University of Amsterdam

Assignment 4

Semantic Analysis

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Students:
René Kok
13671146

Aram Mutlu
13574116

Lecturer:
Dhr. dr. C.U. Grelck

Course:
Compiler Construction

Course code:
5062COMP6Y

1 Introduction

2 Scoping and symbol tables

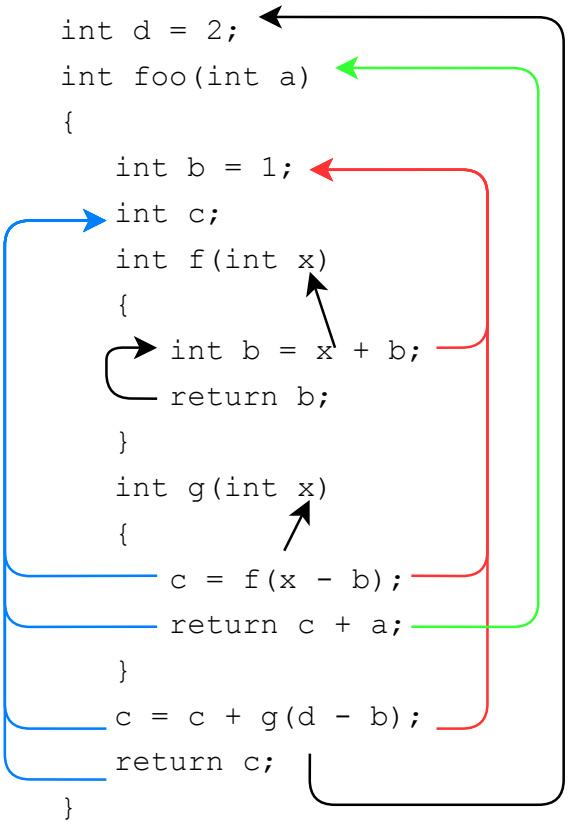
Consider the following CiviC nested function definition:

```
int d = 2;

int foo(int a) {
  int b = 1;
  int c;

  int f(int x) {
      int b = x + b;
      return b;
  }

  int g(int x) {
      c = f( x - b);
      return c + a;
  }

  c = c + g( d - b);
  return c;
}
```

a). What is the value of foo(8), and, more importantly, why?

aaaaa

b). Mark every occurrence of a variable identifier in statement position by an arrow to the declaration



c). Annotate each scope (level) with its symbol table.

baaa

d). Annotate each variable identifier in statement position by a number indicating the relative scope distance to the corresponding declaration.

aaaa

3 Lambda lifting

```
int d = 2;

int f(int x, int b) {
        int b = x + b;
        return b;
}

int g(int x, int a, int b, int *c) {
        *c = f(x - b);
        return *c + a;
}

int foo(int a, int d) {
        int b = 1;
        int c;

        c = c + g(d - b, *c, b, a);
        return c;
}
```

4 Function overloading