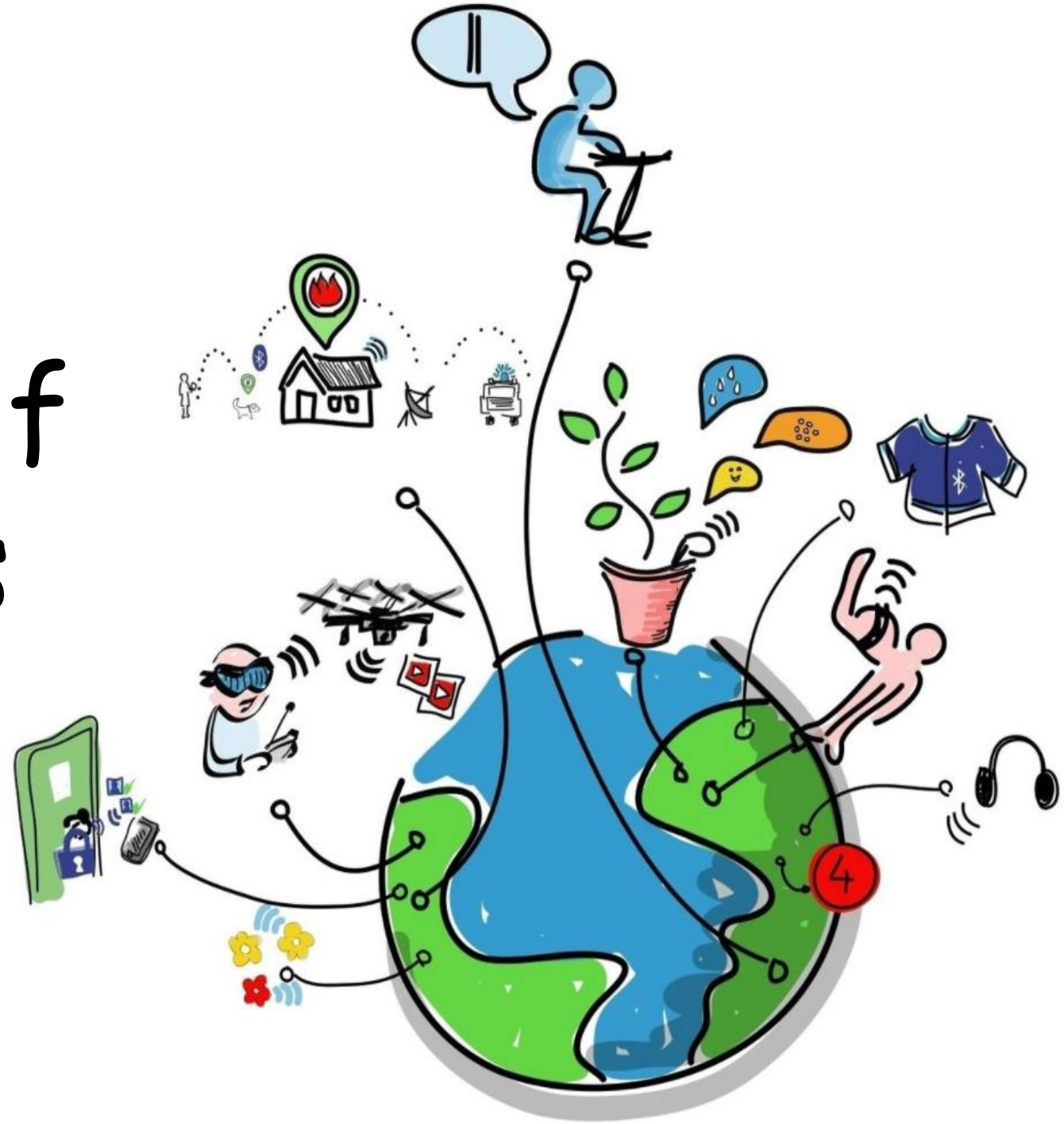
Simple Program Logic

- **Concept of Simple Program Logic**
- Apply the concept on our daily lives

Process to develop various sets of instruction is known as programming.

Various sets of instruction is known as program.



A proper or reasonable way of thinking about something is known as logic.

What is Program Logic?

Program Logic

Instructions in a program arranged in a prescribed order to solve a problem.

Algorithms

An algorithm is simply a set of steps used to complete a specific task. They're the building blocks for programming, and they allow things like computers, smartphones, and websites to function and make decisions.

Logic is a formal description of your reasoning.

Algorithm is a formal description of steps required to achieve some goal.

You could think of a recipe used in cooking as some kind of algorithm. Making decision what to cook would be logic. So you cannot easily separate the logic and algorithm. Because making the logical decision can easily involve another series of steps needed to arrive to your conclusion.

Let's watch a video first

Video Source: Computer Science Basics: Algorithms - YouTube

What is Syntax?

Syntax

The arrangement of words and phrases to create well-formed sentences in a language

Syntax refers to the rules that define the structure of a language. Syntax in computer programming means the rules that control the structure of the symbols, punctuation, and words of a programming language.

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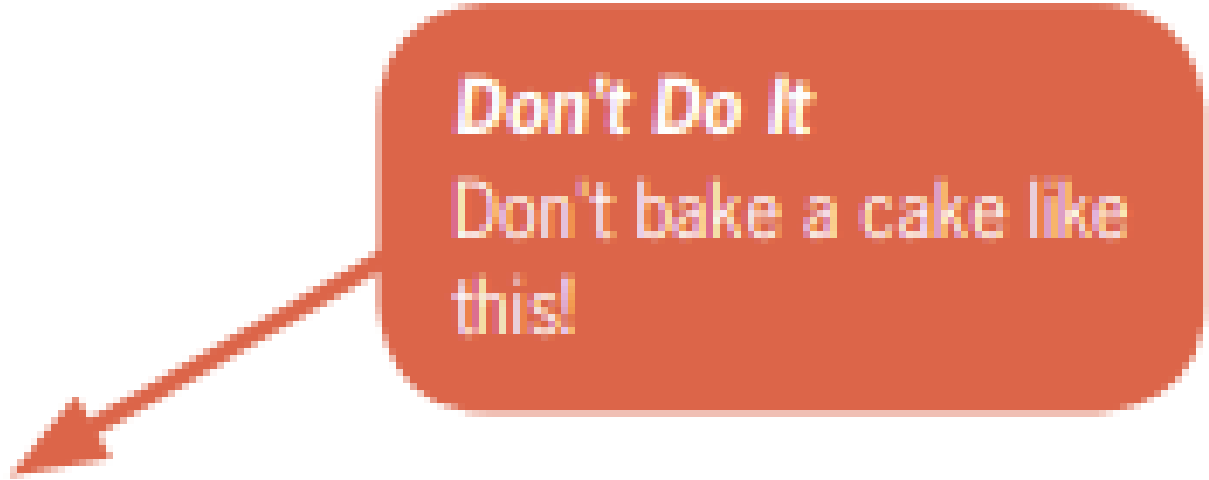
A program with syntax errors cannot execute.

A program with no syntax errors can execute, but might contain **logical errors**, and produce incorrect output as a result.

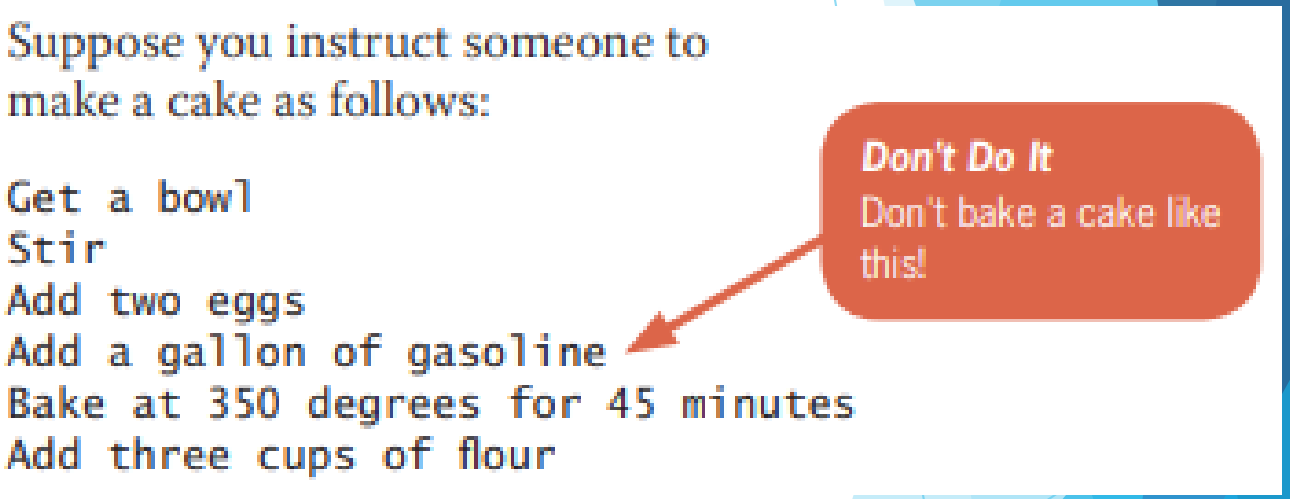
For a program to work properly, you must give the instructions to the computer in a specific sequence, you must not leave any instructions out, and you must not add extraneous instructions. By doing this, you are developing the logic of the computer program.

Suppose you instruct someone to make a cake as follows:

```
Get a bowl
Stir
Add two eggs
Add a gallon of gasoline
Bake at 350 degrees for 45 minutes
Add three cups of flour
```



The dangerous cake-baking instructions are shown with a **Don't Do It** icon. You will see this icon when the book contains an unrecommended programming practice that is used as an example of what not to do.



Even though you have used the English language syntax correctly, the cake-baking instructions are out of sequence, some instructions are missing, and some instructions belong to procedures other than baking a cake.

If you follow these instructions, you are not going to make an edible cake, and you most likely will end up with a disaster.

Logical errors are much more difficult to locate than **syntax errors**—it is easier for you to determine whether "eggs" is spelled incorrectly in a recipe than it is for you to tell if there are too many eggs or if they are added too soon.

If you misspell a programming language word, you commit a **syntax error**, but if you use an otherwise correct word that does not make sense in the current context, programmers say you have committed a **semantic error**. Either way, the program will not execute.

Most simple computer programs include steps that perform input, processing, and output. Suppose you want to write a computer program to double any number you provide. You can write such a program in a programming language such as Visual Basic or Java, but if you were to write it using English-like statements, it would look like this:

input myNumber
*set myAnswer = myNumber * 2*
output myAnswer

The number-doubling process includes three instructions:

- The instruction to input myNumber is an example of an input operation. When the computer interprets this instruction, it knows to look to an input device to obtain a number.

When the number is retrieved from an input device, it is placed in the computer's memory at the location named myNumber. The location myNumber is a variable. A variable is a named memory location whose value can vary.

From a logical perspective, when you input a value, the **hardware device is irrelevant.** The same is true in your daily life. If you follow the instruction “Get eggs for the cake,” it does not really matter if you purchase them from a store or harvest them from your own chickens—you get the eggs either way.

The number-doubling process includes three instructions:

- The instruction set myAnswer = myNumber * 2 is an example of a processing operation. Mathematical operations are not the only kind of processing operations, but they are very typical.

The instruction takes the value stored in memory at the myNumber location, multiplies it by 2, and stores the result in another memory location named myAnswer.

The number-doubling process includes three instructions:

- In the number-doubling program, the output myAnswer instruction is an example of an output operation.

When this instruction executes, the value stored in memory at the location named myAnswer is sent to an output device.

EXAMPLE: Adding two numbers

EXAMPLE: Adding two numbers

Input firstnum

Input secondnum

Set myanswer = firstnum + secondnum

Output myanswer

Input firstnum : 7

Input secondnum : 6

Set myanswer = 7 + 6

Output myanswer : 13

EXAMPLE: Subtracting two numbers

EXAMPLE: Subtracting two numbers

Input firstnum

Input secondnum

Set myanswer = firstnum - secondnum

Output myanswer

Input firstnum : 7

Input secondnum : 6

Set myanswer = 7 - 6

Output myanswer : 1

EXAMPLE: Multiplying two numbers

EXAMPLE: Multiplying two numbers

Input firstnum

Input secondnum

Set myanswer = firstnum * secondnum

Output myanswer

Input firstnum : 7

Input secondnum : 6

Set myanswer = 7 * 6

Output myanswer : 42

EXAMPLE: Dividing two numbers

EXAMPLE: Dividing two numbers

Input firstnum

Input secondnum

Set myanswer = firstnum / secondnum

Output myanswer

Input firstnum : 42

Input secondnum : 6

Set myanswer = 42 / 6

Output myanswer : 7

Applications???

EXAMPLE: Rubiks cube

How to Solve a 3x3 Rubik's Cube In No Time | The Easiest Tutorial - YouTube

EXAMPLE: Simple Electric circuit

How To Make a Simple Electric Circuit | Working Model School Science Project - YouTube

EXAMPLE: Rice cooker

How to Use a Rice Cooker - YouTube

Any questions???

REFERENCES:

- Algorithms. (2021). https://edu.gcfglobal.org/en/computer-science/algorithms/1/
- Farrell, J. (2011). *Programming Logic and Design Comprehensive. Sixth Edition. https://drive.uqu.edu.sa/_/fbshareef/files/farrell23936_1111823936_02_01_chapter01.pdf*
- *Programming Logic and Design Comprehensive. Sixth Edition. https://websites.delta.edu/donaldsouthwell/cst170/ch01_ppt.pdf*
- What is the difference between logic and algorithm?. (2018). https://www.quora.com/What-is-the-difference-between-logic-and-algorithm#:~:text=Logic%20covers%20reasoning%20(deduction%2C%20inferences,every%20recipe%20is%20an%20algorithm)