

# Compiler Project

## Phase 2

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### Team Members:

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### How to run:

\$ cd Pass/build/

\$ make

```
● vagrant@ubuntu-mantic:~/src/compiler_project/CS201-F23-Template/Pass/build$ make
[ 50%] Building CXX object CMakeFiles/ReachingDefinition.dir/ReachingDefinition.cpp.o
[100%] Linking CXX shared module libReachingDefinition.so
[100%] Built target ReachingDefinition
```

\$ cd test/phase2/

\$ ./create\_input.sh

\$ ./test.sh 1.ll

\$ vi 1.ll

```
1 ReachingDefinition: By Anvaya and Arnav : Compiler Construction Phase-II: test
2 ----entry-----
3 0: %y = alloca i32, align 4
4 1: %x = alloca i32, align 4
5 2: %z = alloca i32, align 4
6 3: store i32 3, i32* %y, align 4
7 4: store i32 10, i32* %x, align 4
8 5: store i32 11, i32* %y, align 4
9 6: %0 = load i32, i32* %x, align 4
10 7: %1 = load i32, i32* %y, align 4
11 8: %cmp = icmp sgt i32 %0, %1
12 9: br i1 %cmp, label %if.then, label %if.else
13 ----if.then-----
14 10: %2 = load i32, i32* %x, align 4
15 11: %add = add nsw i32 %2, 1
16 12: store i32 %add, i32* %x, align 4
17 13: %3 = load i32, i32* %x, align 4
18 14: %add1 = add nsw i32 %3, 2
19 15: store i32 %add1, i32* %y, align 4
20 16: br label %if.end
21 ----if.else-----
22 17: %4 = load i32, i32* %x, align 4
23 18: store i32 %4, i32* %z, align 4
24 19: store i32 4, i32* %x, align 4
25 20: br label %if.end
26 ----if.end-----
27 21: ret void
```

```

1 ReachingDefinition: By Anvaya and Arnav : Compiler Construction Phase-II: test
2 -----entry-----
3 GEN: 4 5
4 KILL: 3
5 IN:
6 OUT: 4 5
7 -----if.then-----
8 GEN: 12 15
9 KILL: 4 5
10 IN: 4 5
11 OUT: 12 15
12 -----if.else-----
13 GEN: 18 19
14 KILL: 4
15 IN: 4 5
16 OUT: 5 18 19
17 -----if.end-----
18 GEN:
19 KILL:
20 IN: 5 12 15 18 19
21 OUT: 5 12 15 18 19
22

```

### ReachingDefinition.cpp

The reaching definition algorithm goes as follows:

- Retrieve Information of Instructions from the IR
- Calculate the GEN and KILL sets for each block
- Compute the IN, OUT sets and print the required sets

*Note:*

*Some of the make files and scripts have been modified with the path the llvm as per environment requirements. The original paths have been commented, please uncomment for your requirement.*