

## INTRODUCTION

There is a lot of discussion about the pros and cons of various languages. When it comes to the domain of web applications, Javascript, Java, PHP and Python are the languages of choice. Much of Virtual Labs' infrastructure is built in Python and Javascript.

Haskell, a pure functional language, has not received much exposure in this area. However, there are features of Haskell that make it ideal for building web applications – conciseness, type-safety, the separation of pure (calculation) and impure (stateful) parts of the system using the monad construct, etc..

## AIM

- 1) To implement the given set of requirements as a web application in Haskell
- 2) To perform a comparative study between the equivalent softwares written in Haskell and in Python

## METHODS

We showcase web application development in Haskell by building a proof-of-concept of a simple web application in Haskell.

We also conduct a comparative study between the application written in Haskell and the same web application written in Python – a language which is, in some sense, the opposite of Haskell (being dynamic-typed, impure and primarily used as an object-oriented language).

## RESULTS

- 1) Haskell code used for the purpose of a web application is more concise- the Haskell code is roughly one-fourth the size of the equivalent Python code.
- 2) In Haskell, commands as well as data are “type-safe”- i.e checking that commands are well-formed and that each method is handling the correct type of data is done by the compiler at compile-time. In Python, the same is implemented via external validation functions, and checked at runtime.
- 3) Haskell code is highly modular, made even more so by the separation of pure units (eg: checking whether a value exists, etc) and impure units (eg: IO actions.)

## CONCLUSIONS AND FURTHER WORK

The comparison of the two languages is in a preliminary stage. More metrics- such as cyclomatic complexity, and performance- need to be considered to come to a full conclusion. A number of confounding factors have not been considered in this study.



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