



# Homework H1

## 1 Description

Write an LLVM pass starting from the template available in Canvas (Template.tar.bz2). The goal of this pass is to print statistics about invocations of functions exported by the CAT library. Specifically, for each bitcode function, you must print first the name of a CAT function that has been invoked in it, and then the number of times it has been invoked within that current bitcode function.

## 2 Example

Consider the following program:

```
#include <CAT.h>

void CAT_execution (void){
    CATData d1;
    CATData d2;
    CATData d3;

    d1 = CAT_create_signed_value(5);
    d2 = CAT_create_signed_value(8);
    d3 = CAT_create_signed_value(0);

    CAT_binary_add(d3, d1, d2);

    return CAT_get_signed_value(d3);
}

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

your pass must generate the following output (stored in `compiler_output`):

```
H1: "CAT_execution": CAT_binary_add: 1
H1: "CAT_execution": CAT_create_signed_value: 3
H1: "CAT_execution": CAT_get_signed_value: 1
```

H1.tar.bz2 includes a few programs you can use to test your work.

### 3 Testing your work

To test your work, go to a test you have available:

```
$ cd H1/tests/test0
```

set the path of your pass in LLVMPASSPATH of Makefile. Now, compile a program

```
$ make
```

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

```
$ make check
```

If you've passed the test, you'll see the following output:

```
Test passed!
```

Otherwise, you'll see the following:

```
Test failed
Output differences can be found in "./diff_output"
```

and you can look at diff\_output to find out the differences.

Good luck with your work!

### 4 What to submit

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

### 5 Homework due

10/11

### 6 CAT library

You can find the following CAT library in Canvas:

```
libcat-1.0.0.tar.gz
```

To uncompress it:

```
$ tar xzf libcat-1.0.0.tar.gz
```

Information about how to install it are in

```
libcat-1.0.0/README
```