Class Overview
CSCE 314: Programming Languages

- Course Homepage
  
  http://robotics.cs.tamu.edu/dshell/cs314/

- Textbooks
  1. Programming in Haskell, Graham Hutton, Cambridge University Press
  2. The Java Programming Language, 4th Ed, Ken Arnold, James Gosling, and David Holmes, Addison- Wesley Professional

- Other Reading Material: See the course homepage
Prerequisites:

● CSCE 221
● CSCE 222 (not official, but desirable)
● Familiarity with recursion
● Familiarity with complexity analysis
● Eager to learn (Energy and enthusiasm)
● Perseverance and
● Positive, constructive thinking
● …
Motivations

- Ever increasing complexity and the size of modern computer programs
- Ever increasing time and cost of program development
- Ever increasing requirements on the correctness of the programs
- Ever increasing need for a better programmer who learns new languages easily!
“We shape our tools, and then our tools shape us.”

Marshall Mcluhan (or John Culkin?)
Course Objectives (1)

Understand the fundamental concepts of the programming languages:

- Broader understanding of language constructs, common abstraction mechanisms, and efficiency consideration

- Understanding of the basics of how programs written in high-level programming languages are executed, i.e., parsing, internal program representation, type checking, interpretation
Course Objectives (2)

Understand the fundamental concepts of the programming languages:

- Encourage the use of formal verification
- Effective use of the functional programming approach to design and implement programs
- Understanding of the main features of modern object-oriented languages
Edwin A. Abbott’s Flatland

Read it, its free!
https://ebooks.adelaide.edu.au/a/abbott/edwin/flatland/
Course Outline (1)

Language Processing

● Grammars, lexing and parsing
● Abstract syntax, internal representations
● Types and type checking
● Interpretation
● Basics of an implementation of a simple programming language
Course Outline (2)

Study of a Functional Language - Haskell

- Type inference
- Parametric polymorphism
- Higher-order functions
- Algebraic data types
- Abstract data types and modules
- Type classes
- Effects in a “pure” language
Grading

- Homework: 40%
- Midterm Examination: 25%
- Final Examination: 35%
Course Outline (3)

Study of an Object-Oriented Language - Java

- Subtyping and inheritance, subtype polymorphism
- Exception handling
- Generics, wildcards
- Reflection
- Concurrency
Assignments and Submission

- Homework will be assigned approximately fortnightly
- Currently planning to use the CSNET submission system
- All assignments will be done individually and may include programming, essay-style problems, and problems from the textbook. It is extremely important to read the assignment statements carefully!
Assignments (Cont.)

- Late turn-in will have penalty:
  - 10% loss for the first 24 hours late
  - 20% loss for the second 24 hours late
  - 100% thereafter.

- Genuine difficulties must be discussed with Instructor before the deadline

- Never cut classes to do your homework

- Some class time will be devoted to hands-on learning (exercises, help with homework, etc.)
Collaboration Policy

Acceptable collaboration includes:

- discussing the assigned problems to understand their meaning, or
- discussing possible approaches to assigned problems.

However, you must explicitly acknowledge any help received from someone and reference every source you use, whether it is a person, a book, a paper, a solution set, a web page or whatever.
Collaboration Policy

Unacceptable collaboration includes:

- copying (verbatim use) of physical papers or computer files (including program files),
- submission of solutions that are jointly authored, or authored either wholly or in part by other individual, or
- providing physical papers or computer files (including program files) of your (or third-party) solutions to other individuals.
Earning grade in this course

● Planning to get an “A” grade?
  Attend all classes, pay attention in the class, do exercises, do assignments, read book and reading material, participate in the class.

● How to get grade “D”?  
  Miss classes, do not pay attention in the class, do not do assignments, don’t read the reading materials.
Summary

- Questions on the operation of the course? Look at the webpage.

- We will study fundamentals of programming languages by way of learning two languages - Haskell and Java

- A lot of “fun” work in the class
Credits and Image sources:

- [http://www.mathaware.org/mam/00/master/people/abbott/JPG/abbott.jpg](http://www.mathaware.org/mam/00/master/people/abbott/JPG/abbott.jpg)

This slide and most that will be presented are based on materials kindly provided by Dr. Hyunyoung Lee and Dr. Jaakko Järvi. I acknowledge their help and graciousness.