Lecture 1: Course Introduction

15CSE402 :: SICP

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Welcome to 15CSE402

"I think it is extraordinarily important that we in computer science keep fun in computing." – Alan J Perils

The SICP book

What can be said about it that hasn't been said a thousand times before?
It is perhaps the single greatest computer science textbook.
It is renowned for its imaginative exercises and mind-blowing techniques.[1]

[1] `https://www.gwern.net/sicp/Introduction`

What does it teach?

It teaches:[2]

- Principles of Computer Programming
- Recursion
- Abstraction
- Modularity
- Program Language Design and
- Implementation

[2] https://en.wikipedia.org/wiki/Structure_and_Interpretation_of_Computer_Programs

What we are going to study?

"We are about to study the idea of computational process".[3]

We are going to understand about:

- *Computational Process*.
- *Processes* that manipulate *data*.
- pattern of rules called *program*.[4]

[3] page 1; SICP book

[4] In our case procedures.

LISP - Our Language

Just as:

- our everyday thoughts are expressed by natural languages,
- descriptions and quantitative phenomena are expressed by mathematical notations,

Our procedural thoughts will be expressed in Lisp.

Why Lisp?

If Lisp is not a mainstream language, why are we using it as the framework for our discussion on programming?
Because the language possesses:

- excellent medium for studying important programming constructs,
- data structures, and
- a medium to relate them.

More precisely Scheme

- Scheme, a dialect of Lisp
- Invented by Guy Lewis and Gerald Jay Sussman at MIT in 1975.
- Re-implemented for instructional use later.

Minimal Syntax

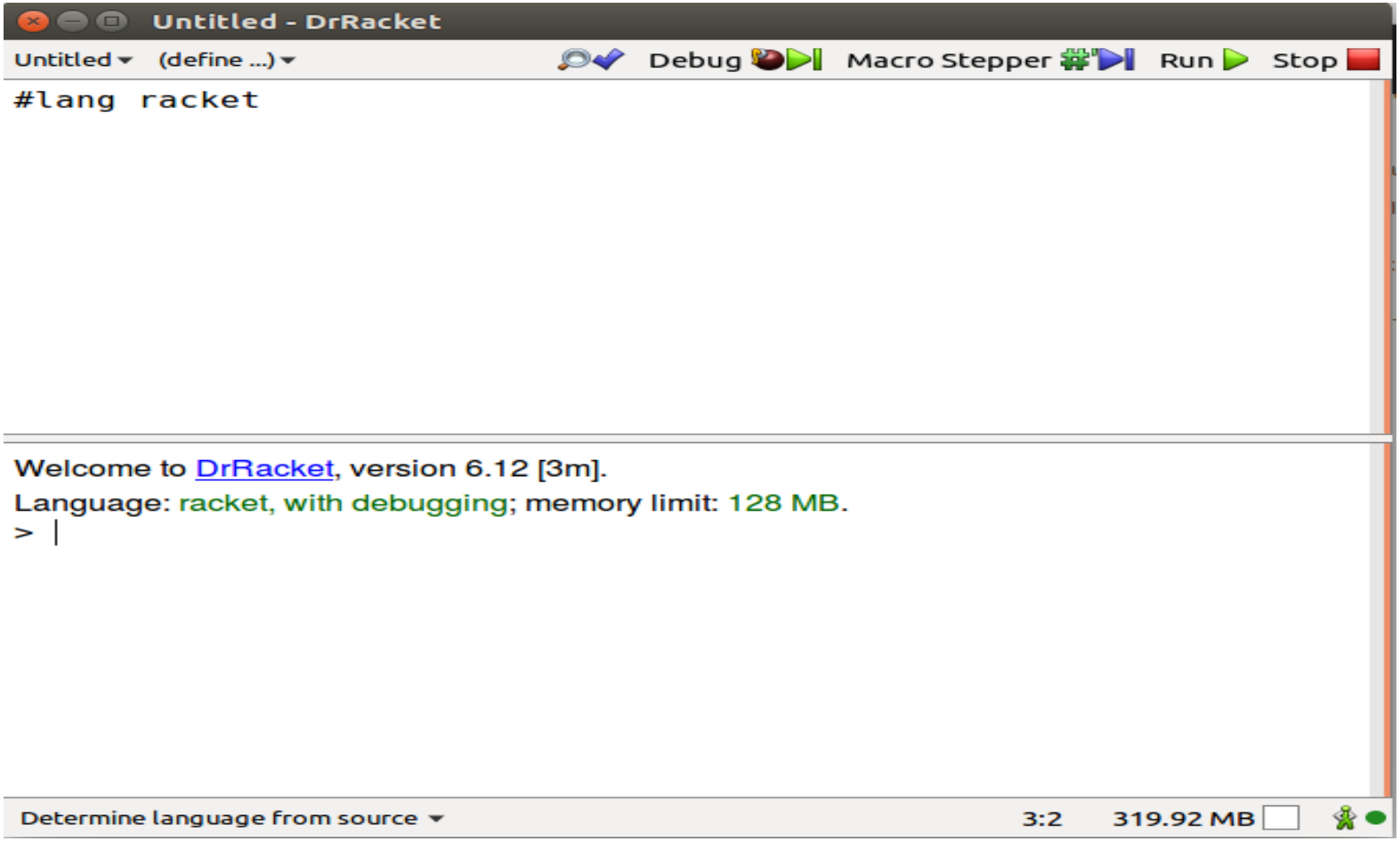
- Scheme has minimal syntax.
- Very few primitive procedures (less than 10)
- Good for building bigger applications by composing smaller procedures.

Our Development Environment

- Dr.Racket[5]
- Powerful Tool
- Earlier known as PLT[6] Scheme
- Top region for typing programs
- Bottom region for REPL[7]

[5] `https://racket-lang.org/`
[6] Programming Languages Team
[7] Read Evaluate Print Loop

Racket IDE

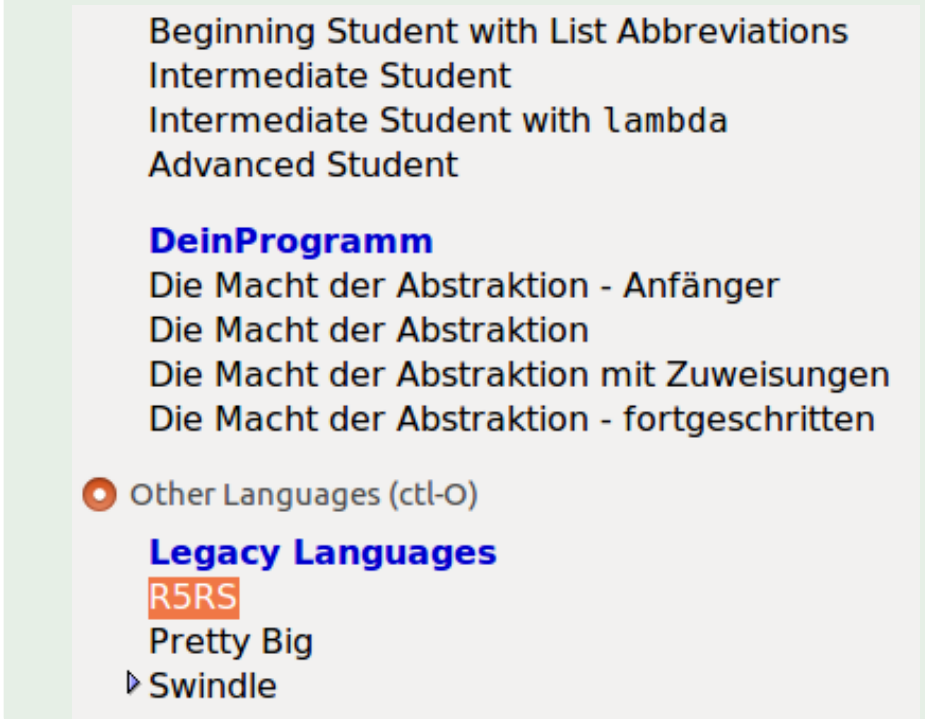

Untitled - DrRacket
Untitled
(define ...)
Debug
Macro Stepper
Run
Stop
#lang racket
Welcome to DrRacket, version 6.12 [3m].
Language: racket, with debugging; memory limit: 128 MB.
>
Determine language from source
3:2
319.92 MB

Instructions

Instructions

- Download from the site
- Change your language to R5RS.

Example (Screen)



Syllabus

First three chapters of the book:

- Building Abstractions from Procedures
- Building Abstractions from Data
- Modularity, Objects and State

Evaluation Pattern

Mostly the evaluation is continuous through out the semester and consists of:

- Quizzes
- Live Interactions
- Programming assignments with Viva

Other Reading Materials

- Little Schemer
- Reasoned Schemer
- Simply Scheme
- How to Design Programs

and many more online materials. . .

Faculty

- Ms. Prathibha Mol
- Mr. Sumesh K J
- (occasionally) Dr.R.Sreekumar

In the next class

- Next, we will have a brief (no, complete) introduction scheme.
- We prefer to call Scheme as "our language".
- Because authors prefers so.

Thank You!!!