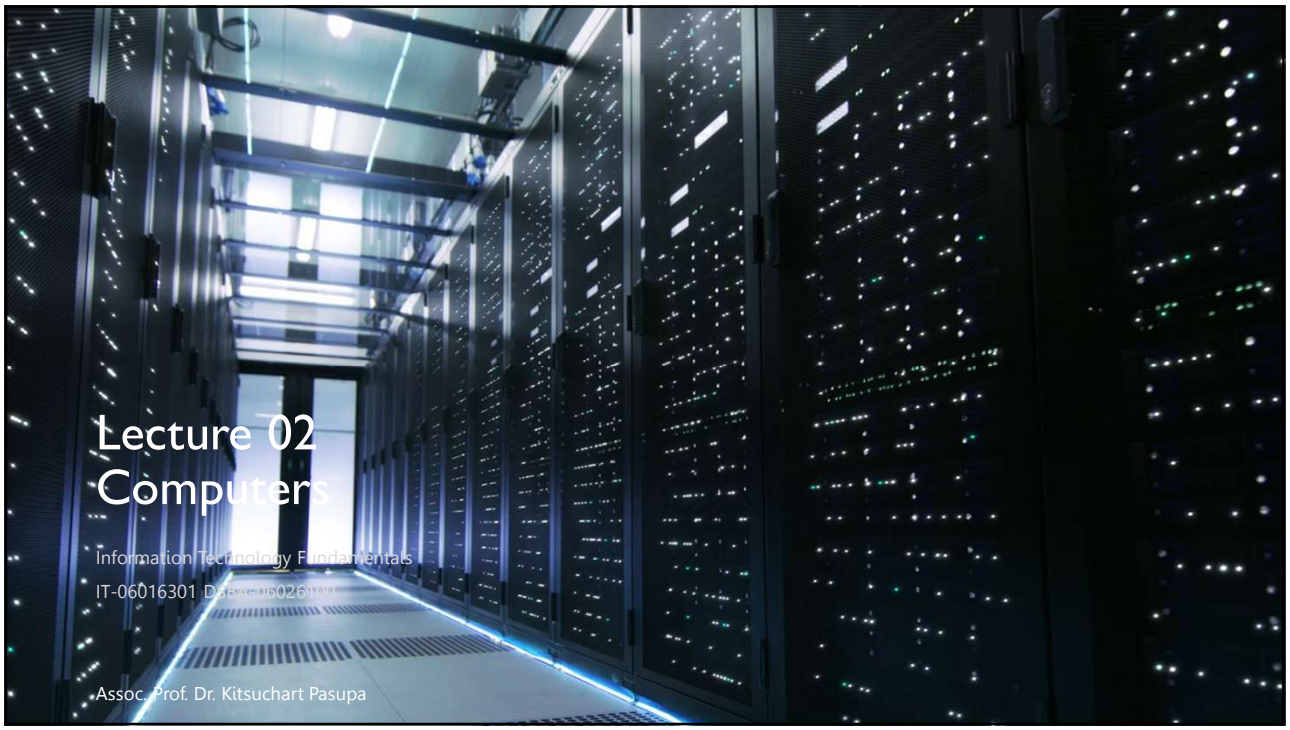
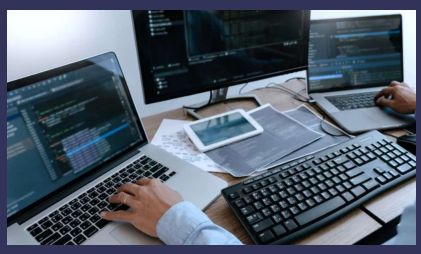


1

Computer

- Computer contains many electric and electronic components (and might contains mechanical components) known as hardware
- It operates under the control of instructions stored in its own memory, known as software



2

Class of Computer

- It can be classified in many ways, such as by purpose, function, usage, generation of technology
- Classified by purpose on the basis of size

Microcomputers
(Personal Computers)

Minicomputers
(Mid-range Computers)

Mainframe Computers

Supercomputers

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Microcomputer

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- It comes with a microprocessor, memory and minimal input/output (I/O) circuitry mounted on a single printed circuit board (PCB)



Personal Computer

Mobile Device

Game Console

Embedded Computer

5

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Personal Computer

- One popular category of computer
- It can be mobile or desktop computers that can perform all of its input, processing, output, and storage activities by itself
- It is intended to be used by one person at a time.

Mobile Device

Game Console

Embedded Computer

6

Personal Computer

เช่น tower

All-in-one

Desktop

A desktop computer (desktop) is a personal computer designed to be in a stationary location, where all of its components fit on or under a table

7

Personal Computer

Stylus (Pen)

Laptop/Notebook

A laptop (a notebook computer) is a lightweight and thin mobile computer with a screen in its lid and a keyboard in its base

Tablet

A tablet is a thin, lighter-weight mobile computer that has a touch screen

Mobile Computer/Device

8

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Personal Computer

Mobile Device
- A portable personal computer, designed so that a user easily can carry it from place to place

Game Console

Embedded Computer

9

Mobile Device

Smartphone
is an Internet-capable phone that usually also includes a calendar, an address book, a calculator, a notepad, games, browser, and numerous other apps

Text Message
LOL = Laugh out loud
5555 => ฮ่า ฮ่า ฮ่า ฮ่า [Foreigner would not understand]
Gr8 => Great
Wrong: Music play an essential role in child development. Correct: Music plays an essential role in child development.
เมพจิง ๆ => เทพจิง ๆ => เทพจริง ๆ => เก่งจริง ๆ
จุงเบย => จังเลย

10

Mobile Device

Phablet

- A portmanteau of the words phone and tablet
- It is straddling between the size format of smartphones and tablets.
- The screen on a phablet usually measures five to seven inches diagonally.
- Some include a stylus.

11

Mobile Device

Handheld Computer

A handheld computer is a computer small enough to fit in one hand

12

Mobile Device

Portable Media Player

Users can store, organize, and play or view digital media.

Technological convergence

It is the tendency for technologies that were originally unrelated to become more closely integrated and even unified as they develop and advance.

13

Mobile Device

Digital Camera

It allows users to take photos and store the photographed images digitally

Point-and-Shoot

It is a still camera for simple operation. It is called "Compact Digital Camera"

DSLR

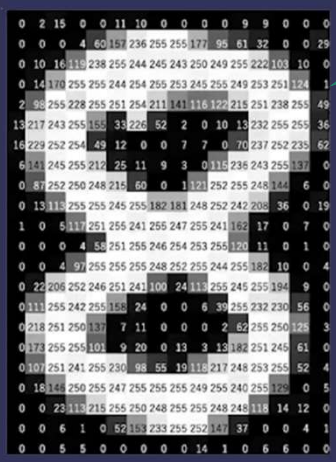
Digital Single-Lens Reflex camera is a digital camera that combines the optics and the mechanisms of a single-lens reflex camera with a digital imaging sensor.

Mirrorless

Mirrorless Interchangeable-Lens Camera (MILC) is a camera with removable lens and a digital display. It does not have a reflex mirror or optical viewfinder like a DSLR camera

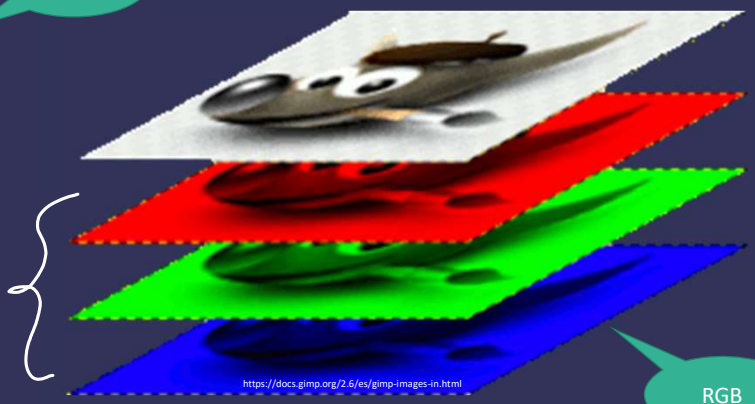
14

How are image stored in computer?



Pixel

https://www.analyticsvidhya.com/blog/2021/03/grayscale-and-rgb-format-for-storing-images/



https://docs.gimp.org/2.6/es/gimp-images-in.html

RGB

3 layers

15

Mobile Device

E-book Reader

It is for reading e-books and other digital publications.

ช่วยกันอ่านสายตา

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Mobile Device

Wearable Device

It is designed to be worn close to and/or on the surface of the skin. Hence, it can detect, analyze, and transmit information concerning to the user.

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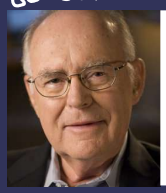
Moore's Law

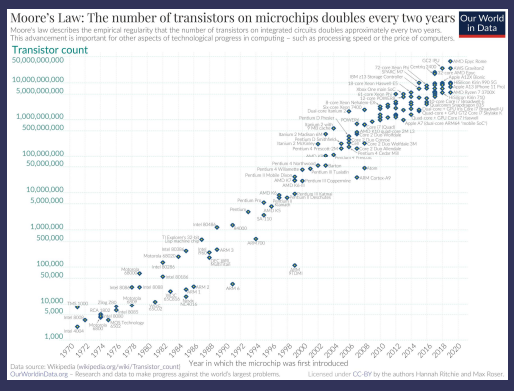
- Gordon Moore–the co-founder of Intel–observed that a doubling every year in the number of components per integrated circuit in 1965.
- In 1975, he revised the forecast to "doubling every two years".
- In 2015, Intel states that the cadence today is closer to 2.5 years than 2.
  - The improvements in MOSFET devices have slowed since 2010.

Gordon Moore



intel

The number of transistors on a CPU would double every two years



18

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Personal Computer	Mobile Device	Game Console	Embedded Computer
		• A mobile computing device designed for single-player or multiplayer video games	

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Game Console

Component
Console Unit
Controller
Game media



Pong - Atari


Famicom - Nintendo | Superfamicom - Nintendo


PlayStation - Sony | Neo Geo - SNK

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Game Console

Wii

Play Station

Game Boy

Nintendo Switch

21

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Embedded Computer

- A special-purpose computer that functions as a component in a larger product

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Embedded Computer

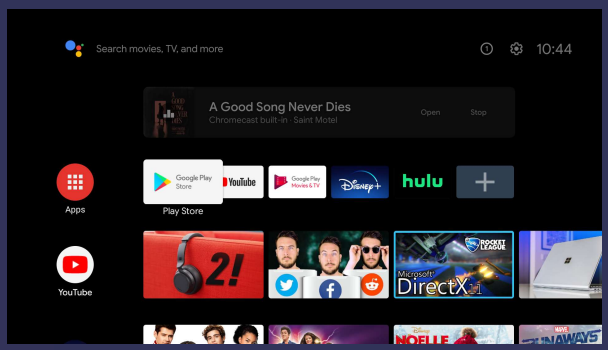
- Consumer Electronics
- Home Automation Devices
- Automobiles
- Process Controller and Robotics
- Office Machines

23

Embedded Computer

Digital Media Player

It is used in a home, that streams digital media from a computer or network to a television, projector, or some other entertainment device



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Embedded Computer

Smart Speaker/Display

A voice command device that comes with an integrated virtual assistant.
The assistant offers interactive actions and hands-free activation with the help of one "hot word".

Apple Home Pod Mini
Siri

Amazon Echo
Alexa

Google Nest Hub
Google

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Embedded Computer

Autonomous Vehicle

It can be called a "self-driving car". It is a vehicle that can sense its environment and moving safely with little or no human input.

26

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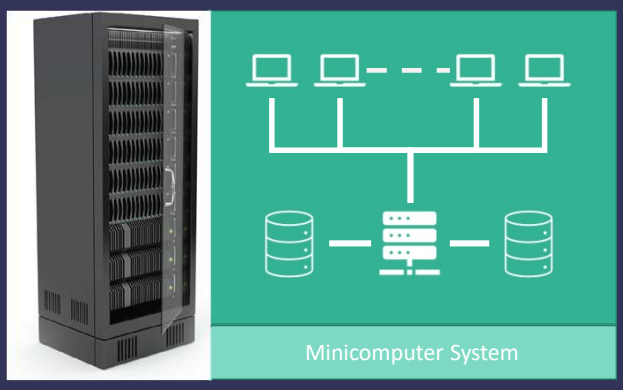
Mainframe Computers	Supercomputers

27

Minicomputers

- Minicomputers is a midsize computer
- It is a multiprocessing system capable of supporting from up to 200 users simultaneously
- It is characterized by one or more processors, supported multiprocessing, and multi-tasking and meant to be resilient for high workloads
- It provides a centralized storage area for programs, data, and information



28

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Mainframe Computers

- A mainframe Computer is large, expensive, powerful computer that can handle hundreds or thousands of connected users simultaneously as well as running multiple programs simultaneously.
- It has high storage capacity.
- Normally used in banking, telecom sectors, etc., which process a high volume of data/transaction in general.
- Enable to run smoothly for a long time with a long life.

Four-frame IBM Z15

30

Server

Server is a computer dedicated to providing one or more services to other computers or devices on a network

Tower Server

Rack Server

Blade Server

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Rack-vs-Blade

Rack Server	
Pros	**Cons**
Cable Management – Although it requires a lot of cable, but they are easy to organize	Power Usage – Require a cooling system to function
Failure Containment – Identifying, removing, and replacing a malfunctioning rack server is simple	Size – Depending on you need. It can take up all your available space
Cost – It offers a substantial amount of computing power at a relatively low cost	Maintenance – Time consuming for routine maintenance tasks on a rack packed with servers

Blade Server	
Pros	**Cons**
Size – Fit a significant amount of computing power into a minimal amount of space	Heat – Heat dispensation is a challenge task
Centralized Management – All blades through a single interface	Cost – More expensive than rack servers
Cabling – Less cabling than rack servers	Power Requirement – Power off, all server is off

32

Client - Terminal

- A terminal is a computer, usually with limited processing power, that enables users to send data to and/or receive information from a server, or host computer
- A thin client is a terminal that looks like a desktop but has limited capabilities and components
- Most retail stores use a POS terminal to record purchases, process credit or debit cards, and update inventory

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Client - Automated Teller Machine

- An ATM is a self-service banking terminal that connects to a host computer through a network

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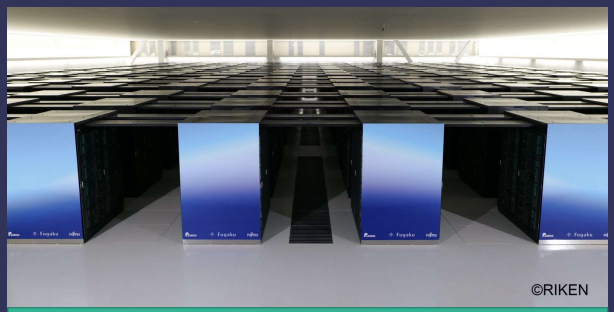
35

Supercomputers

- A supercomputer is the fastest, most powerful computer and most expensive.
- It is capable of processing trillions of instructions (10^{12}) in a single second.
- Basically, it is used in scientific and engineering applications such as weather forecasting, scientific simulations, exploring the solar system, and nuclear energy research.



Supercomputer Fugaku: RIKEN Center for Computational Science. It has 7,630,848 cores and can 442 Pflop/s. (Peta=10^{15})
It is the number one system in the world, June 2021 (https://www.top500.org/resources/top-systems/)

You can imagine how fast it is. Compare it with Intel Core i7-11370H (11th Generation CPU) which can achieve around 200 Gflops (10^9).

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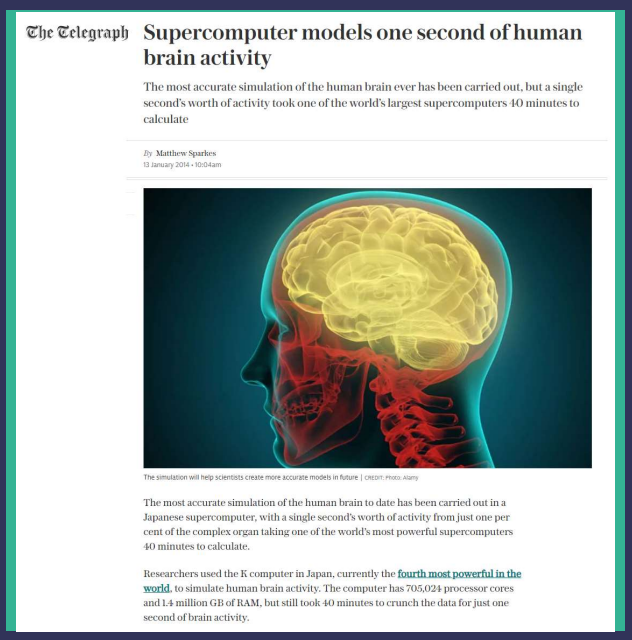
Simulation of Human Brain



The Telegraph

Supercomputer models one second of human brain activity

The most accurate simulation of the human brain ever has been carried out, but a single second's worth of activity took one of the world's largest supercomputers 40 minutes to calculate

By Matthew Sparkes
13 January 2014 • 10:04am

The simulation will help scientists create more accurate models in future | CREDIT: Photo: Alamy

The most accurate simulation of the human brain to date has been carried out in a Japanese supercomputer, with a single second's worth of activity from just one per cent of the complex organ taking one of the world's most powerful supercomputers 40 minutes to calculate.

Researchers used the K computer in Japan, currently the fourth most powerful in the world, to simulate human brain activity. The computer has 705,024 processor cores and 1.4 million GB of RAM, but still took 40 minutes to crunch the data for just one second of brain activity.

37

Cloud Computing

- Cloud computing refers to an environment that provides resources and services accessed via the Internet

38

Ports & Connection

A port is the point at which a peripheral device attaches to or communicates with a device for data transferring

A connector joins a cable to a port

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Universal Serial Bus (USB)

A USB port can connect up to 127 different peripheral devices together with a single connector

Instead of connecting peripheral devices directly to ports on a mobile computer, some mobile users prefer the flexibility of port replicators and docking stations

Connectors		USB 1.0 1996	USB 1.1 1998	USB 2.0 2001	USB 2.0 Revised	USB 3.0 2011	USB 3.1 2014	USB 3.2 2017	USB4 2019
Data rate		1.5 Mbit/s (*Low Speed*) 12 Mbit/s (*Full Speed*)		1.5 Mbit/s (*Low Speed*) 12 Mbit/s (*Full Speed*) 480 Mbit/s (*High Speed*)		5 Gbit/s (*SuperSpeed*)	10 Gbit/s (*SuperSpeed+*)	20 Gbit/s (*SuperSpeed+*)	40 Gbit/s (*SuperSpeed+, Thunderbolt 3 and 4*)
Standard	A	Type A Type-A				Type A Type-A SuperSpeed		Deprecated	
	B	Type B Type-B				Type B Type-B SuperSpeed		Deprecated	
	C	N/A		Type C (*enlarged*)					

https://en.wikipedia.org/wiki/USB

40

Docking Station

Docking Station

เพิ่มรู้เสียบให้เพิ่ม

41

Wireless Communication

คลื่นวิทยุสื่อสาร

Wi-fi	Bluetooth	Near Field Communication

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Protecting Hardware

Theft

Failure

43

Protecting Hardware - Theft

- Physical access controls
- Alarm system
- Physical security devices
- Security or device-tracking app
- Require identification

find iPhone/iPod

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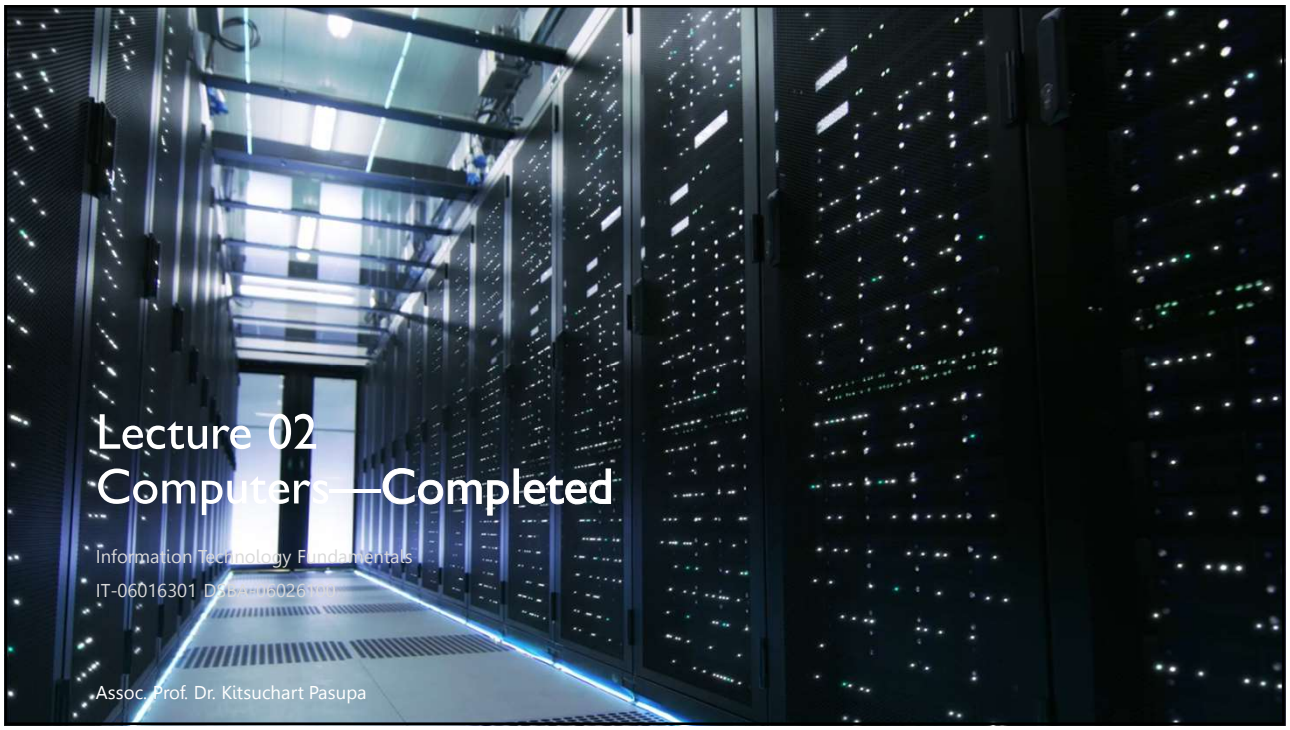
Protecting Hardware - Failure

Surge Protector

Uninterruptible Power Supply

กันไฟกระชาก (Powerbank ของเรา)

45



Lecture 02 Computers—Completed

Information Technology Fundamentals

IT-06016301 Date: 16026/2021

Assoc. Prof. Dr. Kitsuchart Pasupa

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