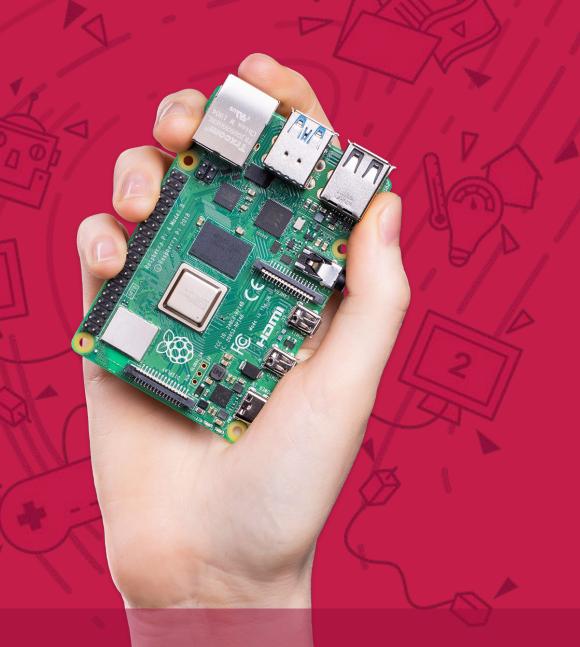


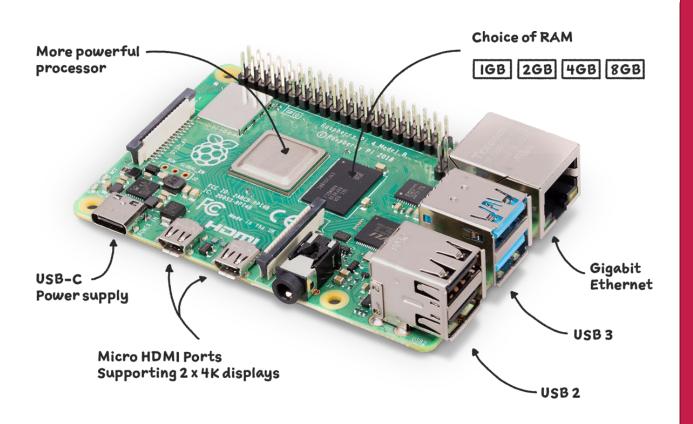
# Raspberry Pi 4

计算机与信息安全学院21级小学期暨 第二届"智慧机器,以芯起航" 树莓派培训 6月28日 9:00-12:00



Your tiny, dual-display, desktop computer ...and robot brains, smart home hub, media centre, networked AI core, factory controller, and much more

# Raspberry Pi 4 Faster, more powerful

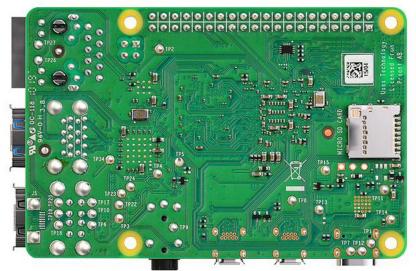


Raspberry Pi 4 comes with Gigabit Ethernet, along with onboard wireless networking and Bluetooth.



We're making different variants of the Raspberry Pi 4 available, depending on how much RAM you need — 1GB, 2GB, 4GB, or 8GB.







参考资料 https://shumeipai.nxez.com/

## 树莓派 40Pin 引脚对照表

内母/K 中OI III J J MAX J MAX								
wiringPi 编码	BCM 编码	功能名	物理引脚 BOARD编码		功能名	BCM 编码	wiringPi 编码	
		3.3V	1	2	5V	CETTE	(Mar)	
8	2	SDA.1	3	4	5V	W37	Jan .	
9	3	SCL.1	5	6	GND	Com		
7	4	GPIO.7	7	8	TXD	14	15	
		GND	9	10	RXD	15	16	
0	17	GPIO.0	11	12	GPIO.1	18	1	
2	27	GPIO.2	13	14	GND			
3	22	GPIO.3	15	16	GPIO.4	23	4	
		3.3V	17	18	GPIO.5	24	5	
12	10	MOSI	19	20	GND			
13	9	MISO	21	22	GPIO.6	25	6	
14	11	SCLK	23	24	CE0	8	10	
		GND	25	26	CE1	7	11	
30	0	SDA.0	27	28	SCL.0	1	31	
21	5	GPIO.21	29	30	GND			
22	6	GPIO.22	31	32	GPIO.26	12	26	
23	13	GPIO.23	33	34	GND			
24	19	GPIO.24	35	36	GPIO.27	16	27	
25	26	GPIO.25	37	38	GPIO.28	20	28	
		GND	39	40	GPIO.29	21	29	
表格由树莓派实验室绘制 http://shumeipai.nxez.com								

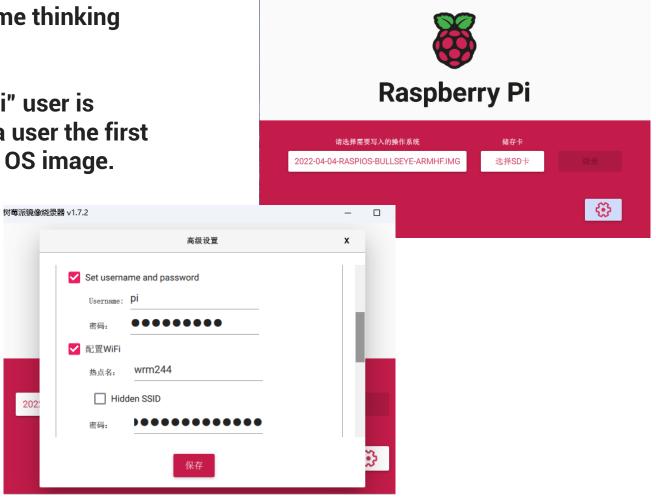
# An update to Raspberry Pi OS Bullseye

7th Apr 2022 https://www.raspberrypi.com/news/raspberry-pi-bullseye-update-april-2022

One of the things which we spend a lot of time thinking about here at Raspberry Pi is security......

......So with this latest release, the default "pi" user is being removed, and instead you will create a user the first time you boot a newly-flashed Raspberry Pi OS image.





# Raspberry OS 器 系统刷入演示环节



## Human-Machine-Interface

remote



# Hardware

Supercomputer Computer Cluster Mainframe computer

Distributed computing

### Keyboard & Mouse

also Braille, Touch-Display, Speech recognition, Graphics tablet, 3D-Mouse, Wii nunchak, etc.

#### Touch-Display

Attitude sensor, Motion sensor Speech recognition

Speech recognition
Attitude sensor
Motion sensor

Display, Sound Vibra<u>tion</u>

remote (SSH, HTTP, Serial, I<sup>2</sup>C, ...)



## **Desktop Computer**

Workstation Home Computer Desktop replacement laptop Thin client

### **Mobile computer**

Note-/ Net-/ Smartbook Tablet Smartphone PDA / Handheld game console

# **Wearable Computer**

Wristwatch Virtual Retina Display Head-mounted display

## **Embedded Computer**

Customer-premises equipment
Measurement Equipment
Laboratory Equipment
Layer3-Switches
other embedded systems

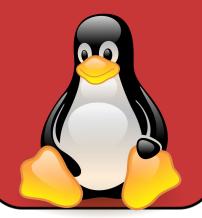
# Linux kernel

High-performance computing
(HPC)

Real-time computing (RTC)

Linux Process Scheduler
Linux Security Modules
Linux Network scheduler

Network stack Netfilter Linux device drivers Linux file system drivers



Web server solution stacks (LAMP)

**Distributed Computing** 

Systems

Windowing

**Routing daemons** 

(Shells

Software Development Package management systems

CAD, CAM & CAE Software

Office

Image Processing
Desktop Publishing (DTP)

Desktop UI

Touch UI

Wearable UI

Video processing software 3D computer graphics Computer animation Motion graphics

Digital Audio Workstation
DJ Mixing Software
Video games
Home cinema solutions

Debian software archives: 37,000 software packages

Widgets for **3D Application Desktop widgets** 2D Application **Media Application Unity** and Plasma possibly adaptations to Wayland/Mir possibly adaptations to Wayland/Mir possibly adaptations to Wayland/Mir **Desktop Shells:** User Interface Toolkits (in the form of libraries): Ubuntu **Android GNUstep GNOME Shell** Enlight. DR19 **GTK** Cinnamon wxWidgets Plasma Ot **EFL** SDL Unity ATK Pango **FLTK** Clutter System libraries: System daemons: Alternative display servers: Display server: **J-Bus-Daemon** avahi-daemon PulseAudio-d weston, clayton, mutter, KWin packagekitd SF unetwork NetworkManager systemd (contains udev) window mir GLib udisks SurfaceFlinger X-Server manager window window glibc **GObject** mir X.Org metacity Glib manager manager **Wayland Compositor uClibc** Xfree86 mutter **GModule** Compiz AWH X-Win32 KWin **GThread** X11, app Compiz libinput kms (Kernel Mode Setting) evdev ? kdbus? libhybris (libbionic kmod-fs-ext4 **SELinux** netfilter drm (Direct Rendering Manager) TOMOYO binder ashmem pmem Linux kernel, device drivers & other modules Smack wakelocks logger ... **AppArmor** ALSA: emu20k1, ctxfi, hda... kmod-ltq-atm-vr9 radeon nouveau lima etna viv freedreno tegra-re ath9k Linux kernel Keyboard & Mouse UMTS/CDMA/LTE Ethernet CPU & GPU (Android-forked)

GPS-receiver

G-sensor

802.11-(abc)

Bluetooth

**Hardware** 

Touch-Screen

BrailleDisplay

cache coherent L2-Caches

main memory

# Web cache

**Squid** Polipo **Traffic server** 

# Web server

Apache Cherokee Lighttpd Nginx

# **CGI** scripting

Perl

PHP

ython

# **Database**

**MariaDB** MySQL Drizzle

# Linux kernel

**AppArmor SELinux** Smack **TOMOYO** 

**Process Scheduler** 

Netfilter

Linux network stack

Network scheduler

NIC device driver

kmod-fs-ext4



# Hardware

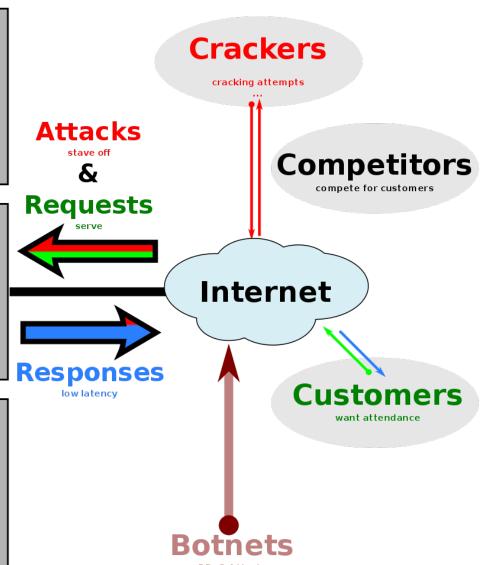
CPU & **RAM** 

**Networking** hardware

# **Storage**

SATA SAS **RAID iSCSI** NAS

# **Environment: CCC**



# 使用者(用戶)

殼層(Shell)

核心(內核)

硬體 (硬件)

命令	作用	选项		
ls	显示文件和目录列表(list)	-a (all) 隐藏文件、特殊 目录.和 -l (long) -t (time)		
pwd	显示当前工作目录(print working directory)			
touch 或者 >	创建空文件			
mkdir	创建目录	-p 父目录不存在情况下先 生成父目录 (parents)		
rm	删除文件(remove)	-r 同时删除该目录下的所 有文件(recursive) -f 强制删除文件或目录 (force)		
cat	显示文本文件内容 (catenate)	cat		
ifconfig、 ip adds	查看linux系统的ip地址			

# CONDA

Package, dependency and environment management for any language—Python, R, Ruby, Lua, Scala, Java, JavaScript, C/C++, Fortran, and more.



OpenCV的全称是Open Source Computer Vision Library, 是一个跨平台的<u>计算机视觉</u>库。OpenCV是由 英特尔公司发起并参与开发,以BSD许可证授权发行,可以在商业和研究领域中免费使用。OpenCV可用于开发实时的图像处理、<u>计算机视觉以及模式识别</u>程序。

pip3 install opency-contrib-python -i https://pypi.tuna.tsinghua.edu.cn/simple

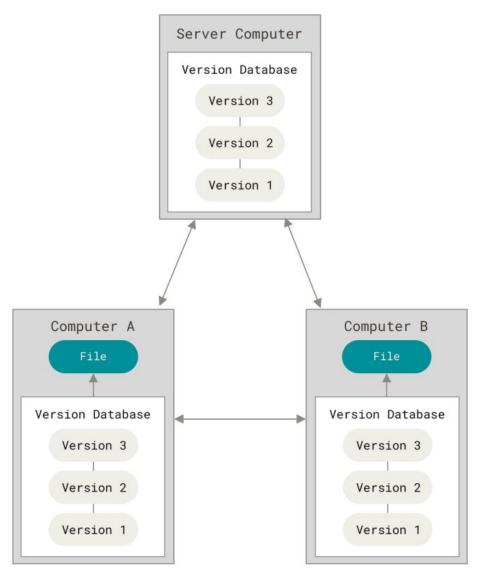
import cv2
print(cv2.\_\_version\_\_)

opencv-python: 只包含opencv库的主要模块. 一般不推荐安装。opencv-contrib-python: 包含主要模块和contrib模块, 功能基本完整, 推荐安装。



Git is a free and open source distributed version control system designed to handle everything from small to very large projects with speed and efficiency.

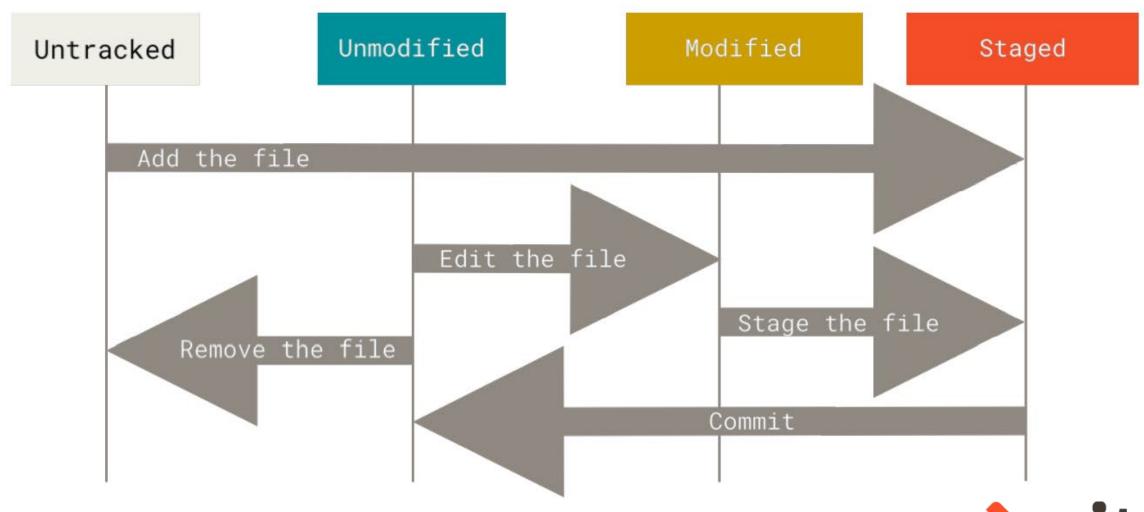




分布式版本控制系统(Distributed Version Control System)

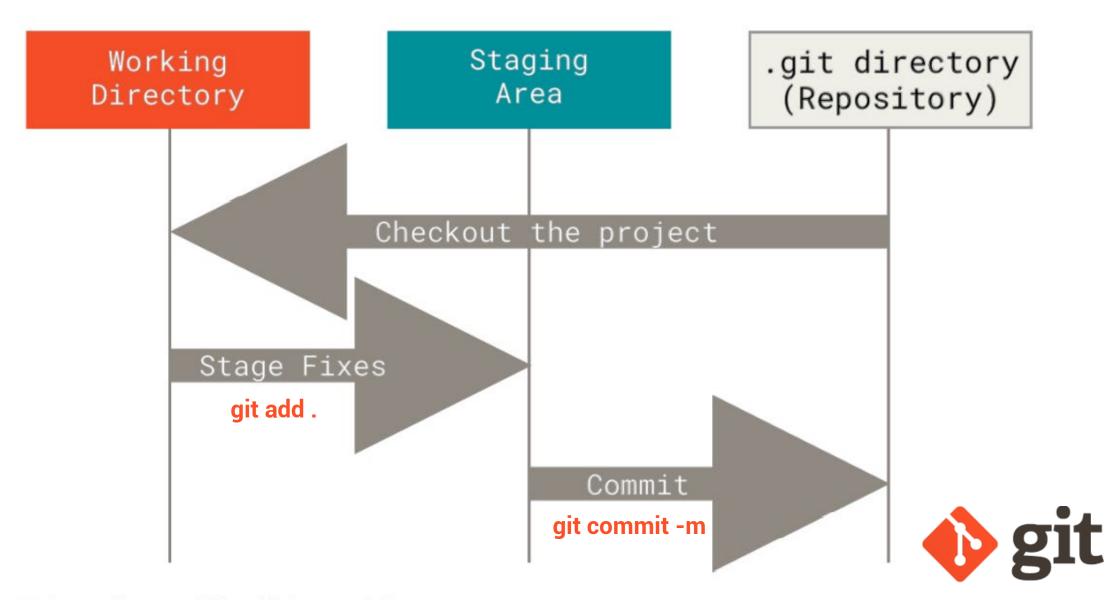
```
git config --global user.name "RiverMountain"
git config --global user.email "wrm244@outlook.com"
git clone [<options>] [--] <repo> [<dir>]
git init
git add
git status
git commit -m " "
git log/reflog
git rm --cache
git reset [--soft | --mixed | --hard] [HEAD]
git remote add <name> <url>
git push [<options>] [<repository> [<refspec>...]]
```



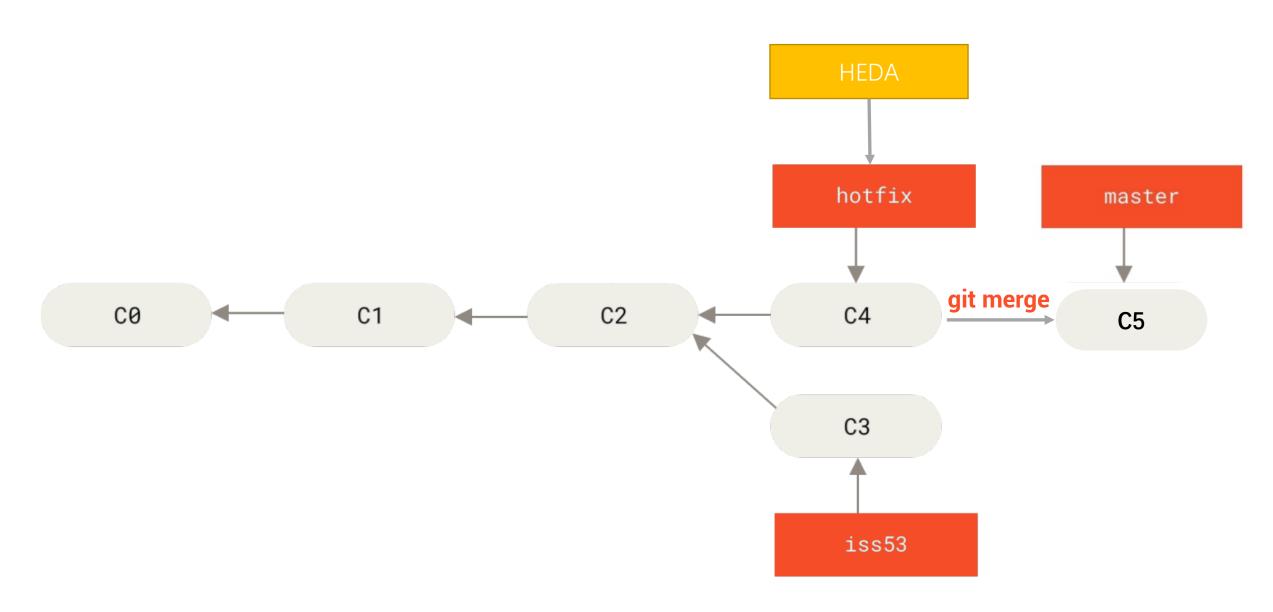


图表 8. 文件的状态变化周期





图表 6. 工作目录、暂存区域以及 Git 仓库.



图表 21. 基于 master 分支的紧急问题分支 hotfix branch

```
git config --global user.name "RiverMountain"
git config --global user.email "wrm244@outlook.com"
git clone [<options>] [--] <repo> [<dir>]
git init
git add
git status
git commit -m " "
git log/reflog
git rm --cache
git reset [--soft | --mixed | --hard] [HEAD]
git remote add <name> <url>
git push [<options>] [<repository> [<refspec>...]]
```



# 实验任务

当的队伍在树莓派刷完系统后以 VNC 连接 Raspberry OS 桌面的同时在 Shell 用 Python 打印出 **opencv 的版本号及** print 函数打印出**一行你的队名**截图保存以队名命名附件发送到wrm244@outlook.com 作为验收任务并归还树莓派。

截止时间:第一批上课:2022年6月30日12:00

第二批上课: 2022年7月2日12:00

Your tiny, dual-display, desktop computer ...and robot brains, smart home hub, media centre, networked AI core, factory controller, and much more