(ID_SD)	27 28	GPIO 1(ID_SC)
GPIO 5	29 30	Ground
GPIO 6	31 32	GPIO 12(PWM0)
GPIO 13(PWM1)	33 34	Ground
GPIO 19(PCM_FS)	35 36	GPIO 16
GPIO 26	37 38	GPIO 20(PCM_DIN)
Ground	39 40	GPIO 21(PCM_DOUT)

Example:

The applications of Raspberry Pi can be used as a game server as well. It is an excellent game server for Minecraft. If multiple Raspberry Pis are used, making one as a dedicated server, a great gaming experience can be achieved. Other multiplayer network games can be set up on the Raspberry Pi.

OutPut:

Raspberry Pi

Operating System

CHOOSE OS

SD Card

CHOOSE SD CARD

WRITE

Raspberry Pi Imager v1.3

Operating System   X

The retro gaming OS supporting 100+ gaming systems!

RISC OS Pi
A fast and easily customised operating system for ARM devices   >

TLXOS
30-day trial of ThinLinX's Debian-based thin client for Raspberry Pi   >

Misc utility images
EEPROM recovery, etc.   >

Erase
Format card as FAT32

Use custom
Select a custom .img from your computer

Raspberry Pi Imager v1.3

Operating System   X

RISC OS Pi
A fast and easily customised operating system for ARM devices

TLXOS
30-day trial of ThinLinX's Debian-based thin client for Raspberry Pi

Misc utility images
EEPROM recovery, etc.

Select image

Look in: C:\Users\Jon\Downloads

My Computer	Name	Size	Type	Date M
Jon	ubuntu-mate-20.10-desktop-arm64+raspi.img(1).xz	1.17 GiB	xz File	1/11/2
	openshift-client-linux.tar.gz	23 MiB	gz File	1/7/20

Install (as superuser)

Keyboard layout

Choose your keyboard layout:

Dzongkha	English (US)
English (Australian)	English (US) - Cherokee
English (Cameroon)	English (US) - English (Colemak)
English (Ghana)	English (US) - English (Dvorak)
English (Nigeria)	English (US) - English (Dvorak, alt. intl.)
English (South Africa)	English (US) - English (Dvorak, intl., with dead keys)
English (UK)	English (US) - English (Dvorak, left-handed)
English (US)	English (US) - English (Dvorak, right-handed)
Esperanto	English (US) - English (Macintosh)
Estonian	English (US) - English (Norman)
Faroese	English (US) - English (US, alt. intl.)

Type here to test your keyboard

Detect Keyboard Layout

Quit   Back   Continue

Install (as superuser)

Where are you?

New York

[Back] [Continue]

Software Updater

Updated software has been issued since Ubuntu 18.04 was released. Do you want to install it now?

▼ Details of updates

Install or remove	Download
☑ **Security updates**	110.9 MB
☑ 🦊 Firefox Web Browser	42.2 MB
☑ 🕊 Thunderbird Mail	33.8 MB
☑ 📅 Calendar Extension for Thunderbird	799 kB
☑ 📅 Calendar Extension for Thunderbird (transitional package)	11 kB

▶ Technical description

124.7 MB will be downloaded.

[Settings...]   [Remind Me Later]   [Install Now]