ITP20005
Programming Languages (PL)

Lecture01
JC

Why do you want to take a PL class?

In the beginning! There was a….

Today's agenda is to
Think about
Languages and Programming Languages
and course information

What are Languages?
(Why do we need languages?)

What are Programming languages?

(Why do we need programming languages?)

What do languages consist of?

What do Programming languages consist of?

What do Programming languages consist of?
(Are they important to choose a proper PL for your project? Why?)

Written vs. Spoken languages

Written
vs.
Spoken programming languages??

https://www.youtube.com/watch?v=Wx7RCJvoCMc

Creation and Languages

Creation and Languages

God said,
Let there be light: and there was light. (Gen 1:3, KJV)

Creation and Languages

In the beginning was the Word, and the Word was with God, and the Word was God. He was with God in the beginning. Through him all things were made; without him nothing was made that has been made. (John 1:1-3)

Creation and Programming Languages

Creation and Programming Languages

JC said,
Let there be a main method: and there was a main method.

Creation and Intelligent Beings

Language and Artificial Intelligent

Programing languages will be disappeared?

⇒

Software developers will be disappeared?

?

Course Information

Course Information

- Instructor: JC (Jaechang Nam)
- Office Hours (OH311)
  - By appointment
    i. Check my calendar at https://lifove.github.io
    ii. Find an available time slot in daytime.
    iii. Send me an email to confirm that you can stop by in your preferred time slot
- Email: jcnam@handong.edu
- Phone: 054-260-1404

Course Information (2)

- TAs
  - TaeEun Kim (김태은, 21400217@handong.edu)
  - YoonHo Choi (최윤호, 21500744@handong.edu)
- TA sessions
  - Thu(목). 20:00 (OH311, JC's office) or by appointment

Course Information (3)

- Course materials (Google drive)
  - drive.google.com → need to login with your HGU email.
  - Check 'Shared with me' (공유문서함)
    - If you want to access the directory from 'My Drive', put the shred directory into your Google drive by using the 'Add to my drive' popup menu.
- Course Hours
  - Section 1: 14:30 - 15:45 Tuesday and Friday
  - Section 2: 16:00 - 17:15 Tuesday and Friday

Grading

- Absolute evaluation (Tentative)
  - >=95: A+, >=90: A0, >=85: B+, >=80: B0, >=75: C+, >=70: C0, >=60: D0, 60>: F
  - Attendance: 5%
    - One absent: -1
      - Officially approved absence requires an official document.
    - Three times of tardy or early leave is counted as one absent.
      - Marked as tardy if you don't show up while checking attendance.
    - Miss more than ¼ lectures (F)
  - HW/Quiz: 45% (9 HW/quizzes, TBD)
  - Midterm exam: 25%
  - Final exam: 25%
  - Additional tasks for bonus points: max 3%
    - Lecture note editing
    - Active discussions during classes...

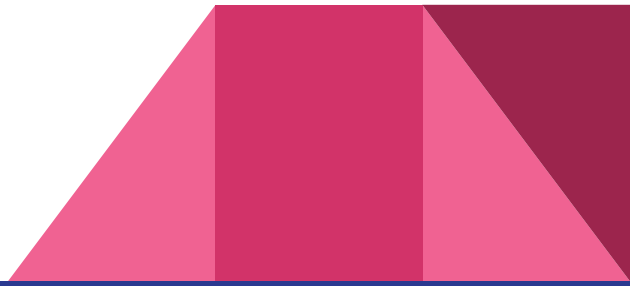
Honour Code

- ***Any types of dishonesty will get you an F.***
- This course has many coding HW tasks.
  - Looking at other student's code is cheating.
    - Discussing about how to solve the problems is OK.
    - Getting `idea' from the Internet is OK.
- For details, check the HGU CSEE Standard
  - http://csee.handong.edu/wp-content/uploads/2018/02/HGU-CSEE-Standard_English_v0.2.pdf

Language in Class

English

for all lectures, homework, quizzes, and exams



Caution!

This course is not about

Learning

a programming language

especially C or Java

We are learning language principles by implementing an interpreter. If you complain Racket is not used in practice, this means you totally misunderstand this class!!

Others

- Do not record my lecture even for personal use!
  ⇒ I'm going to record all my lectures and share in LMS.
- Contents of this course have been significantly changed since last year.
  - There are many coding HW tasks.
    ⇒ If you decided to take this course because this course is a theory course and no coding, please drop the course. You would get troubled!
  - You can check yourself by doing HW1!

Our Goals

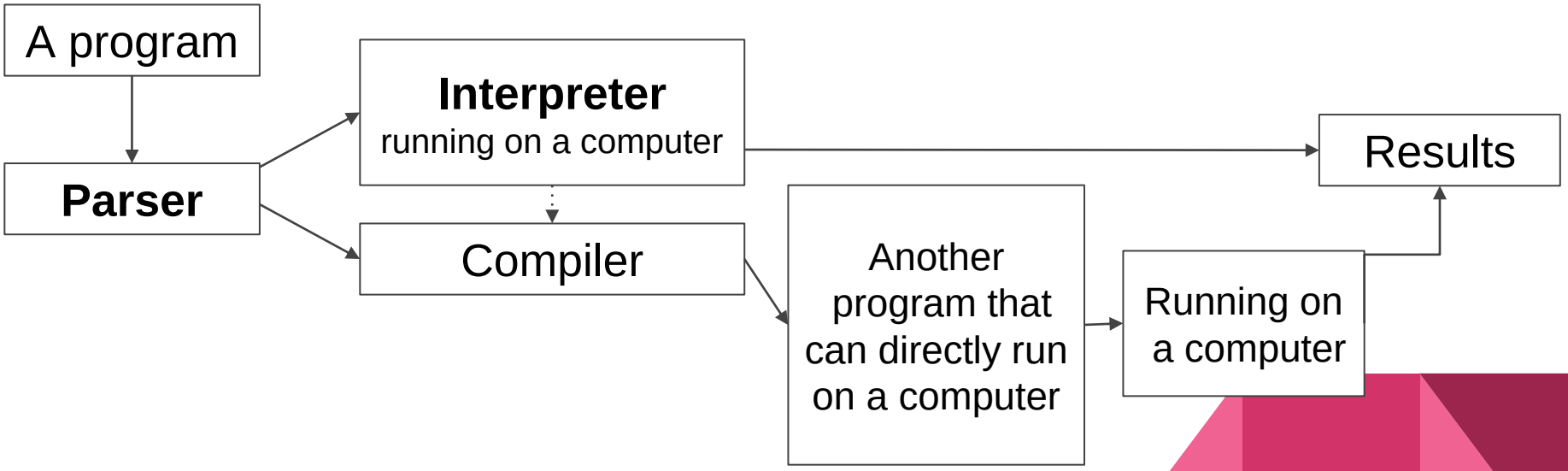
- Learn basic principles in programming languages to learn new programming languages quickly.
- Learn fundamentals to design a light programming language.
- Learn ability to pick a proper programming language for given tasks.

Teaching approach

- By implementing interpreters
  - Write *programs* to learn *concepts*.
  - We are going to use Racket (formerly *Scheme*) and variants
  - Textbook (Free Ebook, Version 2007-04-26)
    - Programming Languages: Application and Interpretation
      - Shriram Krishnamurthi (Brown University)
      - http://www.plai.org
- Another approach we partially adopt
  - Survey approach
    - Good to learn the consequences of languages.
- Others
  - Definitional interpreter approach
  - Rigorous approach

Big Picture (modeling languages)

- Just write an interpreter to explain a language.
- By writing an interpreter, we can understand the language!
- Interpreter can be converted into a compiler!!!



What do we learn?

Topics we cover and schedule (tentative)

- Racket tutorials (L2,3)
- Modeling languages (L4,5)
- Interpreting arithmetic (L5)
- Language principles
  - Substitution (L6)
  - Function (L7)
  - Deferring Substitution (L8, L9, HW)
  - First-class Functions (L10-L12)
  - Laziness (L13,14)
  - Recursion (L15,16)
  - Mutable data structures (L17,18)
  - Variables (L19,L20)
  - Continuations (L21,22,23)
  - Garbage collection (L24)
  - Semantics (L25)
  - Type (L25,26)
- Guest Video Lecture (L28)

No class: October 2 (Fri, Chuseok), October 9 (Fri, Hangul day)
Online only class can be provided.

TO-DOs for the next class

- Install Dr. Racket
  - http://racket-lang.org/
- Language level: plai
- Each file should be prefixed with: #lang plai
- Example
  - Type the following in the Definitions window:

```
#lang plai
(define (area-of-square a)
          (* a a))
(test (area-of-square 4) 16)
```

  - Click Run
- Read and try:
  - https://htdp.org/2018-01-06/Book/part_prologue.html

HW1

- https://docs.google.com/document/d/16ayoIl7A_VnjhtWuwSwALzu4UtfVqcv2nSQnkKuMii8/edit#heading=h.ahfmihrl5103
- Create and share your google drive directory and your score sheet
  - DUE: 22:00 September 7 (Mon), 2020.
  - Follow the directions in the google doc.
- HW1 problems can be solved after taking Lecture 2 and/or 3.
  - DUE: 22:00 September 12 (Sat), 2020.

JC

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https://lifove.github.io

* Slides are from Prof. Sukyoung Ryu's PL class in 2018 Spring or created by JC based on the main text book.