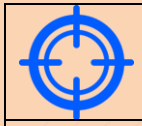
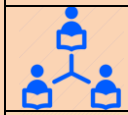
	**Module Focus/Specific Learning Outcomes:** make sure that you write the key unit objectives to be acquired at the end of the unit.
	**Learning Activity:** Complete a learning activity. This will help you to review or practise what you have learned and to prepare you for an assignment or an examination. You will not submit learning activities to your tutor/marker. Instead, you will compare your responses to those provided in the Learning Activity Answer Key found at the end of the applicable module.
	**Video/Flashcard app:** View a video.
	**Stop/Caution:** Use caution when conducting this learning activity or experiment.
	**Assignment:** Complete an assignment. You will submit your completed assignments to your tutor/marker for assessment in accordance with the chart found in the course Introduction.
	**Learning Partner:** Ask your learning partner to help you with this task.
	**Note:** Take note of and remember this important information or reminder.
	**Examination:** Write your final examination at this time.

UNIT 4	VOCABULARY	SKILLS WORK	FUNCTIONS	QUIZ
4 **Memories**	**Lead-in activity** Read the text and find particular information.	**Reading** Memories Adapters cards, Expansion slots **Listening** Watch a video about different types of computer memories	To understand the main functions of ROM and RAM To identify the components To broaden vocabulary connected to the topic To enhance reading comprehension To develop writing skills	8-question test to understand better the subject

In this unit, you will learn;

- To understand the difference between ROM and RAM
- To understand functions of adapter cards and expansion slots
- To identify some of their types
- To widen vocabulary knowledge of topic

UNIT 4

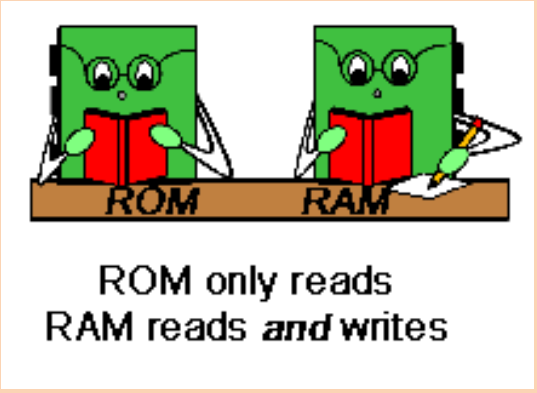
Memories

- ROM and RAM
- Adapter cards and expansion slots

1 Lead-in Activity:

Read the text and find the following.

1. Type of memory where basic instructions for operations are stored
2. The term that means unstable
3. The term for individual memory chips
4. What influences how much data a processor can process
5. Type of memory that is used as cache memory



ROM

Memory chips store data in the form of bytes. Bytes represent information such as letters, numbers, and symbols. A byte is a grouping of digital information in computing. A byte is most commonly a block of eight bits. Each bit is stored as either 0 or 1 in the memory chip.

Read-only memory (ROM) chips are located on the motherboard and other circuit boards. ROM chips contain instructions that can be directly accessed by a CPU. Basic instructions for operation, such as booting the computer and loading the operating system, are stored in ROM. ROM is non-volatile which means that its chips retain their contents even when the computer is powered down. The contents cannot be erased or changed by normal means.

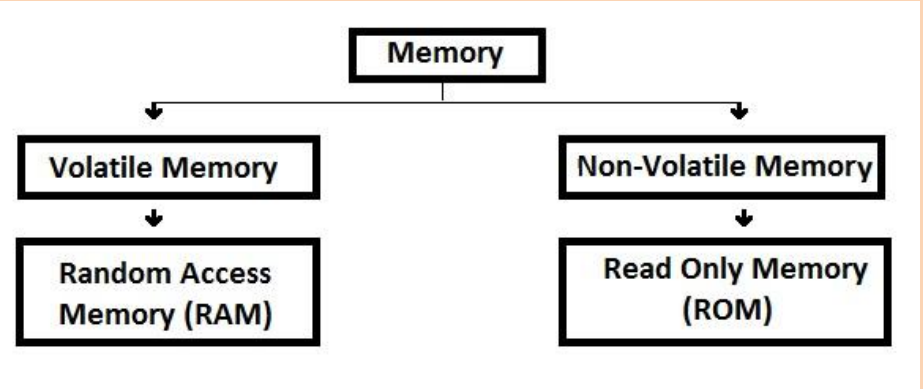
 **NOTE**: ROM is sometimes called firmware. This is misleading, because firmware is actually the software that is stored in a ROM chip.

RAM

RAM is the temporary storage for data and programs that are being accessed by the CPU. RAM is volatile memory, which means that the contents are erased when the computer is powered off. The more RAM in a computer, the more capacity the computer has to hold and process large programs and files. More RAM also enhances system performance. The maximum amount of RAM that can be installed is limited by the motherboard.

MEMORY MODULES

Early computers had RAM installed on the motherboard as individual chips. The individual memory chips, called dual inline package (DIP) chips, were difficult to install and often became loose. To solve this problem, designers soldered the memory chips on a special circuit board to create a memory module.



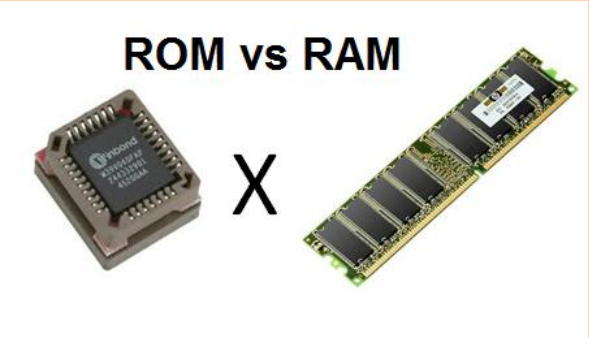
NOTE: Memory modules can be single-sided or double-sided. Single-sided memory modules contain RAM only on one side of the module. Double-sided memory modules contain RAM on both sides.

The speed of memory has a direct impact on how much data a processor can process, because faster memory improves the performance of the processor. As processor speed increases, memory speed must also increase. For example, single-channel memory is capable of transferring data at 64 bits per clock cycle. Dual-channel memory increases the speed by using a second channel of memory, creating a data transfer rate of 128 bits.

Double Data Rate (DDR) technology doubles the maximum bandwidth of Synchronous Dynamic RAM (SDRAM). DDR2 offers faster performance and uses less energy. DDR3 operates at even higher speeds than DDR2. However, none of these DDR technologies are backward- or forward-compatible.

CACHE

Static RAM (SRAM) is used as cache memory to store the most recently used data and instructions. SRAM provides the processor with faster access to the data than retrieving it from the slower dynamic RAM (DRAM), or main memory.



ERROR CHECKING

Memory errors occur when the data is not stored correctly in the RAM chips. The computer uses different methods to detect and correct data errors in memory.

2 **Watch a video about different types of computer memories and while watching fill in the missing words into the sentences. To watch, please click on the icon.**

1. Data and programs can only be used when moved to _____.
2. BIOS is _____ in ROM.
3. EPROM is the same as PROM, but we can _____ it if we have the right equipment.
4. EEPROM – we can change the contents of the memory just by running an _____.
5. SRAM is very _____.
6. SRAM is static memory which means that we don't have to constantly refresh it's _____ for it to be available to us, but it's still _____.
7. DRAM – without refreshing the data in the memory _____.
8. SDRAM – the memory itself is synchronized with the clock _____ of the memory bus.

3 **Read descriptions of different adapter cards and match column A with column B in the table.**

ADAPTER CARDS, EXPANSION SLOTS

Adapter cards increase the functionality of a computer by adding controllers for specific devices or by replacing malfunctioning ports. These are some common adapter cards that are used to expand and customize the capability of a computer:

A	B
Network Interface Card (NIC)	Provides the ability to watch and record television signals on a PC by connecting a cable television, satellite, or antenna to the installed tuner card.
Wireless NIC	Provides graphic capability.
Sound adapter	Connects SCSI devices, such as hard drives or tape drives, to a computer.
Video adapter	Connects a computer to peripheral devices.
Capture card	Connects a computer to a network using radio frequencies.
TV tuner card	Connects a computer to peripheral devices.
Modem adapter	Sends a video signal to a computer so that the signal can be recorded to the computer hard drive with Video Capture software.
Small Computer System Interface (SCSI) adapter	Connects multiple hard drives to a computer to provide redundancy and to improve performance.
Redundant Array of Independent Disks (RAID) adapter	Connects a computer to peripheral devices.
Universal Serial Bus (USB) port	Connects a computer to a network using a network cable.
Parallel port	Provides audio capability.
Serial port	Connects a computer to the Internet using a phone line.

Computers have expansion slots on the motherboard to install adapter cards. The type of adapter card connector must match the expansion slot.

A riser card was used in computer systems with the LPX form factor to allow adapter cards to be installed horizontally. The riser card was mainly used in slim-line desktop computers.

Communications and Networking Riser (CNR) is a special slot used for some networking or audio expansion cards. The CNR is not in use any more because many of the functions of the CNR are now found on-board the motherboard.

4 **Read the questions below and for each choose the correct answer a) – c**

1. **What kind of computer memory is both static and non-volatile?**
   a) RAM
   b) ROM
   c) Cache memory
2. **Where does most data go first within a computer's memory hierarchy?**
   a) RAM b) ROM c) BIOS
3. **What does BIOS stand for?**
   a) Biological internet operating system
   b) Binary inner/outer stages
   c) Basic input/output system
4. **When your computer's speed begins to drop, which element of memory is likely overtaxed?**
   a) Flash memory
   b) RAM
   c) ROM

5. **What is memory cache?**

   a) The amount of memory your computer has on hand for any particular task
   b) An outdated memory storage device
   c) A temporary memory storage device that keeps certain data available for quick reference

6. **What is latency?**

   a) The number of clock cycles needed to read a particular bit of information
   b) The gap between a processor's speed and a computer's bus speed
   c) Anything that causes a computer memory crash

7. **Which kind of computer memory is the first to activate when you turn on your computer?**

   a) RAM
   b) ROM
   c) BIOS

8. **What is clock cycle?**

   a) The accuracy of a computer's internal clock compared to an external one
   b) The amount of time it takes for a computer to recover something from memory after booting up
   c) The CPU's processing speed

Writing an informal letter/email

An informal letter or email is usually between people who know each other fairly well. There are a lot of similarities between informal letters and conversation. Informal letters ask a lot of questions, show interest and enthusiasm, and imagine a lot of shared information.

Start with ***Dear*** followed by the first name of the person to whom you are writing. In emails, you can also start with ***Hi*** (and the person's name). ***Dear Ben***, or ***Hi Ben***,

Useful phrases for the opening

- How are you? / How have the family been? / I hope you are well.
- Thank you / Many thanks for your (recent/last) letter / postcard.
- It was good / nice / great to hear from you again.
- I was so surprised to hear that...
- I'm sorry I haven't written / haven't been in touch for such a long time.
- It's ages since I've heard from you. I hope you're well / you and your family are well.
- How are things? / How are you? / How's it going?

Making suggestions and recommendations

- Why don't you …? / Maybe you could …? / How about …?
- You can't leave New York without (...doing sth)
- I'm sure you will enjoy (...doing sth). If you like, we can …
- Do visit ... / Don't forget to ...

5 **Your friend Jonny has asked you for help – see picture below. Write him an e-mail/letter answering his questions.**

Write a letter to Jonny to answer his questions.

6 **QUIZ - please click on the icon.**

Sources:

Resources available under creative commons licence [2015-12-12]

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https://www.youtube.com/watch?v=ygElbzv1S_w

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VIDEO, " Matching activity": https://youtu.be/p80zooiPMDA?list=UUiwKO-pQO-xj1WoSBjPn1-A

Quiz: http://glafka.cz/evet/unit4/quiz_u4/Computer_memory_quiz.htm