4. Discuss within your group and pick one hardware item type that is different from the rest of the group. The groupings are listed in the roll list in the folder for the course on google drive. Look up the internet to identify at least 3 latest entries of that hardware item and put down their specs. Comment what kind of gadgets / workstations / servers / clusters from OEMs include such a hardware item. Give the source of your information. (a) CPU (b) GPU (c) DRAM (d) SATA hard disc (e) Network switches for cluster (f) Network card.
The solution includes a tabular listing of specs along with source of information as a reference below. [2 Marks]
Hint: Start with leading OEMs for these items using Wikipedia and then look up latest releases.
Application: One should know hardware limitations for program execution as part of scientific computing in real life.

Graphics Processing Unit

A **graphics processing unit** (**GPU**) is a specialized electronic circuit designed to rapidly manipulate and alter memory to accelerate the creation of images in a frame buffer intended for output to a display device.[1] GPUs are used in embedded systems, mobile phones, personal computers, workstations, and game consoles. Modern GPUs are very efficient at manipulating computer graphics and image processing.

History[2] (Decade)

1970-1980

Arcade system boards have been using specialized graphics circuits since the 1970s. In early video game hardware, the RAM for frame buffers was expensive, so video chips composited data together as the display was being scanned out on the monitor.

1980-1990

The NEC µPD7220 was the first implementation of a PC graphics display processor as a single Large Scale Integration (LSI) integrated circuit chip, enabling the design of low-cost, high-performance video graphics cards such as those from Number Nine Visual Technology.

1990-2000

All major PC graphics chip makers had added 2D acceleration support to their chips. Real-time 3D graphics were becoming increasingly common in arcade, computer and console games, which led to an increasing public demand for hardware-accelerated 3D graphics.

Software implementations of OpenGL were common during this time, although the influence of OpenGL eventually led to widespread hardware support.

2000-2010

Nvidia was first to produce a chip capable of programmable shading. The introduction of the ATI Radeon 9700, the world's first Direct3D 9.0 accelerator, pixel and vertex shaders could implement looping and lengthy floating point math, and were quickly becoming as flexible as CPUs, yet orders of magnitude faster for image-array operations.

Nvidia's CUDA platform, first introduced in 2007, was the earliest widely adopted programming model for GPU computing.

2010-Present

Nvidia launched the RTX 20 series GPUs that add ray-tracing cores to GPUs, improving their performance on lighting effects.

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[1] Source: Wikipedia
[2] Source: Wikipedia

AMD released the successor to their Graphics Core Next (GCN) microarchitecture/instruction set. Dubbed as RDNA, the first product line up featuring the first generation of RDNA was the Radeon RX 5000 series of video cards

Types of GPUs[3]

Dedicated Graphics Cards

The GPUs of the most powerful class typically interface with the motherboard by means of an expansion slot such as PCI Express (PCIe). The term "dedicated" refers to the fact that dedicated graphics cards have RAM that is dedicated to the card's use. This RAM is usually specially selected for the expected serial workload of the graphics card (see GDDR).

Technologies such as SLI and NVLink by Nvidia and CrossFire by AMD allow multiple GPUs to draw images simultaneously for a single screen, increasing the processing power available for graphics.

Integrated Graphics Cards

Integrated graphics processors (IGPs) utilize a portion of a computer's system RAM rather than dedicated graphics memory. IGPs can be integrated onto the motherboard as part of the (northbridge) chipset, or on the same die (integrated circuit) with the CPU (like AMD APU or Intel HD Graphics).

Applications[4]

Most GPUs are designed for a specific usage, real-time 3D graphics or other mass calculations:

Gaming
  - ➤ GeForce GTX, RTX
  - ➤ Nvidia Titan
  - ➤ Radeon HD, R5, R7, R9, RX, Vega and Navi series
  - ➤ Radeon VII

Cloud Gaming
  - ➤ Nvidia GRID
  - ➤ Radeon Sky

Workstation
  - ➤ Nvidia Quadro
  - ➤ AMD FirePro
  - ➤ AMD Radeon Pro

Cloud Workstation
  - ➤ Nvidia Tesla
  - ➤ AMD FireStream

Artificial Intelligence training and Cloud
  - ➤ Nvidia Tesla
  - ➤ AMD Radeon Instinct

Automated/Driverless car
  - ➤ Nvidia Drive PX

Major Manufacturers [5]

- • Nvidia

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[3] Source: Wikipedia
[4] Source: Wikipedia
[5] Source

- [AMD](#)
- [Asus](#)
- [Intel](#)
- [EVGA](#)
- [Gigabyte](#)

Latest Entries[6]

Manufacturer and Model	Launch Date	Specifications
[Nvidia GeForce RTX 3060 Ti](#)	February 25, 2021	➢ Architecture: Ampere ➢ Stream Processors: 4,864 ➢ Core Clock: 1.41 GHz (1.67 GHz boost) ➢ Memory: 8 GB GDDR6 ➢ Memory Clock: 14Gbps ➢ Outputs: HDMI 2.1, 3x DisplayPort 1.4a ➢ Power Connectors: 1x PCIe 8-pin ➢ Required Power: 600W
[Nvidia GeForce RTX 3090](#)	September 24, 2020	➢ Architecture: Ampere ➢ Stream Processors: 10,496 ➢ Core Clock: 1.40 GHz (1,70 GHz boost) ➢ Memory: 24 GB GDDR6X ➢ Memory Clock: 19.5Gbps ➢ Outputs: HDMI 2.1, 3x DisplayPort 1.4a ➢ Power Connectors: 2x PCIe 8-pin ➢ Required Power: 750W
[AMD Radeon RX 6700](#)	March 21, 2021	➢ Architecture: RDnA2 ➢ Stream Processors: 2,560 ➢ Core Clock: 2.32 GHz (2.58 GHz boost) ➢ Memory: 12GB GDDR6 ➢ Memory Clock: 16 Gbps ➢ Power Connectors: 8 pin + 6 pin ➢ Outputs: HDMI 2.1, DisplayPort 1.4 with DSC ➢ Required Power: 230W
[AMD Radeon RX 6900 XT](#)	December 8, 2020	➢ Architecture: RDnA2 ➢ Stream Processors: 5,210 ➢ Core Clock: 1.82 GHz (2.25 GHz boost) ➢ Memory: 16GB GDDR6 ➢ Memory Clock: 16Gbps ➢ Power Connectors: 2 x 8 pin ➢ Outputs: DisplayPort 1.4 with DSC, HDMI 2.1 VRR and FRL ➢ Required Power: 300W

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[6] [Source](#)