**Language Design and Implementation**

**6CC509**

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Description automatically generated**

Figure 1https://xkcd.com/1270/

Assessment 1

Rich Conniss

**Language Design and Implementation**

**6CC509**

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# Module Leader

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# Key dates and details

|  |  |
| --- | --- |
| **Assessment Type:** | Research Paper |
| **Assessment weighting:** | 40% |
| **Word Count** | 1500 +/- 10% |
| **Learning Outcomes:** | 1 |
| **Submission Method:** | Turnitin |
| **Date Set:** | 9:30am UK time, 07/02/2022 in a synchronous session |
| **Submission Date:** | 23:59 UK time, 25/03/2022 |
| **Provisional Feedback Release Date:** | 09:00 UK time 15/04/2022 |

# Description of the assessment

This coursework assesses learning outcome one (LO1): Demonstrate a critical awareness of the theory and practical issues involved in implementing language parsers, compilers, and interpreters.

This report will help inform the second assessment for the module, where you will be asked to design your own simple programming language. The aim here is for you to independently research the theory of designing programming languages and the practical issues related to building a language of your own, by researching how existing languages are created.

# Assessment Content

Your report should relate to one of the following general areas

1. Compare the design of two or more existing languages
2. Detailed investigation into the design of a single language.
3. An in-depth report on the theory of language design.

Each of the above topics should be written up into a report of 1500 words. The report should be structured as follows.

1. Introduction
2. Main Body
3. Summary and/or Conclusions
4. Bibliography

Your document should adhere to the standards of academic writing.

* Citations should be made using a consistent referencing system e.g. Harvard.
* Figures and Table should be captioned and numbered and citied in the main body of your work.
* Your report should be submitted as a pdf and titled “CW1 – [student number]”

To aid you in preparing the report, for each of the options you could address the following.

**Compare the design of two or more existing languages:**

Select 2 or more languages and explore the differences in how these languages work. You should select languages that are sufficiently different to be interesting. Comment on how each of the languages are designed and implemented. Examples of comparison could include

* Compiled vs Interpreted
* Programming paradigm e.g. Functional vs OOP
* Static vs dynamic typing
* Readability, documentation tools, IDE support.
* Target applications e.g. good for Web, good for Data Science, good for speed…

**Detailed investigation into the design of a single language.**

Select a programming language. Discuss the origins of the language and why it came to be. Investigate the technical aspects of how the language is implemented.

* Why was the language developed, what problem did it solve?
* Paradigm, functional, OOP, declarative… and how this is useful.
* Syntax and Grammar.
* Compiled to machine code/bytecode, interpreted
* Unusual characteristics of the language.
* Downsides/problems with the language.

**An in-depth report on the theory of language design.**

Investigate the theory of how languages are designed. You should focus on the technical aspects of why design decisions are made. Syntax, grammar, parsers, interpreters, compilers, trees and so on. You should focus on

* How are languages built?
* What makes a good language?
* What techniques are used in language design?
* What is the underlying theory for languages? Maths!

# Assessment Rubric

Your report will be assessed by the following descriptors.

*90-100% Excellent*

Exceptional standard; an exceptional level of critical analysis and evaluation, incisive original thinking; commendable originality; exceptionally well researched; high quality presentation; exceptional clarity of ideas; excellent coherence and logic. An exceptional standard of work illustrating thorough and in-depth understanding, communicated with exceptional authority.

*80-89% Excellent*

Outstanding; very high standard; a very high level of critical analysis and evaluation, incisive original thinking; commendable originality; exceptionally well researched; high quality presentation; exceptional clarity of ideas; excellent coherence and logic. Trivial or very minor errors.

*70-79% Excellent*

Excellent; high standard; a high level of critical analysis and evaluation, incisive original thinking; commendable originality; very well researched; high quality presentation; excellent clarity of ideas; excellent coherence and logic. Very minor errors.

*60-69% Very good*

A very good standard; a very good level of critical analysis and evaluation; significant originality; well researched; a very good standard of presentation; commendable clarity of ideas; thoughtful and effective presentation; very good sense of coherence and logic; minor errors only.

*50-59% Good*

A good standard; a fairly good level of critical analysis and evaluation; some evidence of original thinking or originality; quite well researched; a good standard of presentation; ideas generally clear and coherent, some evidence of misunderstandings; some deficiencies in presentation.

*40-49% Satisfactory*

A sound standard of work; a fair level of critical analysis and evaluation; little evidence of original thinking or originality; adequately researched; a sound standard of presentation; ideas clear and coherent, some significant misunderstandings and errors; some weakness in style or presentation but satisfactory overall.

*35-39% Unsatisfactory*

Overall, marginally unsatisfactory; some sound aspects but some of the following weaknesses are evident; inadequate critical analysis and evaluation; little evidence of originality; not well researched; standard of presentation unacceptable; ideas unclear and incoherent; some significant errors and misunderstandings. Marginal fail.

*21-34% Poor*

Below the pass standard; a poor critical analysis and evaluation; virtually no evidence of originality; poorly researched; presentation unacceptable and not up to graduate standard; ideas confused and incoherent, some serious misunderstandings and errors. A clear fail, short of pass standard.

*1-20% Very poor*

Well below the pass standard, with many serious errors. Standard of presentation totally unacceptable, incoherent and may be severely under- length. No evidence of evaluation or application. A very clear fail, well short of the pass standard.

*NS Non-submission*

No work has been submitted.

*Z Academic offence notation*

Applies to proven instances of academic offence.

# Anonymous Marking

You must submit your work using your **student number** to identify yourself, not your name. You must not use your name in the text of the work at any point. When you submit your work in Turnitin you must submit your student number within the assignment document and in the *Submission title* field in Turnitin.

# Assessment Regulations

The [University’s regulations, policies and procedures](https://www.derby.ac.uk/about/academic-regulations/) for students define the framework within which teaching and assessment are conducted. Please make sure you are familiar with these regulations, policies and procedure