

# Compilation Project

## Mid-Project Report

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## 1 Introduction

Today, we are in the mid project. Therefore, we wrote this report to sum up all our work done.

We begin by presenting you our planning of work for the last weeks and our logs, then we list all the implemented functionalities, as well as the problems encountered with our solutions.

In the root folder of our project there is a "README.md" file, detailing the build instructions and structure of our project.

## 2 Planning and log

Date	Implementation
12/01	Intermediate Representation classes
13/01	IR code generation from AST
14/01	Finished code generation
15/01	Assembly generation
16/01	Working prototype, able to compile simple programs

## 3 Functionality implemented

1. Detection of free variables with unit tests
2. Type Checking with unit tests
3. Alpha Conversion with unit tests (for integers and float)
4. Beta Reduction (for integers and float)
5. Constant Folding
6. Code Generation with an Intermediate Representation (IR)
7. Assembly Code generation (integer computation, `print_newline` and `print_int`)

## 4 Problems encountered and solution found

- We had some minor problems concerning the IR. We couldn't find (in a timely fashion) a simple and efficient way of implementing it.
- We have some issues during the assembly code generation for float. We have some ideas but nothing concrete right now.
- We tried implementing stack management as well, but couldn't get it to work for this mid-project dead-line. For the moment we use global variables; this means recursive functions will not work properly.
- Some language constructs were difficult to compile (like closures), so for now we just stop the compilation with an error when encountering such a situation.

## 5 Future steps

- Finish all other transformations on the AST (closure conversion, K-normalization, let-reduction...)
- Debug and improve our code generation (both IR and assembly).
- Implement optimizations on the IR.
- Follow the guidelines more closely, towards project completion.