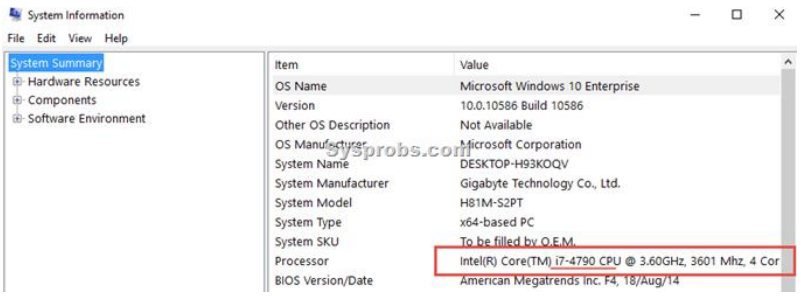
Practical 01
Identify the components of a personal computer (PC)

In this practical, you will examine the motherboards of some personal computers and learn to categorize the components indicated in the pictures as:

A. Central Processing Unit (CPU) [ALU + Control Logic]
B. Memory
C. CPU Cache
D. Input/output, Network Interface Card

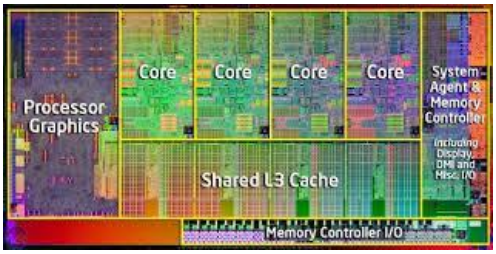
A. Identifying the CPU of your own PC

1. To find the exact processor model on your Windows 10 or Windows 8.1 computer, you can look for '***System Information***' in search. On the detailed system informationpanel, you can identify the model of the processor (look for the model number).



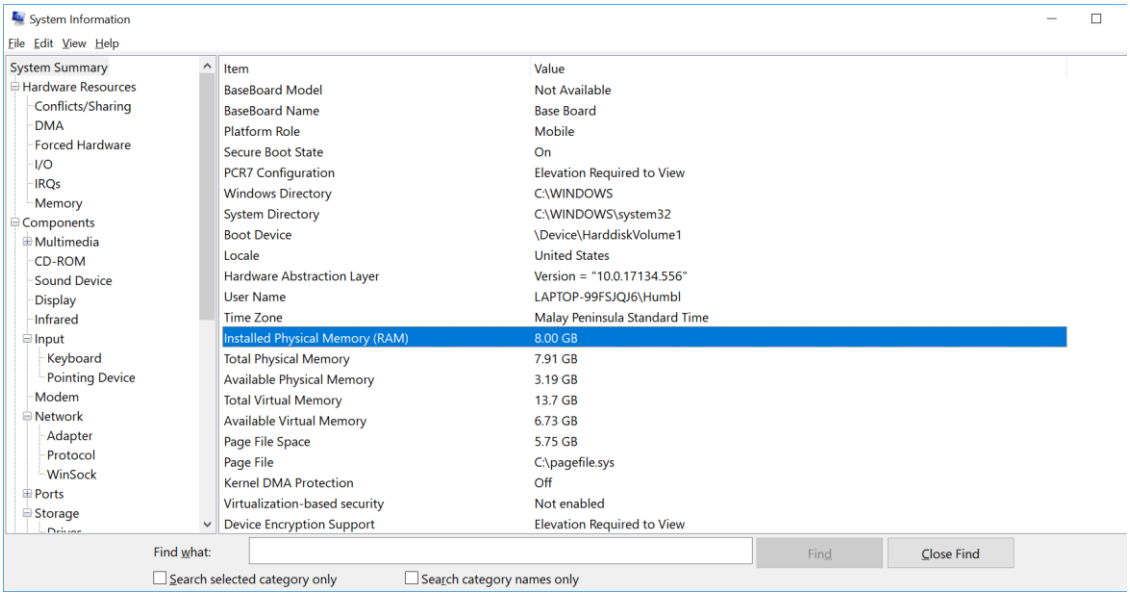
2. Write down your observation:

System Type (32bit or 64bit)	**64 bit**
Processor Model	**I7-13700H**
Number of CORES	**14**



B. Identifying the Memory of your own PC

1. Observe and write down the physical memory:



Size of the physical memory	**16.0 GB**

Memory capacity: The more gigabytes (GB) your memory module has, the more programs you can have open at once.

- 2-4 GB. This was the standard RAM capacity and shipped with systems running Windows Vista or XP. This amount of memory could handle single applications. If your system has less than 4GB of RAM, adding more RAM would greatly improve its performance.

- 4-6 GB. This standard RAM capacity will handle an average user's tasks, such as web browsing, working in Word documents, and emailing, with ease.
- 6-8 GB. This larger RAM capacity works great for casual gamers and basic multimedia users. It can handle multiple programs open at one time and new technology so that users don't have to upgrade when their needs change.
- 8+ GB. This robust RAM capacity is perfect for hardcore gamers and high-end multimedia users and creators. These users want to try the newest technology on the market without upgrading their RAM.

Memory Speed: The amount of time that it takes RAM to receive a request from the processor and then read or write data. Generally, the faster the RAM, the faster the processing speed.
Search google to find the Speed of typical physical memory for your PC.

RAM speed is measured in Megahertz (MHz), millions of cycles per second, so that it can be compared to your processor's clock speed

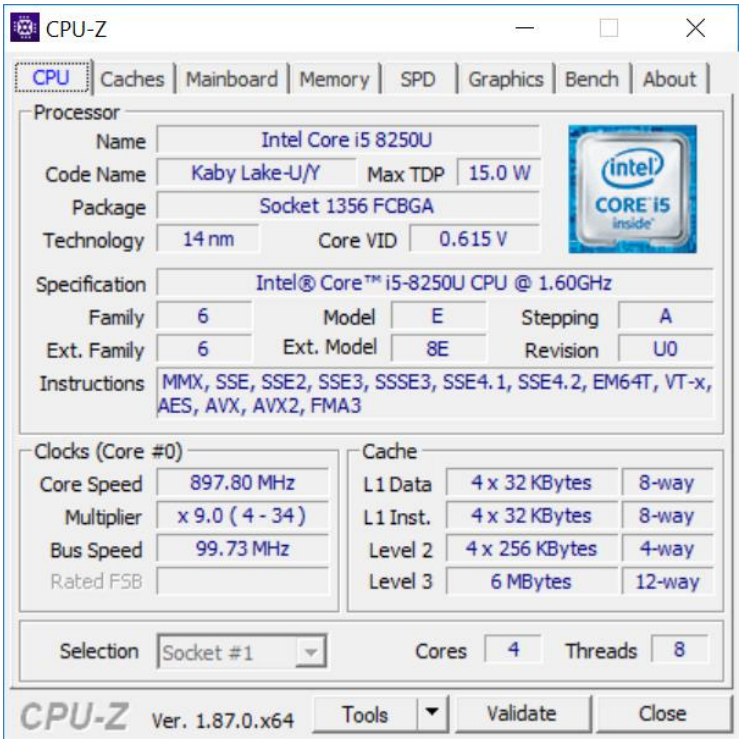
C. CPU Cache

1. Based on the model of the processor in previous step, search google for the CPU model, take note of the CPU CACHE size

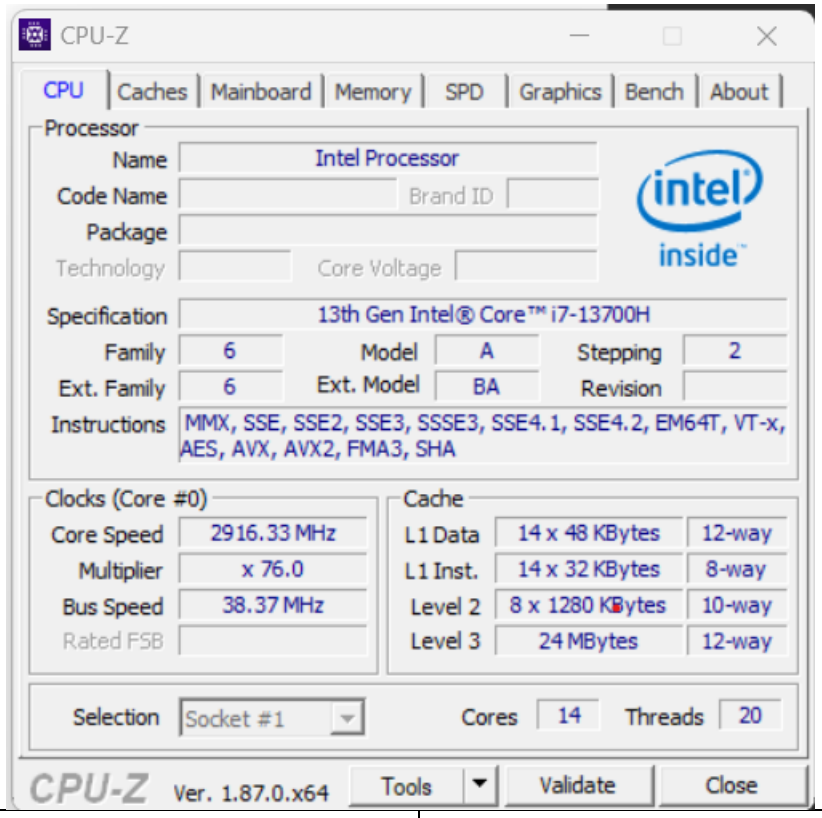
CPU Cache size	24M Cache

2. Download and install cpu-z from **https://www.cpuid.com/downloads/cpu-z/cpu-z_1.87-en.exe**

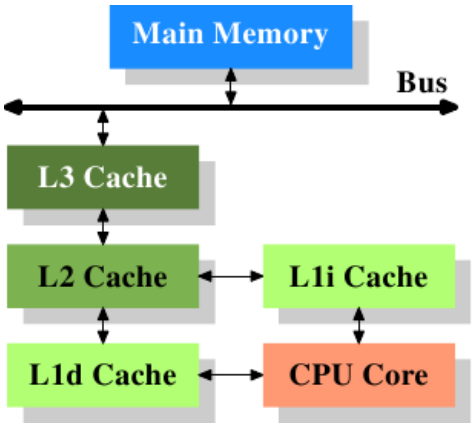
3. Check the CPU Cache size:



4. Take note and write down the Cache size:



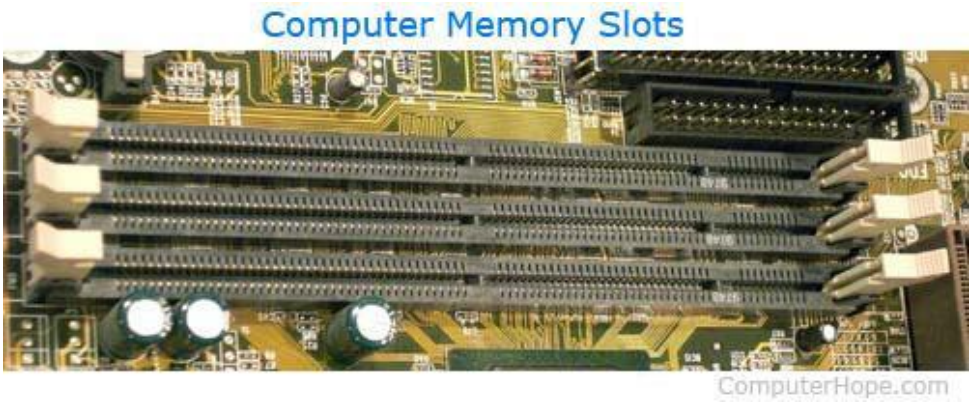
L1 Data	**14 x 48 Kbytes, 12-way**
L1 Inst	**14 x 32 Kbytes, 8-way**
Level 2	**8 x 1280 Kbytes, 10-way**
Level 3	**24 MBytes**

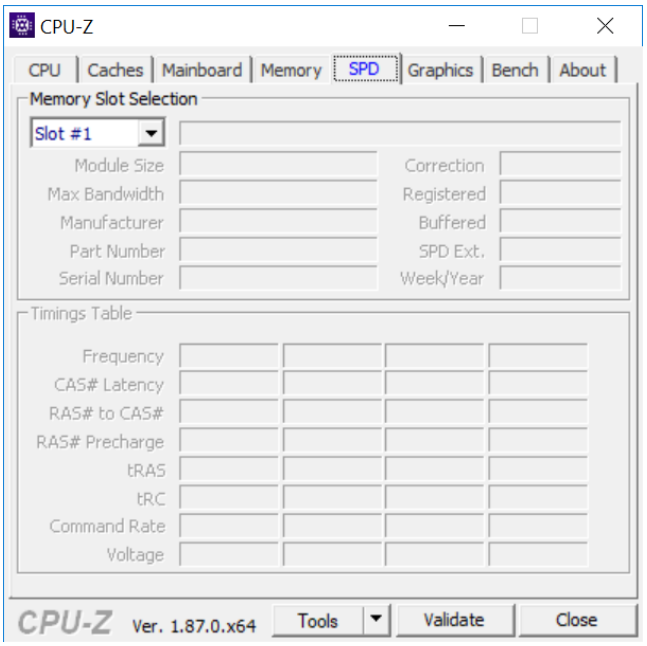


Explain how CPU cache can enhance the computer speed by referring to the picture:

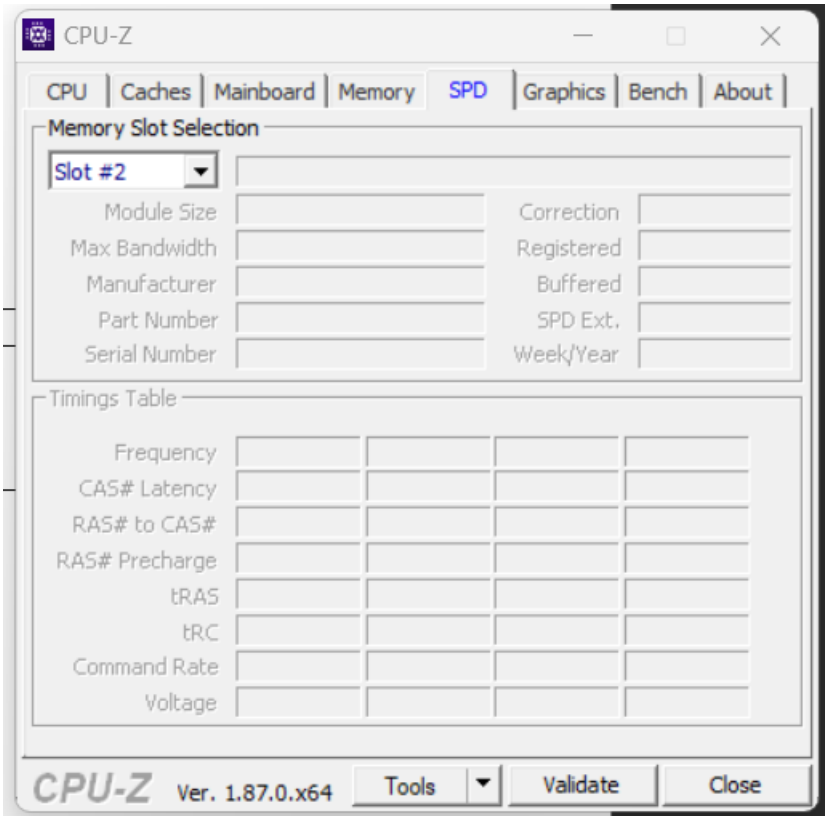
Explain how CPU cache can enhance the computer speed
The caches are arranged in a hierarchy, L1 to L3. L1 is smallest and fastest and is the closest to CPU and hence stores data by CPU cores for immediate use. L2 stores both data and instructions and provides a larger pool of frequently accessed data and instructions to enhance the performance. L3 serves as a shared cache for all CPU cores. These different specializations of the different cache aids with its different purposes and reduces the waiting time for data from the main memory, enhancing the speed of the computer.

5. RAM upgrades are limited by the capability of the system and the availability of expansion slots for adding RAM. Check if you have expanded RAM on your computer.





How many slots are used for memory expansion?
2

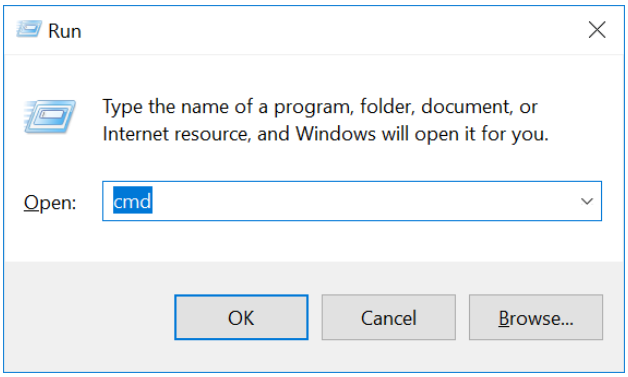


D. Network Interface Card

Ethernet Card

Ethernet card, also known as network interface card (NIC), is a hardware component used by computers to connect to Ethernet LAN and communicate with other devices on the LAN. The earliest Ethernet cards were external to the system and needed to be installed manually. In modern computer systems, it is an internal hardware component. The NIC has RJ45 socketwhere network cable is physically plugged in.

1. Go to command window by typing run cmd



2. Type the following command in the command window

```
systeminfo
```

```
Network Card(s):          6 NIC(s) Installed.
                          [01]: Cisco AnyConnect Secure Mobility Client Virtual Miniport Adapter for Windows x64
                                Connection Name: Ethernet 2
                                Status:         Hardware not present
                          [02]: Qualcomm Atheros QCA9377 Wireless Network Adapter
                                Connection Name: Wi-Fi
                                DHCP Enabled:    Yes
                                DHCP Server:     10.65.36.61
                                IP address(es)
                                [01]: 10.197.28.146
                                [02]: fe80::e844:ff81:8bcf:17b3
                          [03]: VMware Virtual Ethernet Adapter for VMnet1
                                Connection Name: VMware Network Adapter VMnet1
                                DHCP Enabled:    Yes
                                DHCP Server:     192.168.179.254
                                IP address(es)
                                [01]: 192.168.179.1
                                [02]: fe80::4c50:1e8c:c6f5:3d5
                          [04]: VMware Virtual Ethernet Adapter for VMnet8
                                Connection Name: VMware Network Adapter VMnet8
```

Type the command:

```
ipconfig /all
```

3. Observe the result and record down:

```
Description . . . . . . . . . . . : Microsoft Wi-Fi Direct Virtual Adapter #2
Physical Address. . . . . . . . . : A2-02-A5-DE-5D-00
DHCP Enabled. . . . . . . . . . . : Yes
Autoconfiguration Enabled . . . . : Yes

eless LAN adapter Wi-Fi:

Connection-specific DNS Suffix  . : student.sp.edu.sg
Description . . . . . . . . . . . : Intel(R) Wi-Fi 6E AX211 160MHz
Physical Address. . . . . . . . . : A0-02-A5-DE-5D-00
DHCP Enabled. . . . . . . . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::5499:f8d5:9e8f:2270%16(Preferred)
IPv4 Address. . . . . . . . . . . : 172.22.94.195(Preferred)
Subnet Mask . . . . . . . . . . . : 255.255.248.0
Lease Obtained. . . . . . . . . . : Monday, 22 April 2024 11:33:05 am
Lease Expires . . . . . . . . . . : Monday, 22 April 2024 6:32:55 pm
Default Gateway . . . . . . . . . : 172.22.88.1
DHCP Server . . . . . . . . . . . : 172.25.17.175
DHCPv6 IAID . . . . . . . . . . . : 161481381
DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-2D-3C-8F-C4-00-DE-AB-CA-19-2B
DNS Servers . . . . . . . . . . . : 172.25.25.111
                                   172.25.25.112
NetBIOS over Tcpip. . . . . . . . : Enabled
```

Ethernet NIC	
model	**NIL**
IP address	**NIL**
MAC address	**NIL**
Wireless NIC model	
Model	**Intel(R) Wi-Fi 6E AX211 160MHz**
IP address	**172.22.94.195**
MAC Address	**A0-02-A5-DE-5D-00**

4. Based on the model of wireless NIC, find the image of the card, for example:

Google Search for the following:

How many bytes for MAC address? **6 bytes**
What is MAC address for? **To identify different devices using the same local network**
If you change a new Wi-Fi Card, will your MAC address also change? **Yes. The MAC address is tied to the physical hardware, so when you swap it out, the address also changes.**