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**Metropolitan State University**

**ICS-365-01 —Organization of Programming Languages**

**Homework #5**

1. Consider the following C program:

**void** fun(**void**) {

**int** a, b, c; /\* definition 1 \*/

. . .

**while** (. . .) {

**int** b, c, d; /\*definition 2 \*/

. . . <------------- 1

**while** (. . .) {

**int** c, d, e; /\* definition 3 \*/

. . . <------------- 2

}

. . . <-------------- 3

}

. . . <---------------- 4

}

For each of the four marked points in this function, list each visible

variable, along with the number of the definition statement that defines it.

Solution:

Point 1:

Definition 1: a

Definition 2: b, c, d

Point 2:

Definition 1: a

Definition 2: b

Definition 3: c, d, e

Point 3:

Definition 1: a

Definition 2: b, c, d

Point 4:

Definition 1: a, b, c

2. Consider the following skeletal C program:

**void** fun1(**void**); /\* prototype \*/

**void** fun2(**void**); /\* prototype \*/

**void** fun3(**void**); /\* prototype \*/

**void** main() {

**int** a, b, c;

. . .

}

**void** fun1(**void**) {

**int** b, c, d;

. . .

}

**void** fun2(**void**) {

**int** c, d, e;

. . .

}

**void** fun3(**void**) {

**int** d, e, f;

. . .

}

Given the following calling sequences and assuming that dynamic scoping

is used, what variables are visible during execution of the last function

called? Include with each visible variable the name of the function in

which it was defined.

Solution:

1. main calls fun1; fun1 calls fun2; fun2 calls fun3.

d, e, f fun3

c fun2(d and e of fun2 are hidden )

b fun1(c and d of fun1 are hidden)

a main(b and c of main are hidden)

1. main calls fun1; fun1 calls fun3.

d, e, f fun3

b, c fun1(d of fun1 is hidden)

a main(b and c of main are hidden)

1. main calls fun2; fun2 calls fun3; fun3 calls fun1.

b, c, d fun1

e, f fun3(d of fun3 is hidden)

(a, d, e of fun2 are hidden)

a main(b and c of main are hidden)

1. main calls fun3; fun3 calls fun1.

b, c, d fun1

e, f fun3(d of fun3 is hidden)

a main(b, c of main are hidden)

e. main calls fun1; fun1 calls fun3; fun3 calls fun2.

c, d, e fun2

f fun3(d, e of fun3 are hidden)

b fun1(c, d of fun1 are hidden)

a main(b, c of main are hidden)

f. main calls fun3; fun3 calls fun2; fun2 calls fun1.

b, c, d fun1

e fun2(c, d of fun2 are hidden)

f fun3(d, e of fun3 are hidden)

a main(b, c of main are hidden)