MODULE IN TLE 9 (COMPUTER SYSTEM SERVICING)
Second Grading / Week 1

Name of Student: _____   Name of Teacher:_____

Grade and Section: _____

WEEK 1: PERFORMING MENSURATION AND CALCULATION (PMC)

EXPECTATIONS

   This module contains unit of competency on "PERFORMING MENSURATION AND CALCULATION (PMC)". This covers knowledge, skills, attitudes, and values needed to select measuring instruments and its specifications such as memory, data storage capacity, processor, and video card.

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

- identify object/s or component to be measured;
- obtain correct specifications from relevant source; and
- select measuring tools in line with job requirements.

PRETEST

   Directions: Match items on column A with column B. Write your answers on your answer sheet.

COLUMN A	COLUMN B
1. It is a memory unit that connects directly to the CPU is the primary memory.	A. Cache Memory
2. It must be continually refreshed in order to maintain the data.	B. Main memory
3. It can be erased one byte at a time, rather than erasing the entire chip.	C. Read-only memory
4. The memory retains its contents as long as power is being supplied.	D. Electrically Erasable Programmable ROM or EEPROM
5. It contains instructions that can be directly accessed by the CPU.	E. Programmable ROM or PROM
6. It can be programmed only once and is not erasable.	F. Secondary memory
7. It is non-volatile in nature and is used to store programs and data when they are not being processed.	G. Electrically Erasable Programmable ROM or EEPROM

8. It is read-only memory that can be modified only once by a user.	H. Static RAM or SRAM
9. It acts as a buffer between the CPU and the main memory.	I. Dynamic Ram or DRAM
10. It can be erased by exposing it to ultra-violet light for a duration of time.	J. Erasable Programmable ROM or EPROM
	K. DDR2 RAM or double data rate two
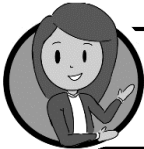
In the previous lesson, you have learned the different ways on how to maintain a computer, file maintenance, how to backup files, and updating your programs and applications. Before you proceed to our new topic, let us recall different maintenance procedures.

Directions: Identify the following. Write your answers on your answer sheet.

1. • It checks the integrity of files and folders on a hard drive by scanning the file system.

2. • It deletes various system files on a hard drive by searching for files that can be safely deleted.

3. • It is a process of duplicating files, folder, and programs.

4. • It is the practice of keeping computer in a good state and physical health.

5. • It is the routine changes, updates, copying, moving, or deleting of files on a computer.

ACTIVITY 1

Read and try to remember as many words as possible for three minutes. After three minutes, write down the words that you can remember from the list within a minute.

1. read, pages, letters, school, study, reading, stories, sheets, cover, pen, pencil, magazine, paper, words

2. house, pencil, apple, shoe, book, flag, rock, train, ocean, hill, music, water, glass, school

3. sheets, pillow, mattress, blanket, comfortable, room, dream, lay, chair, rest, tired, night, dark, time

4. door, tree, eye, song, pillow, juice, orange, radio, rain, car, sleep, cat, dream, eat

A computer memory is just like a human brain. It is used to store data and instructions. Computer memory is the storage space in the computer where data is to be processed and instructions required for processing are stored.

Different computer components have different role for a computer component to work. These types of components and objects are to be measured and should have the correct specification to work properly.

REMEMBER

Computer Memory is any physical device capable of storing information temporarily, like RAM (Random Access Memory), or permanently, like ROM (Read-Only Memory). Memory devices utilize integrated circuits and are used by operating systems, software, and hardware.

There are two types of computer memory. **Volatile memory (RAM) and Non-volatile memory (ROM)**. Computer memory is based on the two factors that include access time and capacity. The faster the speed of the memory, the lesser will be the access time.

Categories of Memory

1) Main Memory or Primary Memory
　　The main memory unit connects directly to the CPU is the primary memory. Furthermore, there are two types of primary memory:

A. Random Access Memory - RAM is also known as the volatile memory. It is the system's short-term memory. When accessing data and programs that are being processed by the CPU, RAM is the temporary storage until the data is needed. RAM is volatile memory, which means that the contents are erased when the computer is powered off. RAM is measured in megabytes (MB) or gigabytes (GB). RAM can be divided into two categories:

- Static RAM or SRAM – indicates the memory to retain its contents as long as power is being supplied. However, the data is lost when the power goes down due to volatile nature.
- Dynamic Ram or DRAM - must be continually refreshed in order to maintain the data.

Types of RAM:
- EDO RAM or Extended Data Out - is a type of memory developed in 1995 by Micron and was first used with Pentium computers.
- SDRAM or Synchronous DRAM - is a type of memory that synchronizes itself with the computer's system clock.
- DDR RAM or Double Data Rate - utilizes both the rising and falling edge of the system clock, potentially doubling the speed of the memory.
- DDR2 RAM or Double Data Rate Two - can operate at greater speeds than DDR, offers a greater bandwidth potential, operates on less power, and generates less heat.
- DDR3 RAM or Double Data Rate Three - have bus clock speed of 400 MHz up to 1066 MHz, range in size from 1GB to 24 GB. DDR3 RAM sticks for a desktop computer have 240 pins. For a laptop computer, DDR3 RAM sticks have 204 pins.
- DDR4 RAM or Double Data Rate Four - has bus clock speeds that range from 800 to 1600 MHz and range in storage capacity from 4GB to 128 GB.

B. Read-Only Memory - contains instructions that can be directly accessed by the CPU. Basic instructions for booting the

computer and loading the operating system are stored in ROM. Data or information that is stored in ROM keeps its contents even when the computer if turned off. ROM has three categories which are:

- Programmable ROM or PROM - is Read-Only Memory that can be modified only once by a user. It can be programmed only once and is not erasable.
- Electrically Erasable Programmable ROM or EEPROM - can be erased one byte at a time, rather than erasing the entire chip. Therefore, the process of reprogramming is flexible but slow.
- Erasable Programmable ROM or EPROM - can be erased by exposing it to ultraviolet light for a duration of up to 40 minutes.

2) Auxiliary Memory or Secondary Memory

Secondary memory is a permanent storage device. It is non-volatile in nature and used to store programs and data when they are not being processed. Because of this, the data remains in the same stage as long as they are not deleted or rewritten from the user's end. A secondary memory includes devices such as:

- Optical disks like DVD, CD, and Blue-ray disks
- Magnetic disks like memory stick, floppy disk, and hard disk drive
- Solid state disks like the thumb drive, pen, and flash

3) Cache Memory

It acts as a buffer between the CPU and the main memory. It is used to hold those parts of data and program which are most frequently used by the CPU. The parts of data and programs are transferred from the disk to cache memory by the operating system from where the CPU can access them.

Data storage capacity. Storage capacity represents how much disk space can one or more storage devices provides. It measures how much data a computer system may contain. For an example, a computer with a 500GB hard drive has a storage capacity of 500 gigabytes.

Processor. A processor is an integrated electronic circuit that performs the calculations that runs a computer. A processor's speed is measured in megahertz (MHz), or millions of instructions per second; and

gigahertz (GHz), or billions of instructions per second. A faster processor can execute instructions more rapidly.

Video card. A video card is used to process images so they can be displayed on your monitor. An upgraded and faster video card is helpful if you are playing games or dealing with photo and video editing.

Along with this one you may also ask units and measurements as to how memory in computers is measured. We all use a hard disk and a pen drive to transfer the data from one place to another. But what are its units? Computer measures data in many forms such as Megabyte, Kilobyte, Byte, Bit, Nibble, Terabyte, Gigabyte, Exabyte, Petabyte, and many more. Here are the conversions of these data into one form or another:

8 Bits	-	1 Byte
Bytes (1024)	-	KiloByte (1KB)
KB (1024)	-	MegaByte (1MB)
MB (1024)	-	GigaByte (1GB)
GB (1024)	-	TeraByte (1TB)
TB (1024)	-	PetaByte (1PB)
PB (1024)	-	ExaByte (1EB)
EB (1024)	-	ZettaByte (1ZB)
ZB (1024)	-	YottaByte (1YB)
1 YB	-	BrontoByte
1024 BrontoByte	-	1 GeopByte

In computer memory, bits are the smallest memory. While Geopbyte is the highest memory. 1 bit is the binary unit.

All components in your computer, such as the CPU, the hard drive, and the operating system, work together as a team, and memory is one of the most essential parts of this team. From the moment you turn on your computer until the time you shut it down, your CPU is constantly using memory.

Directions: Arrange the word/s properly and explain its use.

1. ymoemr

2. osroprsce

3. devoi rdca

4. eard-lyno omryme

5. omndra cecass omryme

POSTTEST

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

1. It is any physical device capable of storing information temporarily, like RAM (Random Access Memory), or permanently, like ROM (Read-Only Memory).
   - A. Auxiliary Memory
   - C. Random Access Memory
   - B. Computer Memory
   - D. Read Only Memory

2. It is also known as the volatile memory and the system's short-term memory.
   - A. Auxiliary Memory
   - C. Random Access Memory
   - B. Computer Memory
   - D. Read Only Memory

3. It contains instructions that can be directly accessed by the CPU.
   - A. Auxiliary Memory
   - C. Random Access Memory
   - B. Computer Memory
   - D. Read Only Memory

4. It indicates the memory to retain its contents as long as power is being supplied.
   - A. Dynamic Ram or DRAM
   - B. EDO RAM or Extended Data Out
   - C. SDRAM or Synchronous DRAM

D. Static RAM or SRAM

5. It must be continually refreshed to maintain the data.
    A. Dynamic Ram or DRAM
    B. EDO RAM or Extended Data Out
    C. SDRAM or Synchronous DRAM
    D. Static RAM or SRAM

6. It is a memory unit that connects directly to the CPU is the primary memory.
    A. Auxiliary Memory or Secondary Memory
    B. Cache Memory
    C. Computer Memory
    D. Main Memory or Primary Memory

7. It is an integrated electronic circuit that performs the calculations that runs a computer.
    A. Data storage capacity
    B. Memory
    C. Processor
    D. Video card

8. It represents how much disk space can one or more storage devices provides.
    A. Data storage capacity
    B. Memory
    C. Processor
    D. Video card

9. It acts as a buffer between the CPU and the main memory.
    A. Auxiliary memory or secondary memory
    B. Cache Memory
    C. Computer Memory
    D. Main memory or primary memory

10. It is used to process images so they can be displayed on your monitor.
    A. Data storage capacity
    B. Memory
    C. Processor
    D. Video card

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MODULE IN TLE 9 (COMPUTER SYSTEM SERVICING)
Second Grading / Week 2

Name of Student: _____   Name of Teacher: _____

Grade and Section: _____

WEEK 2: 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:

- select appropriate measuring instrument to achieve required outcome;
- obtain accurate measurements for job;
- perform calculation needed to complete task using the four mathematical fundamental operations: addition (+), subtraction (-), multiplication (x), and division (÷);
- use calculation involving fractions, percentages, and mixed numbers to complete workplace tasks; and
- self-check and correct numerical computation for accuracy.

PRETEST

Directions: Write **True** if the underlined word/s makes the statement correct and **False** if the statement is incorrect. Write your answers on your answer sheet.

1. A group of 8 bits is called a <u>nibble</u>.
2. Most <u>computers</u> can process millions of bits every second.
3. 8 bits (b) is equivalent to <u>1byte</u> (B) system which is made up of 10 numbers.
4. A <u>hard drive's</u> storage capacity is measured in gigabytes or terabytes.
5. The <u>binary system</u> on computers uses combinations of 1s and 2s.
6. This counting system is known as <u>decimal</u>, denary, or base 10.

7. A <u>number base</u> indicates how many digits are available within a numerical system.
8. <u>Binary</u> is known as base 10 because there are ten choices of digits between 0 and 9.
9. The binary system is also known as <u>base 2</u>.
10. Computers use <u>binary codes</u> to represent and interpret letters, numbers and special characters with bits.

In the previous lesson, you have learned that computer memory is a physical device capable of storing information. It is important because from the moment you turn on your computer until the time you shut it down, your CPU is constantly using memory. Before you proceed to our new topic, let us recall different categories and types of memory.
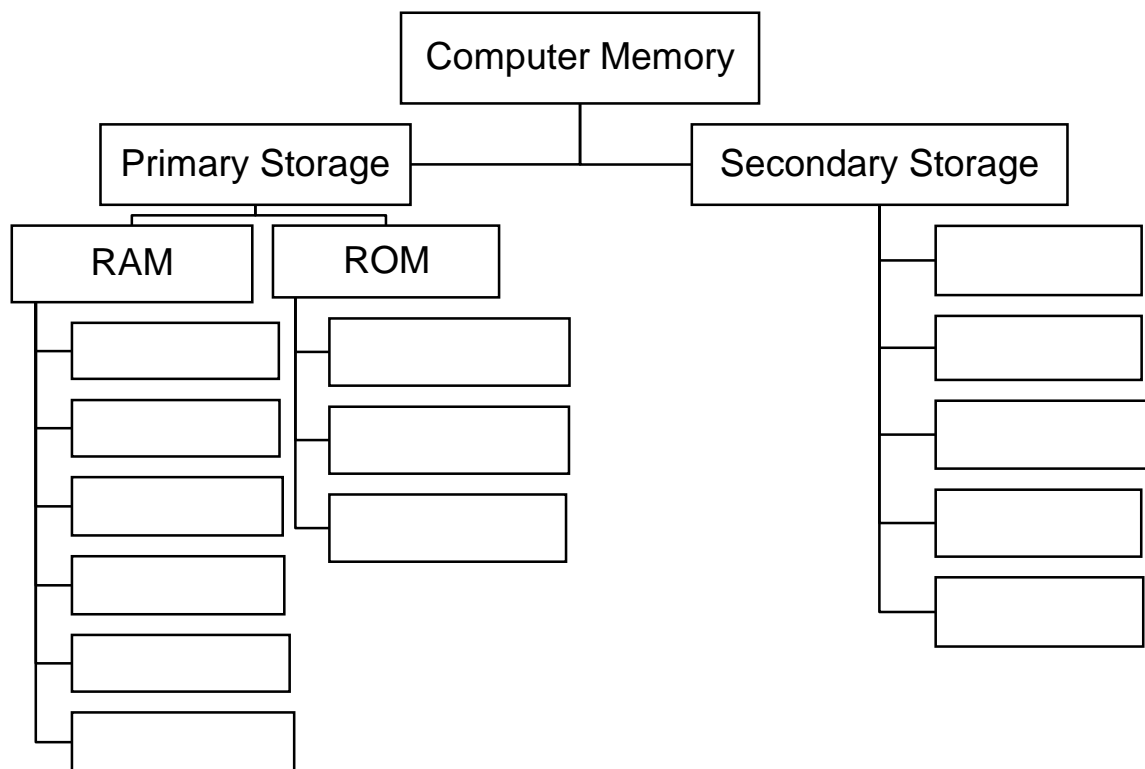
ACTIVITY 1

01001000 01100101 01101100 01101100 01101111 00100001

The ones and zeros above could be just numbers for you but in binary code the numbers mean "Hello!". Did you know that computers don't understand words or numbers the way humans do? All computer data is represented using binary, a number system that uses 0s and 1s. Binary digits can be grouped together into bytes.

Based on the table below, spell your name using UTF-8 binary code. Check for the 8-bit binary code sequence for each letter of your name, for example, if your name starts with the letter A, your first letter would be 01000001.

Character	Binary Code	Character	Binary Code
A	01000001	Q	01010001
B	01000010	R	01010010
C	01000011	S	01010011
D	01000100	T	01010100
E	01000101	U	01010101
F	01000110	V	01010110
G	01000111	W	01010111
H	01001000	X	01011000
I	01001001	Y	01011001
J	01001010	Z	01011010
K	01001011	a	01100001
L	01001100	b	01100010
M	01001101	c	01100011
N	01001110	d	01100100
O	01001111	e	01100101
P	01010000	f	01100110

Character	Binary Code	Character	Binary Code
g	01100111	w	01110111
h	01101000	x	01111000
i	01101001	y	01111001
j	01101010	z	01111010
k	01101011	!	00100001
l	01101100	"	00100010
m	01101101	#	00100011
n	01101110	$	00100100
o	01101111	%	00100101
p	01110000	&	00100110
q	01110001	'	00100111
r	01110010	(	00101000
s	01110011	)	00101001
t	01110100	*	00101010
u	01110101	+	00101011
v	01110110	,	00101100

FAITH	(Example)

- 01000110 01000001 01001001 01010100 01001000

REMEMBER

Computers use binary - the digits 0 and 1 to store data. The smallest unit of data in computing is called a binary digit, or bit. It is presented by a 0 or 1.

The tiny switch is called a transistor which is activated by the electronic signals it receives. The circuits in a computer's processor are made up of billions of transistors. The digits 1 and 0 used in binary reflect on and off states of a transistor.

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.

Bits can be grouped together to make them easier to work with. A group of 8 bits is called a byte. 8 bits (b) is equivalent to 1 byte (B) system which is made up of 10 numbers: 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. It is the most commonly used numbering system. The logic behind is convenience. We have 10 fingers that we use for counting so it is easier

to count with a base 10 numbering system. Therefore, decimal is widely used.

> Nibble - 4 bits (half a byte)
> Byte - 8 bits
> Kilobyte (KB) - 1000 bytes
> Megabyte (MB) - 1000 kilobytes
> Gigabyte (GB) - 1000 megabytes
> Terabyte (TB) - 1000 gigabytes

Most computers can process millions of bits every second. A hard drive's storage capacity is measured in gigabytes or terabytes. RAM is often measured in megabytes or gigabytes.

A number base indicates how many digits are available within a numerical system. The binary system on computers uses combinations of 0s and 1s. In everyday life, we use numbers based on combinations of the digits between 0 and 9. For binary numbers there are only two possible digits available: 0 or 1. The binary system is also known as base 2. Denary or base 10 in counting system is known as decimal. Denary is known as base 10 because there are ten choices of digits between 0 and 9.

Computers use binary codes to represent and interpret letters, numbers, and special characters with bits. A commonly used code is the American Standard Code for Information Interchange (ASCII). With ASCII, each character is represented by a string of bits.

For Example:
    Capital letter: F = 01000110
    Number: 1 = 00110001

Conversion from Decimal to Binary
Conversion can be done by dividing the decimal number by 2 repeatedly until the final result is 0. Divide the number by 2.
1. Compute the quotient and the remainder.
2. Bring down the quotient, divide it by 2, and get the quotient and remainder again.
3. Do it repeatedly until the quotient results to 0.
4. Copy the remainder from bottom to top and that is the binary equivalent.

For example, the decimal number 357 is converted to binary number as follows:

Division	Quotient	Remainder
357 / 2	178	1
178 / 2	89	0
89 / 2	44	1
44 / 2	22	0
22 / 2	11	0
11 / 2	5	1
5 / 2	2	1
2 / 2	1	0
1 / 2	0	1

Binary number is taken from the remainder starting from the last to the start, or in the illustration above, from bottom to top, which is 101100101.

Decimal number 357 is equivalent 101100101 in binary number.

Conversion from Binary to Decimal

Conversion can be done by plotting each binary digit value on each column corresponding to its decimal digit value. Each column is the number 2 raised to an exponent. The exponent increases by one from right to left. To get the total value you add the value of those columns tagged as ON or equivalent to 1.

For example, the binary number 101100101 is converted to decimal number as follows:

Exponent	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
Value	256	128	64	32	16	8	4	2	1
ON / OFF	1	0	1	1	0	0	1	0	1

Total value = (256+64+32+4+1) = 357.
Binary number 101100101 is 357 in decimal number.

Directions: Convert the following numbers to their binary equivalents. Show your solution.

1) 27^{10}
2) 33^{10}
3) 54^{10}
4) 47^{10}
5) 78^{10}

2^7 128	2^6 64	2^5 32	2^4 16	2^3 8	2^2 4	2^1 2	2^0 1	Answer
1	0	1	0	1	0	0	1	6)
0	0	1	1	0	0	1	0	7)
0	0	1	1	1	0	0	0	8)
0	1	1	0	0	0	1	0	9)
1	1	1	0	1	1	1	0	10)

POSTTEST

Directions: Choose the letter of the best answer. Write your answers on your answer sheet.

1. It is the smallest unit of data in computing.
   A. Binary
   B. Circuit
   C. Software
   D. Transistor
2. It is a tiny switch that is activated by the electronic signals it receives.
   A. Binary
   B. Circuit
   C. Software
   D. Transistor

3. These are sets of instructions that is translated into machine code. It is simple binary codes that activate the CPU.
  - A. Bits
  - B. Computer programs
  - C. Programmers
  - C. Software

4. It is represented by a 0 or a 1.
  - A. Binary
  - B. Circuit
  - C. Software
  - D. Transistor

5. It indicates how many digits are available within a numerical system.
  - A. Binary
  - B. Decimal
  - C. Denary
  - D. Number base

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MODULE IN TLE 9 (COMPUTER SYSTEM SERVICING)
Second Grading / Week 1

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

1. _____
2. _____
3. _____
4. _____
5. _____

BRIEF INTRODUCTION

1. _____
2. _____
3. _____
4. _____

CHECKING YOUR UNDERSTANDING

1. _____
2. _____
3. _____
4. _____
5. _____

POSTTEST

1. _____   3. _____   5. _____   7. _____   9. _____

2. _____   4. _____   6. _____   8. _____   10. _____

MODULE IN TLE 9 (COMPUTER SYSTEM SERVICING)
Second Grading / Week 2

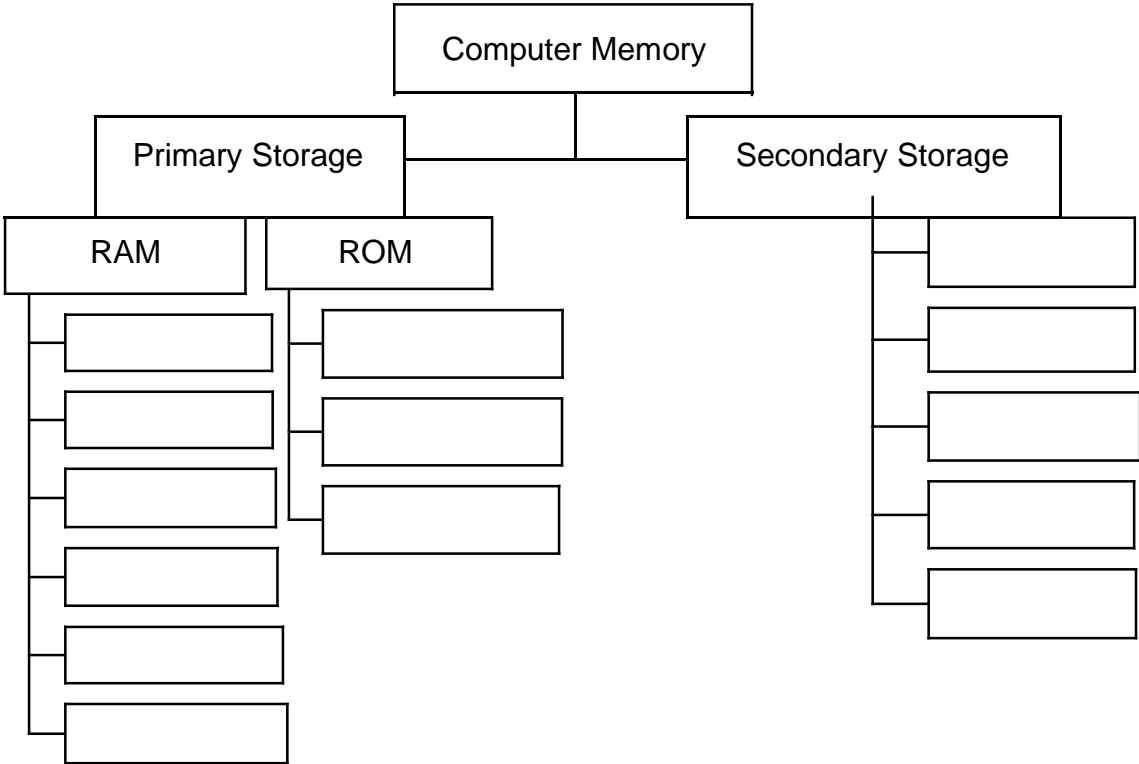## ANSWER SHEET IN TLE 9 COMPUTER SYSTEMS SERVICING

Name: _____ **School:** _____

Teacher: _____ **Grade & Section:** _____ **Date:** _____

PRETEST

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

LOOKING BACK

Directions: Recall and fill up the boxes with the different categories and types of memory.

```
                          ┌──────────────────┐
                          │ Computer Memory  │
                          └──────────────────┘
              ┌──────────────────┐      ┌──────────────────┐
              │ Primary Storage  │      │ Secondary Storage│
              └──────────────────┘      └──────────────────┘
        ┌──────────┐  ┌──────────┐              ┌──────────┐
        │   RAM    │  │   ROM    │              │          │
        └──────────┘  └──────────┘              └──────────┘
          ┌────────┐   ┌────────┐                ┌──────────┐
          │        │   │        │                │          │
          └────────┘   └────────┘                └──────────┘
          ┌────────┐   ┌────────┐                ┌──────────┐
          │        │   │        │                │          │
          └────────┘   └────────┘                └──────────┘
          ┌────────┐   ┌────────┐                ┌──────────┐
          │        │   │        │                │          │
          └────────┘   └────────┘                └──────────┘
          ┌────────┐                             ┌──────────┐
          │        │                             │          │
          └────────┘                             └──────────┘
          ┌────────┐
          │        │
          └────────┘
          ┌────────┐
          │        │
          └────────┘
```

BRIEF INTRODUCTION OF THE LESSON

Directions: Based from the table given in the module, spell your name using UTF-8 binary code. Check for the 8-bit binary code sequence for each letter of your name, for example, if your name starts with the letter A, your first letter would be 01000001.

| FAITH | (Example)
- 01000110 01000001 01001001 01010100 01001000

_____

_____

CHECKING YOUR UNDERSTANDING

Directions: Convert the following numbers to their binary equivalents. Show your solution.

1) 27_{10}

2) 33_{10}

3) 54_{10}

4) 47_{10}

5) 78_{10}

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	
128	64	32	16	8	4	2	1	Answer
1	0	1	0	1	0	0	1	6)
0	0	1	1	0	0	1	0	7)
0	0	1	1	1	0	0	0	8)
0	1	1	0	0	0	1	0	9)
1	1	1	0	1	1	1	0	10)

POSTTEST

1. _____   2. _____   3. _____   4. _____   5. _____