Practical 1

Aim: Prepare Raspberry Pi: Hardware preparation and Installation.

Apparatus:

1. Raspberry Pi
2. Monitor or TV
3. HDMI cable
4. Ethernet cable
5. USB keyboard
6. USB mouse
7. Micro USB power supply
8. 8GB or larger microSD card
9. SD Card Reader

Theory:

1. Gather Your Hardware

- Before starting, make sure you have all the necessary hardware components:
- Raspberry Pi (any model, such as 4, 3, or zero)
- MicroSD card (at least 8GB, Class 10 recommended)
- Power supply (5V, 3A for Raspberry Pi 4; 5V, 2.5A for Raspberry Pi 3)
- HDMI cable (for connecting to a monitor)
- Monitor/Display (with HDMI input)
- Keyboard & Mouse
- Ethernet cable (optional, if not using Wi-Fi)
- Case (optional, for protection and better cooling)
- Heat sinks (optional, for better thermal performance)
- Micro-USB to USB cable (optional, for powering your Pi through a battery pack or USB port)

2. Prepare the MicroSD Card

- The microSD card is where the operating system will be installed. To get started:
- Download Raspberry Pi OS: Visit the Raspberry Pi Downloads page and download the Raspberry Pi OS (previously Raspbian).
- Install Raspberry Pi OS: Use a tool like Raspberry Pi Imager to flash the OS onto the microSD card. You can also use other tools like Balena Etcher.

- Insert your microSD card into your computer.
- Open Raspberry Pi Imager and select the OS you want to install (typically "Raspberry Pi OS (32-bit)" or "Raspberry Pi OS Lite").
- **Choose your microSD card as the target and Click "Write" to install the OS.**

3. Set Up the Hardware

- Insert the microSD card into the Raspberry Pi's microSD card slot.
- Connect the keyboard and mouse to the USB ports on the Raspberry Pi.
- Connect the monitor using the HDMI cable.
- Plug in the power supply to the Raspberry Pi to turn it on. The Pi should boot into the Raspberry Pi OS.
- Optional: Insert heat sinks if you're using them to manage the temperature better.
- Optional: Insert the Ethernet cable if you want to use a wired connection (otherwise, Wi-Fi can be used).

4. Initial Setup

- Once the Raspberry Pi is powered on, you'll see the Raspberry Pi OS booting up on the screen. The first time you boot it up, it will go through an initial setup process:
- Language and Region: Select your preferred language, time zone, and keyboard layout.
- Wi-Fi Setup: If you're using Wi-Fi, it will prompt you to choose a network and enter your password.
- Update Software: It may ask to update the software packages to the latest version.
- Create User Account: Set up a username and password to access your Raspberry Pi.

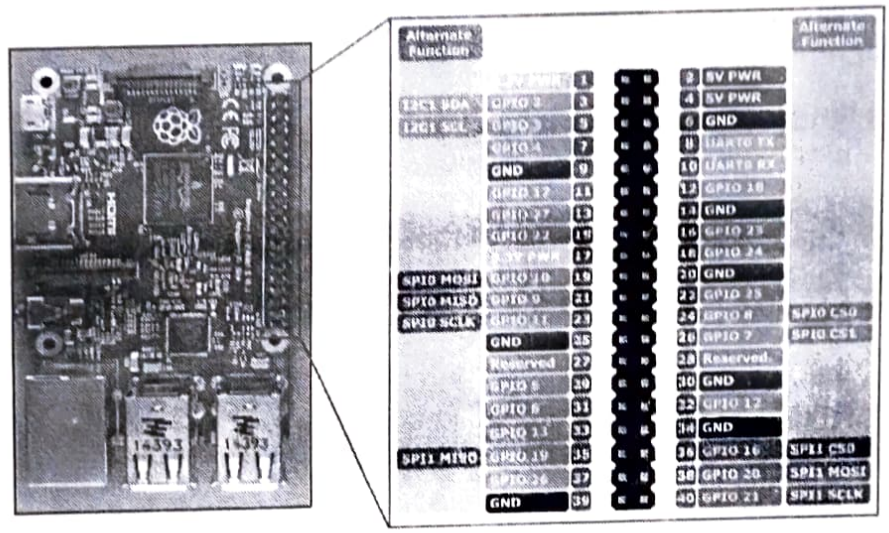
5. Final Touches

- Once the initial setup is complete:
- Reboot the Raspberry Pi to apply all configurations.
- Install any additional software you may need from the terminal or software manager.

6. Start Using the Raspberry Pi

- You're ready to start using your Raspberry Pi! You can use it as a desktop computer or for various projects (IoT, robotics, etc.). If you need to install more software, you can do so via the Add / Remove Software menu or through the terminal using apt-get commands.

Raspberry Pi Pins:



Output: