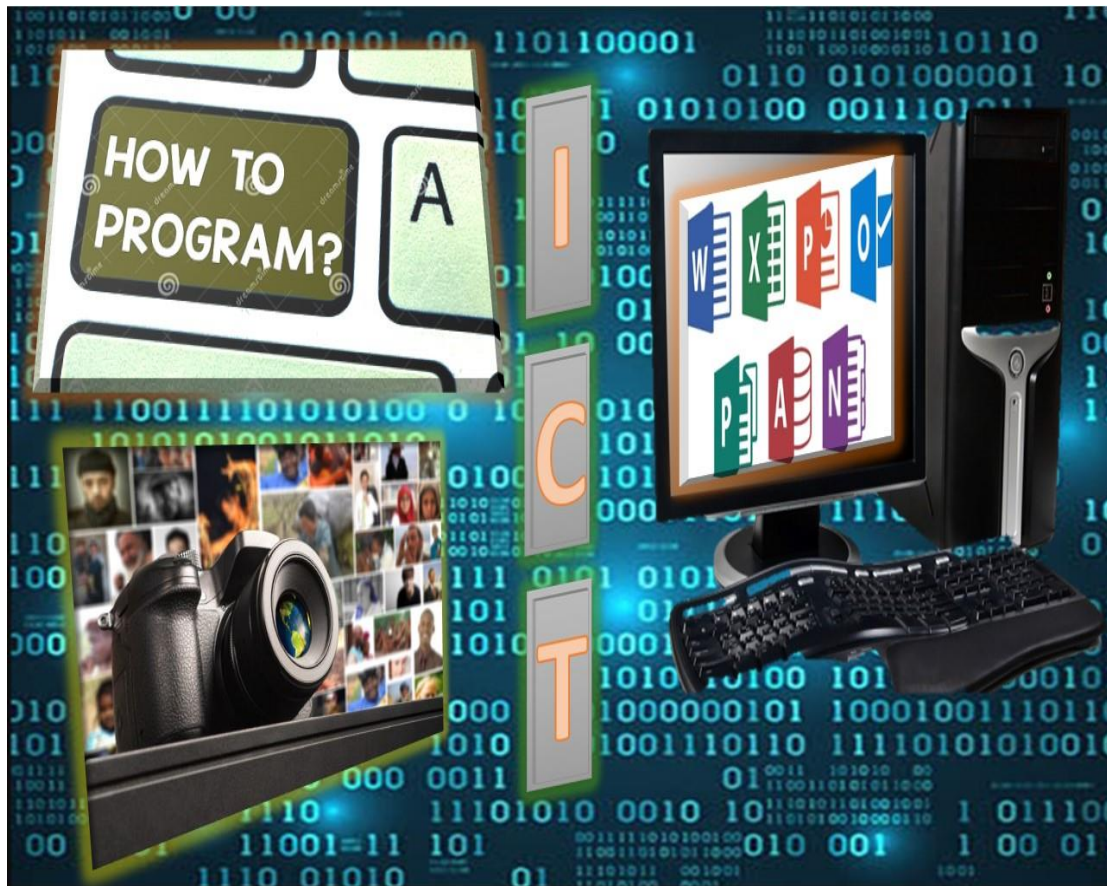


9

ICT 9 Activity Sheet Quarter 4 | Weeks 1-2

Basics of Microcontroller



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Introductory Message

Welcome to ICT 9!

The **Learning Activity Sheet** is self-directed instructional materials aimed to guide the learners in accomplishing activities at their own pace and time using the contextualized resources in the community. This will also assist the learners in acquiring the lifelong learning skills, knowledge and attitudes for productivity and employment.



For learning facilitator:

The **ICT 9 Activity Sheet** will help you facilitate the leaching-learning activities specified in each Most Essential Learning Competency (MELC) with minimal or no face-to-face encounter between you and learner. This will be made available to the learners with the references/links to ease the independent learning.



For the learner:

The **ICT 9 Activity Sheet** is developed to help you continue learning even if you are not in school. This learning material provides you with meaningful and engaging activities for independent learning. Being an active learner, carefully read and understand the instructions then perform the activities and answer the assessments. This will be returned to your facilitator on the agreed schedule.

Name of Learner: _____ Grade and Section: _____
School: _____ Date: _____

ICT-9 ACTIVITY SHEET

Basics of Microcontroller

Learning Competency:

Describe the basics of microcontroller.

Support Competencies:

1. Identify the main components of microcontroller.
2. Explain the basic principles of microcontroller.
3. Identify the applications of microcontroller.

Background information for the learners

Microcontrollers can be found in many applications. One of its applications can be found in our household appliances which we use tend to use in our day-to-day activity such as remote control, camera, refrigerator, oven, microwave, etc.

In this lesson, you will learn the basics of microcontroller, its structure, principle and applications.

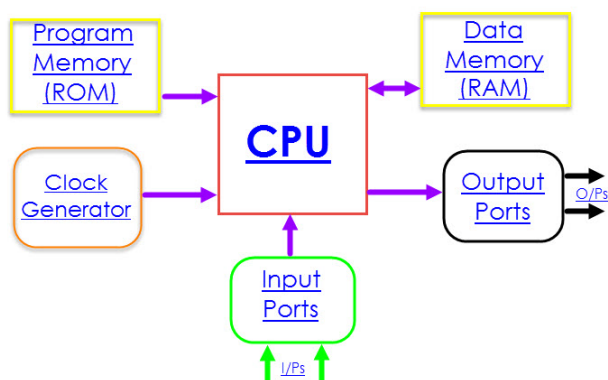
Activity Proper

Activity 1.

What is Microcontroller?

- A microcontroller is an integrated circuit (IC) that can be programmed to perform a set of functions to control a collection of electronic devices.
- A self-contained system in which a processor, support, memory, and input/output (I/O) are all contained in a single package.
- Being programmable is what makes the microcontroller unique.

Basic Structure of a Microcontroller



Three Main components of a Microcontroller

CPU

Central Processing Unit or CPU is the brain of the Microcontroller. It consists of an Arithmetic Logic Unit (ALU) and a Control Unit (CU). A CPU reads, decodes and executes instructions to perform Arithmetic, Logic and Data Transfer operations.

Memory

Program instructions that tell the brain or the CPU on what to do.

Program Memory, as the name suggests, contains the program for example, the instructions to be executed by the CPU. Data Memory on the other hand, is required to store temporary data while executing the instructions.

Usually, Program Memory is a **Read Only Memory** or **ROM** and the Data Memory is a **Random Access Memory** or **RAM**. Data Memory is sometimes called as Read Write Memory (R/W M).

Inputs/ Outputs (I/O)

The interface for the Microcontroller to the external world is provided by the I/O Ports or Input/Output Ports. Inputs device like Switches, Keypads, etc. provide information from the user to the CPU in the form of Binary Data.

The CPU, upon receiving the data from the input devices, executes appropriate instructions and gives response through Output Devices like LEDs, Displays, Printers, etc.

Basic Principles of Operation

- Microcontrollers are used for specific applications.
- They do not need to be powerful because most applications only require a clock of a few MHz and small amount of storage.

- A microcontroller needs to be programmed to be useful.
- A microcontroller is only as useful as the code written for it. If you wanted to turn on a read light when temperature reached a certain point, the programmer would have to explicitly specify how that will happen through his code.

Applications of Microcontrollers

There are huge number of applications of Microcontrollers. In fact, the entire embedded systems industry is dependent on Microcontrollers.

The following are few applications of Microcontrollers.

- Front Panel Controls in devices like Oven, washing Machine etc.
- Function Generators
- Smoke and Fire Alarms
- Home Automation Systems
- Automatic Headlamp ON in Cars
- Speed Sensed Door Locking System
- Many robots use microcontrollers to allow robots to interact with the real world.

Answer the questions below.

What do the following acronyms stand for?

- | | |
|--------|--------|
| 1. CPU | 4. ALU |
| 2. RAM | 5. I/O |
| 3. ROM | 6. CU |

Activity 2.

In this activity, you will watch a video about how microcontroller works.

Link:

https://www.youtube.com/watch?v=i_g1dD5fFLo

After watching the video, answer the questions below.

1. What is a microcontroller and what does it do?
2. Where do we use microcontrollers?

Activity 3.

Multiple choice. Select the letter of the correct answer.

1. It is considered the brain of a microcontroller.

a. Memory	c. CPU
b. I/O	d. Integrated circuit
2. Temporary data are stored in ROM.

a. True	b. False
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3. A microcontroller is used for all types of applications.

a. True	b. False
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4. A microcontroller is programmable.

a. True	b. False
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5. The following are examples of input devices, except?

a. switches	c. keyboard
b. keypads	d. printer
6. Which of the following statement is TRUE about microcontroller?

a. Microcontroller is used to control a collection of electronic devices.
b. Microcontroller is only useful if there's a code of program written on it.
c. Embedded system uses microcontroller.
d. All of the above.
7. ALU and CU are part of the CPU that performs arithmetic operations.

a. True	b. False
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8. Which of the following is NOT an example of output device?

a. printer	c. displays
b. LED	d. speaker
9. What type of memory stores all program instructions?

a. RAM	c. ALU
b. ROM	d. CU
10. Which of the following does not use a microcontroller?

a. Microwave	c. Oven
b. Camera	d. None of the above

Reflection.

Complete the statements below.

I understand _____

I don't understand _____

I need more information about _____



Links and/or Other References

<https://www.slideshare.net/xavierpaulino/microcontroller-presentation-42673826>

<https://www.electronicshub.org/8051-microcontroller-architecture/>

<https://www.electronicshub.org/microcontrollers-basics-structure-applications/>

<https://www.youtube.com/watch?v=CmvUY4S0Ubl>

https://www.youtube.com/watch?v=i_g1dD5fFLo