

ITF Lecture

Week01 Today's Technologies

Digital Literacy ; knowledge of digital technology

consists of Use, Create, Understand

ព័ត៌មានការងារ គិតជាដែនដោះស្រាយ

Class of Computer (classified by size)

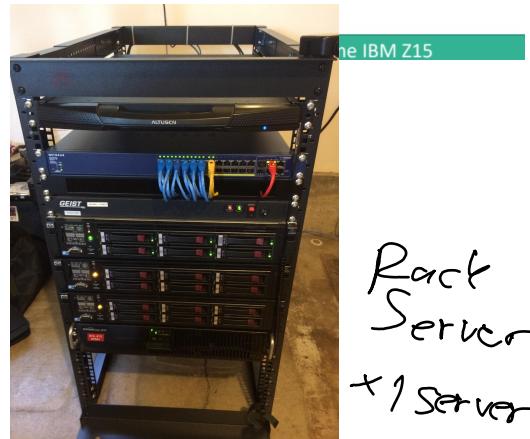
- Microcomputer PC, Handheld Comp., Embedded Comp.
- Minicomputer (Mid-range computer) for organization, company, etc
 - ↳ Multitasking 200 users simultaneously
 - ↳ up to 1,000 users
- Mainframe computers for banks, large organization, telecoms
- Supercomputer AI, Research, Future prediction
 - ↳ enable to process trillions (10^{12}) of instructions in a second

Home Automation Devices
smart speaker

Server

Rack Server

- 1 រ៉ូ (rack) មាន 1 server
- rack មានវិសាខាទិន្នន័យ - ពិសេសទៅលើការប្រើប្រាស់
- នាយកដៃអចលក់ - ភ្លាមៗ



Blade Server

- មានការចេញការងារ
- នាយកដៃអចលក់
- ស្រុងការ
- ស្នើសុំការងារជាមួយ centralized
- 1 លូដីមានឱ្យលើក server
- ភ្លាមៗជូន, កិច្ចបុរុយនាយកដៃ

Rack Server
x1 Server



Input → Mic, Mouse, Keyboard, Webcam
for video recording

Output → Printer, 3D Printer, Display, Farbuk

Storage keeps data, information and instructions



Virus and other malwares

- Virus រឿង code ទូទាត់ដឹង execute នូវ app/program បានផ្តល់ការងារ
- Ransomware តើងតារាំង - Adwares ធែងឈាម user នូវផែនធីមុខមាតា
- Spyware ធែងពេលវិជ្ជាពី user - Trojans សម្រាប់ផ្តល់ការងារ remote control
- Worms គិតឯកទិន្នន័យ CPU ការងារបានការពិនិត្យ → អ្នកចំណាំ, - Keyloggers តិចតាមការអិនិញ្ញា
(Duplicate និងលើង)

Ports & Connection

- ទូរគ្រែស៊ីវិថី



VGA/SVGA (male) DE-15

HDMI Type A (male)

CPU

- CPU មានព័ត៌មាននៃលទ្ធផល core
ការពិនិត្យនៃលទ្ធផល core ក្នុងបច្ចុប្បន្ន
និងលទ្ធផល processor និងបច្ចុប្បន្ន

[Process Unit]

Control Unit
- សម្រេចសំណើនូវការការពិនិត្យ
- គិតឯកទិន្នន័យ

Arithmetic Logic Unit
- សម្រេចសំណើនូវការការពិនិត្យ
- គិតឯកទិន្នន័យ

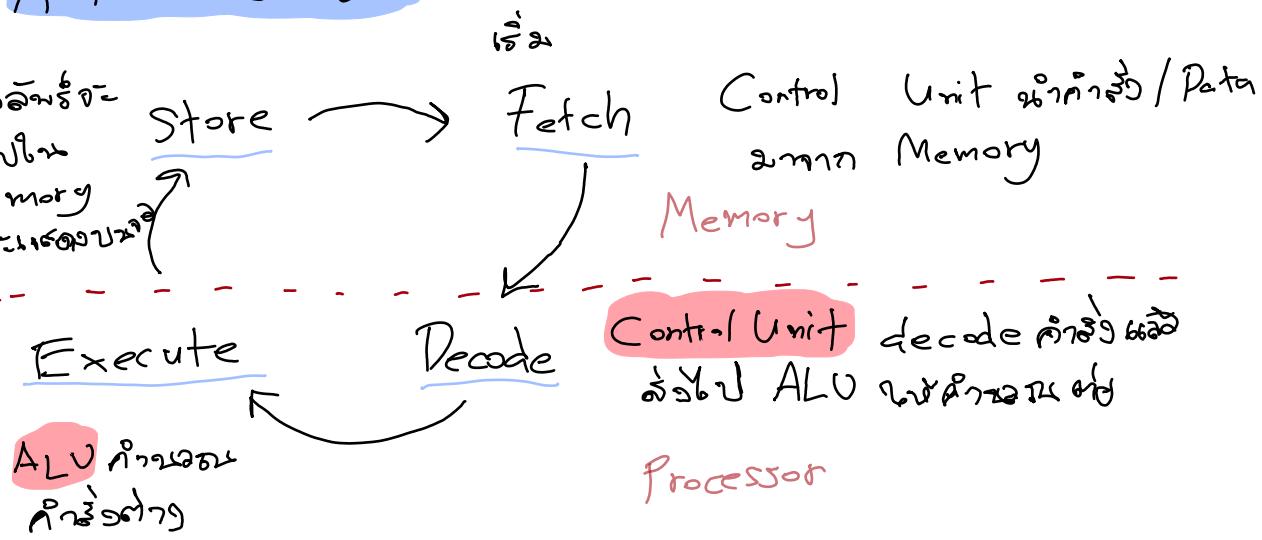
Input
→ Data

Memory (RAM)

Storage Device (HDD)
ការរក្សាទុក

→ Output
Information

A Machine Cycle



Instruction Pipelining

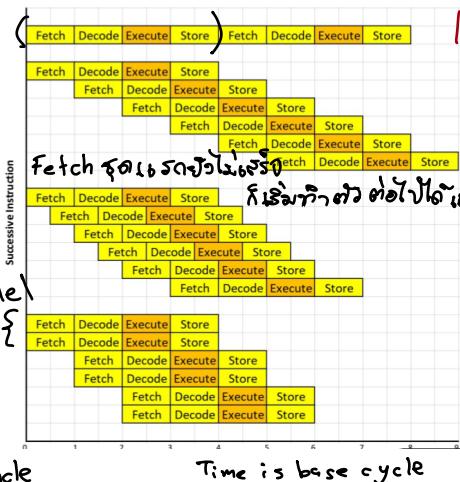
Instruction Pipelining

No Pipelining

Pipelining: Processor begins fetching a second instruction before it completes the machine cycle for the first instruction. Perform only one stage per clock cycle

Super-pipelined system

Superscalar performs only one pipeline stage per clock cycle in each parallel pipeline



No Pipelining

Pipelining

Super-pipelined system

Superscalar

1 GHz ក្នុង 1,000,000 cycle

1 byte = 8 bit = 1 character

Memory

- stores instructions waiting to be executed

Volatile Memory (មេន្តូរ)

- រាយការណ៍ទិន្នន័យ RAM

Static RAM (SRAM)

- semiconductor

- faster, consumes less power

- used as cache memory of PC

Dynamic RAM (DRAM)

- transistor, capacity - used for computer's main memory

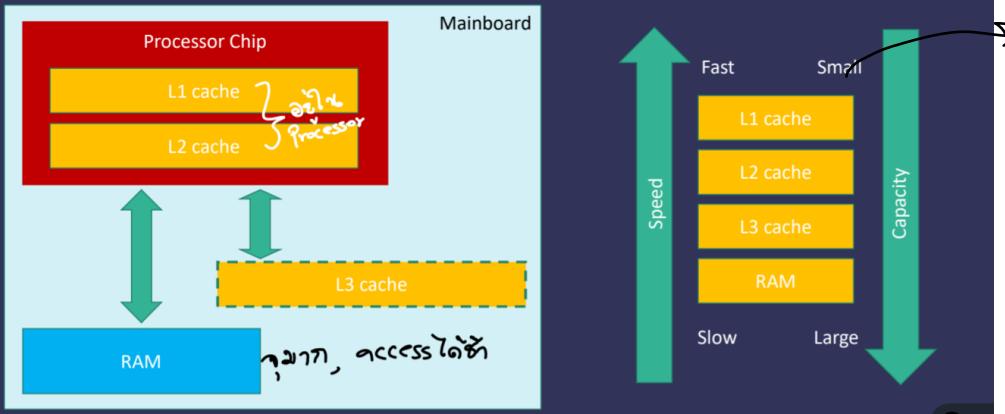
- cheaper, more storage capacity

Memory Cache

កំណត់ថាគាត់ទីនេះក្នុងការប្រើប្រាស់

Memory Cache

- It speeds the processes of the computer because it stores frequently used instructions and data



Key *

Non-volatile Memory (ឧបនា)

ROM, Flash Memory
- ជំនួយសម្រាប់ផ្តល់ព័ត៌មាន

Non-volatile Memory - Read Only Memory (ROM)

ROM Read-only-memory	BIOS
<p>It refers to memory chips storing permanent data and instructions by manufacturer.</p> <p>The microprocessor can read from ROM, but it cannot write to it or modify it.</p> <p>It contain special instructions for the computer, that are always there because they're not erasable.</p>	<p>It stands for Basic Input/Output System, pronounced as bye-oss.</p> <p>It is a ROM chip found on motherboards that allows user to access and set up their computer system at the most basic level.</p>

Guider ដែលបានដាក់ឡើង

រាយការណាស់គឺជាប្រព័ន្ធអំពី

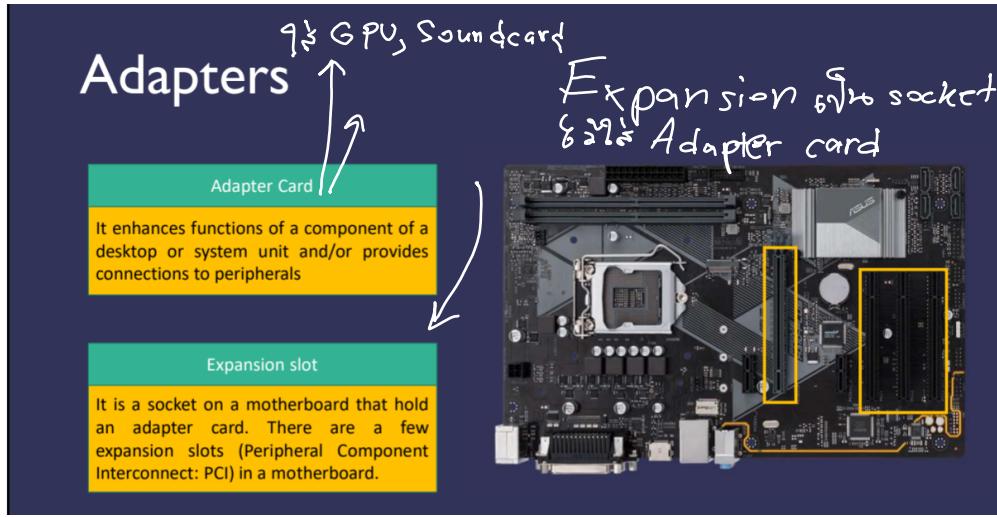
EEPROM

Electrically Erasable Programmable Read-Only Memory (EEPROM)

<p>It is called "flash memory"</p> <p>It can be erased electronically and rewritten → តើលើកអាណាពិនាទោរកម្រួល</p> <p>Most computers use flash memory to hold their start-up instructions because it allows the computer to update its contents easily.</p> <p>Flash memory chips store data and programs on many mobile devices and peripheral devices, such as smartphones, portable media players.</p>

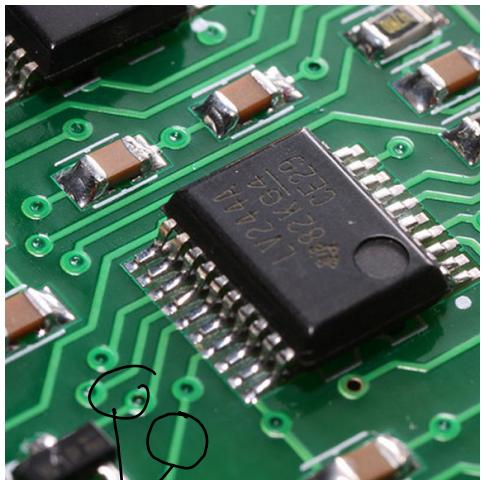
បង្ហាញនៃការប្រើប្រាស់

នៃការប្រើប្រាស់



- "Plug & Play" උපුරුත්තෙහි ස්ථාන ප්‍රිඩ් නැත්තාවල ප්‍රිඩ්
ex. GPU, Snd Card

- Dongle වීනු USB Adapter



Buses (ස්ථාන නැගුණු මෙත්බොර්ඩ්)

Physical Types of Bus

System bus (Front-side bus): it connects processor to main memory
Backside bus: it connects processor to cache (කොළඹුවේ යුතු තුළුව)
Expansion bus: it connects processor to peripherals (නිශ්ච්‍ය තුළුව)



- Data Bus සංශෝධන ප්‍රිඩ්
- Address Bus සං ප්‍රිඩ් ප්‍රිඩ්

System, backside, expansion
main memory Cache peripherals (වුන්ස්වාස්)
processor

Power Supply

- AC → DC

Yn 2726
220V - 5-15V (outputs)

- Batteries typically are rechargeable lithium-ion batteries

Week 4

Inputs



Trackball

Pointing Stick (the red thing on the keyboard)



Ergonomic Mouse

- takes pressure off from wrist and forearm

D TV; Digital TV

HDTV; High-definition TV (most advanced)

Smart TV - Inter enabled HDTV

Nonimpact Printer - print without contacting the paper

Laser Printer

- High-speed & high-quality

Thermal Printer

- Pushes electrically heated pins against heat sensitive paper

All-in-one/Multifunction printer

- Allows users to print, scan, copy or fax



Dye Sublimation

- uses heat to transfer dye onto materials such as a plastic, fabric



Sublimation(n.) - act of expressing strong emotions/using energy by doing/creating sth

ppm - page per minute the printer can print

Plotter

- រូបរាងរូល -> Ink-jet

Large-format Printer

- photo-realistic quality color
- huge



Impact Printer

- contacts paper



Dot Matrix Paper

- uses striking mechanism against an inked ribbon that physically contacts the paper

Audio Output



Earbuds

- សំវិកទូរសព្ទ និងចុះតុកភាព
ដើម្បីផ្តល់សាស្ត្រភាពទៅខ្លួន
ex. subwoofer នៃលើកខ្លួន



Earphone

Interactive Whiteboard

- touch-sensitive device
- connected to computer screen

Game Controller

- ពិនិត្យ Input, Output (ភាគ)

Storage

- Primary Storage

- > called "Memory"
- > RAM, ROM, etc.
- > main memory where data and info. are stored
- > Volatile/NonVolatile in nature

- Secondary Storage

- > called "Storage Medium"
- > Long-time storage
- > Non-volatile in nature
- > HDD, SSD

- Offline Storage

- > Removable
- > Not under control of a processing unit
- > Must be inserted by a human operator
- > CD, DVD, Flash Drive

Storage medium keeps data in the physical material
Cloud storage keeps information on the internet server
(files are transparent to user)

- Tertiary Storage

- > Similar to secondary storage
- but can only be accessed via network
- > NAS, SAN