11.Install I2C tool

The Raspberry Pi's I2C is turned off by default and needs to be turned on manually and some necessary library files installed.

1. Install I2C tool

1. Input following command to install the I2C tool

```
sudo apt install i2c-tools
```

```
dofbot@Dofbot:~$ sudo apt install i2c-tools
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  apt-clone archdetect-deb dctrl-tools dpkg-repack girl.2-json-1.0
  girl.2-nma-1.0 girl.2-timezonemap-1.0 girl.2-xkl-1.0 grub-common
  libdebian-installer4 libtimezonemap-data libtimezonemap1 os-prober
  python3-icu python3-pam rdate
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  libi2c0 read-edid
Suggested packages:
  libi2c-dev python-smbus
The following NEW packages will be installed:
  i2c-tools libi2c0 read-edid
0 upgraded, 3 newly installed, 0 to remove and 168 not upgraded.
Need to get 90.3 kB of archives.
After this operation, 368 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

2. Test the I2C function and scan the address of the currently connected I2C device.

```
sudo i2cdetect -y -r 1
```

```
dofbot@Dofbot:~$ sudo i2cdetect -y -r 1
     0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:          -- -- -- -- -- -- -- -- -- -- 0d -- --
10: -- -- -- -- -- 15 -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- 3c -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- --
dofbot@Dofbot:~$
```

The above figure shows that three I2C devices are connected, among which 0x15 is the I2C device address of the robot arm expansion board.

3. Add the current user to the I2C group. The advantage of this is that you can use the current user to run I2C commands without administrator rights.

```
sudo adduser dofbot i2c
```

```
dofbot@Dofbot:~$ sudo adduser dofbot i2c
Adding user `dofbot' to group `i2c' ...
Adding user dofbot to group i2c
Done.
dofbot@Dofbot:~$ ▊
```

4. Restart the Raspberry Pi and allow the dofbot user to be added to the I2C group to take
   effect.

```
sudo reboot
```

2. Install the I2C-Python environment

Since the ubuntu mate 20.04 system already comes with the Python 3.8 environment by default,
you only need to install other library files.

1.Input following command to install pip3

```
sudo apt install python3-pip
```

```
dofbot@Dofbot:~$ sudo apt install python3-pip
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  apt-clone archdetect-deb dctrl-tools dpkg-repack girl.2-json-1.0
  girl.2-nma-1.0 girl.2-timezonemap-1.0 girl.2-xkl-1.0 grub-common
  libdebian-installer4 libtimezonemap-data libtimezonemapl os-prober
  python3-icu python3-pam rdate
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  libexpatl-dev libpython3-dev libpython3.8-dev python-pip-whl python3-dev
  python3-wheel python3.8-dev zliblg zliblg-dev
The following NEW packages will be installed:
  libexpatl-dev libpython3-dev libpython3.8-dev python-pip-whl python3-dev
  python3-pip python3-wheel python3.8-dev zliblg-dev
The following packages will be upgraded:
  zliblg
1 upgraded, 9 newly installed, 0 to remove and 167 not upgraded.
Need to get 6,641 kB of archives.
After this operation, 23.5 MB of additional disk space will be used.
Do you want to continue? [Y/n] y▊
```

2.Input following command to install smbus

```
sudo apt install python3-smbus
```

```
dofbot@Dofbot:~$ sudo apt install python3-smbus
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  apt-clone archdetect-deb dctrl-tools dpkg-repack girl.2-json-1.0
  girl.2-nma-1.0 girl.2-timezonemap-1.0 girl.2-xkl-1.0 grub-common
  libdebian-installer4 libtimezonemap-data libtimezonemapl os-prober
  python3-icu python3-pam rdate
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  python3-smbus
0 upgraded, 1 newly installed, 0 to remove and 167 not upgraded.
```

3.Input following command to install other related tools

```
sudo apt install build-essential python3-dev
```

```
dofbot@Dofbot:~$ sudo apt install build-essential python3-dev
[sudo] password for dofbot:
Reading package lists... Done
Building dependency tree
Reading state information... Done
python3-dev is already the newest version (3.8.2-0ubuntu2).
python3-dev set to manually installed.
The following packages were automatically installed and are no longer required:
  apt-clone archdetect-deb dctrl-tools dpkg-repack gir1.2-json-1.0
  gir1.2-nma-1.0 gir1.2-timezonemap-1.0 gir1.2-xkl-1.0 grub-common
  libdebian-installer4 libtimezonemap-data libtimezonemap1 os-prober
  python3-icu python3-pam rdate
Use 'sudo apt autoremove' to remove them.
The following packages will be upgraded:
  build-essential
1 upgraded, 0 newly installed, 0 to remove and 166 not upgraded.
Need to get 4,664 B of archives.
After this operation, 1,024 B of additional disk space will be used.
Do you want to continue? [Y/n]
```