



Homework H0

1 Description

Write an LLVM pass starting from the template available in Canvas (Template.tar.bz2). The goal of your first pass is to print every function being compiled. Specifically, for each function compiled, you must first print to standard error its name and then its body.

2 Develop Your Compiler

Develop To develop your compiler, extend `Template/catpass/CatPass.cpp`.

Build and Run Follow the instructions in `Template/README` to build and run your compiler.

Test After compiling your work, you need to test that your compiler is invocable. To do so, run

```
cat-c --version
```

The output needs to include

```
clang version 3.8
```

Now you are ready to test your work.

3 Testing Your Work

Run all tests Go to `H0/tests` and run `make` to test your work.

The following output means you passed all tests:

```
./misc/run_tests.sh
```

```
SUMMARY: 2 tests passed out of 2
```

If you didn't pass a test, then the output will include all tests that have failed.

Run a test You probably want to figure out why you failed a test. To do so, go to such test (let's assume test0 failed):

```
$ cd H0/tests/test0
```

Now, compile a program

```
$ make clean ; make
```

Check the output generated by your pass against the oracle output:

```
$ make check
```

and follow the instructions printed in the output to debug your work.

A piece of good advice `H0.tar.bz2` includes a few programs you can use to test your work as well as their Makefile that shows how to invoke `cat-c` to generate `compiler_output`. Read these makefile to become familiar with `cat-c` and `llvm` tools.

The correct output of a test is stored in its subdirectories that start with the name `output`. Because different platforms might generate different compilations, in an `output` directory there are multiple files, one per platform. You need to match at least one of them. When you will debug a test, read these output files to understand what you should generate and compare it with your current output.

4 Example

Consider the following program:

```
int main (int argc, char *argv[]){
    return 0;
}
```

Your compiler needs to generate the following output:

Function "main"

```
; Function Attrs: nounwind uwtable
define i32 @main(i32 %argc, i8** %argv) #0 {
entry:
    %retval = alloca i32, align 4
    %argc.addr = alloca i32, align 4
    %argv.addr = alloca i8**, align 8
    store i32 0, i32* %retval
    store i32 %argc, i32* %argc.addr, align 4
    store i8** %argv, i8*** %argv.addr, align 8
    ret i32 0
}
```

5 LLVM API

This section describes the set of LLVM APIs I have used in my H0 solution. You can choose whether or not using these APIs.

- Method `getName` of the class `Function`
- Method `print` of the class `Function`
- Method `errs`

6 What to submit

Submit via Canvas the C++ file you've implemented (CatPass.cpp).

7 Homework due

9/28 at noon

Good luck with your work!