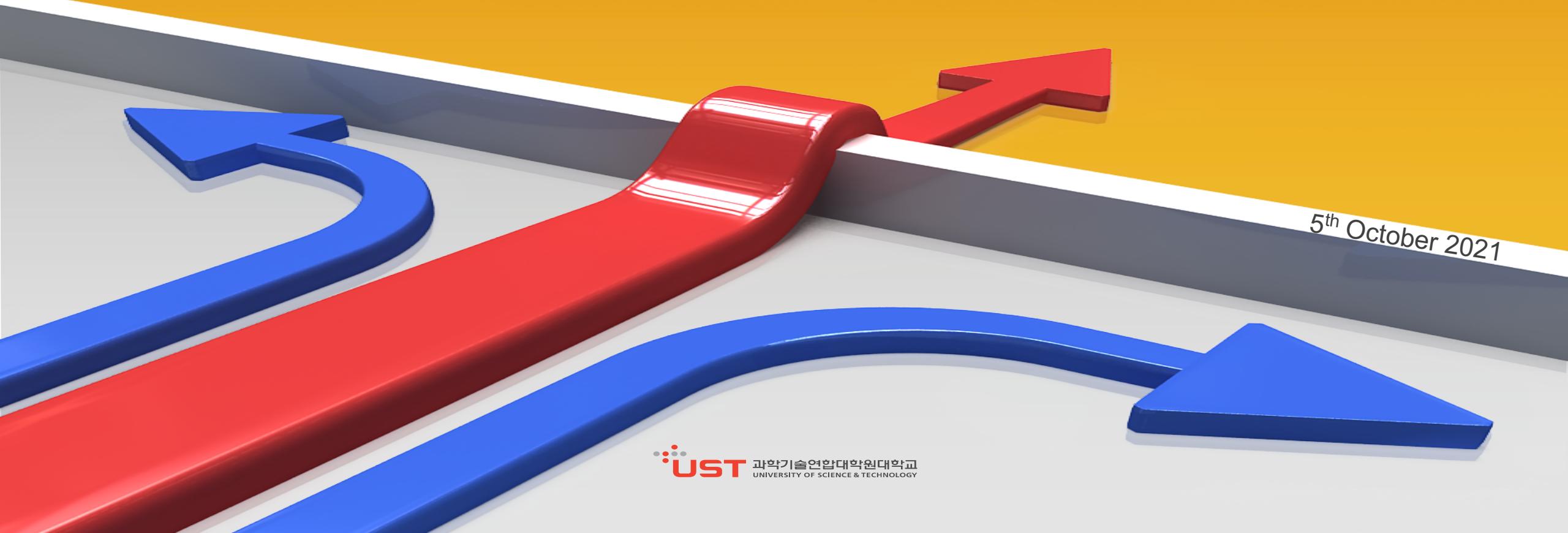


Non Coding Day~

Supercomputer & Metaverse



5th October 2021

What we did last week is..

Lesson 1: Let's talk to your computer..

- Michael: Hello, how are you?
- Francesca: Fine thank you, and you?
- Michael: Fine thank you.

You: How are you?

Computer: Fine thank you and you?

You: Fine thank you

Lesson 2: Let your computer to read file..

- Read the file in your computer line by line.
- If your computer find something in your file, let you know about it.
- We will teach your computer Three Grammars
 - handle = open(file name, option)
 - for ~ in~
 - find()

COVID-19 Map

Where can I get the raw data of COVID-19?

Number of COVID-19 cases and deaths by country or region

You can view the status of COVID-19 cases, deaths and vaccinations around the world on a map. The larger the circle, the larger the number.

You can view the status of COVID-19 confirmed cases, deaths, and vaccinations by week in a graph.

What is Git..?

git GitHub

- 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.
- Projects on GitHub can be accessed and manipulated using the standard Git command-line interface, and all standard Git commands work with this interface.

DataFrame in Pandas library

- Pandas stands for Python Data Analysis Library.
- This provides R's Dataframe in a form that can be used in python.
- Pandas Dataframe is very convenient because data can be processed in the form of a table.





01

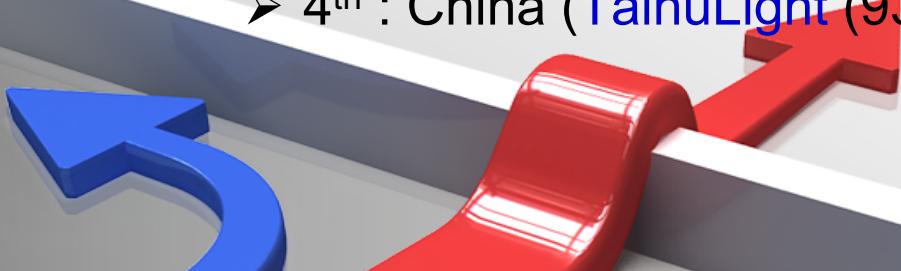
Supercomputer...!





TOP500

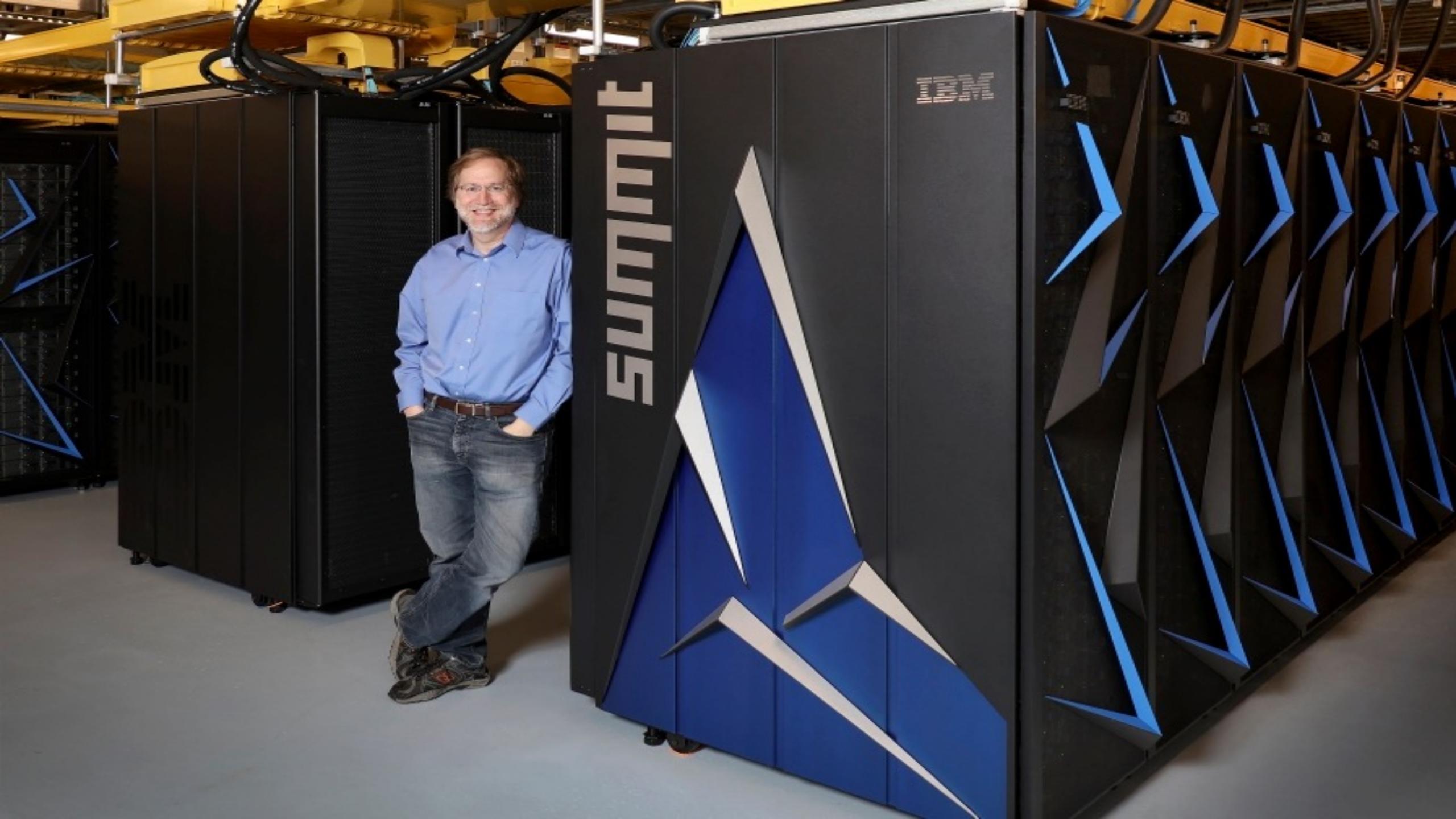
- Computers in the **TOP500** (ranked 500)
 - ISC (International Supercomputing Conference)
 - SC (Supercomputing Conference)
- June 2021 ranking
 - 1st : Japan ([Fugaku](#) (442 Pflop/s), Fujitsu RIKEN Center for Computational Science)
 - 2nd : U.S. ([Summit](#) (148.8 Pflop/s), Oak Ridge National Laboratory)
 - 3rd : U.S. ([Sierra](#) (94.6 Pflop/s), Lawrence Livermore National Laboratory)
 - 4th : China ([TaihuLight](#) (93.0 Pflop/s), National Supercomputing Center in Wuxi)



西田庄由

西田庄由

C01



SUMMIT

IBM

神威
太湖之光

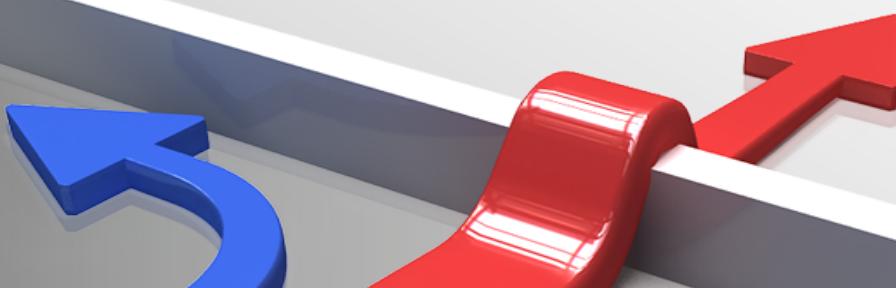
国家并行计算机工程技术研究中心





TOP500

- June 2021 ranking of Korea
 - 23rd & 24th : Korea (Maru & Guru(16.8 Pflop/s), Korean Meteorological Administration)
 - 31st : [Korea \(Nurion \(13.9 Pflop/s\), KISTI\)](#)
 - 209th & 210th : Korea (Nuri & Miri (2.3 Pflop/s), Korean Meteorological Administration)



Korean Meteorological Administration



기상청 슈퍼컴퓨터
1호기 NEC SX-5

기상청 슈퍼컴퓨터
2호기 Cray X1E

기상청 슈퍼컴퓨터
3호기 Cray XE6

기상청 슈퍼컴퓨터
4호기 Cray XC40

기상청 슈퍼컴퓨터
5호기 LENOVO SD 650

Korean Meteorological Administration



1. Observation data collection
2. Establishing equations to reproduce atmospheric conditions and motion
3. Supercomputer programming for calculating equations
4. Short-time calculation of numerical models with supercomputers
5. Weather forecast using forecast results

Nurion @ KISTI

[KISTI-1]
Cray 2S
2 GFlops



[KISTI-2+]
Cray T3E
115 GFlops



[KISTI-3]
NEC SX-5/6
320 GFlops



[KISTI-4]
SUN Blade 6048
324 TFlops



[KISTI-5]
Cray CS500
25.8 PFlops



1988
2GF

1993
16GF

1997
131GF

2001

2002
5.2 TF

2003

2009
360 TF

2018
25.8 PF

2019

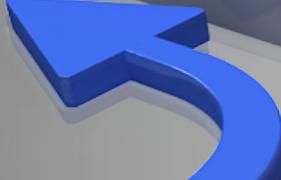
[KISTI-2]
Cray C90
16 GFlops



[KISTI-3]
IBM p690
4.4 TFlops



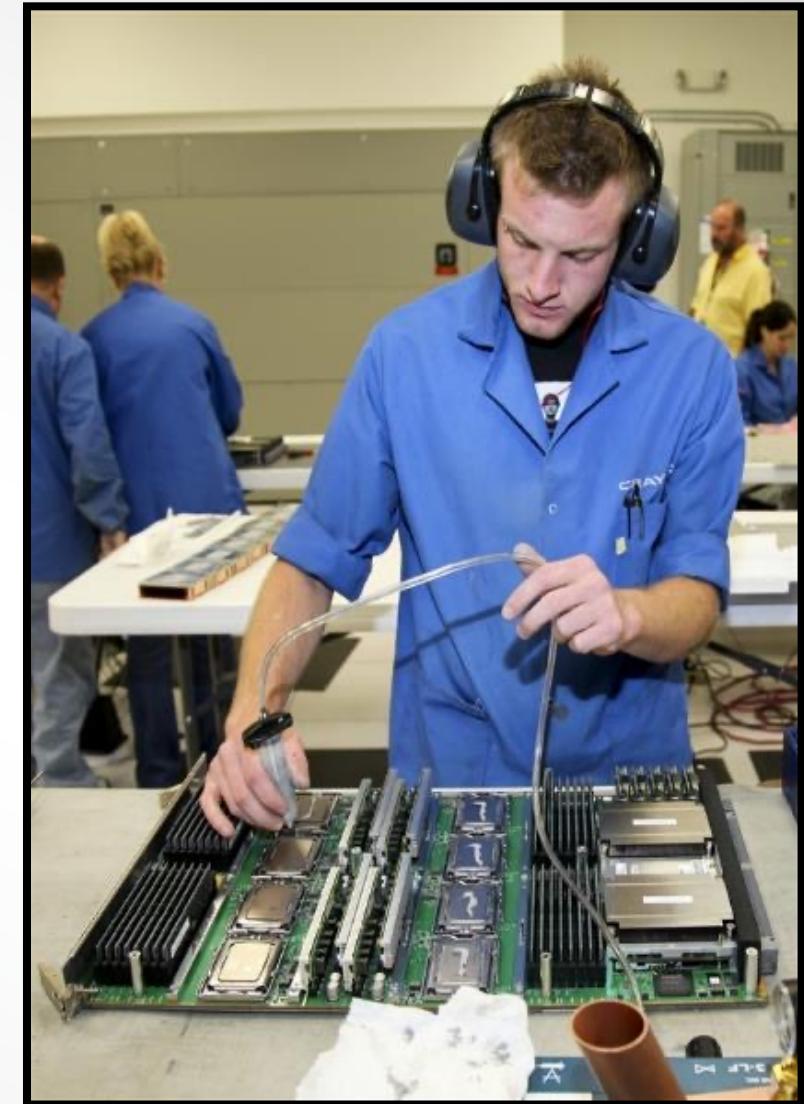
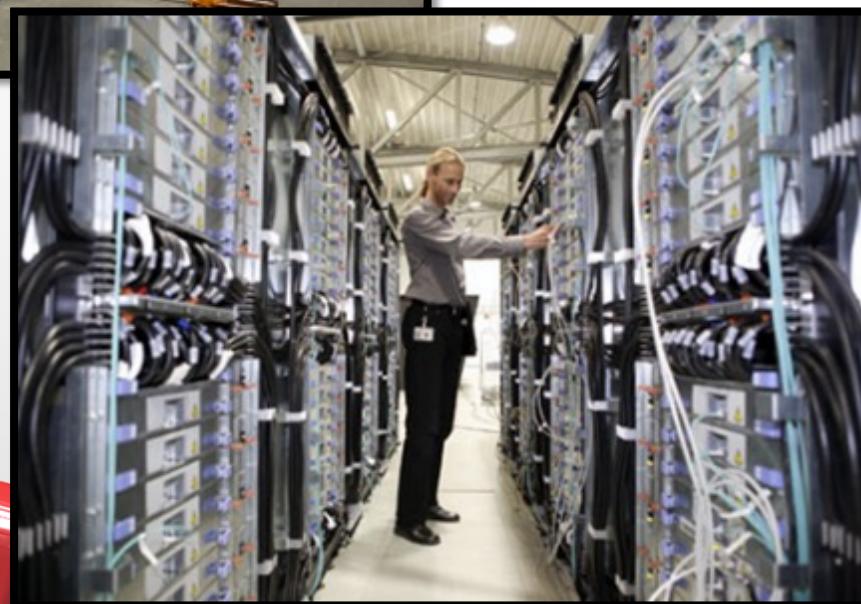
[KISTI-4]
IBM p595
36 TFlops



Nurion @ KISTI



Supercomputer manufacturing process



Packaging with racks



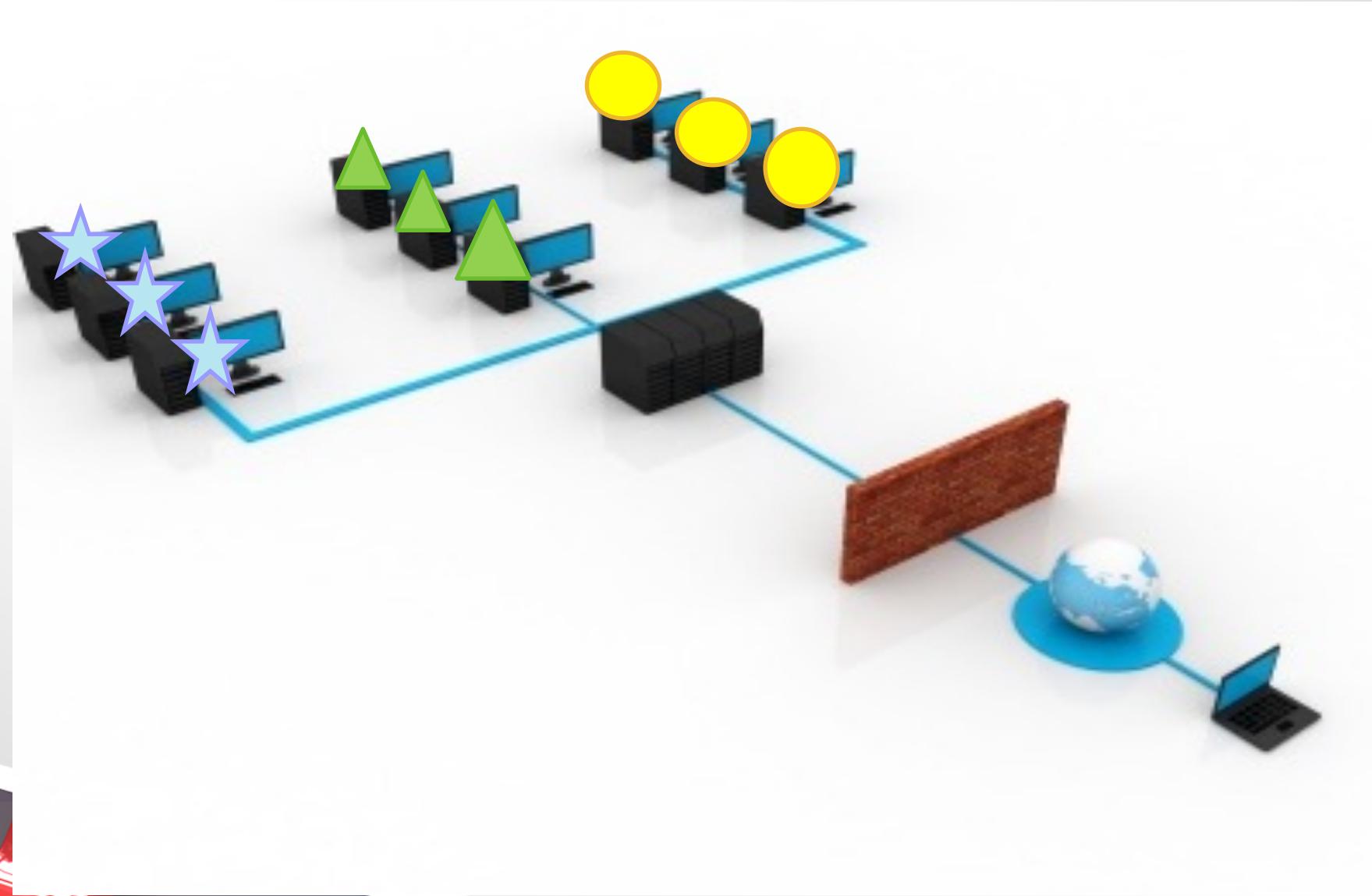
- Mainboards, which are parts of supercomputers, have a flat shape.
- The flat-shaped mods are placed sequentially in boxes called racks.
- All CPUs are connected to a network to perform a given task.

Why does supercomputer look like that?



- The answer is parallel computing.
- The internal structure of a supercomputer is largely composed of :
 - each node → a rack that collects several nodes → a network switch connecting the rack and the rack
 - a storage node for storing the operation results

Why is parallel computing so fast?



Korea's First Supercomputer is..



Film industry and supercomputers



- Movies using supercomputers
 - Take Off (국가대표), Toy Story, Monster Inc., King Kong, Men in Black, etc.
- Filmmaking process
 - Full look design → Making miniatures and shooting from multiple angles. → ‘Rendering’

- When an imaginary movie star is the main character
 - Regular PC → It takes **about 10 years** to make film.
 - Supercomputer → The time required can be **reduced to one-tenth**.
- Movie ‘300 (2006)’
 - Soldiers on the battlefield → Cyber actors → The cost of hiring extras and the time-saving effect of filming



Past rendering techniques..



Modern rendering technology..!





02

What is Metaverse..?



What is Metaverse...?

- Metavers = Meta + Universe
- The metaverse is derived from the 1992 novel 'Snow Crash' by Neal Stephenson.
 - The characters in the novel must borrow a virtual body called 'Avatar' to enter the 'Metaverse', a virtual world.
- In the virtual reality called metaverse, there is no time or physical limitation.



4 main types of metaverse

1. Augmented Reality (AR)

- A technology that synthesizes and displays virtual objects or information in the real environment in devices such as smartphones. (ex. Pokemon GO)

2. Virtual Reality (VR)

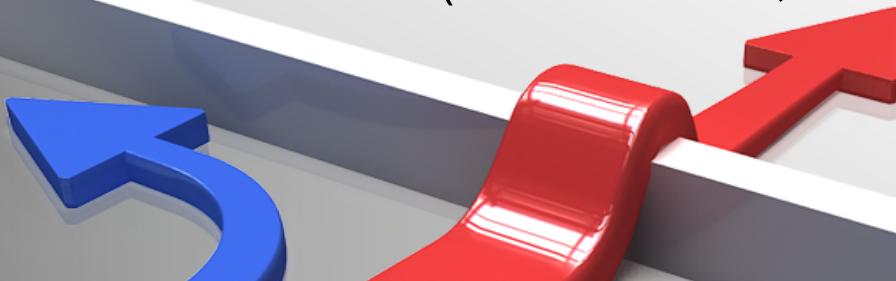
- Building a virtual cyberspace with computer graphics.

3. Mirror World

- It refers to a state in which the real clock is copied but information and convenience are added. (ex. Google Map, Zoom, Navigator)

4. Lifelogging

- Activities to record, store, and share various experiences and information about one's life. (ex. Facebook, Instagram, Kakao story, Twitter)



Major Metaverse Platforms: Roblox



- ❖ Roblox is an online gaming platform and game creation system that allows users to program games and play games created by other users.
- ❖ This was made even more famous by the COVID-19 pandemic in the 2020s.
- ❖ Roblox is free to play and can be purchased in-game through a virtual currency called "Robux".

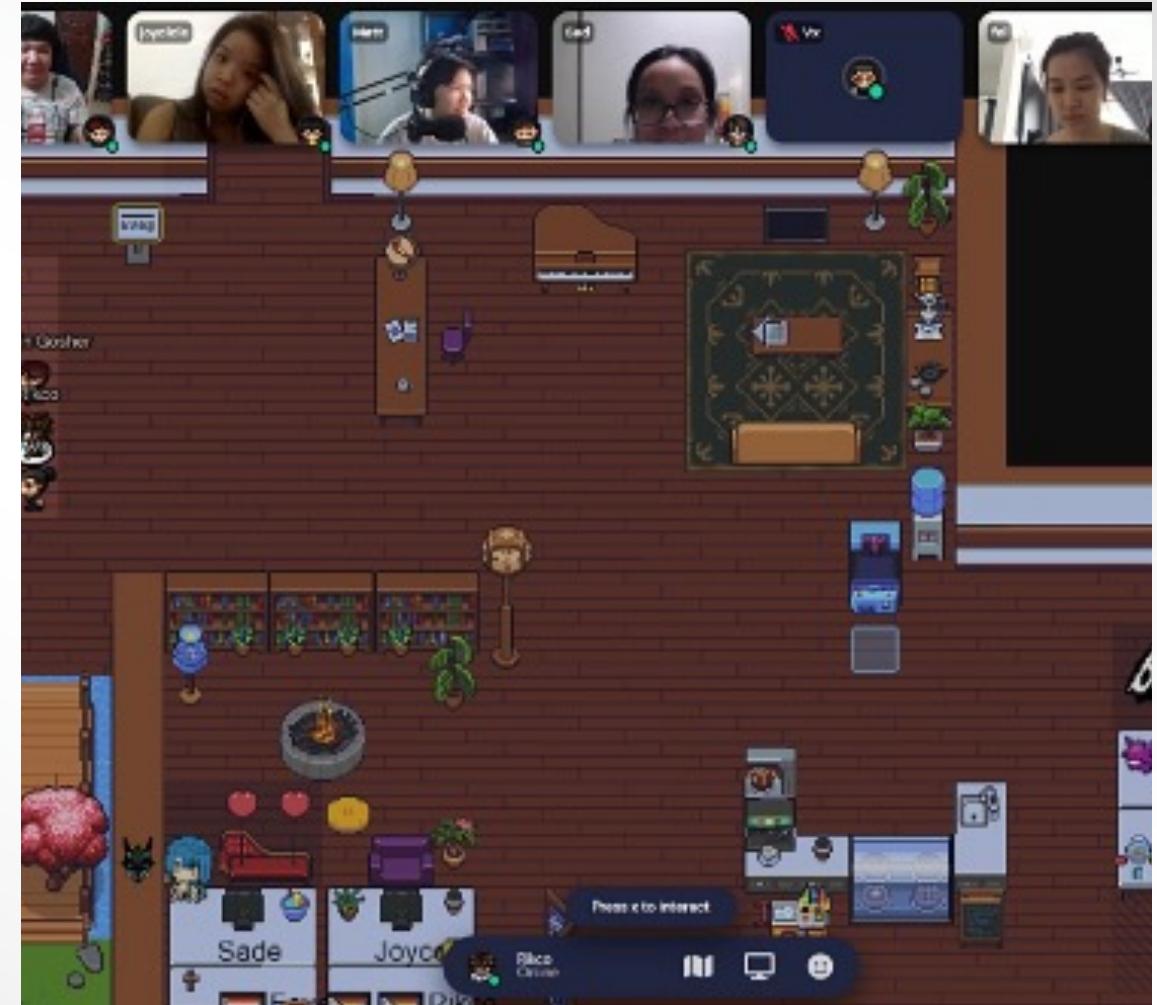
Major Metaverse Platforms: ZEPETO

- ZEPETO is a 3D avatar creation application launched by SNOW, a subsidiary of NAVER.
- Global fashion brands such as Gucci, Dior, and Nike create virtual booths to promote their brands and sell paid items.



Major Metaverse Platforms: Gather.town

- ✓ Gather town was launched in 2020 by American startup [Gather Presence](#).
- ✓ It provides a two-dimensional virtual platform and is a specialized [virtual office platform](#) that enables collaboration with colleagues through avatars.



We will meet @ Gather town soon...

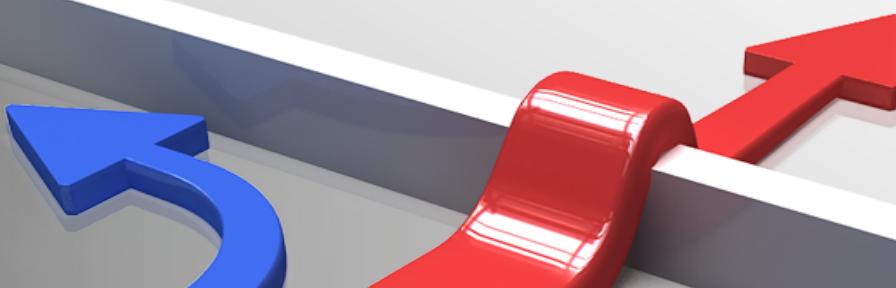




Assignments



1. No programming assignments this week.
2. Instead, think about the **supercomputer** you learned today, the principle of **parallel computing**.
3. During the midterm exam, your presentations will be shared and evaluated against each other through a **virtual classroom in Geter town**.



THANK YOU

