

Department of Education
SPTVE
COMPUTER SYSTEMS SERVICING 8
Specification of Materials and Components
Quarter 2: Week 1 Module



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EXPECTATIONS

At the end of the module, the learners are expected to:

1. identify the different cables/wires and electronic components used in computer and logic gates;
2. enumerate the different electronic components and its function;
3. perform resistor color coding properly; and
4. understand the value of cables, wires and electronic components in order for the computer to function properly.



PRE-TEST

Directions: Write the letter of the correct answer on a separate sheet of paper.

1. Which of the following is the standard cable used to connect a computer to a monitor or a television screen that is used to transfer video signals?
A. DVI B. HDMI C. USB D. VGA
2. A cable that sends both video and audio signals together and is compatible to new devices only?
A. DVI B. HDMI C. USB D. VGA
3. What electronic component is used to resist or oppose the flow of current?
A. capacitor B. diode C. resistor D. transistor
4. An electronic component used to amplify signals or switch electronic signal and electrical power in radios and computers is known as _____.
A. capacitor B. diode C. resistor D. transistor
5. Which of the following best explain the importance of different electronic components in the computer? It _____.
A. gives power C. maintains the cleanliness
B. stores information D. helps computer to function properly
6. What is the equivalent color code of $580\Omega \pm 10\%$?
A. green-gray-brown-silver C. green-blue-brown-gold
B. green-gray-brown-gold D. green-blue-brown-silver
7. Which of the following is the value of the resistor with Red-Blue-Black-Gold?
A. $26\Omega \pm 5\%$ B. $26\Omega \pm 10\%$ C. $260\Omega \pm 5\%$ D. $260\Omega \pm 10\%$
8. It is a cable that power up a computer by transmitting an electrical signal or power on it.
A. power cable B. ethernet cable C. firewire D. VGA
9. How many basic logic gates are present in an integrated circuit?
A. 5 B. 6 C. 7 D. 8
10. What kind of logic gate uses multiplication in getting the output?
A. AND B. NAND C. OR D. XOR



LOOKING BACK

Directions: Based on what you have learned about the lesson “Branding”, answer the following questions briefly on a separate sheet of paper.

1. What is branding?
2. What is the purpose of branding your product?
3. What will be the advantages of doing the SWOT analysis?



BRIEF INTRODUCTION

Specification of Materials and Components

Wires and Cables used in CSS

Wires and Cables are the common medium used to transmit signals in the computer. Computer uses both electrical and digital signal. Digital signal are also known as data signal that is transmitted through the use of cables. Below are examples of cables that transmit data signal:

- **Video Graphics Array (VGA)** used to connect a computer to a monitor or a television screen that is used to transfer video signals. The video graphic cable comes in two types, male and female connector.



Source: <https://tinyurl.com/u2kcxnzn> on 09/06/20

- **Digital Visual Interface (DVI)** is used to connect a video source, such as a video display controller, to a display device, such as a computer monitor. It sends digital or analog signals between sources and displays.



Source: <https://tinyurl.com/u3awcbuu> on 09/06/20

- **High Definition Multimedia Interface (HDMI)** unlike VGA and DVI, HDMI sends both video and audio signals together. The signals are digital only thus, HDMI is compatible to new devices only.



Source: <https://tinyurl.com/y2wgl4qb> on 09/06/20

- **Universal Serial Bus (USB)** is the most popular cable types available, used mostly to connect computers to other devices such as cellphones, tablets, etc.



Source: <https://tinyurl.com/u3u6c7nz> on 09/06/20

- **Integrated Drive Electronics (IDE)** is used to connect storage devices such as hard drive and optical drive to a motherboard. It has 40pins. It is also called as Parallel Advance Technology Attachment (PATA) cable.



Source: <https://tinyurl.com/u34k9t3c> on 09/06/20

- **Serial Advance Technology Attachment (SATA)** is the successor of IDE cable, it provides higher data transfer speeds. Recent motherboard uses SATA before of its advance technology.



Source: <https://tinyurl.com/yqdytj3an> on 09/06/20

- **Fire wire (IEEE 1394)** is similar to that of USB: high speed data transfer for computer peripherals. High bandwidth devices like printers and scanners will benefit from this. But Fire wire is not widespread as USB.



Source: <https://tinyurl.com/u2uc8up2> on 09/06/20

- **Ethernet Cable** is used to setup local area networks mostly to connect routers to modems and computers. It transfers data at a rate of 10Mbps, 100Mbps or 1 Gbps.



- **Power Cable** is also known as a power cord transmitting an electrical signal or power on it.

Source: <https://tinyurl.com/y4kf2vhn> on 09/06/20



Source: <https://tinyurl.com/yxh6vk5> on 09/06/20



Source: <https://tinyurl.com/y23ryvf> on 09/06/20



Source: <https://tinyurl.com/y5quvtsr> on 09/06/20

- **Audio Jacks** this type of jack is intended for the audio and microphone port.



Source: <https://tinyurl.com/y5lcuzo2> on 09/06/20

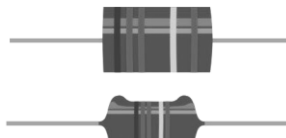
- **S-Video Jack** this type of jack is for S-Video port.



Source: <https://tinyurl.com/yxkz88qx> on 09/06/20

Electronic Components found in Computers

- **Resistor** used in circuit to control the flow of current to other components. So, a resistor is used to limit the current. The unit of resistor



<https://pixy.org/376363/> Image:1920X1086 on 09/08/20



is Symbol

<https://thenounproject.com/term/resistor/157068/> on 09/08/20

In order to read the value of a resistor, you will need a resistor color coding chart. See figure 1.1.

Figure 1.1 - Resistor Color Coding Chart

Standard EIA Color Code Table 4 Band: $\pm 2\%$, $\pm 5\%$, and $\pm 10\%$

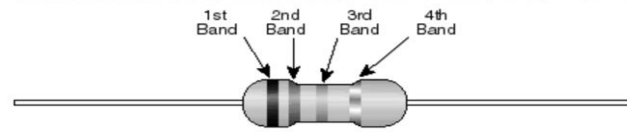


Image and Table Source: <https://www.parts-express.com/resources-resistor-color-code-chart> on 09/06/20

Color	1 st Band (1 st Figure)	2 nd Band (2 nd Figure)	3 rd Band (Multiplier)	4 th Band (Tolerance)
Black	0	0	10^0	
Brown	1	1	10^1	
Red	2	2	10^2	$\pm 2\%$
Orange	3	3	10^3	
Yellow	4	4	10^4	
Green	5	5	10^5	
Blue	6	6	10^6	
Violet	7	7	10^7	
Gray	8	8	10^8	
White	9	9	10^9	
Gold			10^{-1}	$\pm 5\%$
Silver			10^{-2}	$\pm 10\%$

When using the table, the first band and second band corresponds to the first and second color (just copy the number from the table), third band (note that third band is a multiplier, that means it is the number of 0's you will add to the first two numbers), and the fourth band (just copy what's in the table).

For example: Find the value of the resistor.

1. Red-Blue-Green-Gold
 $2 \quad 6 \quad \times 10^5 \quad \pm 5\%$
 $= 2,600,000 \pm 5\%$
 $= 2.6\text{M } \Omega \pm 5\%$

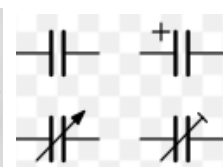
Take note: When the value reaches thousand, use k to represent it, sample $30,000\Omega \pm 5\%$ it will become $30\text{k}\Omega \pm 5\%$. While if the value reaches million, use M to represent it.

2. Black-Brown-Red-Silver
 $0 \quad 1 \quad \times 10^2 \quad \pm 10\%$
 $= 100 \pm 10\%$
 $= 100 \Omega \pm 10\%$

Take note: Do not forget to include the unit Ω in the final answer.

(Disregarded the zero in the first band since it doesn't have a value)

- **Capacitor** stores electrical energy and give this energy again to the circuit when necessary. It is also used to blocks the flow of direct current (DC) and permits the flow of alternating current (AC).



Symbol

[https://commons.wikimedia.org/wiki/File:Capacitors_\(7189597135\).jpg](https://commons.wikimedia.org/wiki/File:Capacitors_(7189597135).jpg)
on 09/08/20

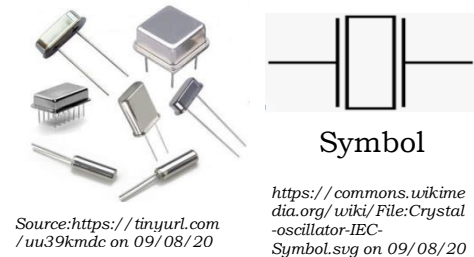
https://commons.wikimedia.org/wiki/File:Electrical_Symbols_IEC.svg
on 09/08/20

Additional Information: Direct current is a current that does not change if its 120 volts it is still 120volts; while Alternating current is a current that changes from time to time, sample if its 120volts it will become 100volts.

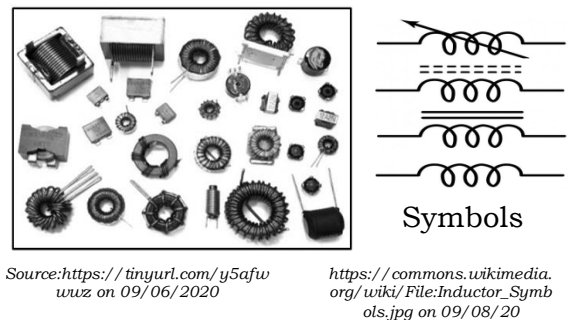
- **Transistor** is used to amplify signals or switch electronic signal and electrical power in radios, computers and etc. It consists of a small block of semiconductor with 3 electrodes.



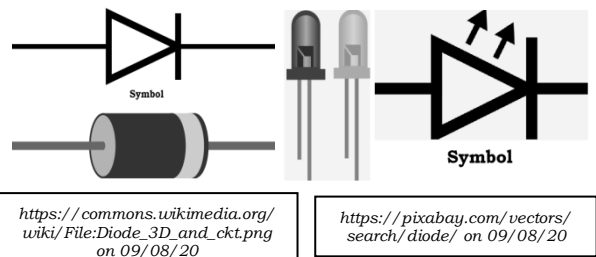
- **Oscillator** converts direct current (DC) from a power supply to an alternating current (AC) signal. They are widely used in many electronic devices ranging from simplest clock generators to digital instruments (like and complex computers and peripherals etc.



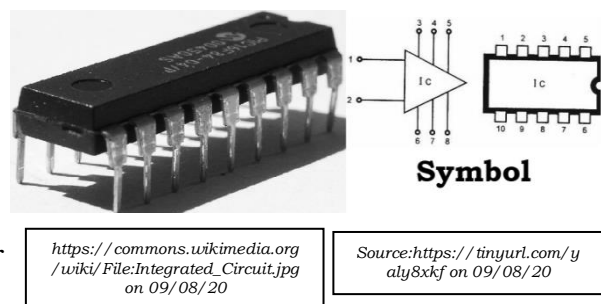
- **Coil/Inductor** is a passive two-terminal electrical component that stores energy in a magnetic field when electric current flows through it. An inductor typically consists of an insulated wire wound into a coil around a core.



- **Diode** is a semiconductor device that essentially acts as a one-way switch for current. It allows current to flow easily in one direction, but severely restricts current from flowing in the opposite direction.



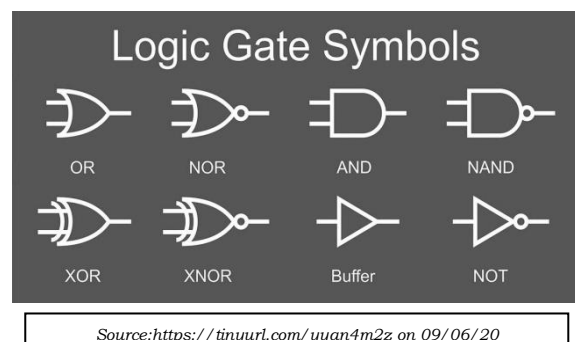
- **Integrated Circuit (IC)** also called a chip or microchip, is a semiconductor wafer on which thousands or millions of tiny resistors, capacitors and transistors are fabricated. An IC can function as an amplifier, oscillator, timer, counter, computer memory, or microprocessor.



Basic Logic Gates

A logic gate is a small transistor circuit, basically a type of amplifier, which is implemented in different forms within an integrated circuit. Each type of gate has one or more (most often two) inputs and one output.

The principle of operation is that the circuit operates on just two voltage levels, called logic 0 and logic 1. When either of

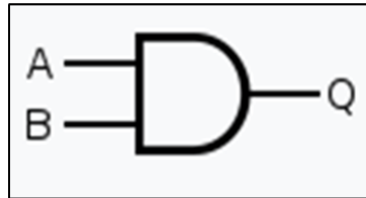


these voltage levels is applied to the inputs, the output of the gate responds by assuming a 1 or a 0 level, depending on the particular logic of the gate. The logic rules for each type of gate can be described in different ways, by a written description of the action, by a truth table, or by a Boolean algebra statement.

Kinds of Logic Gates

- **AND Gate** A circuit which performs an AND operation is shown in figure. It has two inputs and one output. In simple way, by obtaining the output, just multiply the inputs.

Logic Diagram



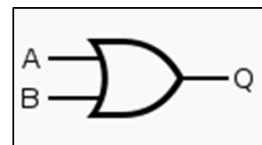
Truth Table

INPUTS		OUTPUT
A	B	Q
0	0	0
0	1	0
1	0	0
1	1	1

https://en.wikipedia.org/wiki/NOR_logic on 09/06/20

- **OR Gate** A circuit which performs an OR operation is shown in figure. It has two inputs and one output. In simple way, just add the inputs to get the output. But in terms of 1+1 the answer will still be 1, since the only number present in logic gates is 0 and 1.

Logic Diagram



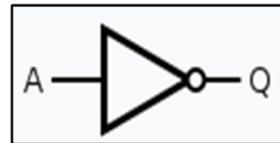
Truth Table

INPUTS		OUTPUT
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

Source:https://en.wikipedia.org/wiki/NOR_logic on 09/06/20

- **NOT Gate** NOT gate is also known as Inverter. It has one input A and one output Y. That means, you just reverse the input to get the output.

Logic Diagram



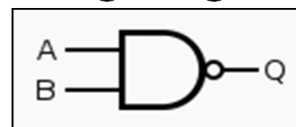
Truth Table

INPUTS		OUTPUT
A		Q
0		1
1		0

https://en.wikipedia.org/wiki/NOR_logic on 09/06/2020

- **NAND Gate** A NOT-AND operation is known as NAND operation. It has two inputs and one output. The opposite of AND gate, so in obtaining the output, just multiply the inputs then reverse the answer.

Logic Diagram



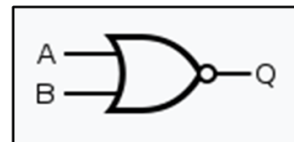
Truth Table

INPUTS		OUTPUT
A	B	Q
0	0	1
0	1	1
1	0	1
1	1	0

https://en.wikipedia.org/wiki/NOR_logic on 09/06/20

- **NOR Gate** operation is known as NOR operation. It has two inputs and one output. The opposite of OR gate, in obtaining the output, just add both inputs then reverse the answer.

Logic Diagram



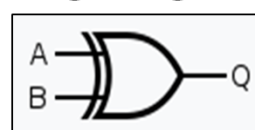
Truth Table

INPUTS		OUTPUT
A	B	Q
0	0	1
0	1	0
1	0	0
1	1	0

https://en.wikipedia.org/wiki/NOR_logic on 09/06/20.

- **XOR Gate or Ex-OR Gate** is a special type of gate. It can be used in the half adder, full adder and subtractor. It has two inputs and one output. Same process in obtaining the output with OR gate but the only difference is when you add two inputs with a value of 1, the answer will be 0 instead of 1.

Logic Diagram



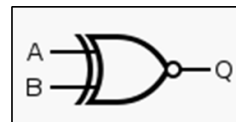
Truth Table

INPUTS		OUTPUT
A	B	Q
0	0	0
0	1	1
1	0	1
1	1	0

https://en.wikipedia.org/wiki/NOR_logic on 09/06/20

- **XNOR Gate** is a special type of gate. It can be used in the half adder, full adder and subtractor. When you have the same inputs, the answer will be 1, while different inputs the answer will be 0.

Logic Diagram



Truth Table

INPUTS		OUTPUT
A	B	Q
0	0	1
0	1	0
1	0	0
1	1	1

https://en.wikipedia.org/wiki/NOR_logic on 09/06/20.



ACTIVITIES

Directions: Choose the correct answer from the box below then write your answer on a separate sheet of paper.

DIODE	USB	IDE	SATA
CAPACITOR	RESISTOR	INDUCTOR	IC
ETHERNET	HDMI	TRANSISTOR	VGA

1. It is a cable used to connect storage device like hard drive and optical drive to a motherboard which has 40 pins.
2. This electronic component is a semiconductor device that essentially acts as a one-way switch for current.
3. An electronic component that is use to store electrical energy and give this energy again to the circuit when necessary.
4. This cable is the successor of IDE cable which provides higher data transfer speeds and commonly used by recent motherboards.
5. A data cable that is used to setup local area networks.
6. Most popular cable types available, used mostly to connect computers to other devices such as cellphones and tablets.
7. A passive two-terminal electrical component that stores energy in a magnetic field when electric current flows through it is known as_____.
8. The standard cable used to connect a computer to a monitor or a television screen that is used to transfer video signals.
9. This electronic component is used to control the flow of current to other components.
10. It is sometimes called a chip or microchip, can function as an amplifier, oscillator, timer, counter, computer memory, or microprocessor.



REMEMBER

Directions: Based from your understanding about the lesson, create a paragraph that will summarize the lesson by answering the guide questions on a separate sheet of paper.

Guide questions:

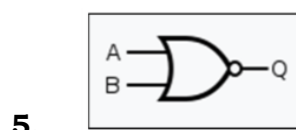
1. Differentiate the types of wires and cables used in computer;
2. State the function of an electronic component;
3. Explain the different wires, cables and electronic components that you have encountered already and where did you see it.



CHECK YOUR UNDERSTANDING

Activity 1 “Naming Logic Gates”

Directions: Name the logic gates illustrated below.



Activity 2 “Resistor Color Coding”

Directions: After learning how to read a resistor, let’s test if you really understand the lesson about color coding. Given here are the colors of each resistor, you have to put the value and don’t forget to use the symbol in your final answer.


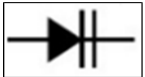
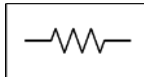
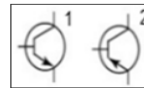
1. Green-Violet-Brown-Gold
2. Violet-Gray-Green-Silver
3. Brown-Black-Orange-Gold
4. Green-Green-Brown-Gold
5. Blue-Orange-Red-Silver

6. Gray-Blue-Red-Silver
7. Red-Black-Brown-Gold
8. Orange-Orange-Red-Gold
9. Brown-Gray-Blue-Gold
10. Black-Red-Red-Silver



POST TEST

Directions: Write the letter of the correct answer on a separate sheet of paper.

1. Which of the following cables is the most commonlu used in transferring data in tablets and computers?
A. ethernet B. firewire C. USB D. VGA
2. Which electronic component is used to store energy when the current passes though it?
A. capacitor B. coil C. resistor D. transistor
3. Which of the following logic gate is called as inverter?
A. AND B. NOR C. NOT D. XOR
4. Which of the following is a symbol for transistor?
A.  B.  C.  D. 

5. Which electronic component is used to oppose or resist the flow of current?
A. capacitor B. coil C. resistor D. transistor

6. Which electronic component converts direct current (DC) from a power supply to an alternating current (AC) signal? They are widely used in clock, calculators, and computers?
A. diode B. integrated circuit C. oscillator D. transistor
7. Kyrie is computing for the color coding for his resistor. If the color of the fourth band is silver, what will be its tolerance value?
A. $\pm 100\%$ B. $\pm 010\%$ C. $\pm 10\%$ D. $\pm 5\%$
8. What is the value of the resistor with the color of Black-Yellow-Brown-Gold?
A. $400\ \Omega \pm 5\%$ B. $40\ \Omega \pm 10\%$ C. $40\ \Omega \pm 5\%$ D. $4\ \Omega \pm 5\%$
9. Jenessa is computing for the resistance of his resistor with a unit of ohms. What symbol should she use to represent the unit of ohms?
A. Ω B. \pm C. ϵ D. μ
10. Jaze wants to connect to the local area network so he can access to the internet connection. Which cable should she use to make this possible?
A. ethernet B. firewire C. USB D. VGA

Answer Key

Post-Test: 1.C 2.A 3.C 4.D 5.C 6.C 7.C 8.C 9.A 10.A
6. USB 7. Inductor 8. VGA 9. Resistor 10. IC
Inductance: 1. Diode 2. Diode 3. Capacitor 4. SATA 5. Ethernet
Pre-Test: 1.D 2.B 3.C 4.D 5.D 6.A 7.A 8.A 9.C 10.A

References

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