Course Code 007313 (Spring 2019)

# 프로그래밍언어의 개념
# Concepts of Programming Language
## **(Lecture 01 : Course Introduction)**

Prof. A. P. Shrestha, Ph.D.
Dept. of Computer Science and Engineering, Sejong University

# Today

- Brief course overview
- Evaluation, grading and other information

# Next class

- Chapter 1-Preliminaries

# Course Information

- Course Number 007313
- Credits: 3
- Hours: 3 hours/weekly
  Tuesday 3:00 pm - 4:30 pm (충 103A), and
  Thursday 3:00 pm - 4:30 pm (충 103A)
- Class Type: Theory
- The lecture slides and assignments will be available in Blackboard

# What To Expect and What NOT to Expect ?

- This course will **NOT**
  - teach you a specific programming language
  - teach you how to program
- This course will
  - introduce fundamental concepts of programming languages
  - examine design issues of various language constructs
  - Compare design alternatives
- Pre-requisite
  - You need to have basic knowledge of at least one programming language
  - If you are not familiar with any programming language, some parts of the lecture might be difficult to understand

# Introduction

## Baking Cake vs. Writing Program

Baking Cake

- Chef tells how to make a cake
- Has ingredients (butter, eggs, flour, sugar) & final dish i.e. cake
- Define a procedure
- Instruct how oven, mixer process inputs to generate cake
- ***Can be expressed in different languages***

Writing Program

- You tell a computer how to do a computation
- Has inputs and outputs
- Define a algorithm (flowchart, pseudocode)
- Instruct how processors process inputs to generate outputs
- ***Can be expressed in different languages***

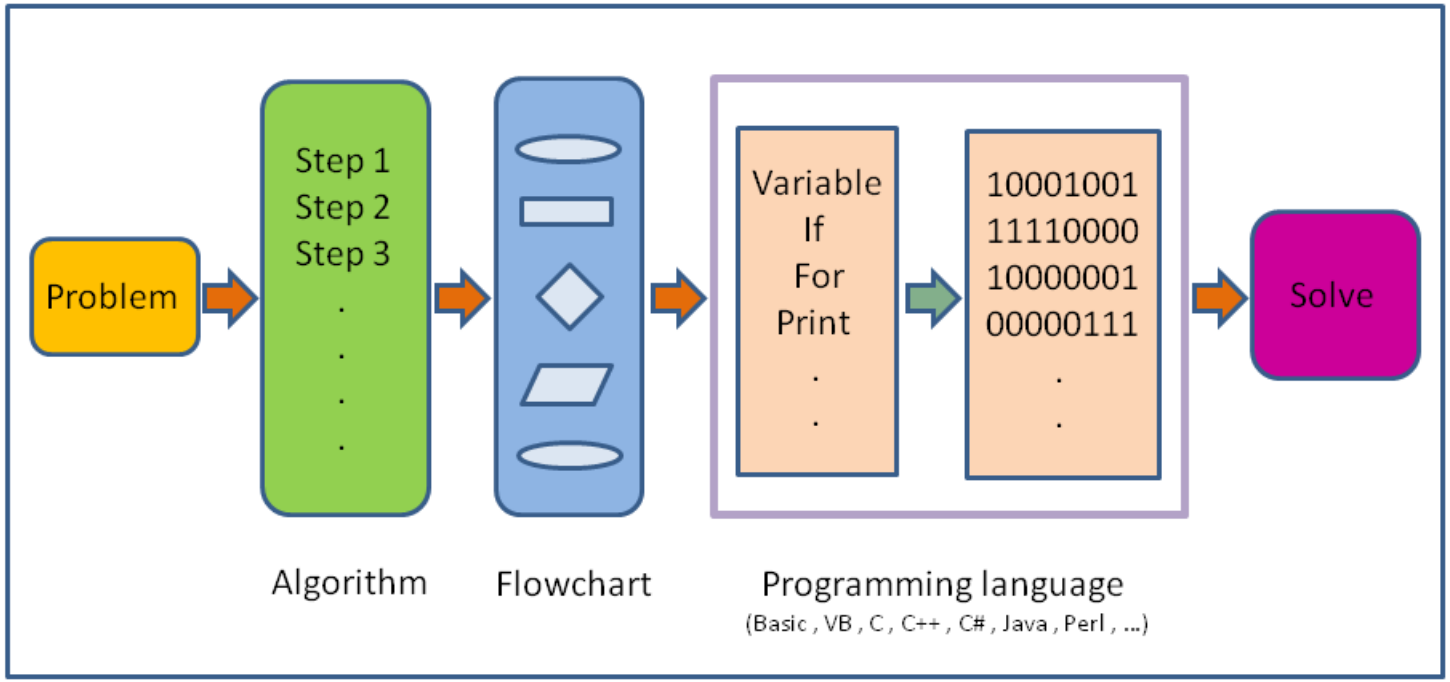
Comparison

- Ingredients ↔Inpput
- Cake ↔ Output
- Procedure ↔ Algorithm
- Oven ↔ Processor
- Programming language?

↔

# Programming Language

- A language is a means of expressing your thoughts to others
- In the case of Programming Language, it is a means of expressing your thoughts (i.e. algorithms) to a computer
- Like any natural language (such as Chinese and English), programming languages also have vocabulary (Instruction sets) and grammatical rule(Syntax).



# Questions Answered in This Course

- Given multiple languages, how do they differ in expressing the same algorithm?
- Which language is better?

  → How to evaluate “goodness” of languages?

- Why are there so many different languages?
- Why does a programming language have so many different features?
- How are these features implemented?

# Current Rankings: PYPL Index

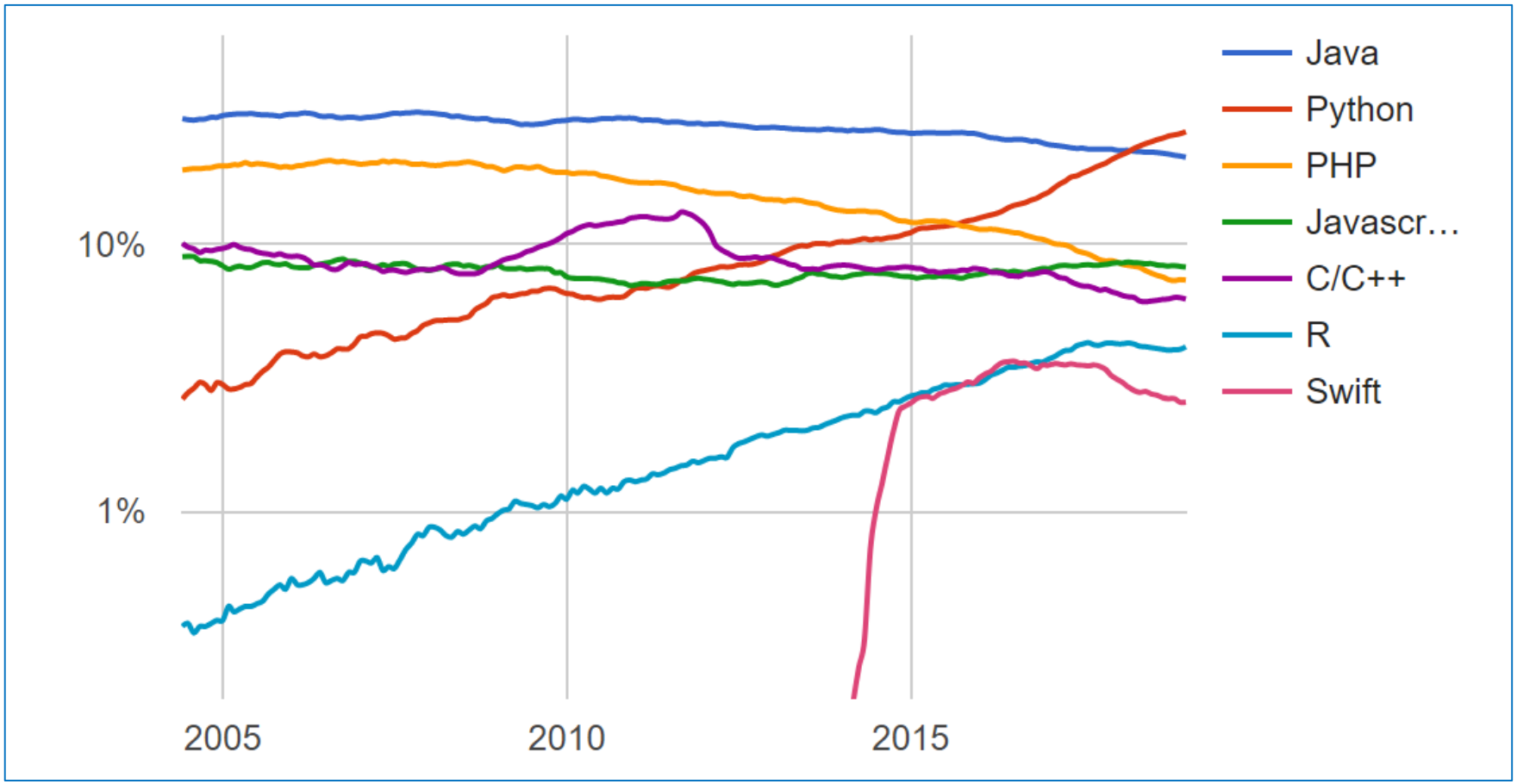
- PYPL: **P**opularit**Y** of **P**rogramming **L**anguage
- Created by analyzing how often language tutorials are searched
- The raw data comes from Google Trends

**Worldwide**, Feb 2019 compared to a year ago:

| Rank | Change | Language | Share | Trend |
|---|---|---|---|---|
| 1 | ↑ | Python | 26.42 % | +5.2 % |
| 2 | ↓ | Java | 21.2 % | -1.3 % |
| 3 | ↑ | Javascript | 8.21 % | -0.3 % |
| 4 | ↑ | C# | 7.57 % | -0.5 % |
| 5 | ↓↓ | PHP | 7.34 % | -1.2 % |
| 6 | | C/C++ | 6.23 % | -0.3 % |
| 7 | | R | 4.13 % | -0.1 % |
| 8 | | Objective-C | 3.04 % | -0.8 % |
| 9 | | Swift | 2.56 % | -0.6 % |
| 10 | | Matlab | 1.98 % | -0.4 % |
| 11 | ↑↑ | TypeScript | 1.61 % | +0.2 % |
| 12 | ↓ | Ruby | 1.54 % | -0.2 % |
| 13 | ↓ | VBA | 1.44 % | -0.0 % |
| 14 | ↑ | Scala | 1.17 % | -0.1 % |
| 15 | ↑ | Kotlin | 1.15 % | +0.3 % |
| 16 | ↓↓ | Visual Basic | 1.15 % | -0.1 % |
| 17 | ↑ | Go | 1.05 % | +0.3 % |
| 18 | ↓ | Perl | 0.58 % | -0.2 % |
| 19 | | Rust | 0.43 % | +0.1 % |
| 20 | | Lua | 0.35 % | +0.0 % |

source: http://pypl.github.io/PYPL.html

# PYPL Index Over Last Decade




source: http://pypl.github.io/PYPL.html

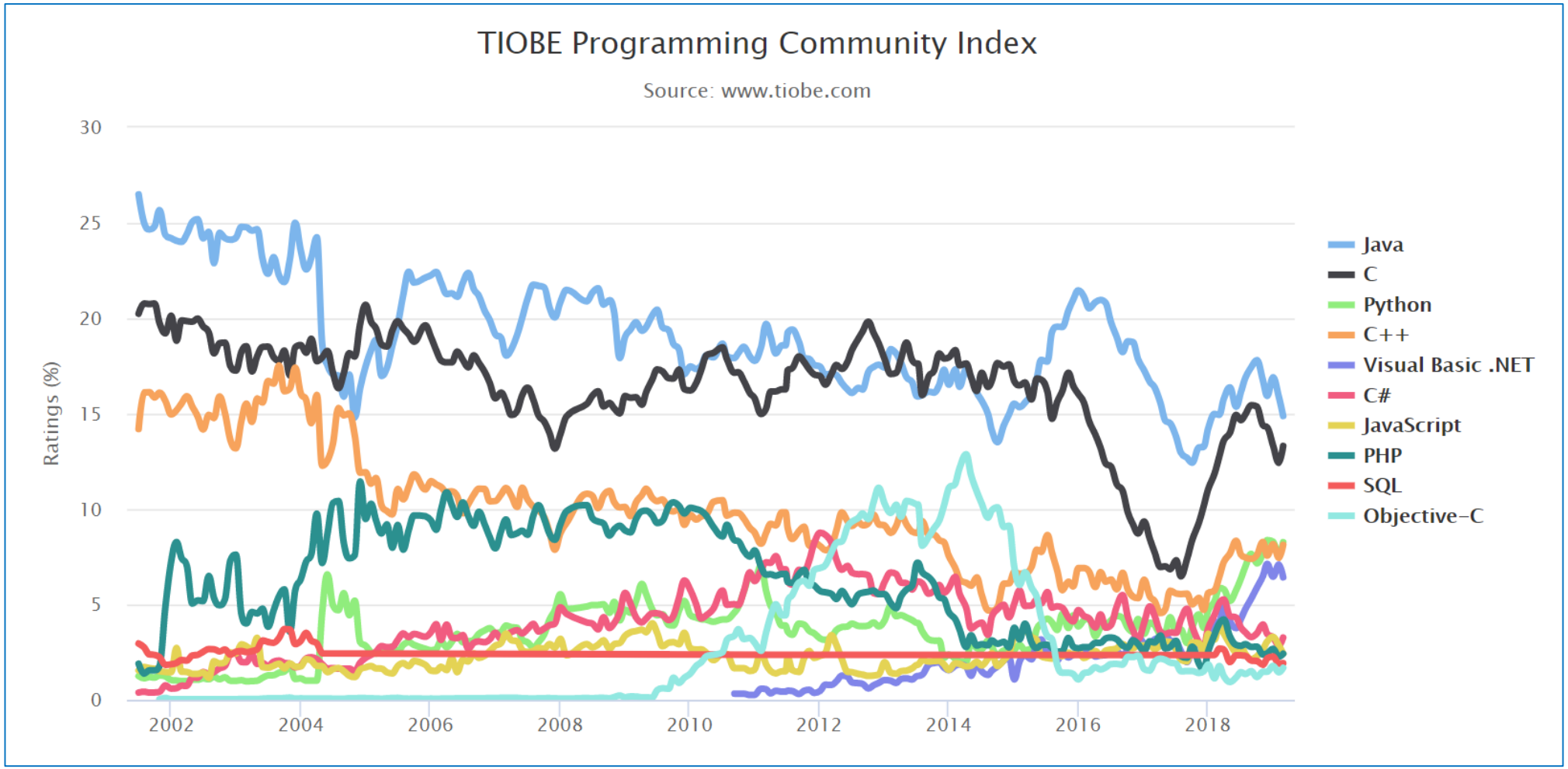
# Current Rankings: TIOBE Index

- **T**he **I**mportance **O**f **B**eing **E**arnest
- Created and maintained by the Dutch Company TIOBE based in Eindhoven.
- Covers searches in Google, Google Blogs, MSN, Yahoo, Baidu, Wikipedia and Youtube.

| Mar 2019 | Mar 2018 | Change | Programming Language | Ratings | Change |
|---|---|---|---|---|---|
| 1 | 1 | | Java | 14.880% | -0.06% |
| 2 | 2 | | C | 13.305% | +0.55% |
| 3 | 4 | ↑ | Python | 8.262% | +2.39% |
| 4 | 3 | ↓ | C++ | 8.126% | +1.67% |
| 5 | 6 | ↑ | Visual Basic .NET | 6.429% | +2.34% |
| 6 | 5 | ↓ | C# | 3.267% | -1.80% |
| 7 | 8 | ↑ | JavaScript | 2.426% | -1.49% |
| 8 | 7 | ↓ | PHP | 2.420% | -1.59% |
| 9 | 10 | ↑ | SQL | 1.926% | -0.76% |
| 10 | 14 | ⇈ | Objective-C | 1.681% | -0.09% |
| 11 | 18 | ⇈ | MATLAB | 1.469% | +0.06% |
| 12 | 16 | ⇈ | Assembly language | 1.413% | -0.29% |
| 13 | 11 | ↓ | Perl | 1.302% | -0.93% |
| 14 | 20 | ⇈ | R | 1.278% | +0.15% |
| 15 | 9 | ⇊ | Ruby | 1.202% | -1.54% |
| 16 | 60 | ⇈ | Groovy | 1.178% | +1.04% |
| 17 | 12 | ⇊ | Swift | 1.158% | -0.99% |
| 18 | 17 | ↓ | Go | 1.016% | -0.43% |
| 19 | 13 | ⇊ | Delphi/Object Pascal | 1.012% | -0.78% |
| 20 | 15 | ⇊ | Visual Basic | 0.954% | -0.79% |

https://www.youtube.com/watch?v=ZkP4sv3H6g8

# TIOBE Over Last Decade

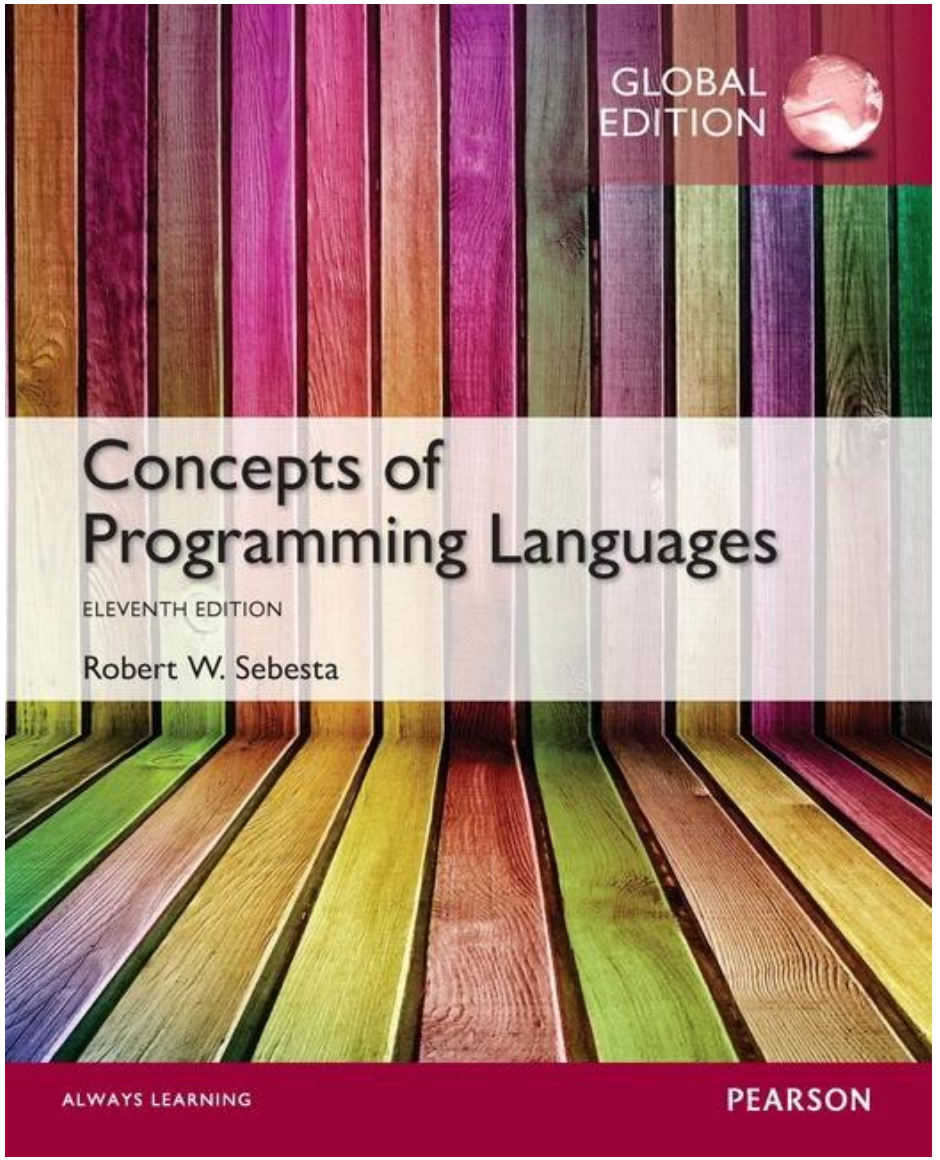


# Course Book

Recommended

- Concepts of Programming Languages

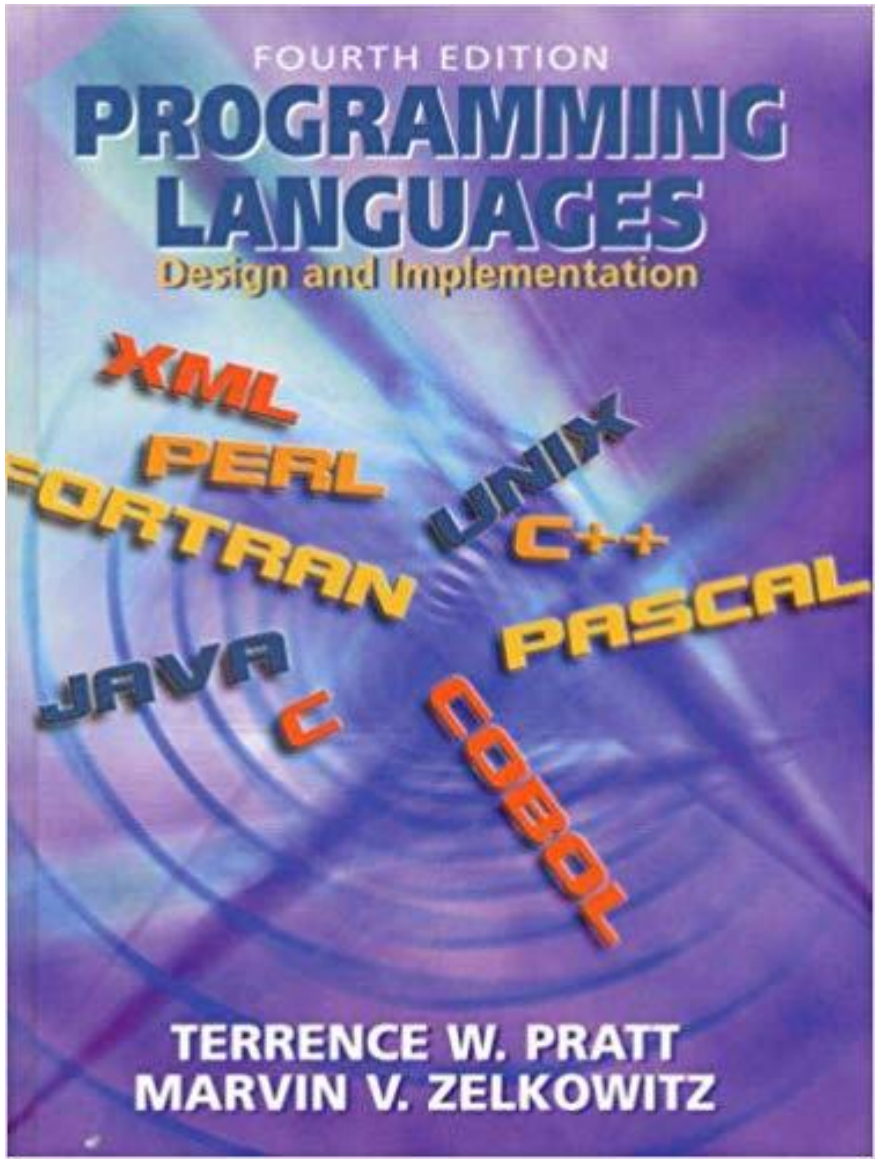
  Robert W. Sebesta (Pearson)



# Extra Book

- Programming Languages: Design and Implementation

  Terrence W. Pratt



# Weekly Lecture Plan

*Quiz 1 will be between week 2-7
*Quiz 2 will be between week 9-15
*Short notice will be given prior to quiz. Please study every week!!

| Week | Contents |
|---|---|
| Week 1 | Course Information and Chapter 1 (Preliminaries) |
| Week 2 | Chapter 2 (Evolution of Major Programming Languages) |
| Week 3-4 | Chapter 3 (Describing Syntax and Semantics) |
| Week 5-6 | Chapter 4 (Lexical and Syntax Analysis) |
| Week 7 | Chapter 5 (Names, Bindings, and Scopes) |
| Week 8 | Mid Term Test |
| Week 9-10 | Chapter 6 (Data Types) |
| Week 11-12 | Chapter 7 (Expressions and Assignment Statements) |
| Week 12-13 | Chapter 8 (Statement-Level Control Structures) |
| Week 14 | Chapter 9 (Subprograms) |
| Week 15 | Chapter 9 (Subprograms) and Few Programming Examples |
| Week 16 | Final Test |

# Evaluation

| 중간고사(%) | 기말고사(%) | 수시평가및과제(%) | 출석(%) |
|---|---|---|---|
| 30 | 30 | 30 | 10 |

| **Attendance (10%)** | **Mid-term (30%)** | **Final-Exam (30%)** | **Others (30%)** |
|---|---|---|---|
| 80 % attendance required | Short answers | Short answers | Assignments: 20 |
| No absence: 10 | Solving problems | Solving problems | Quiz 1: 5 |
| - 1 for each absence | Drawing figures<br>Eg. State diagrams etc. | Drawing figures<br>Eg. State diagrams etc. | Quiz 2: 5 |
| *Absence on week 1 will be excused | Objective questions<br>Example:<br>1. Multiple choice question,<br>2. Predicting output of program<br>3. True or False<br>4. Fill in the blanks etc. | Objective questions<br>Example:<br>1. Multiple choice question,<br>2. Predicting output of program<br>3. True or False<br>4. Fill in the blanks etc. | Quiz 1: Before midterm<br>Quiz 2: After midterm<br><br>Quiz will be mostly objective questions |

# Grading

*m: mean
*d: deviation

- Grading is **relative!**
- **Criteria 1:** Top 25% (approx.) can get A+ or A (university recommendation)

| Grades | Criteria 2 | Criteria 3 |
|---|---|---|
| A+ | > m+1.5d | 85 % or above |
| A | m+1.0d ~ m+1.5d | 70% or above |
| B+ | m+0.5d ~ m+1.0d | NA |
| B | m ~ m+0.5d | NA |
| C+ | m-0.5d ~ m | NA |
| C | m-1.0d ~ m-0.5d | NA |
| D+ | m-1.5d ~ m-1.0d | NA |
| D | m-2.0d ~ m-1.5d | 30% or above |
| F | NA | Less than 30% |

All four criteria should be fulfilled!!

# Assignment

- **Total Assignments**: 6 assignments
  - 3 assignments before midterm exam, and
  - 3 assignments after midterm exam
  - Assignments will be uploaded in blackboard

- **Assignment Submission:**
  - You have to submit assignment in A4 paper or any other type paper, AND upload the digital copy in Blackboard also
    (Digital copy: take picture of your assignment using mobile or any camera)

- **Assignment Deadline:**
  - 1 week (7 days)

# Assignments Rubrics

- Points will be indicated in each question

| | 0 score | 50% score | 100% score |
|---|---|---|---|
| Completion | No attempt | Partial attempt | Fully completed |
| Correctness | Does not address question | Partially correct | Fully correct |
| *Procedure | Only final answer is present | Few intermediate steps are presented | All the necessary intermediate steps clearly presented |
| Readability | Difficult to read or understand | Partially clear | Neat and clear |

(* applies if it is numerical problem)

| | | | |
|---|---|---|---|
| Deadline (1 week) | After 14 days : 0.0 ×Total | Within 7~14 days: $^1/_2$×Total | Within 7 days: Total |

Submission date in blackboard will be considered

# Attendance

**Department Rule!!**

| Present | Late | Absent |
|---|---|---|
| After 5 mins lect. start | 5-15 mins after lect. start | After 15mins |

**Procedure**

- Install Ucheck Plus app in your smartphone and check-in accordingly

**Note**

- If there is any issue during check-in, inform Professor before 15 mins.
- Delay in reporting will result in absence
- Week 1 attendance will not be counted during grading

- **Cannot make examinations**
  - Tell early and we will schedule makeup

# Value vs. Success

"Try not to become a woman/man of success. Rather become a woman/man of value."

- Do it yourself!!
- No plagiarisms
- No copying assignment (discussion is fine).
- No cheating in exam

# Contact

- Email (recommended)
  - anishpshrestha@sejong.ac.kr
  - Please mention your name and course name while sending email
- Office Phone
  - 2-6935-2445
- Mobile Phone
  - Available in blackboard. Do not hesitate to call me in mobile if it is urgent.
- Office Time
  - Preferred: Wed 2:00-3:30 pm,  Fri 2:00-3:30 pm
  - Please make a prior appointment through e-mail (recommended).
- Office
  - Room# 431 센

# Q & A