

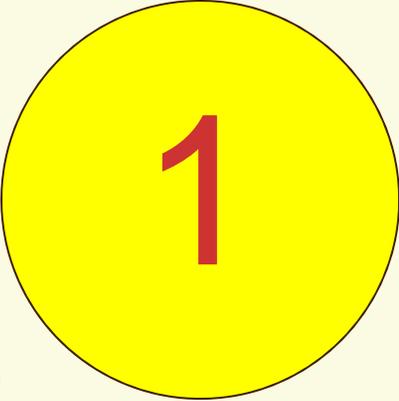
COMSC-051

**Java Programming
Part 1**



Part-Time Instructor: Joenil Mistal

Chapter 1



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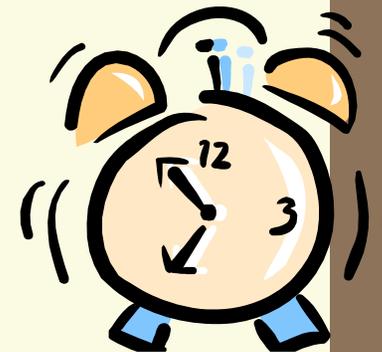
A General Introduction to Programming

Developing good and correct software is a very important challenge in today's business environment.

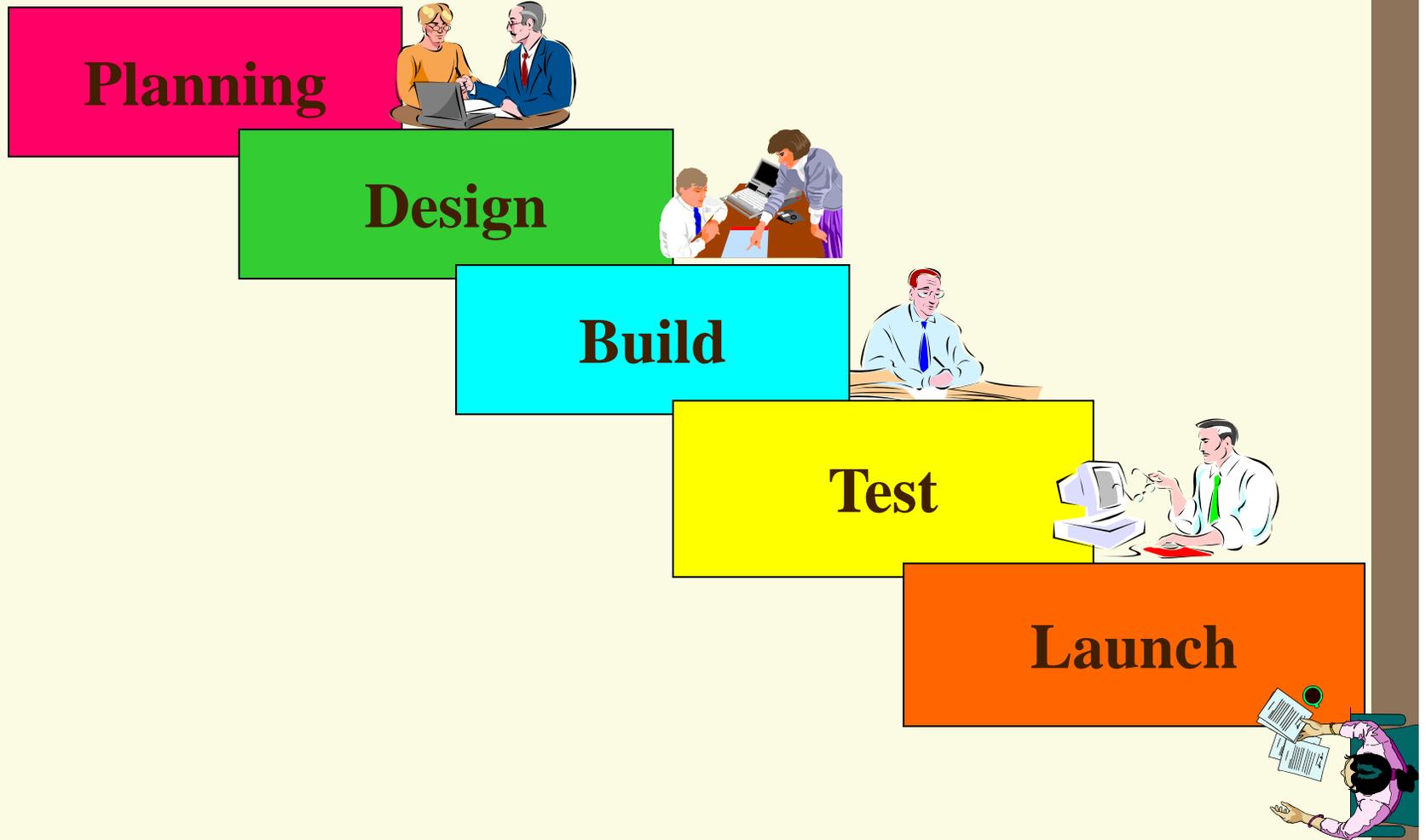
Chapter 1 Topics:

What you will learn in this chapter:

- The key steps in a programming process
- The different types of programming errors
- The key principals of software testing
- The different types of software maintenance
- The key principles of structured programming

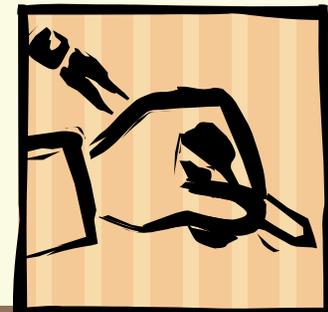


Five Phases of a Software Development



Programming Process page 2

- A **program** is a set of instructions targeted to solve a particular program.



Programming Process page 1

- A **programming** is the activity of writing or coding a program in specific programming language.
- A **programming language** had strict grammar and syntax rules, symbols, and special keywords.
- People who write programs and commonly referred to as **programmers** or application developers.

Programming Process page 2

INPUTS

OUTPUT



Programming Process page 2

- **Programs** are typically written using a step-by-step approach as follows:
 1. Requirements gathering and analysis
 2. Program design
 3. Program coding
 4. Translation to machine language
 5. Testing and debugging
 6. Deployment
 7. Maintenance

Programming Process Tools

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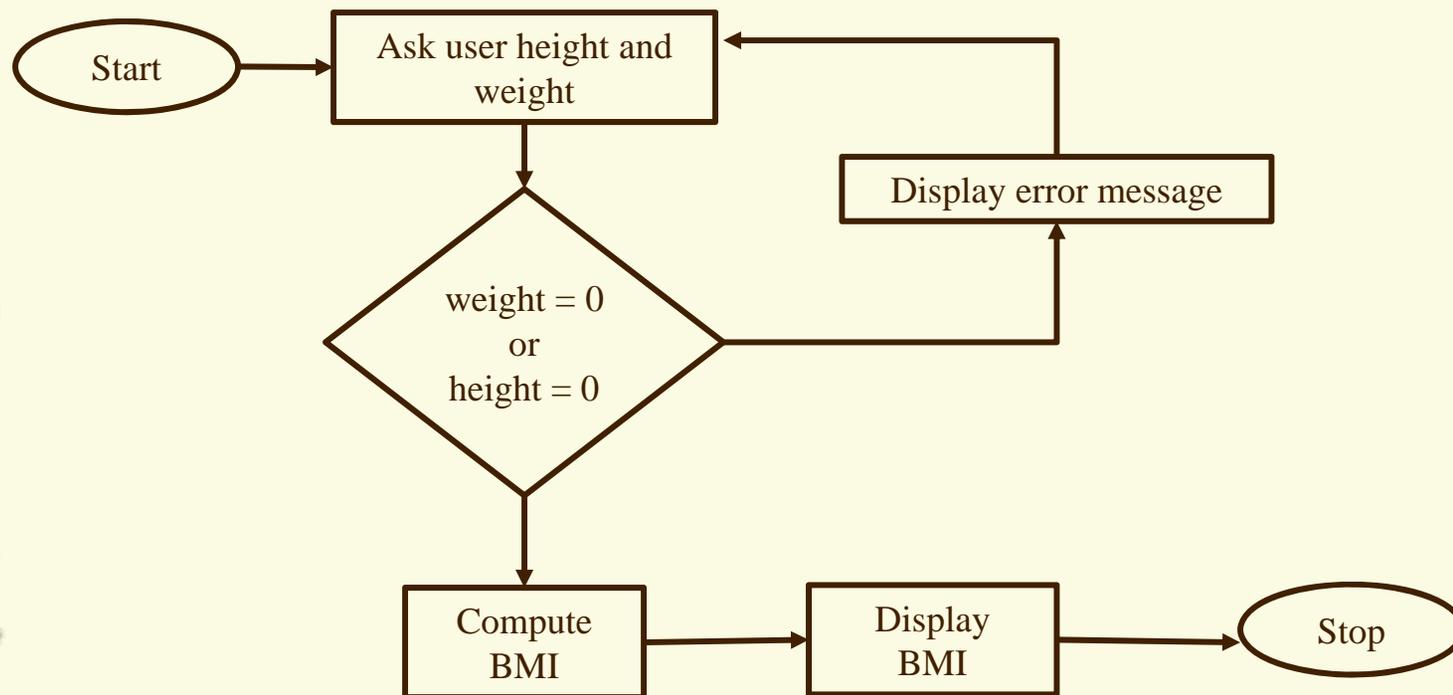
- **Pseudo-code** is a type of structured English but without stricture grammar rules.

```
ask user: height
ask user: weight
if height = 0 or weight = 0;
    error "Incorrect input values"
    return to beginning (ask height and weight)
end if
x = weight/ (height * height)
message: "Your BMI is ", x
```

Programming Process Tools

page 4

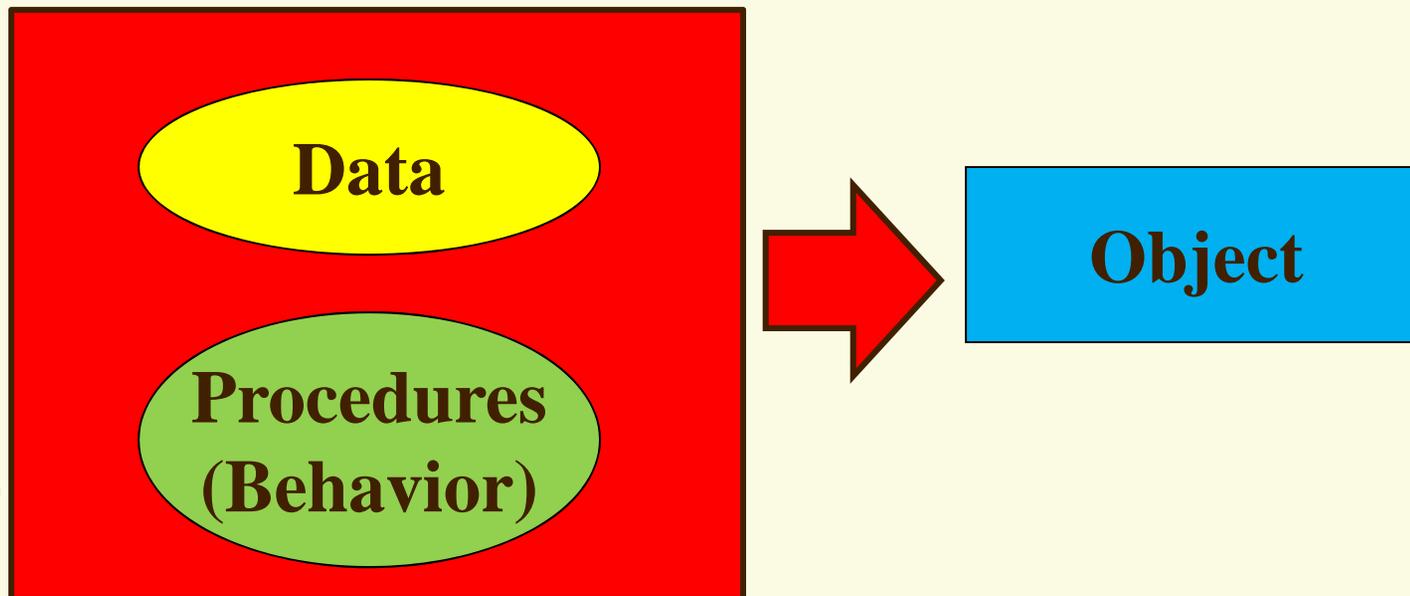
- **Flowchart** represents the application in a diagram, where boxes show the activities and the arrows the sequences between them.



Object-Oriented Programming

page 5

- An application that consist of a series of objects that ask services from each other.
- Each object is an instance of a **class** that contains blueprint description of the object's characteristics.



Object-Oriented Programming

page 5

- **Java** is an object-oriented programming language.
- The following code example demonstrates how to implement the BMI example in Java:

```
public class BMICalculator {
    private double weight, height, BMI;

    public BMICalculator( double weight, double height ){
        this.weight = weight;
        this.height = height;
    }

    public void calculate(){
        BMI = weight / (height*height);
    }

    public boolean isOverweight(){
        return (BMI > 25);
    }
}
```

Object-Oriented Programming

page 5

- **Java** is an object-oriented programming language.

DATA:
weight,
height &
BMI

PROCEDURE:
BMICalculator,
calculate
isOverweight

Programming Errors

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- A programming error is also referred to as a **bug**
- **Debugging** is the procedure for removing bugs.
- Types of Programming Errors:
 1. Syntax/ Compilation Errors
 2. Runtime Errors
 3. Logic/ Semantic Errors

Principles of Software Testing

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- The main purpose of testing is verification and validation of the software build.
- **Alpha testing** is performed internally by the application developers
- **Beta testing** is done by a selected target audience and errors are reported back.

Software Maintenance

page 8

- **Maintenance** is the activity of adjusting the program after post production.
- Main Types of Maintenance:
 1. Adaptive Maintenance
 2. Perfective (Enhancements) Maintenance
 3. Corrective Maintenance
 4. Preventive Maintenance

Principles of Structure Programming

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- Basic principles of structured programming:
 - **Stepwise Refinement** - Programs should be designed using a top-down strategy
 - **Documentation** – Provides important clarification of complex programming statements.
 - Assign meaningful names to programming concepts such as variables and procedures.