

# **Software Engineering**

## **[CACS253 ]**

### **BCA 4<sup>th</sup> Sem**

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# **Unit 5**

## **Coding**

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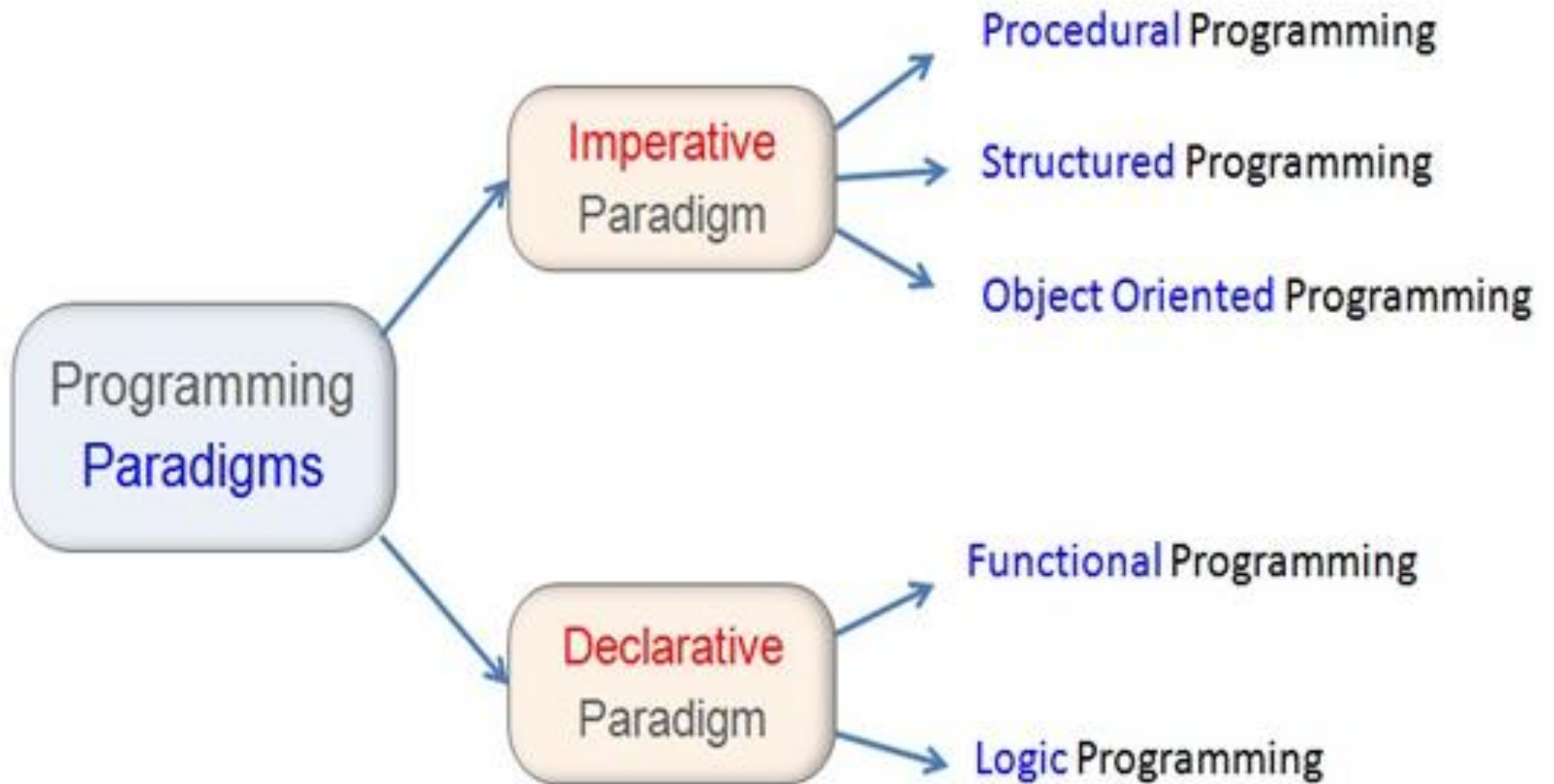
- 1. Programming Language**
- 2. Development Tools**
- 3. Selecting Languages and Tools**
- 4. Good Programming Practices**

# Programming Language

A programming language is any set of rules that converts strings, or graphical program elements in the case of visual programming languages, to various kinds of machine code output. Programming languages are one kind of computer language, and are used in computer programming to implement algorithms.

A programming language is a **computer language** that is used by **programmers (developers) to communicate with computers**. It is a set of instructions written in any specific language ( C, C++, Java, Python) to perform a specific task.

# Programming Language



# Programming Language

## 1. Imperative Programming Model:

It is one of the oldest programming model. It features close relation to machine architecture. It works by changing the program state through assignment statements. It performs step by step task by changing state. The main focus is on how to achieve the goal. The model consist of several statements and after execution of all the result is stored.

### **Advantage:**

Very simple to implement

It contains loops, variables etc.

### **Disadvantage:**

Complex problem cannot be solved

Less efficient and less productive

Parallel programming is not possible

Examples:

**C** : developed by Dennis Ritchie and Ken Thompson

**Fortan** : developed by John Backus for IBM

# Programming Language

## i. Procedural Oriented Programming Language

- Procedural Oriented Programming (POP) language is derived from structured programming and based upon the procedure call concept. It divides a program into small procedures called routines or functions.
- Procedural Oriented programming language is used by a software programmer to create a program that can be accomplished by using a programming editor like IDE, Adobe Dreamweaver, or Microsoft Visual Studio.
- The advantage of POP language is that it helps programmers to easily track the program flow and code can be reused in different parts of the program.
- **Example:** C, FORTRAN, Basic, Pascal, etc.

# Programming Language

## ii. Object-Oriented Programming Language

- Object-Oriented Programming (OOP) language is **based upon the objects**.  
In this **programming language**, **programs are divided into small parts called objects**. It is used to implement real-world entities like inheritance, polymorphism, abstraction, etc in the program to makes the program resusable, efficient, and easy-to-use.
- The main advantage of object-oriented programming is that OOP is faster and easier to execute, maintain, modify, as well as debug.
- **Example:** C++, Java, Python, C#, etc.

# Programming Language

## iii. Parallel Processing Approach

- Parallel processing is the processing of program instructions by dividing them among multiple processors.
- A parallel processing system possesses many numbers of processor with the objective of running a program in less time by dividing them.
- This approach seems to be like divide and conquer. Examples are NESL (one of the oldest one) and C/C++ also supports because of some library function.



# Programming Language

## 2. Declarative Programming Model:

- It is divided as Logic, Functional, Database. In computer science the *declarative programming* is a style of building programs that expresses logic of computation without talking about its control flow.
- The focus is on what needs to be done rather how it should be done basically emphasize on what code code is actually doing.
- It just declares the result we want rather how it has be produced.
- This is the only difference between imperative (how to do) and declarative (what to do) programming model.
- **Eg: JavaScript**

# Programming Language

## i. Logic Programming Paradigms

It can be termed as abstract model of computation. It would solve logical problems like puzzles, series etc.

In logic programming we have a knowledge base which we know before and along with the question and knowledge base which is given to machine, it produces result.

e.g., Prolog

# Programming Language

## ii. Functional programming paradigms –

- The functional programming paradigms has its roots in mathematics and it is language independent.
- Data are loosely coupled to functions.
- The function hide their implementation.
- Function can be replaced with their values without changing the meaning of the program.
- Some of the languages like perl, javascript mostly uses this model.

# 2. Software Development Tools

- Known as either a software development tool or a programming tool, this is a computer program that is used by software developers to support other programs and applications by creating, debugging, maintaining – so on and so forth.
- The term usually is used to refer to fairly simple programs, which together can achieve a task.

## *Uses of Software Development Tools*

1. Making Program Information Available to Humans
2. Translation from Human Language to a Computer Language

# 2. Software Development Tools

## *Most Popular Tools Used in Agile Software Development*

**Linux** is used for APIs, automation, and, application development. It is a low code development platform used to build and automate backend applications as well as web services.

Linux allows you to simply and swiftly build processes that allow you to control and rewrite data across multiple systems.

### **Features:**

- Design applications using the prebuilt components to automate workflow
- Create processes to implement logic, integrations and business rules
- Visual debugging features
- Speed up application delivery with the provided programming functions and services

# 2. Software Development Tools

## *Most Popular Tools Used in Agile Software Development*

**Cloud9** is a software development environment to integrate online. Supporting multiple programming languages such as Python, JavaScript, PHP, and other Cloud9 is a great diverse option for developing software.

As of 2016, Cloud9 was acquired by Amazon Web Service and has undergone major improvements and offers more opportunities than its starting in 2010.

### **Features:**

- Usable for scripting, running and debugging code in the cloud
- Code together in real-time with the collaborating options
- Easy to write, run and debug serverless applications
- Quick to run commands and access AWS services directly

# 2. Software Development Tools

## *Most Popular Tools Used in Agile Software Development*

**NetBeans** is an open-source IDE that allows you to develop desktop, mobile, and web applications.

The tool is written in Java and allows you to quickly and easily create and develop applications.

NetBeans is our top choice in the drag and drop software development tools category and web developers love it.

### **Features:**

- Tools for JavaScript, HTML5 and CSS3
- Community provided plugins
- Ability to write bug-free code
- Fast code editing
- Supports multiple languages

# 2. Software Development Tools

## *Most Popular Tools Used in Agile Software Development*

**Atom** is an all-around text editor and useful software development tools. It is an open-source that can be used and customized to do anything without the added effort of modifying the configuration file.

Based on its suitability for the development of management tools we've included Atom in our software development tools category.

### Features:

- Cross-platform editing
- Smart autocompletion allows for faster coding
- In-built package manager
- Comes with 4 UI and 8 syntax themes
- Easy to customize and style



# 2. Software Development Tools

## *Most Popular Tools Used in Agile Software Development*

**CodeLobster** is a PHP IDE. The software can be used to develop a web application.

CodeLobster supports HTML, Twig, CSS, Smarty, and JavaScript. This is one of the favorite tools for JavaScript developers.

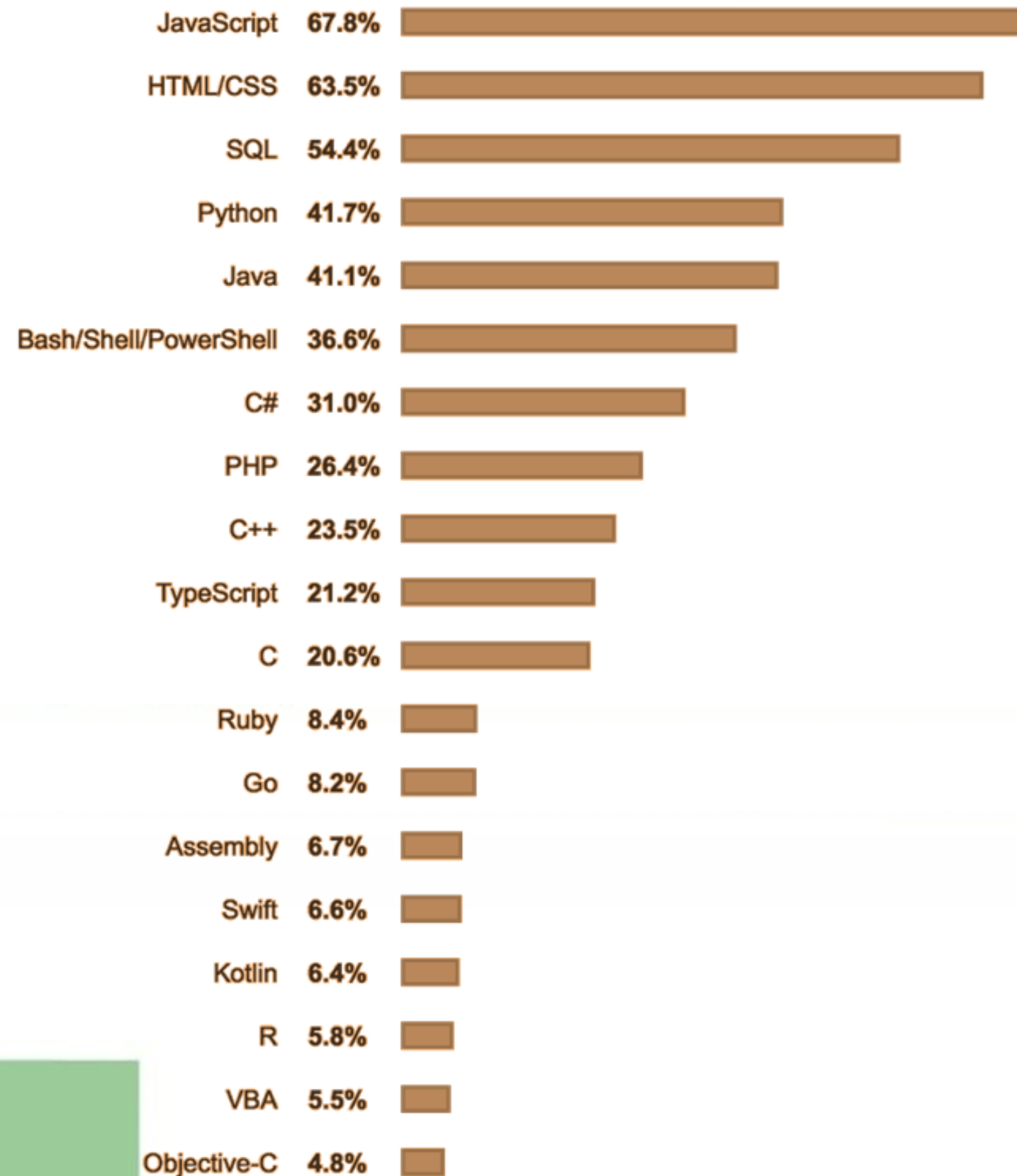
### **Features:**

- Simplifies the software development process
- Supports WordPress, Magento, Joomla, etc.
- CSS code inspector
- PHP debugging facilities
- Advanced autocomplete options allow for easy coding

# 3. Selecting Languages and Tools

- Choosing a programming language for a project is different than choosing one to learn. Often, people will tell you that there's no choice.
- Certain languages are chosen as the industry standard, and you just have to adapt.
- With as little freedom as you have, there are still some considerations to be made when choosing a programming language.
- After all, it will impact the main constraints on your project, such as time, budget, resources, and maintainability, and etc.

# 3. Selecting Languages and Tools



# 4. Good Programming Practices

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1. Be consistent with formatting.
2. Be consistent with naming conventions.
3. Use global [identifiers] sparingly.
4. Don't assume output formats.
5. Add comment to your code – explain what and why
6. Provide useful error messages.
7. Recover (or fail) gracefully.

# Reference

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