CS399 INTRODUCTION TO FUNCTIONAL PROGRAMMING

Summer, 2019

Prerequisites

CS 225

General Information

Class Schedule:	*Monday, Friday 4:00pm-5:40pm*
Class room:	*Monday: Jimbo, Friday: Blanc*
Professor:	*Alexander Carter*
Email	*{School email address}*
Phone number:	*{Office phone number}*
Class web page:	*https://github.com/alrunner4/cs399*
Office Hours:	*Monday, Friday 5:45pm-6:45pm*

Description

Pure functional programming languages promote a powerful paradigm for analyzing, constructing, and composing programs. By controlling side-effects, the purpose of each unit of code becomes clearer, and enables us to have greater confidence in the soundness of our programs. This course will enable students to become productive with pure functional programming languages, and delve into the mathematical foundations

Course Objectives and Learning Outcomes

Students will gain an alternate perspective on program composition with pure functions, familiarity with the similarities and differences from object-oriented methodologies, and hands-on experience building real-time systems in a functional programming language.

Academic Integrity Policy

Academic dishonesty in any form will not be tolerated in this course. Cheating, copying, plagiarizing, or any other form of academic dishonesty (including doing someone else's individual assignments) will result in, at the extreme minimum, a zero on the assignment in question, and could result in a failing grade in the course or even expulsion from DigiPen.

Disability Support Services

If students have disabilities and will need formal accommodations in order to fully participate or effectively demonstrate learning in this class, they should contact the Disability Support Services Office at (425) 629-5015 or dss[at]digipen[dot]edu. The DSS Office welcomes the opportunity to meet with students to discuss how the accommodations will be implemented. Also, if you may need assistance in the event of an evacuation, please let the instructor know.

Course Materials

Optional Textbooks

Purely Functional Data Structures, Chris Okasaki, Cambridge Univ. Press, 0521663504
Structure and Interpretation of Computer Programs, Harold Ableson and Gerald Jay Sussman, MIT Press, 0262510871
Real World Haskell, Bryan O'Sullivan; John Goerzen; Don Stewart, Sebastopol O'Reilly Media, 0596514980

References

http://learnyouahaskell.com
https://idris-lang.org

Assessment

Grading Policy

10% Midterm Exam
20% Final Exam
10% Weekly Quizzes
60% Projects

Late Policy

Projects submitted after their due dates will be subject to a 25% per-week penalty. Ex:

- *An A- (90%) project submitted one week late will receive a score of 68%*
- *A C- (70%) project submitted one week late will receive a score of 53%*

Course Outline and Tentative Dates

May 6, May 11	*Introduction to Idris Syntax*
May 13, May 17	*Model of Evaluation, IO, Project 1 Assigned*
May 20, May 24	*Type Classes, Type Inference*
May 27, May 31	*State, Generalized Algebraic Data Types, Project 2 Assigned*
June 3, June 7	*Purely Functional Data Structures, Lenses*
June 10, June 14	***Midterm Exam**, Understanding Type-level Error Messages*
June 17, June 21	*Dependent Types, Project 3 Assigned*
June 24, June 28	*Proofs*
July 1, July 5	*Foreign Function Interface to C, Project 4 Assigned*
July 8, July 12	*Totality and Decidability*
July 15, July 19	*Review, **Final Exam***

Additional Information

Relevance/Statement

This course strives to provide students with new conceptual tools for creating and understanding robust, composable programs. Even in the absence of a functional programming language, students will be able to recognize and implement pure functional systems when useful in their language of choice.

Instructor's Biography

Alexander Carter's journey in functional programming began shortly after his graduation from DigiPen Institute of Technology's RTIS program in 2010, in an effort to broaden his understanding of programming languages. He was quickly hooked, and has spent the last 8 years studying and applying functional programming techniques wherever he can.

Last Day to Withdraw

In order to withdraw from a course it is not sufficient simply to stop attending class or to inform the instructor. In accordance with the policy, contact your advisor or the Registrar to begin the withdrawal process. The last day for withdrawal from this course is cited in the official catalog.

Academic Support Center

The Academic Support Center, located on the 2nd floor next to Gibran and Edison, offers free tutoring sessions for select 100 and 200 level courses. Tutors are trained to enhance the understanding of core course concepts, answer questions, and assist with exam preparation. Drop-in tutoring is available throughout the day or students can schedule a drop-in appointment. For any additional questions regarding Tutoring Services, please contact studentsuccess@digipen.edu.