SJSU SAN JOSÉ STATE UNIVERSITY

College of Science · Computer Science

Programming Paradigms Section 01

CS 152

Fall 2023   3 Unit(s)   08/21/2023 to 12/06/2023   Modified 08/21/2023

🖥 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); Computer Science, Applied and Computational Math or Software Engineering Majors only; or instructor consent.

Letter Graded

📋 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 Learning Outcomes (CLOs)

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 (CLO)

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

1. *Have a basic knowledge of the history of programming languages.*
2. *Have a basic knowledge of the procedural, object-oriented, functional, and logic programming paradigms.*
3. *Understand 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, by hand or with a parser generator.*
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 in excess of 200 LOC.*

📖 Course Materials

Course materials will be uploaded to [http://www.cs.sjsu.edu/~austin/cs152-fall23/ (http://www.cs.sjsu.edu/~austin/cs152-fall23/)](http://www.cs.sjsu.edu/~austin/cs152-fall23/) (once it is working again).

Textbooks:

- "Teach Yourself Scheme in Fixnum Days", Dorai Sitaram, https://ds26gte.github.io/tyscheme/.

- "Eloquent JavaScript", 3rd ed., Marijn Haverbeke, https://eloquentjavascript.net/.
- Other readings TBD.

✔ Grading Information

Determination of Grades

1. 25% -- Homework assignments (individual)
2. 15% -- Class project (team)
3. 25% -- Midterm
4. 25% -- Final
5. 10% -- Participation (labs and drills)

Assignments are due by 11:59 PM Pacific Time on the specified day.

Late homework assignments will not be accepted.

Nominal grading scale:

Percentage	Grade
92 and above	A
90 - 91	A-
88 - 89	B+
82 - 87	B
80 - 81	B-
78 - 79	C+
72 - 77	C
70 - 71	C-
68 - 69	D+
62 - 67	D
60 - 61	D-

59 and below	F

🏛 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

TENTATIVE Course Schedule

Week	Date	Topics, Readings, Assignments, Deadlines
1	8/21	Course introduction
1	8/23	Scheme
2	8/28	Syntax & Semantics, and Language Design Criteria
2	8/30	Higher order functions – map and filter
3	9/4	**LABOR DAY**
3	9/6	Higher order functions – fold
4	9/11	Operational semantics
4	9/13	Closures and scoping
5	9/18	Macros
5	9/20	Programming contracts
6	9/25	Java lambdas
6	9/27	JavaScript
7	10/2	Event-based programming
7	10/4	Scoping in JavaScript, JSLint, and TypeScript
8	10/09	ECMAScript 6 and metaobject protocols

Week	Date	Topics, Readings, Assignments, Deadlines
8	10/11	Review for midterm
9	10/16	**MIDTERM EXAM**
9	10/18	ANTLR & Syntax
10	10/23	Prolog
10	10/25	Resolution and unification, the cut operator
11	10/30	Lists in Prolog and debugging Prolog
11	11/1	Ruby
12	11/6	Ruby blocks
12	11/8	Eval in Ruby, Intro to LaTeX, Domain Specific Languages (DSLs)
13	11/13	Virtual Machines
13	11/15	Python and IDE plugins
14	11/20	Inform 7
14	11/22	**HAPPY THANKSGIVING!!!**
15	11/27	TBD
15	11/29	TBD
16	12/4	Advanced Java features, wrap-up
16	12/6	Review for final
Final Exam	12/12	9:45am-11:45am