

CISC 860* Topics in Programming Languages: Structure and Design of Programming Languages

J.R. Cordy - Fall 2014

Project on Programming Language Structure and Design

As part of this course, each member of the class will prepare a formal written project on some relevant aspect of programming language structure and design, and present an oral presentation of their findings of approximately 1 hour's length in class.

Proposals for projects must be given in writing and must clearly state the purpose of the project research, goals of the project, the method by which it will be carried out, and objective criteria by which the project may fairly be judged (i.e., how can I tell if you've done a good job?). Projects with significant original research are encouraged, as are projects which consist of simply researching the literature and intelligently distilling key ideas for presentation.

Kinds of Projects

At least three distinct kinds of projects are possible.

- Case studies of particular languages, language designs or language features are appropriate.

The goal of this kind of project would be to search the literature on the language and intelligently distill the key ideas for presentation. The project should include identification of the language goals and an evaluation of the language with respect to its goals and the general principles of language design.

- Comparative studies of two or more languages or language features designed with similar goals or to express solutions using similar paradigms are possible.

In this kind of project, the common goals should be identified, the context of the languages or features being compared should be contrasted, and a comparative evaluation of the solutions made.

- Original language design projects are also possible.

This kind of project involves the identification of particular programming paradigm or similar goal, and the design of a language fragment, extension or feature to provide a notation for the paradigm or to achieve the goal.

Project Marking

Because the work load in this course is otherwise relatively light, and because a good fraction of your course mark will depend on the project, the standards for projects will be high. If the project is an investigation of an original language feature design, the project should centre on the aspects of the design which are significantly original, and show clearly how the design meets the goals of the project. If the project is a review of literature in a particular area, emphasis should be placed on the significantly different concepts of the language or language feature being researched. Your mark will depend largely on how clearly and concisely you distill the important ideas for presentation to an audience of mixed background (i.e. the class). You will be asked to evaluate the presentations of the other members of the class to guide me in my own evaluations.

Marks will be split among the three parts of the project in approximately the following proportions :

| | |
|--------------------|-----------------|
| Proposal | 5 marks |
| Written submission | 25 marks |
| Oral presentation | 20 marks |
| <hr/> | <hr/> |
| Total | 50 marks |

Some Suggestions for Projects

Here are some suggestions for possible projects. If interested, see me for details. There is no need to limit yourself to doing one of these; you are encouraged to suggest any other topic that you personally find interesting, particularly if it will contribute to your own research.

Case Studies

| | | | | | |
|------------|----------|-------------|----------|--------|-------|
| Java | Python | ADA | ICON | TCL | Perl |
| Stratego | Ruby | Eiffel | Haskell | Oberon | C# |
| ColdFusion | PHP | Rascal | Stratego | Maude | Flash |
| JavaScript | Modula 3 | Objective C | Prolog | WebDSL | |

(or any one of hundreds of others ...)

Comparative Studies

TCL vs. Perl vs. Python
NIAL vs. J
Algol 68 vs. PL/I
Stratego vs. TXL vs. ASF
PHP vs Python vs Ruby

Original Designs

Outline a problem area and programming paradigm unserved by existing languages, and design a language to serve the paradigm using design principles outlined in class.