

ICT Programming – Clozed Notes

Lesson 1

Introduction to Programming

What is Programming

- Programs consist of **instructions** that tell the computer what to do
- Programmer is a person that **writes** programs
- Programming is the **process** of writing a computer program
- Programming language is a set of key words and **syntax** (rules) for how to organize the instructions.

Computers

- Computer: a **machine** that can perform a task independently
 - ✓ Needs a **program** that tells it what to do
- Executing: when a computer **runs** a program and performs the tasks instructed by the program
- Primary functions a computer performs:
 1. Storing, **retrieving**, and displaying data
 2. Calculates & **manipulates** data
 - ✓ Adding, multiplying, comparing & moving data

Programming Languages: Machines

- Machine language: the elemental language of computers made up of a long sequence of **binary** digital zeros and ones (bits)
 - ✓ *The only language a computer **understands***
- Transistor: an electrical **switch** that is either off (0) or on (1)
- **Bits**: the on or off switch
- Byte: **eight** bits
- Base: 2 (0,1)

Binary & Machine Language

Binary code: “Hello, World!”

```
010010000110010101101100011011000110111100100000010101110110111101  
110010011011000110010000100001
```

Machine Language code: “Hello, World!”

```
ba 0c 01  
b4 09  
cd 21  
b8 00 4c  
cd 21  
48 65 6c 6c 6f 2c  
20 57 6f 72 6c 64  
21 0d 0a 24
```

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Assembly Language

- More **human-like** representation of machine language
- Uses **symbols** and recognizable code
- Unique to **different** computers / operating systems
- Difficult to **write**

High Level Language

- Programming languages with **unique** rules (syntax) and can be written without regard of computer running it
- Usually use English words and phrases and easily **recognizable** symbols
- Languages people usually write **programs** in
- Python, C++, Visual Basic, Java, Perl, PHP
- Must be **translated** into machine language before they can be run

High Level Languages

“Hello, World!” in Java

```
public class HelloWorld {  
    public static void main(String []  
args) {  
        System.out.println("Hello  
World!");  
    }  
}
```

“Hello, World!” in Python

```
print("Hello World!")
```

“Hello, World!” in Scratch



Compiled and Translated Code

- Compiled languages: Translate **entire** program before the computer runs it
 - ✓ Usually **faster** than translated
- Translated language / Interpreter: **translates** a number of program **instructions**, waits for the computer to **execute** them, and then translates the next series, until the program is fully executed

Structured Programming

- Works from the **top** to bottom
- Designed by breaking problems into smaller, **logical** problems to make them easier to execute
- Allows programmers to **re-use** portions of code and makes it easier to correct errors.