

DEPARTMENT OF EDUCATION- NATIONAL CAPITAL  
REGION SCHOOLS DIVISION OF PASAY CITY

MODULE IN TLE 9 (COMPUTER SYSTEM SERVICING)  
Second Grading / Week 3

Name of Student: \_\_\_\_\_

Name of Teacher: \_\_\_\_\_

Grade and Section: \_\_\_\_\_

WEEK 3: PERFORMING MENSURATION AND  
CALCULATION (PMC)



**EXPECTATIONS**

This module contains unit of competency on “PERFORMING MENSURATION AND CALCULATION (PMC)”. This covers the knowledge, skills, attitudes, and values needed in understanding concepts and underlying principles in performing measurements and calculations.

At the end of this module, you are expected to:

- perform calculation needed to calculate storage capacity of storage media using the four mathematical fundamental operations: addition (+), subtraction (-), multiplication (x), and division (÷);
- use calculation involving fractions, percentage, and mixed numbers to complete workplace tasks; and
- self-check and correct numerical computation for accuracy.



**PRETEST**

**Directions:** The table below shows the storage capacities of computers. Arrange the following unit measurement system from the lowest to highest. 1 being the lowest and 9 being the highest.

|  |                |
|--|----------------|
|  | Zettabyte (ZB) |
|  | Terabyte (TB)  |
|  | Exabyte (EB)   |
|  | Gigabyte (GB)  |
|  | Kilobyte (KB)  |
|  | Yottabyte (YB) |
|  | Megabyte (MB)  |
|  | Byte (B)       |
|  | Petabyte (PB)  |



### **LOOKING BACK**

In the previous lesson, you have learned that computer data is represented using binary, a number system that uses 0s and 1s. Some of your computer files such as software, music, documents, and any other information that is processed by a computer is also stored using binary.

Before you proceed to our new topic, Convert the following letters to binary number system using UTF-8 binary code.

|             |  |
|-------------|--|
| 1. ICT      |  |
| 2. TLE      |  |
| 3. Bit      |  |
| 4. Love     |  |
| 5. Computer |  |



### **BRIEF INTRODUCTION**

## **ACTIVITY 1**

Look and list down different storage media around you. Then, write its type and storage capacity as shown in the table below:

| <b>Storage Media</b><br>(Ex. Memory Card,<br>Flashdrive) | <b>Type</b><br>(Magnetic/Optical/Flash<br>Memory) | <b>Capacity</b><br>(Example:<br>KB,MB,GB,T) |
|--|---|---|
| Ex. CD-ROM   | Optical   | 700 MB                                      |
| 1.   |   |   |
| 2.   |   |   |
| 3.   |   |   |
| 4.   |   |   |
| 5.   |   |   |

Before deciding what kind or type of storage device you need to use, it is important to identify the requirements or specification of your data storage. When deciding on the type of device needed, you should consider cost, capacity, speed of access, portability, durability, and reliability.

From the past lesson, you learned that the binary number system uses only two symbols, 0 or 1. This is how a computer stores information and into the indicated storage device such as a hard drive.



### **REMEMBER**

The most common unit of digital data storage is a **bit**. It is also called as binary and it is considered as the standard unit in which a computer stores data. To increase the size of information stored, bits are clustered into groups of eight, which equals to a **byte**. This measurement process continues exponentially (8 bits = 1 byte, 1 kilobyte = 1,024 bytes, etc.).

The table below shows the unit measurement system which helps users understand the storage process of computers. Here is a basic table to illustrate how the units increase exponentially.

|                  |            |
|------------------|------------|
| 1 Byte (B)       | 8 bits     |
| 1 Kilobyte (KB)  | 1024 bytes |
| 1 Megabyte (MB)  | 1024 KB    |
| 1 Gigabyte (GB)  | 1024 MB    |
| 1 Terabyte (TB)  | 1024 GB    |
| 1 Petabyte (PB)  | 1024 TB    |
| 1 Exabyte (EB)   | 1024 PB    |
| 1 Zettabyte (ZB) | 1024 EB    |
| 1 Yottabyte (YB) | 1024 ZB    |

As you can see, the conversions vary from a standard system such as the metric system. 1 kilobyte does not convert to 1,000 but instead 1,024 bytes. The process simplifies and allows quick calculations due to the pattern of growth (1024KB to 1024MB to 1024GB etc.).

Have you ever thought of how many files can be stored in a storage media? Here are the steps on how to calculate how many files can be stored in a storage media.

### Calculating Storage Capacity

To calculate how much data can be stored within a certain capacity you need to understand three things:

1. The size of the data being stored.
2. The available space (capacity) for storing the data.
3. How to convert between the relevant units?

### Situation #1

If the size of an average digital photograph is 8MB, how many photographs can be stored on a 32GB SD card?

1. Convert the available capacity from GB to MB by multiplying by 1024:

$$\begin{array}{rcl}
 32 & \text{(GB)} & \\
 \times 1024 & \text{(Megabytes)} & \\
 \hline
 = 32,768 & \text{(MB available storage)} & 
 \end{array}$$

2. Divide the available space by the space required for one image to find how many can be stored in total:

$$\begin{array}{r} 32,768 \text{ (MB total storage)} \\ \div \quad 8 \text{ (MB per image)} \\ \hline = 4,096 \text{ images} \end{array}$$

**Answer:** 4,096 images can be stored on a 32 GB SD card.

## **Situation #2**

Suppose there are 140 music files, each of which is approximately 6 megabytes in size and 1 gigabyte USB memory stick on which these files are to be stored. In order to identify how much storage space is required to store all these files on the USB memory stick, the following calculation can be used:

$$\begin{array}{r} 140 \text{ (music files)} \\ \times \quad 6 \text{ (megabytes size of each music file)} \\ \hline = 840 \text{ (megabytes size of data being stored)} \end{array}$$

To determine whether the USB memory stick has enough capacity to store all 140 music files, the units used for both the files and the storage device need to be the same. The size of the music files is in megabytes, so the capacity of the USB will also need to be converted to megabytes. In this example, the USB memory stick has a 1 gigabyte capacity.

$$1 \text{ gigabyte} = 1024 \text{ megabytes}$$

The capacity of the USB memory stick is now expressed in megabytes. The following calculation will determine how many 6 megabyte files this storage device can hold.

$$\begin{array}{r} 1024 \text{ (megabytes)} \\ \div \quad 6 \text{ (megabytes)} \\ \hline = 166.66 \text{ files (music files can fit to 1024 megabytes of} \\ \text{USB memory stick)} \end{array}$$

**Answer:** As there are 140 music files, they will all fit on the USB memory stick.

This process can be applied to files of any types and sizes:

| File type               | Typical size  | Quantity 1 gigabyte USB memory stick could hold   |
|-------------------------|---------------|---|
| Word processed document | 50 kilobytes  | 1 gigabyte = 1,000 megabytes,<br>1000 megabytes = 1,000,000 kilobytes, $1,000,000 / 50 = 20,000$ word processed files |
| Image file              | 100 kilobytes | 1 gigabyte = 1,000 megabytes,<br>1000 megabytes = 1,000,000 kilobytes, $1,000,000 / 100 = 10,000$ image files         |
| Video file              | 100 megabytes | 1 gigabyte = 1,000 megabytes,<br>$1,000 / 100 = 10$ video files   |

Most files in our computer contain thousands of bytes and file sizes are often measured in kilobytes. Larger files, such as images, videos, and audio files, contain millions of bytes and are measured in megabytes. Modern storage devices can store thousands of these files, that is why storage capacity is typically measured in gigabytes or even terabytes. Being familiar on the process and how the digital unit conversion measurements help you understand sizes of storage devices.



### **CHECKING YOUR UNDERSTANDING**

**Directions:** Compute how much data can be stored within a certain data storage. Show your solution.

1. Heaven has a smart phone with 6GB of storage. She wants to store music on her phone. A typical mp3 encoded music file takes up 4MB. How many tracks can be stored on her phone?
2. Keiffer wants to store photos on his phone with 32 GB of storage. Given that a typical photo taken by a phone will be around 2MB, How many pictures can be stored on his phone?



### **POSTTEST**

**Directions:** Match column A with column B about equivalent conversion of the following unit of measurement in the storage process of computers. Write the chosen letter in the answer sheet provided.

I.

| Column A          | Column B      |
|-------------------|---------------|
| 1. Byte (B)       | A. 1024 KB    |
| 2. Kilobyte (KB)  | B. 1024 PB    |
| 3. Megabyte (MB)  | C. 8 bits     |
| 4. Gigabyte (GB)  | D. 1024 MB    |
| 5. Terabyte (TB)  | E. 1024 ZB    |
| 6. Petabyte (PB)  | F. 1024 TB    |
| 7. Exabyte (EB)   | G. 1024 GB    |
| 8. Zettabyte (ZB) | H. 1024 EB    |
| 9. Yottabyte (YB) | I. 1024 bytes |
|                   | J. 1024 bits  |

II. **Directions:** Compute how much data can be stored within a certain data storage. Show your solution.

1. Freya has a photo that is 2MB. How many of these can she store on his 3GB memory stick?
2. Alice has 600 MB of data and Alucard has 2000 MB of data. Will it all fit on Alice's 4 GB thumb drive?
3. Esmeralda has 100 small images. Each of which is 500 KB. How much space does she take up overall in MB?

## References

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## WEEK 4: PERFORMING MENSURATION AND CALCULATION (PMC)



### **EXPECTATIONS**

This module contains unit of competency on PERFORMING MENSURATION AND CALCULATION (PMC)". This covers the knowledge, skills, attitudes, and values needed in understanding of concepts and underlying principles in performing measurements and calculations.

At the end of this module, you are expected to:

- ensure proper handling of storage media to avoid damage; and
- identify tasks to be undertaken for proper storage of instruments according to manufacturer's specifications and standard operating procedures.



### **PRETEST**

**Directions:** Read each question carefully. Choose the letter of the best answer and write it on your answer sheet.

1. It is the most common type of storage used in computers.
  - A. Flash memory devices
  - B. Magnetic storage devices
  - C. Optical storage devices
  - D. Storage media devices
2. It is a data-storage medium used transferring data between a personal computer (PC) and other digital devices.
  - A. Flash memory devices
  - B. Magnetic storage devices
  - C. Optical storage devices
  - D. Storage media Devices
3. It is a portable storage device which connects a computer via USB port.
  - A. Hard drive
  - B. Memory card
  - C. Thumb drive
  - D. SD card
4. It is an internal hard drive is the main storage device in a computer.
  - A. Hard drive
  - B. Memory card
  - C. Thumb drive
  - D. SD card
5. It uses lasers and lights as its method of reading and writing data.
  - A. Flash memory devices

- B. Magnetic storage devices
  - C. Optical storage devices
  - D. Storage media devices
6. It should be pulled out safely from the PC after use because it could result to full damage of the disk.
- A. Blu-ray disc
  - B. CD-ROM
  - C. Memory Card
  - D. Optical Disks
7. It should be maintained and cleaned on a regular basis to prevent damage to media.
- A. Drives
  - B. RAM
  - C. ROM
  - D. SD card
8. It causes the melting of electronic elements in the storage media.
- A. Air
  - B. Heat
  - C. Liquid
  - D. Magnetic field
9. It is the data-carrying layer of the optical disk which is the most prone to damage.
- A. Both surface
  - B. Lower surface
  - C. Side surface
  - D. Upper surface
10. There should be enough \_\_\_\_\_ to prevent damaging your devices with moisture or heat.
- A. Air supply
  - B. Electricity supply
  - C. Heat supply
  - D. Magnetic supply



### **LOOKING BACK**

In the previous lesson, you have learned the importance to have a knowledge about the process of digital unit conversion or measurements which helps you understand how to save data in a storage media. Let us review on how to calculate data storage media.

### **Situation:**

France has a memory card with 8GB of storage. He wants to store photos on his phone. How many pictures can be stored in his phone if one picture is equal to 5MB?



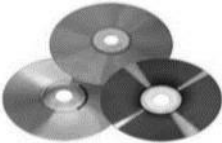

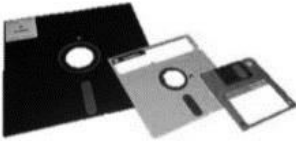




## BRIEF INTRODUCTION

### ACTIVITY 1

Recognize the following components of your computer system:

| Name That Device!   |  |
|---|--|
|    |  |
|    |  |
|  |  |
|  |  |
|  |  |

A storage device is a piece of computer hardware used for storing data. It can keep and hold information in short-term or long-term. It comes in different shapes and sizes depending on the needs and functionalities. It is important to take care of the storage devices of your computer system.



## REMEMBER

A **storage device** is any hardware capable of holding information either temporarily or permanently.

There are two types of storage devices used in computers: a **primary storage** device, such as RAM, and a **secondary storage** device, such as a hard drive. Secondary storage can be removable, internal, or external.

Here are some of the examples of storage devices:

1. **Magnetic storage devices** – are the most common type of storage used in computers.
  - a. Floppy diskette - A 3 ½ inches disk that can store 1.44 MB of data.
  - b. Hard drive - An internal hard drive is the main storage device in a computer. It stores the operating system, software applications or programs and the majority of computer's data.
2. **Optical storage devices** - use lasers and lights as its method of reading and writing data.
  - a. Blu-ray disc – it can store up to 25 GB single-layer disc (50 GB on a dual-layer disc), and are the same size as a standard CD.
  - b. CD-ROM disc (Compact Disc Read-Only Memory) - an optical storage device that is read-only or cannot be modified nor deleted.
  - c. CD-R (CD-Recordable) discs- are recordable disc that can be written to once.
  - d. CD-RW (CD-ReWritable) disc - is a rewritable disc that can be written to multiple times.
  - e. DVD-R (DVD-Recordable) discs – are recordable discs that can be written to once.
  - f. DVD-RW (DVD-ReWritable) - are rewritable discs that can be written to multiple times.
3. **Flash memory devices** – It is a data-storage medium used transferring data between a personal computer (PC) and other digital devices.
  - a. USB flash drive, jump drive, or thumb drive – it is a portable storage device. It connects to a computer via a USB port. Flash drives are an easy way to store and transfer information between computers and range in sizes from 2 GB to 1 TB.
  - b. Memory card – it is a type of storage media that is often used to store photos, videos, or other data in electronic devices.
  - c. SD Card (Secure Digital card) - it is one of the more common types of memory cards used with electronics.

## **How to Take Care of Storage Media?**

**Storage Media** should not be allowed to encounter liquids, dust, or smoke, and should not be exposed to either extreme heat or direct sunlight. It should be kept away from potential sources of magnetic fields, including electrical equipment. Drives should be maintained and cleaned on a regular basis to prevent damage to media.

**Optical Disks** should only be handled by the extreme edges or the center hole, and the recording surface must not be touched. The upper surface of optical discs is the data-carrying layer, which is the most prone to damage.

**Flash memory devices** should be kept away from static electricity and humid places.

### **Put storage devices at room temperature.**

Storage devices should not be stored to extremely cold or hot places. Heat causes melting of electronic elements in the storage media. Make sure that the place of storage has enough air supply and proper ventilation to prevent damaging your devices with moisture or heat.

### **Do not place the devices on top of other electronics**

Do not place your USB Flash drives near a gaming set or TV set for a long period because it leads to data damage.

### **Eject the devices safely**

It is important to make sure that you always safely remove your storage devices from your computer. Pulling the USB or memory card without safely removing it from the PC after use results to full damage of the disk.

### **Maintain integrity of your files**

Install antivirus applications on your computer that will actively scan for malware when any type of removable media or device is connected.

### **Keep it safe**

To avoid losing important data on your storage media, be sure to have a copy or back up your files. For example, you can use cloud-based storage servers. This is a system that enables computer you safely store data for future use.



### CHECKING YOUR UNDERSTANDING

**Directions:** Read the following situations and give proper advices/tips.

Ashia purchased a new hard disk drive for her computer. Give her tips on how to maintain it.

- 
- 

Kirsten formatted her flashdrive due to virus. Give her tips on how to avoid data damage.

- 
- 

Joy received a memory card as a gift on her birthday. Give her advice on how to take care of the storage media.

- 
- 



### POSTTEST

**True or False.** Write **True** if the underlined word/s makes the statement correct and **False** if the statement is incorrect.

1. Storage media should not be allowed to encounter liquids, dust, or smoke, and should not be exposed to either extreme heat or direct sunlight.
2. Optical disks should be kept away from static electricity and humid places.
3. Do not place your USB flash drives near a gaming set or TV set for a long period because it leads to data damage.
4. It is important to make sure that you always safely remove your storage devices from your computer.
5. Flash memory devices should only be handled by the extreme edges or the center hole, and the recording surface must not be touched.
6. CD-R are recordable discs that can be written to once.
7. Blu-ray disc is an optical storage device that is read-only or cannot be modified nor deleted.
8. Memory card is a type of storage media that is often used to store photos, videos, or other data in electronic devices.
9. The floppy diskette is a 3 ½ inches disk that can store 1.44 MB of data.
10. The hard drive stores the operating system, software applications, or programs, and the majority of computer's data.

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MODULE IN TLE 9 (COMPUTER SYSTEM SERVICING)  
Second Grading / Week 3

ANSWER SHEET IN TLE 9 COMPUTER SYSTEMS SERVICING

Name: \_\_\_\_\_ School: \_\_\_\_\_  
Teacher: \_\_\_\_\_ Grade & Section: \_\_\_\_\_ Date: \_\_\_\_\_

PRETEST

**Directions:** The table below shows the storage capacities of computers. Arrange the following unit measurement system from lowest to highest. 1 being the lowest and 9 being the highest.

|  |                |
|--|----------------|
|  | Zettabyte (ZB) |
|  | Terabyte (TB)  |
|  | Exabyte (EB)   |
|  | Gigabyte (GB)  |
|  | Kilobyte (KB)  |
|  | Yottabyte (YB) |
|  | Megabyte (MB)  |
|  | Byte (B)       |
|  | Petabyte (PB)  |

LOOKING BACK

**Directions:** Convert the following letters to binary number system using UTF-8 binary code.

|             |  |
|-------------|--|
| 1. ICT      |  |
| 2. TLE      |  |
| 3. Bit      |  |
| 4. Love     |  |
| 5. Computer |  |

BRIEF INTRODUCTION OF THE LESSON

**Directions:** Look and list down different storage media around you. Then, write its type and storage capacity as shown in the table below:

| Storage Media<br>(Ex. Memory Card,<br>Flashdrive) | Type<br>(Magnetic/Optical/Flash Memory) | Capacity<br>(Example:<br>KB,MB,GB,T) |
|---|---|--------------------------------------|
| Ex. CD-ROM  | Optical                                 | 700 MB                               |
| 1.  |   |                                      |
| 2.  |   |                                      |
| 3.  |   |                                      |
| 4.  |   |                                      |
| 5.  |   |                                      |

CHECKING YOUR UNDERSTANDING

**Directions:** Compute how much data can be stored within a certain data storage. Show your solution.

1. Heaven has a smart phone with 6GB of storage. She wants to store music on her phone. A typical mp3 encoded music file takes up 4MB. How many tracks can be stored on her phone?
2. Keiffer wants to store photos on his phone with 32 GB of storage. Given that a typical photo taken by a phone will be around 2MB, How many pictures can be stored on his phone?

POSTTEST

I. **Directions:** Match Column A with Column B about equivalent conversion of the following unit of measurement in the storage process of computers.

|       | Column A          | Column B      |
|-------|-------------------|---------------|
| _____ | 1. Byte (B)       | A. 1024 KB    |
| _____ | 2. Kilobyte (KB)  | B. 1024 PB    |
| _____ | 3. Megabyte (MB)  | C. 8 bits     |
| _____ | 4. Gigabyte (GB)  | D. 1024 MB    |
| _____ | 5. Terabyte (TB)  | E. 1024 ZB    |
| _____ | 6. Petabyte (PB)  | F. 1024 TB    |
| _____ | 7. Exabyte (EB)   | G. 1024 GB    |
| _____ | 8. Zettabyte (ZB) | H. 1024 EB    |
| _____ | 9. Yottabyte (YB) | I. 1024 bytes |
|       |                   | J. 1024 bits  |

II. **Directions:** Compute how much data can be stored within a certain data storage. Show your solution.

1. Freya has a photo that is 2MB. How many of these can she store on his 3GB memory stick?
2. Alice has 600 MB of data and Cecillion has 2000 MB of data. Will it all fit on Alice's 4 GB thumb drive?
3. Emily has 100 small images, each of which is 500 KB. How much space do they take up overall in MB?

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CITY**

**MODULE IN TLE 9 (COMPUTER SYSTEM SERVICING)  
Second Grading / Week 4**

**ANSWER SHEET IN TLE 9 COMPUTER SYSTEMS SERVICING**

**Name:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Teacher:** \_\_\_\_\_ **Grade & Section:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**PRETEST**

- |          |          |          |          |           |
|----------|----------|----------|----------|-----------|
| 1. _____ | 3. _____ | 5. _____ | 7. _____ | 9. _____  |
| 2. _____ | 4. _____ | 6. _____ | 8. _____ | 10. _____ |

**LOOKING BACK (pls. do your computations here)**

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**BRIEF INTRODUCTION**

- 1.
- 2.
- 3.
- 4.
- 5.

**CHECKING YOUR UNDERSTANDING**

- A.** \_\_\_\_\_  
\_\_\_\_\_
- B.** \_\_\_\_\_  
\_\_\_\_\_
- C.** \_\_\_\_\_  
\_\_\_\_\_

**POSTTEST**

- |          |          |          |          |           |
|----------|----------|----------|----------|-----------|
| 1. _____ | 3. _____ | 5. _____ | 7. _____ | 9. _____  |
| 2. _____ | 4. _____ | 6. _____ | 8. _____ | 10. _____ |