

Programming Paradigms Section 04

CS 152

Spring 2024 3 Unit(s) 01/24/2024 to 05/13/2024 Modified 01/19/2024

Contact Information

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Office Hours

Tuesday, 3:00 PM to 4:00 PM, online via Zoom

Wednesday, 4:00 PM to 5:00 PM, online via Zoom

Course Description and Requisites

Programming language syntax and semantics. Data types and type checking. Scope, bindings, and environments. Functional and logic programming paradigms, and comparison to other paradigms. Extensive coverage of a functional language.

Prerequisite: CS 151 or CMPE 135 (with a grade of "C-" or better); Allowed Majors: Computer Science or Software Engineering; or instructor consent.

Letter Graded

* Classroom Protocols

Regular attendance is an integral part of the learning process. Please arrive to class on time and make sure your cell phones are silent during the lecture.

Class time will be spent in interactive lecture. You are required to bring your wireless laptop to class. Your laptop must remain closed except for designated activities.

We'll use iClicker to gather your feedback and check understanding during the lecture. iClicker helps me understand what you know, gives everyone a chance to participate, and allows you to review the material after class. You must be in the classroom to participate in the iClicker activity.

Program Information

Diversity Statement - At SJSU, it is important to create a safe learning environment where we can explore, learn, and grow together. We strive to build a diverse, equitable, inclusive culture that values, encourages, and supports students from all backgrounds and experiences.

Course Goals

Upon successful completion of this course, students will be able to:

1. Understand programming language design.
2. Achieve competence in a functional programming language.

Course Learning Outcomes (CLOs)

Upon successful completion of this course, students will be able to:

1. Recognize the history of programming languages.
2. Discuss and distinguish the procedural, object-oriented, functional, and logic programming paradigms.
3. Explain the roles of interpreters, compilers, and virtual machines.
4. Critique the design of a programming language.
5. Read and produce context-free grammars.
6. Write recursive-descent parsers for simple languages.
7. Understand variable scoping and lifetimes.
8. Write interpreters for simple languages that involve arithmetic expressions, bindings of values to names, and function calls.
9. Understand type systems.
10. Understand the implementation of procedure calls and stack frames.
11. Produce programs in a functional programming language.

Course Requirements and Assignments

Homework

Homework assignments will be posted and submitted on Canvas. For full credit, they must be submitted by the posted due date and time. A detailed grading rubric is provided for all programming assignments. Please make sure you read and follow the grading rubric to ensure full credit.

Some assignments will be individual work. Others will be team assignments. I will make it clear whether the assignment is an individual assignment or a team assignment.

All work submitted on individual assignments must be your own. You may not share or copy code or answers from fellow students or from the web. Infractions will be detected and will lead to an automatic 0. If someone else copies your work, with or without your permission, you will be held responsible.

For team assignments, teams will consist of two students. The work must be done by both team members and both team members will receive the same grade. Teams may not share or copy code from other teams or from the web. Both team members will receive a zero if that happens regardless of who copied or shared the work. Both team members will also be reported to the Student Conduct and Ethical Development office.

Questions of the Week

We will have a single question every week to check your understanding of the previous week's material. I will count the 9 best scores out of the 11 total questions in the semester. You must be in the classroom and must use the LockDown browser to access and answer the question on Canvas. Missed questions cannot be made up.

Class Participation

You are expected to attend all class meetings as you are responsible for all the material discussed. Since active participation is essential to ensure maximum benefit, we'll use iClicker to give everyone a chance to participate. The iClicker participation points may be used to give your final grade in the course a slight boost.

Exams

We'll have 3 exams in the semester, the last being the final exam.

The first two exams are scheduled during our regular class time as follows:

Exam 1: Thursday, February 22

Exam 2: Thursday, March 28

The final exam is scheduled according to the SJSU Final Exam Schedule and will take place on Monday May 20, 9:45 AM-12:00 PM.

Grading Information

The final grade in the course will be calculated based on the homework assignments, questions of the week and the three exams.

The iClicker points may be used to give your final grade a slight boost. Students with the highest iClicker scores will get up to 1 bonus point. Students who violate the academic integrity policy are not eligible.

No extra credit options will be given.

Late Work

Assignments are due by 5 PM on the due date. Late assignments will be accepted with a 1-point penalty for each day or partial day late. Late days include weekend days. For example, an assignment due on Tuesday by 5 PM will incur a penalty of 1 point if submitted at 8 AM on Wednesday. Everyone gets two free 'late days' for the semester. No submissions will be accepted more than 2 days late.

Academic Dishonesty

Students who are suspected of cheating will be referred to the Student Conduct and Ethical Development office and depending on the severity of the conduct, will receive a zero on the assignment or a grade of F in the course. Grade Forgiveness does not apply to courses for which the original grade was the result of a finding of academic dishonesty.

Criteria

| Type | Weight | Topic | Notes |
|-----------------------|--------|-------|-------|
| Homework Assignments | 30% | | |
| Questions of the Week | 10% | | |
| Exam 1 | 20% | | |
| Exam 2 | 20% | | |
| Final Exam | 20% | | |

Breakdown

| Grade | Range | Notes |
|---------|------------|-------|
| A plus | 98 to 100% | |
| A | 93 to 97% | |
| A minus | 90 to 92% | |
| B plus | 87 to 89% | |
| B | 83 to 86% | |
| B minus | 80 to 82% | |
| C plus | 77 to 79% | |
| C | 73 to 76% | |

| Grade | Range | Notes |
|---------|-----------|-------|
| C minus | 70 to 72% | |
| D | 60 to 69% | |
| F | below 60% | |

University Policies

Per [University Policy S16-9 \(PDF\)](http://www.sjsu.edu/senate/docs/S16-9.pdf) (<http://www.sjsu.edu/senate/docs/S16-9.pdf>), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on the [Syllabus Information](https://www.sjsu.edu/curriculum/courses/syllabus-info.php) (<https://www.sjsu.edu/curriculum/courses/syllabus-info.php>) web page. Make sure to visit this page to review and be aware of these university policies and resources.

Course Schedule

| When | Topic | Notes |
|-----------------------|---|--|
| Week 1: Jan 25 | Course Logistics | Form a team by February 1 |
| Week 2: Jan 30, Feb 1 | Historical Overview, Computational Paradigms, Language Definition, Language Design Criteria | |
| Week 3: Feb 6, 8 | Functional Programming, Scheme Basics | Q1 on Feb 6 Homework 1 due Feb 19 |
| Week 4: Feb 13, 15 | Higher Order Functions, Recursion and Efficiency, Macros | Q2 on Feb 13 |
| Week 5: Feb 20, 22 | Programming Practice, Exam 1 | Q3 on Feb 20 Exam 1 on Feb 22 |
| Week 6: Feb 27, 29 | Haskell | Homework 2 due on Mar 14 |
| Week 7: Mar 5, 7 | Haskell | Q4 on Mar 5 |

| When | Topic | Notes |
|------------------------|--|---------------------------------------|
| Week 8: Mar 12, 14 | Language Translation, Lexical Analysis, Context-free Grammars, Ambiguity, Associativity and Precedence | Q5 on Mar 12 |
| Week 9: Mar 19, 21 | Parsing Techniques & Tools | Q6 on Mar 19 Homework 3 due Mar 29 |
| Week 10: Mar 26, 28 | Review, Exam 2 | Q7 on Mar 26 Exam 2 on March 28 |
| Week 11 | Spring Recess - No Classes | |
| Week 12: Apr 9, 11 | Basic Semantics | Homework 4 due Apr 18 |
| Week 13: Apr 16, 18 | Procedure Semantics, Closures and Dynamic Environments | Q8 on Apr 16 |
| Week 14: Apr 23, 25 | Type Systems, The Logic Paradigm | Q9 on Apr 23 |
| Week 15: Apr 30, May 2 | Prolog | Q10 on Apr 30 Homework 5 due May 9 |
| Week 16: May 7, 9 | Control Structures, Object-oriented Paradigm, Final Review | Q11 on May 7 |
| Final Exam | Monday May 20, 9:45 AM-12:00 PM | |