Contents

Introduction

Extensible programming languages (cite Douglas McIlroy) were first discussed in the 1960s. The original basic concept was that you have a base language that can be extended through some meta-language. This has been modernized to include various other concepts, including extensible syntax, extensible compilers, extensible runtimes, as well as the idea of separting content from form.

One example of an extensible programming language is `AbleC`(cite), an extensible version of the C programming language, built on top of the `Silver` (cite) attribute grammar system. Various extensions exist for `AbleC` that were created to solve various problems.

This paper examines the uses of extensible programming languages in a real-world application: an Internet Relay Chat (IRC) server implementation. The IRC protocol was originally designed for text-based conferencing (cite IRC RFC).

Internet Relay Chat (IRC) is a protocol designed for text-based conferencing. It is designed as a network of servers, users, and channels (reference to original IRC RFC here from Oikarinen & Reed). Within this paper, we will

Introduction should cover:

- Overview of what the objective of the paper is

- Discussion of AbleC (reference to original papers)

- Discuss the original NGIRCd server

- Discuss motivation of adding these extensions

- At this point, probably want to discuss the specific extensions that were implemented

  - Discussion of nonnull can be fairly brief
  - Discussion of Wuffs parsing
  - Discussion of asynchronous

- The discussions should include information on what motivates the specific extensions.

Background

Background information will go here

Non-Null Pointer Extension

Information on the `ableC` non-null pointer extension here.

Asynchronous I/O

Information about the `ableC` Asynchronous I/O extension

Wuffs Parsing

Information here about the Wuffs extension. Probably also want to include details about what Wuffs is, why we're including it

Discussion

Discussion of each of the extensions, it's use, etc

Non-null Pointers

Non-null discussion

Asynchronous I/O

Async IO discussion

Wuffs

Wuffs discussion

Future Work

Discussion of future work

Bibliography

- https://link.springer.com/content/pdf/10.1007/3-540-45937-5_11.pdf Forwarding in attribute grammars

- https://dl.acm.org/doi/10.1145/3138224 original AbleC paper

- https://core.ac.uk/download/pdf/429260481.pdf Aaron's thesis

- https://conservancy.umn.edu/bitstream/handle/11299/203190/technical_report.pdf?sequence=1 Also Aaron's thesis?

- https://www-users.cse.umn.edu/~evw/pubs/carlson19ppopp/carlson19ppopp.pdf Tutorial for how to build extensions