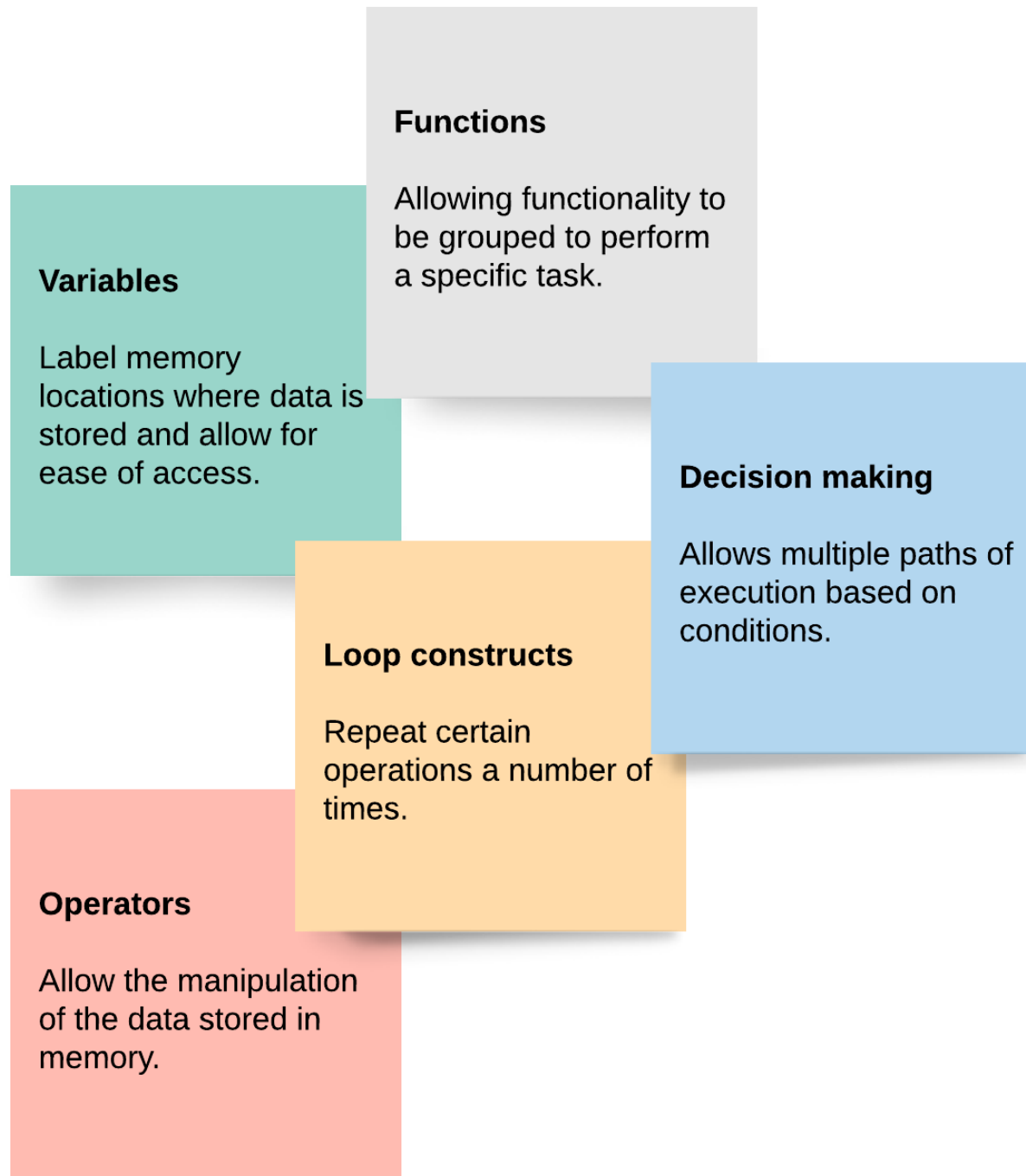# Introduction to Computer Programming

Chapter 02

Basic Building Blocks

These slides are not finished yet

Functions

Allowing functionality to be grouped to perform a specific task.

Variables

Label memory locations where data is stored and allow for ease of access.

Decision making

Allows multiple paths of execution based on conditions.

Loop constructs

Repeat certain operations a number of times.

Operators

Allow the manipulation of the data stored in memory.

Introduction

- Basic building block available in almost any programming language
  - **Variables** label memory locations where data is stored and allow for ease of access.
  - **Operators** allow the manipulation of the data stored in memory.
  - **Decision making** allows multiple paths of execution based on conditions.
  - **Loop constructs** repeat certain operations a number of times.
  - **Functions** allowing functionality to be grouped to perform a specific task.
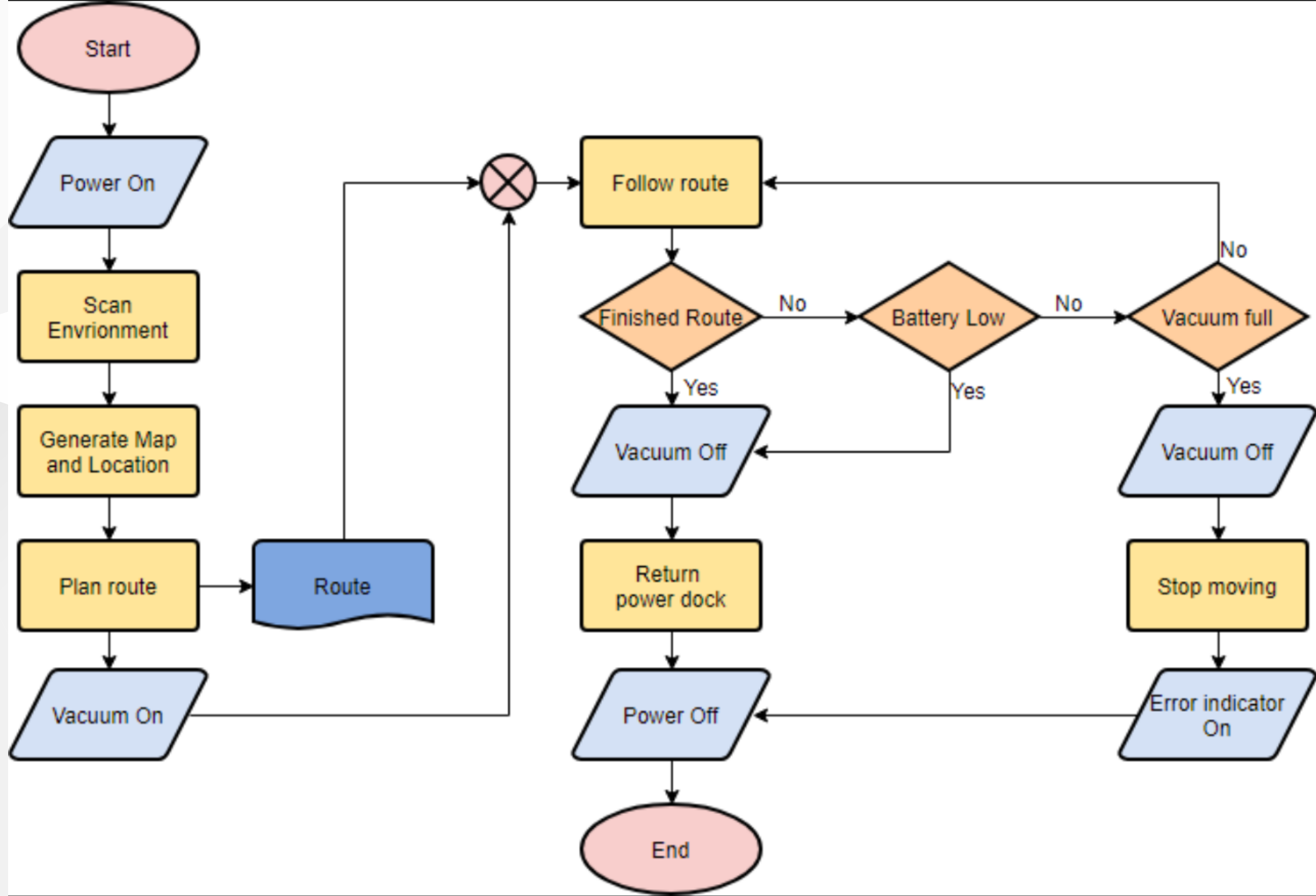
Introduction

- High-level programming languages introduce more advanced tools
    - classes
    - inheritance
    - interfaces
    - multi-threading
    - collections
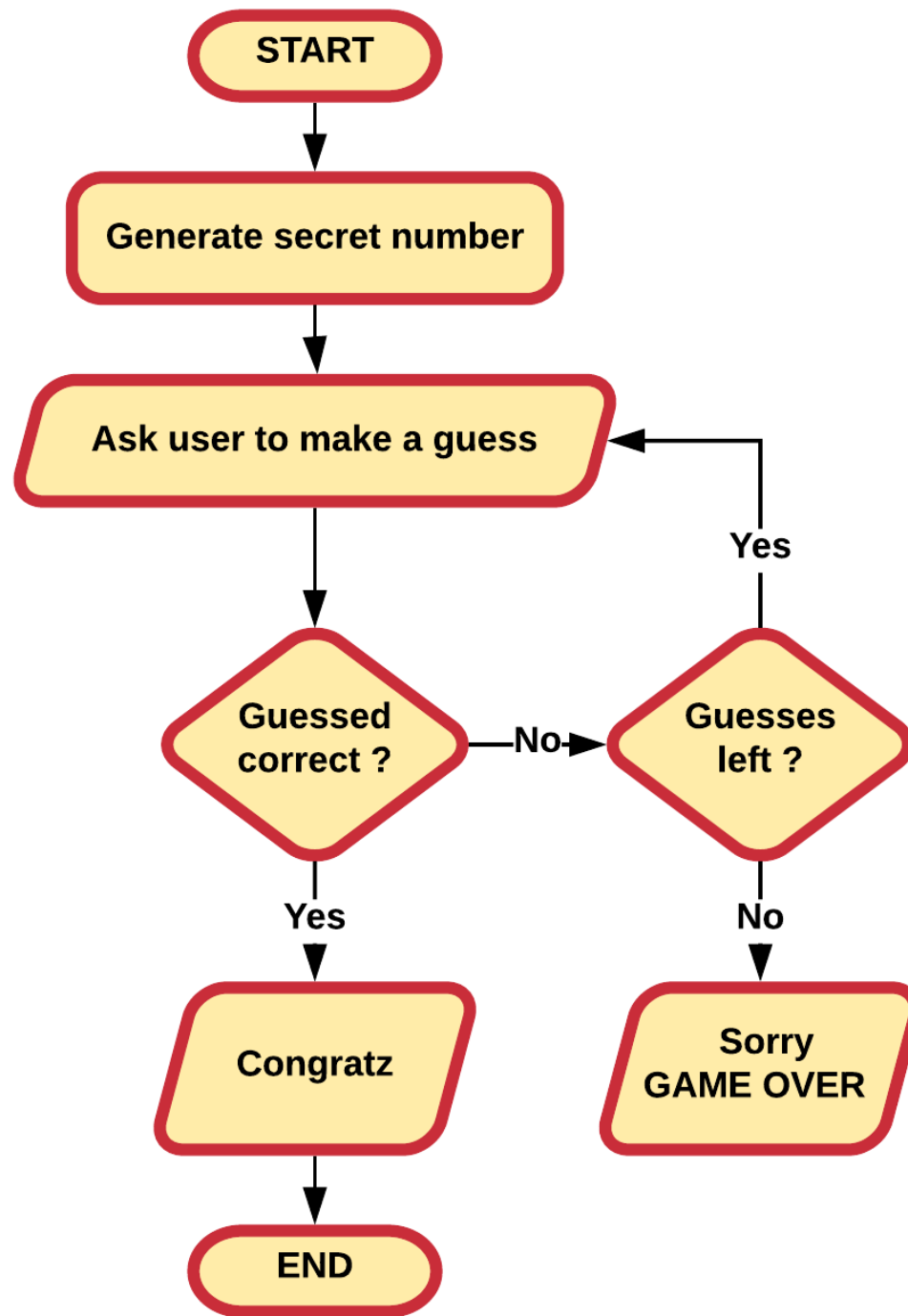   - lambda-expressions
    - generics
    - …

4

Flowcharts

- **A structured graphical way to document process flow**
  - Exist since 1921
- Allow us to **document things in a visual manner**
  - algorithms
  - application logic
  - data flows
- Graphical representations have proven to be very useful in the software development world

Examples

- Let's take a look at some examples

START

Generate secret number

Ask user to make a guess

Guessed correct ?

No → Guesses left ?

Yes

Yes

No

Congratz

Sorry GAME OVER

END

Examples

- You do not need to be a programmer to understand the basic of how it works.

Common used Symbols

- **Terminal**
  - indicates the start or ending of an application or sub-process
  - rounded (fillet) rectangle.
  - usually contains the word "Start" or "End"

START

END

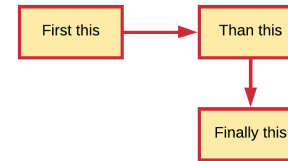# Common used Symbols

- **Process step**
  - basic rectangle
  - action or operation that changes a value, takes an internal action, ...

Turn on the light in the kitchen

Common used Symbols

- **Flowline**
  - indicates the flow of operation
  - line connecting one symbol with another
  - arrows are optional if the flow is not the standard top-to-bottom or left-to right
    - almost always added
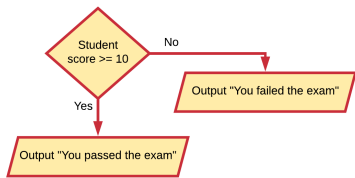
Common used Symbols

- **data input/output**
  - parallelogram
  - Input can come from terminal or another source
  - Output can for example be
    - printing a text to the user via the terminal
    - writing something to a file
  - *Some developers just use a standard rectangle*

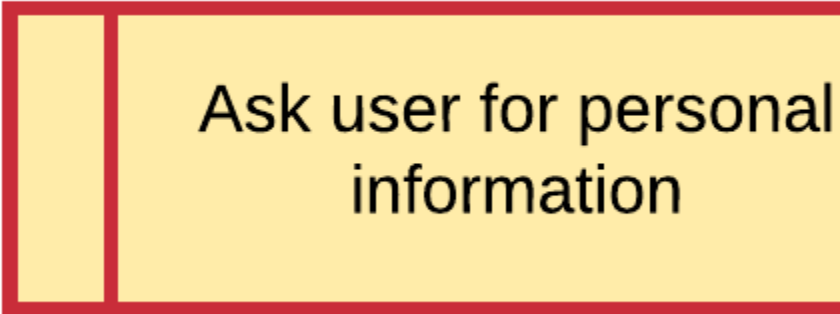Output "Hello World" to the terminal

Common used Symbols

- **decision**
  - diamond
  - multiple paths of execution can be taken based on a condition
  - commonly a *yes/no* question or *true/false* test.

Common used Symbols

- **predefined process**
  - rectangle with double-struck vertical edges.
  - The name of the predefined process is placed inside the inner rectangle bounds.

Ask user for personal information

Common used Symbols

- **note**
  - used to clarify something in your flowchart.

- There are more flowchart symbols, but these are the ones you will need the most.

This is just a simple note that can be used anywhere in your chart to clarify something