

## Lesson 4 Raspberry Pi System Operation

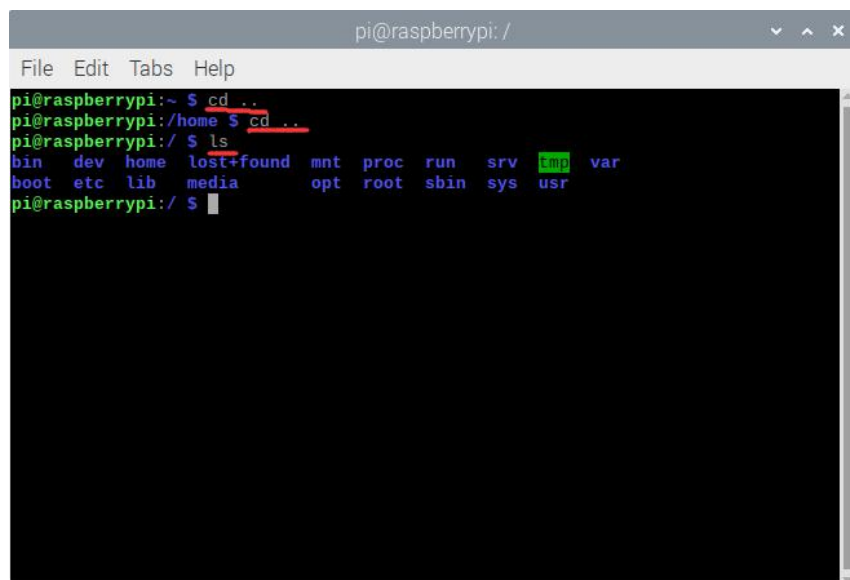
The operating system of the Raspberry Pi is Linux. Users can control the computer by inputting control commands or clicking the icons on the graphical interface.

Because Linux is an open source system, the degree of freedom will be higher, and the system can be customized according to needs. This is why the Linux system has become the preferred operating system for programmers and makers.

Therefore, the system directory refers to the directory where the main files of the operating system are stored. The files in the directory directly decided whether the system is working properly.

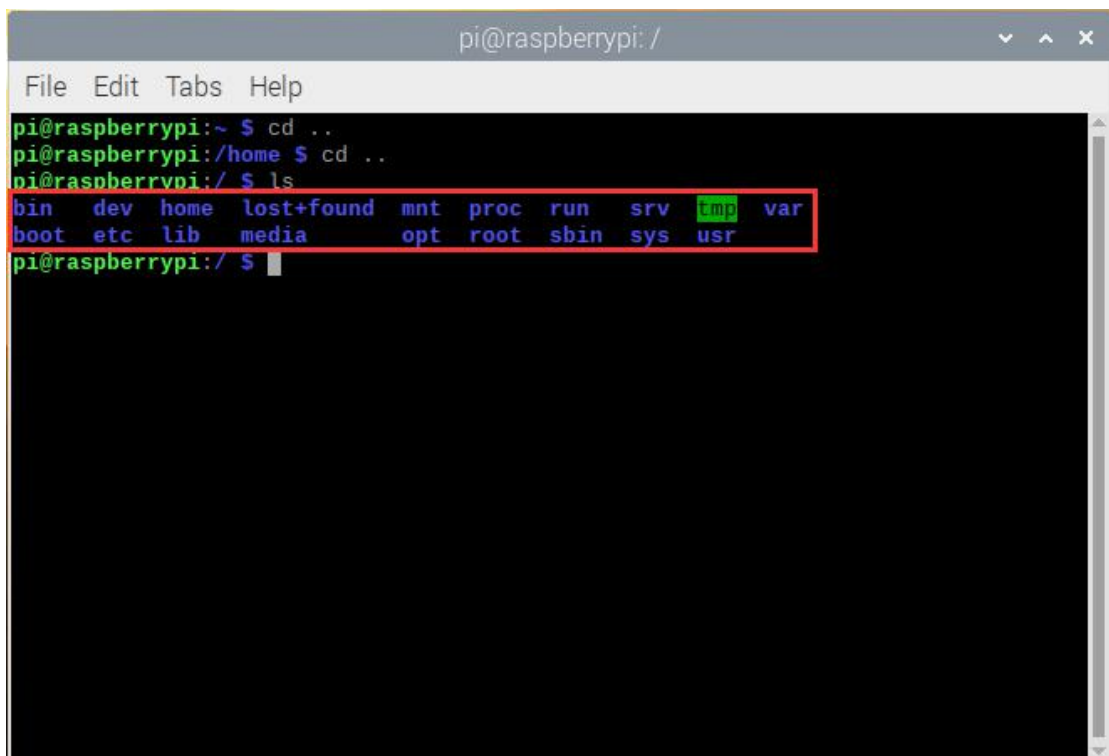
### 1. Turn on System Directory

- 1) Start the Raspberry Pi and open the LX terminal as the previous method.
- 2) According to the red line as shown in the figure below, input the command "cd .." and the command "ls" in turn (**note**: there is a space between cd and ..), and then press the Enter key after each command.



```
pi@raspberrypi: /  
File Edit Tabs Help  
pi@raspberrypi:~$ cd ..  
pi@raspberrypi:/home$ cd ..  
pi@raspberrypi:/ $ ls  
bin  dev  home  lost+found  mnt  proc  run  srv  tmp  var  
boot  etc  lib  media      opt  root  sbin  sys  usr
```

3) System directory in Linux refers to the folder in red box shown in the figure below. The Linux operating system is based on files and file systems. All information is stored in the form of files and defined by file names and paths. In the Linux system, the directory structure is a tree data structure. The "/" mark represents the root of tree data structure which is called as root directory.



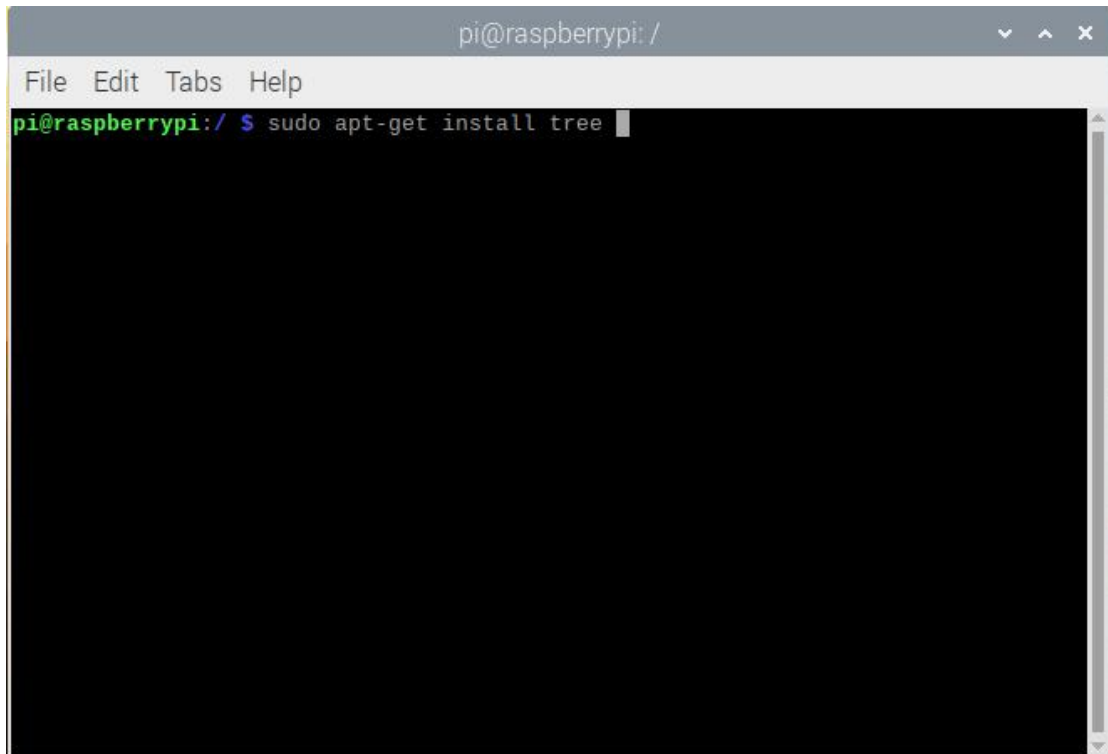
A terminal window titled 'pi@raspberrypi: /' showing the command 'ls' being executed at the root directory. The output lists the following directories: bin, dev, home, lost+found, mnt, proc, run, srv, tmp, var, boot, etc, lib, media, opt, root, sbin, sys, and usr. The 'tmp' directory is highlighted with a green box, and the entire output line is enclosed in a red rectangular box.

```
pi@raspberrypi:~ $ cd ..
pi@raspberrypi:/home $ cd ..
pi@raspberrypi:/ $ ls
bin  dev  home  lost+found  mnt  proc  run  srv  tmp  var
boot  etc  lib  media      opt  root  sbin  sys  usr
pi@raspberrypi:/ $
```

## 2. Check System Directory

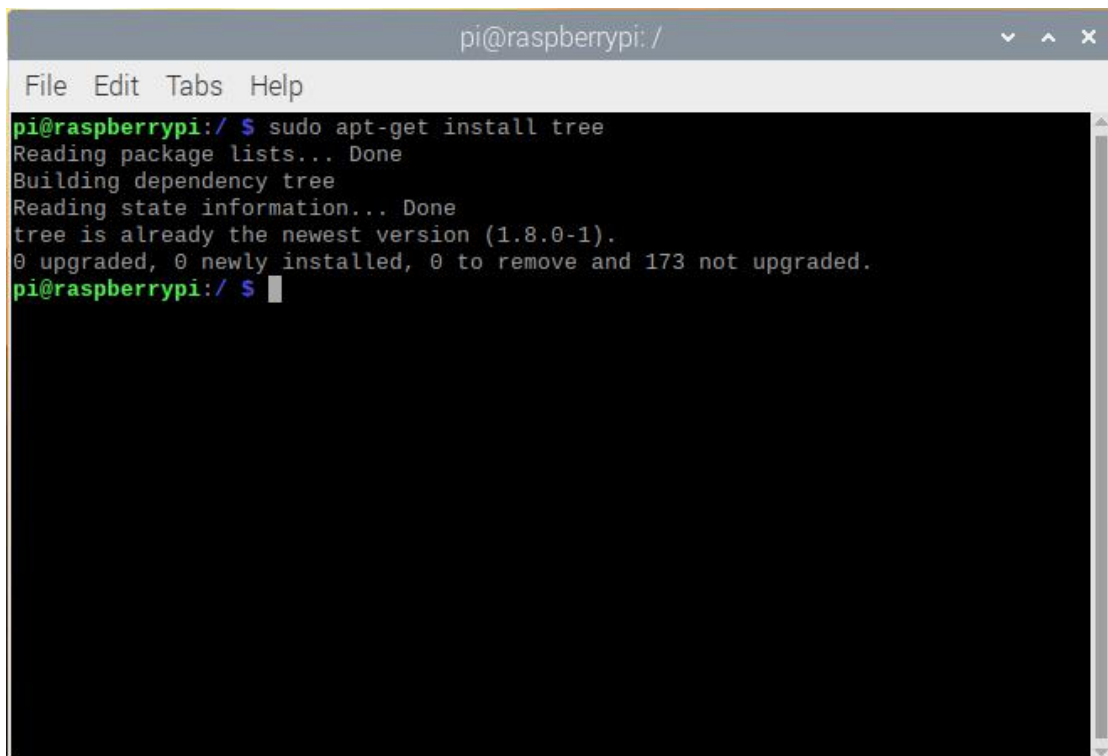
We can send command to check the system directory in the Linux according to the following steps.

Step 1: Input the command “sudo apt-get install tree” and install the software pack.



```
pi@raspberrypi: /
File Edit Tabs Help
pi@raspberrypi:/ $ sudo apt-get install tree
```

Install software pack



```
pi@raspberrypi: /
File Edit Tabs Help
pi@raspberrypi:/ $ sudo apt-get install tree
Reading package lists... Done
Building dependency tree
Reading state information... Done
tree is already the newest version (1.8.0-1).
0 upgraded, 0 newly installed, 0 to remove and 173 not upgraded.
pi@raspberrypi:/ $
```

Step 2: When complete the installation, you can send the commands of tree.

tree: display all files in a tree data structure.

tree -L N: All folders are displayed in a tree view, and subfolders are displayed to the N level. (There is a space between "tree" and "-", and between "L" and "N". N needs to be replaced by a number to indicate the number of folder levels.)

Step 3: Enter the "tree -L 1" command to display the subfolders to the first level, as shown in the figure below. The Windows system also uses a tree data structure, but it is based on the disk as the root partition. The C disk and D disk are the first level of subfolders. For Linux systems, "/" is a hard disk which is divided into partitions such as "/etc", "/dev", and "/lib".

```

pi@raspberrypi: /
File Edit Tabs Help
pi@raspberrypi:/ $ tree -L 1
.
├── bin
├── boot
├── dev
├── etc
├── home
├── lib
├── lost+found
├── media
├── mnt
├── opt
├── proc
├── root
├── run
├── sbin
├── srv
├── sys
├── tmp
├── usr
└── var

19 directories, 0 files
pi@raspberrypi:/ $

```

System directory distribution

Function of each directory:

Directory	Function
bin	Store Linux commands in common use.
boot	Store Linux starting file.
dev	Store Linux peripheral device.
etc	Store all configuration files and subdirectories needed for system management.
home	Store home directory.

<u>lib</u>	Store dynamic link shared libraries.
<u>media</u>	Provide conventional mount points for all removable devices.
<u>mnt</u>	Mount point for temporary files.
<u>proc</u>	Store information about system resources.
<u>root</u>	Home directory of the root user.
<u>sbin</u>	Store non-essential and unimportant system binary files and network application tools in the system.
<u>sys</u>	Store kernel, firmware and system files.
<u>tmp</u>	Store temporary files.
<u>usr</u>	Store user documents, games, graphics files, libraries, other user, management commands and files.
<u>var</u>	Store the frequently modified directory.