

# ICT Computing Essentials

## Lesson 1: Introduction to Computers

### LESSON SKILLS

After completing this lesson, you will be able to:

- Define "computer."
- Describe how a computer system functions.
- Describe how and where computers are used.
- Identify and compare various types of computers.
- Identify the four parts of a computer system.

### KEY TERMS

computer	microcomputer	software
data	notebook computer	storage
handheld computer	output	supercomputer
hardware	peripherals	tablet computer
input	processing	user
mainframe computer	server	

## Points to Ponder

These Points to Ponder are designed to help you focus on key elements in this lesson. They are also suitable for use to spark discussions or individual research.

- Define "computer" using your own words.
- List the different ways you use a computer every day.
- Create a schedule of your daily activities, and circle any activities that require a computer.
- List the different types of computers you have ever used.
  - Provide an example of how you have used each.
- Consider how the world might be a different place without the invention of computers.
  - Describe how a lack of computers would change your daily routine.
- Identify the four parts of a computer system.

## Overview

In this lesson, you will discover what defines a computer. You will discuss how computers are used and identify the parts of a computer system. You will also explore the various types of computers.

# What Is a Computer?

## Objectives

**1.1.1: Define "computer," and explain why it is important to have a basic understanding of how computers work.**

**1.1.2: Describe the four functions of the computing cycle (i.e., input, processing, output, storage).**

According to [Dictionary.com](https://www.dictionary.com) (2016) a **computer** is, "a programmable electronic device designed to accept **data**, perform prescribed mathematical and logical operations at high speed and display the results of these operations. Mainframes, desktop and laptop computers, tablets, and smartphones are some of the different types of computers." As we can see from this definition, there are many different kinds of computers that are used in today's world. You might be asking yourself, "When did computers begin? How have they changed the world we live in?"

Let's take a brief look at the history of computers. You may be surprised to learn that the earliest computing devices date back to 1937 when George Stibitz used a relay system that was based on Boolean logic. Not long after, David Packard and Bill Hewlett founded their company in Palo Alto, CA and developed the HP 200A Audio Oscillator; an instrument that was used to produce a single tone or frequency at a time, used in the production of stereos, telephones and other kinds of audio equipment. Disney Studios would order several of these for theaters showing Fantasia in 1940. Computers were not only being invented in the USA, in 1941 Konrad Zuse developed a machine that could calculate floating point binary arithmetic that would be used for aerodynamic calculations.

Many of the earliest computers were designed for mathematical calculations. One of the most famous of early computers was the ENIAC at the University of Pennsylvania in 1943. This computer was all electronic and ground breaking. The ENIAC could perform tasks 1,000 faster than any other computer at the time. It would not be until 1948 that the first computer program ran on a computer thanks to the University of Manchester researchers Frederic Williams, Tom Kilburn, and Geoff Toothill.

Fast forwarding to the 1950's we begin to see the emergence of computers that are able to store different processes and programs. Notable here were the Standards Eastern Automatic Computer (SEAC) in Washington, DC and the Standards Western Automatic Computer SWAC at UCLA. The middle of the 1950's brought about the first transistorized computer built by Grimsdale and Webb at Manchester University. By the 1960's we were seeing the development of computers that used keyboards to **input** information directly into their systems and the world was truly changing. Large government organizations like the Census Bureau were relying more and more on computers to do the heavy lifting for classifying and tallying data. Keep in mind that these early computers were huge and often would take up an entire room on their own. They required very controlled environments and had far less power than the smartphone in your pocket!

These early computers were too large and too expensive for common use. We'll fast forward again to 1968 when the Apollo Guidance Computer (AGC) made its debut, reducing the size to that of seven refrigerators side by side making space travel a little easier. Imagine what your kitchen might look like

with seven refrigerators! And this was a significant reduction in the space (and weight) of a system to guide a rocket. Remember too, your smartphone has more computing power than the AGC.

In the 1970's we saw the emergence of the first microcomputers from Data General. This little computer had 32 KB of memory and a price point of \$8,000! We've really come a very long way. By the middle of the decade Intel introduced the first microprocessor and the world once again began to change and development of computers gained speed. We often refer to this as Moore's Law as described in [Webopedia.com](https://www.webopedia.com) (2016), "that the number of transistors per square inch on integrated circuits had doubled every year since the integrated circuit was invented. Moore predicted that this trend would continue for the foreseeable future."

In 1977, Steve Wozniak complete the Apple-1 which was instrumental in a push towards more affordable computers for consumers. Around the same time, Tandy Radio Shack introduced the TRS-80. For many, it was their very first taste of what a computer could do for home users. And your smartphone still has more power!

By the 1980's we saw the explosion of computers for home use really begin to take off. The Commodore 64 was one of the computers everyone seemed to want and with a price tag of \$595 it was far more affordable. It must have been, because it sold more than 22 million units. Around the same time, IBM introduced their first personal computer (PC) and with it a range of other products, known as **peripherals** to go along with it. By now it was obvious that computers for research, businesses and home use were completely changing the landscape of how we worked and played. We were still tied to our desks until Compaq introduced the Compaq Portable, a "huggable luggable" and the era of only working at one location was forever changed.

The 1990's continued to see a growth in the home computing market but also the development of supercomputers like the Intel Touchstone Delta with 512 processors. Caltech used this kind of computer for real time processing of satellite images and models of molecular structures. In 1996, the Palm Pilot brought a new kind of computer power to us in the form of a personal organizer that you could synchronize to your computer. Computers were becoming smaller and faster with each passing year.

In the early 2000's we saw camera phones becoming available and the Earth Simulator, the fastest supercomputer to date. Computers were making their way into our educational system as the One Laptop per Child Initiative took off in 2006 under the direction of Nicholas Negropopnite, as part of MIT's Media Lab. By 2011, over 2.4 million laptops had been shipped.

Now, we have computers everywhere we look; from our smartphones to our e-readers (Kindles and Nooks), to parts of our car engines, to refrigerators. Computers have truly changed the way we do almost everything. It is because computers are everywhere and a part of almost everything we do, it is important that we have an understanding of what they are, what they are capable of doing and how to work with them. In this course, we will do just that.

### Link to Learn More

Visit [Timeline of Computer History](#) for an overview of how computers have changed

There are basically four major functions of the computing cycle; input, **processing**, output and **storage**, as shown in Figure 1-1.

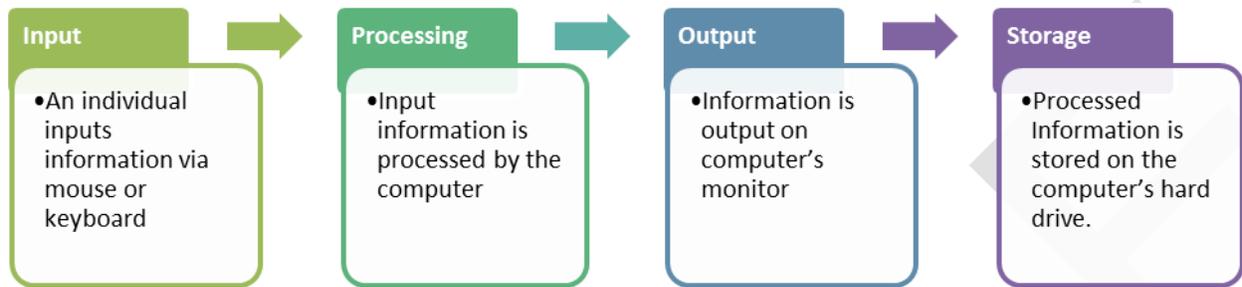


Figure 1-1: Four functions of the computing cycle

Let's see how that works in our everyday world. You go to a grocery store and the store clerk scans an item's barcode. A computer processes the barcode. The computer **outputs** the price and description of the item. Transaction information is stored on the computer for inventory purposes. That's much faster than the clerk having to ring up each item after looking up the price tag, isn't it?

### Link to Learn More

[Input, Processing, Output and Storage: Information System Components](#) (YouTube video, 3 mins)

### Suggested activity

- Reviewing the Computer Cycle (Hands-on)
- The Computer Cycle (Online)

## How Computers Are Used

### Objectives

1.1.3: Describe how people use computers at home, school and work.

We have seen how computers began as very large, very expensive tools for large scale agencies and research centers. In the beginning, computers were used almost exclusively for calculations to help those people in their related fields. Over time, computers have become smaller and more versatile. Their uses have moved from the lab to the home, to our cars, to our washing machines and watches. With each new breakthrough in computer technology, we have managed to find new and creative ways to harness their power.

As the cost of computers has come down more and more people are able to afford them (although this is not yet a universal truth). The size of computers has also played a role in their adoption for home and entertainment use as well. The cost and size of early computers limited who could use them as they were very expensive and the size of rooms. Think about your home, your friends, family, business and school. Where do you see computers in use every day? Can you think of a place where they are not in use?

There have been many people who have been responsible for how computers have changed and how people have adopted their use. Steve Wozniak (Apple), Steve Jobs (Apple), Bill Gates (Microsoft), David Packard and Bill Hewlett (HP) are a few that you might be familiar with who were key in bringing

computers into home use. These men stood on the shoulders of others dating back to the 1800's with Charles Babbage, who proposed a Difference Engine that could automate the production of mathematical tables.

In the next section, we'll take a closer look at how and where computers are used. Before we do, take a look at Figure 1-2 of some first generation computers:

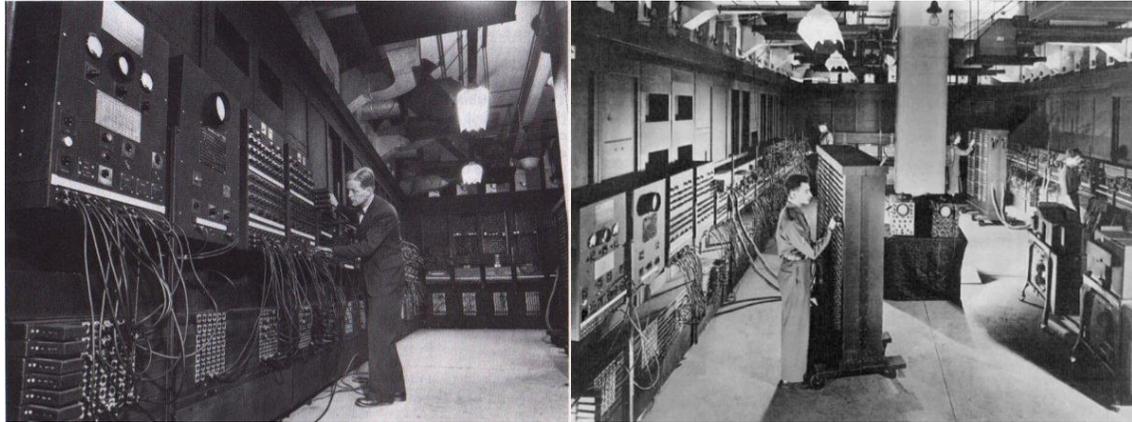


Figure 1- 2: Examples of first-generation computers

## Computers at Home

With the price of personal computers dropping, more and more people are able to own a (or sometimes more) computer for home use. The Internet has added even more reasons to have a personal computer. Here are some of the common activities people use their PC for:

- streaming TV shows, movies, and music
- shopping
- social networking
- remote jobs
- online schools
- e-mail
- surfing the internet

The use of computers goes beyond these. In today's world, we find computers are part of running appliances in our homes. Integrating computers into household appliances, such as refrigerators, thermostats, garage doors or home security, can enhance, automate or take the work out of using them. With wireless access, many of these can be accessed from anywhere you have an Internet connection.

## Computers at School

Computer literacy and use has become common place in our schools. Many schools are working towards having a device for every student or encouraging students to bring their own devices to school. You may see that as BYOD (Bring Your Own Device) so that students are able to do research online and in many instances their homework.

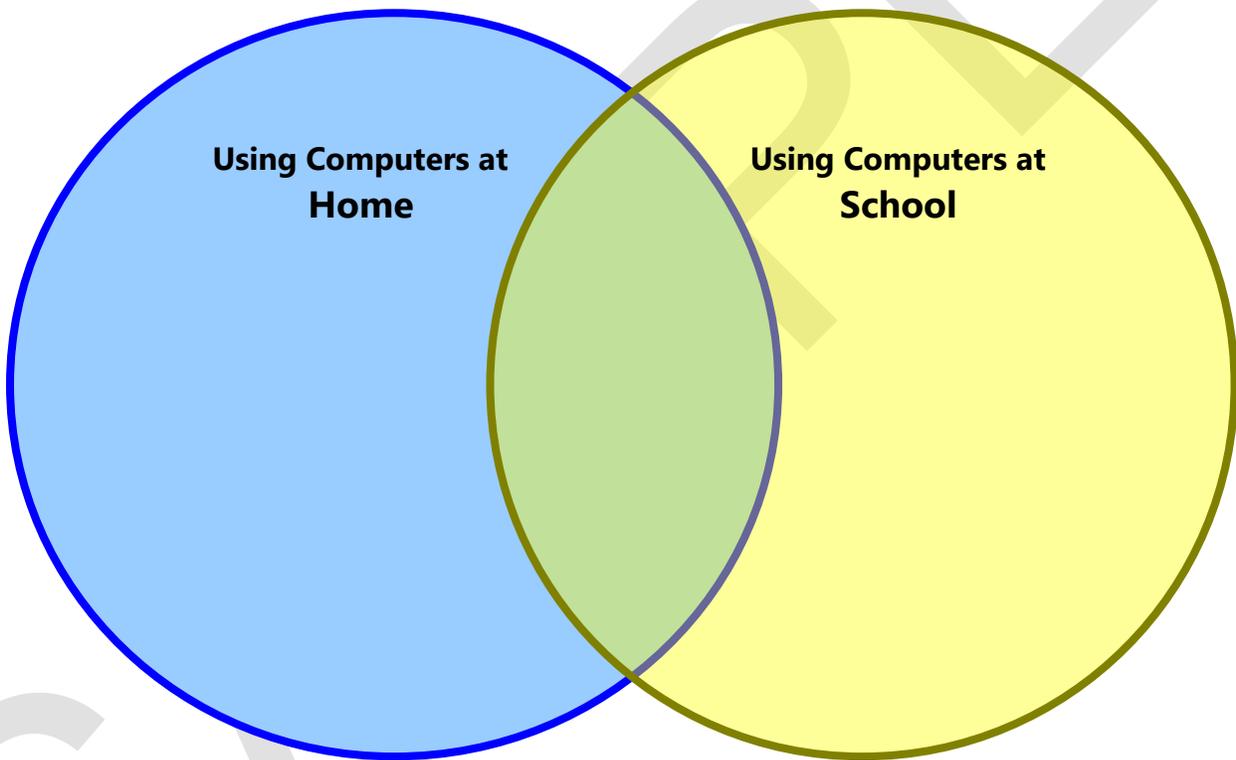


# Comparing the Ways Computers Are Used



In this activity, you will list and compare various ways that people use computers at home and at school.

1. Study the Venn diagram below.
2. Think of ways that people use computers at home. Write examples in the Home area.
3. Think of ways that people use computers at school or the office. Write examples in the School area.
4. Can you think of any ways that people use computers at both home and school or office? Write these examples in the area where the two circles overlap.







# Reviewing the Computing Cycle



In this activity, you will identify the various functions in the computing cycle.

1. Read the following list of computer functions:

- Processing
- Output
- Input
- Storage

2. Study the diagram below, which represents the computing cycle of a computer system.

3. Write the name of each function into the correct section of the diagram.

