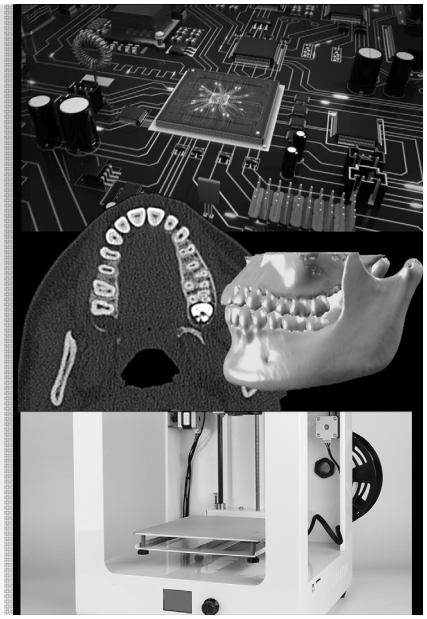
COMPUTER SCIENCES

CUSTOMIZE YOUR COMPUTER - DIY (DEMANDS, PERFORMANCE VS PRICE)

Chia-Feng Lu 盧家鋒

Department Of Biomedical Image And Radiological Sciences, NYCU
Ext. 67308
alvin4016@nycu.edu.tw



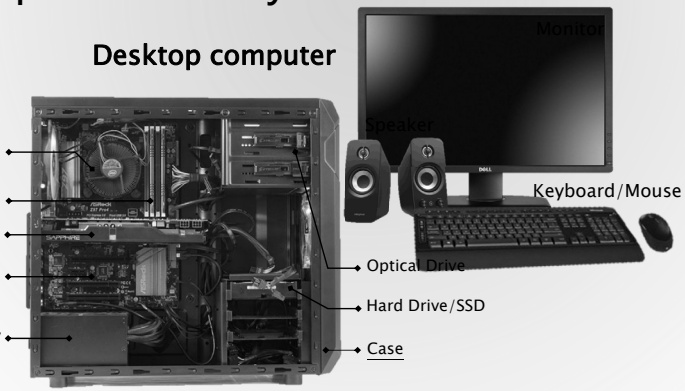
Computer assembly

- Computer Case
- Step 1: Component selection
- Step 2: Hardware and driver installation

Please download handouts from (Week 7)
http://cflu.lab.nycu.edu.tw/CFLu_course_CompSci.html

Computer Assembly - DIY

Desktop computer



Believe me. You can DO IT YOURSELF!

CASE機殼

- Case selection
  - Case size and expandability
  - Ease of assembly and disassembly
  - Case material and heat dissipation
  - Front panel connection ports
  - Exterior Design

It is not recommended to use the power supply included in the case!

Case Size And Expandability

- Sufficient size for expansion and to facilitate heat dissipation

Ease Of Assembly And Disassembly

Screw-free, cassette design, no scratching

- Modular design allows for more flexible use of space

http://www.coolermaster.com/case/mid-tower/cm693/

Case Material And Heat Dissipation

- Aluminum/aluminum-magnesium alloy for better heat dissipation
- Cooling hole design and possibility of adding cooling fan
- Clean the case!

http://www.coolermaster.com/case/mid-tower/cm693/

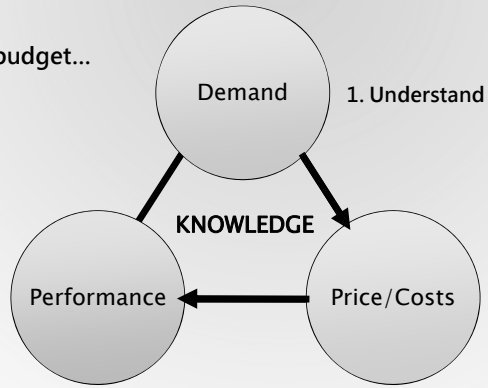
Front Panel Connection Ports

- Convenient for users to connect external devices such as headphones, microphones, USB devices, etc.
- Must be connected to the motherboard with the cable for the front panel.

DIY STEP 1: COMPONENT SELECTION

TO MAKE A RIGHT CHOICE

On a limited budget...



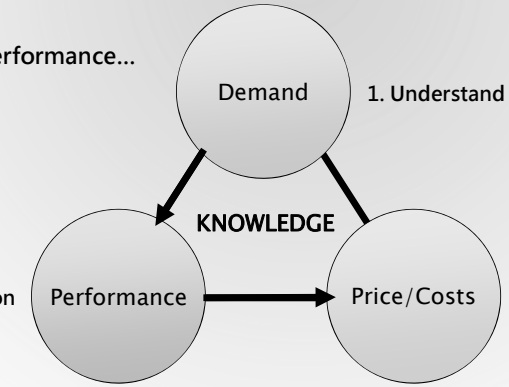
1. Understand your needs

2. Compare price online

3. Find the best option

TO MAKE A RIGHT CHOICE

In the pursuit of performance...



1. Understand your needs

2. Find the best option

3. Compare price online

Low-cost Entry Level

Components	Models	Prices (NTD)
CPU	Intel Celeron 3.4GHz	1900
Memory	DDR4 8GB	600
Motherboard	Intel 600 series/1700 socket/DDR4	2900
Monitor	19-20" LED Full HD	2000
Graphics card	CPU build-in	0
Audio, Internet	Motherboard build-in	0
Hard drive	HDD SATAIII 1TB	1300
Optical drive	--	0
Case	Standard ATX	900
Power supply	400W/80+ bronze	1100
Speaker	--	0
Keyboard, mouse	2.4G wireless devices	500
	Total	11,200

Economical Level

Components	Models	Prices (NTD)
CPU	AMD R3 3.8GHz (4.0GHz)	3000
Memory	DDR4 8G	600
Motherboard	B550M-K/AM4 socket/DDR4	2900
Monitor	21-22" LED Full HD	2500
Graphics card	GT1030-2G GDDR5/4K	2900
Audio, Internet	Motherboard build-in	0
Hard drive	HDD SATAIII 2TB	1700
Optical drive	Blue Ray/DVD recorder	2000
Case	Standard ATX	900
Power supply	400W/80+ bronze	1100
Speaker	3-piece speaker	450
Keyboard, mouse	2.4G wireless devices	500
Webcam	HD webcam	800
	Total	19,350

Business Application Level

Components	Models	Prices (NTD)
CPU	Intel i5 3.0GHz (4.6GHz)	6800
Memory	DDR5 8GB x 2	2000
Motherboard	B660-G	6000
Monitor	24" LED Full HD	3600
Graphics card	GTX1660-6G GDDR6/8K	6000
Audio, Internet	Motherboard build-in	0
Hard drive	HDD SATAIII 2TB	1700
Optical drive	Blue Ray/DVD recorder	2000
Case	Standard ATX	1500
Power supply	550W/80+ bronze	1600
Speaker	3-piece speaker	1000
Keyboard, mouse	2.4G wireless devices	1000
Webcam	HD webcam	800
	Total	34,000

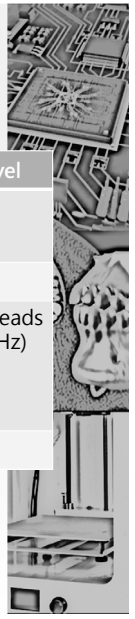
High-end Computing Level

Components	Models	Prices (NTD)
CPU	Intel i7 3.6GHz (5.0GHz)	13000
Memory	DDR5 16GB x 4	7200
Motherboard	Z690-P	6500
Monitor	27" LED Full HD x 2	10000
Graphics card	RTX3060Ti-8G GDDR6/8K	13000
Audio, Internet	Motherboard build-in	0
Hard drive 1	SSD M.2 1TB	3500
Hard drive 2	HDD SATAIII 2TB	1700
Optical drive	Blue Ray/DVD recorder (external)	2300
Case	Standard ATX with cooling design	3000
Power supply	750W/80+ gold	3300
Speaker	3-piece speaker	1000
Keyboard, mouse	2.4G wireless devices	2000
	Total	66,500

Central Processing Unit (CPU)

	Entry level	Economical level	Business level	High-end level
Applications	Social media, emails	Entertainment, office processing	Video editing, commercial usage	Engineering calculation, gamer
Model	Intel Celeron	AMD R3	Intel i5	Intel i7
Specifications	2 cores/2 threads 3.4GHz 4MB Cache UHD710 TDP 46W	4 cores/8 threads 3.8GHz (4.0GHz) 4MB Cache No build-in GPU TDP 65W	6 cores/12 threads 3.0GHz (4.6GHz) L3 18MB UHD770 TDP 65W	12 cores/20 threads 3.6GHz (5.0GHz) L3 25MB UHD770 TDP 125W
Price	~1900	~3000	~6800	~13100

The recommended CPU purchase price is about 20%~30% of the total budget.



Memory Module

	Entry level	Economical level	Business level	High-end level
Applications	Social media, emails	Entertainment, word processing	Video editing, commercial usage	Engineering calculation, gamer
Model	DDR4	DDR4	DDR5	DDR5
Specifications	8 GB DDR4 module 3200 MHz Life-time warranty	8 GB DDR4 module 3200 MHz Life-time warranty	8 GB x 2 DDR5 module 4800 MHz Life-time warranty	16 GB x 4 DDR5 module 4800 MHz Life-time warranty
Price	600	600	2000	7200

- **Memory price fluctuates a lot.**
- **>3GB, should be used with 64-bit operating system.**

Motherboard

	Entry level	Economical level	Business level	High-end level
Applications	Social media, emails	Entertainment, word processing	Video editing, commercial usage	Engineering calculation, gamer
Model	H610M-K	B550M-K	B660-G	Z690-P
Specifications	LGA 1700 socket Intel H610 chipset DDR4 x 2, dual PCI-E 3.0 x 1 SATA 6GB x 4 M.2 x 1 Micro ATX	AM4 socket AMD B550 chipset DDR4 x 4, dual PCI-E 3.0, 4.0 x 1 SATA 6GB x 4 M.2 x 2 Micro ATX	LGA 1700 socket Intel B660 chipset DDR5 x 4, dual PCI-E 3.0, 4.0, 5.0 SATA 6GB x 4 M.2 x 2 Wi-Fi 6, BT v5.2 Micro ATX	LGA 1700 socket Intel Z690 chipset DDR5 x 4, dual PCI-E 3.0, 4.0, 5.0 SATA 6GB x 4 M.2 x 3 ATX
Price	2900	2900	6000	6500

- **Be sure to purchase a CPU compatible chipset**
- **Sufficient types and numbers of backplane I/O ports**

Graphics Card

	Entry level	Economical level	Business level	High-end level
Applications	Social media, emails	Entertainment, word processing	Video editing, commercial usage	Engineering calculation, gamer
Model	CPU build-in	GT1030-2GD5	GTX1660-6GD6	RTX3060Ti-8GD6
Specifications	UHD710	NVIDIA GeForce GT1030 GPU GDDR5 2GB PCI-E 3.0 CUDA Core 384 D1H1 (4K) 75W	NVIDIA GeForce GTX1660 GPU GDDR6 6GB PCI-E 3.0 CUDA Core 1408 D1H1P1 (8K) + 1 x 8-pin power	NVIDIA GeForce RTX3060 GPU GDDR6 8GB PCI-E 4.0 CUDA Core 4864 H1P3 (8K) + 1 x 8-pin power
Price	0	2900	6000	13000

- **When a new generation chip is launched, the price of the previous generation usually drops significantly**
- **Be sure to check whether the video output port meets the demand.**

Price Comparison & Bargain

- Do check the price on the Internet.
- Confirm the model specifications before paying.

Bargain

- Little room for bargains if you only buy few components.
- Buy all kinds of parts and components from the same store.
- Request free accessories (keyboards, mouse, speakers…) on demand.

DIY STEP 2: HARDWARE AND DRIVER INSTALLATION

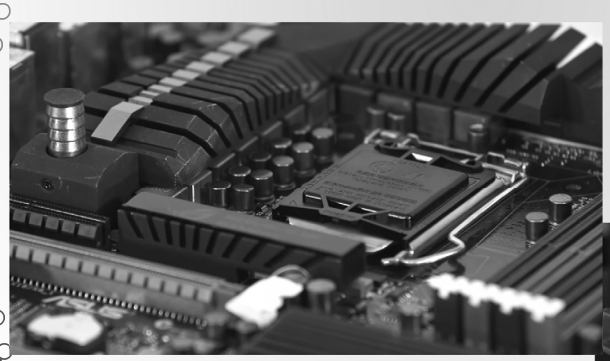
DIY References

- **How to build a gaming PC: a beginner's guide**
  - Instruction videos → links
- [阿咪愛教學] 硬體組裝DIY·圖解安裝流程
  - 開箱到安裝步驟照片 → 連結
- [痞客邦3C - MiLo BLOG]圖解DIY組裝電腦全過程
  - 安裝步驟照片 → 連結

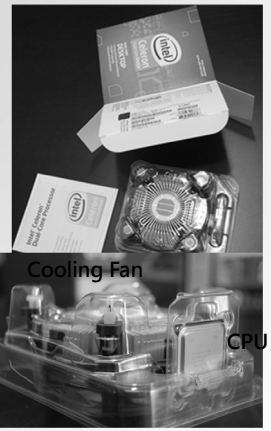
Computer Components

[阿咪愛教學] 硬體組裝DIY·圖解安裝流程

DIY STEP 1: INSTALL CPU



Youtube @ Techquickie
https://youtu.be/5qczGR4KMnY



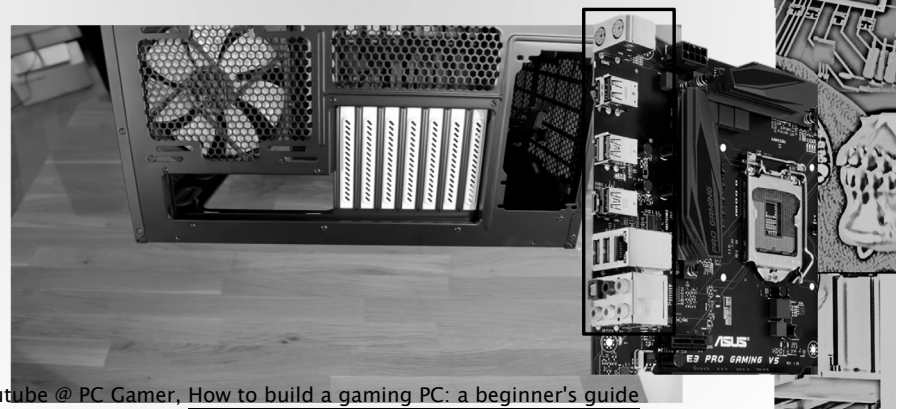
[阿咪愛教學] 硬體組裝DIY·圖解安裝流程

DIY STEP 2: INSTALL RAM

Dual-channel architecture

Youtube @ PC Gamer, How to build a gaming PC: a beginner's guide

DIY STEP 3: INSTALL THE IO SHIELD



Youtube @ PC Gamer, How to build a gaming PC: a beginner's guide

DIY STEP 4: INSTALL THE MOTHERBOARD

Youtube @ PC Gamer, How to build a gaming PC: a beginner's guide

DIY STEP 5: INSTALL POWER SUPPLY

Youtube @ PC Gamer, How to build a gaming PC: a beginner's guide

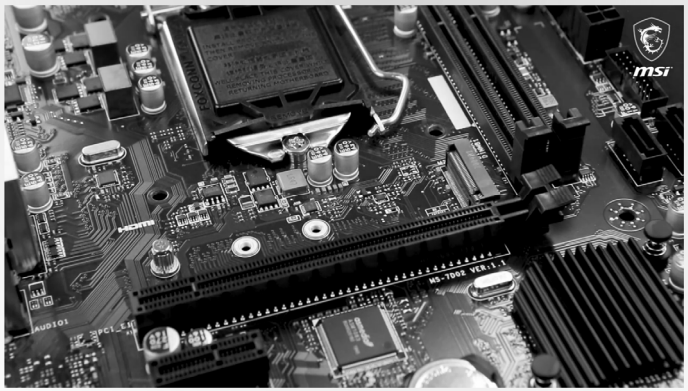
DIY STEP 6: CONNECT POWER & WIRES

Youtube @ PC Gamer, How to build a gaming PC: a beginner's guide

DIY STEP 7: INSTALL HDD

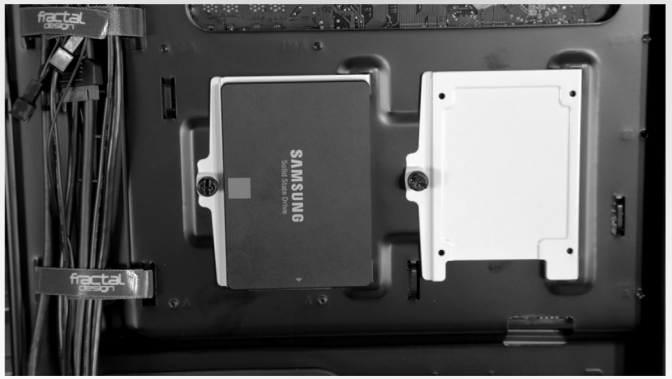
Youtube @ PC Gamer, How to build a gaming PC: a beginner's guide

DIY STEP 8: INSTALL SSD



Youtube @ MSI How-to Channel, MSI® HOW-TO install M.2 SSD correctly

DIY STEP 9: PLUG IN SATA POWER



Youtube @ PC Gamer, How to build a gaming PC: a beginner's guide

DIY STEP 10: INSTALL GRAPHICS CARD

Youtube @ PC Gamer, How to build a gaming PC: a beginner's guide

After The Hardware Installation Is Completed .... Power on and Trouble Shooting!

- Install the operating system
- Install drivers for each component
  - Order: motherboard, graphics card (CPU, memory, hard disk, CD-ROM drive do not need to be installed)
  - Method 1: Put in the driver CD
  - Method 2: Download the latest drivers from the official website
- Partition hard drives, set up networks, and install anti-virus software

Believe me. You can DO IT YOURSELF!

THE END

ALVIN4016@NYCU.EDU.TW