Introduction to Methods

Part 2: Scope of Variables

Course: CPSC 1150

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Lecture 12

Learning Outcomes

- Define global and local variables
- Recognize the scope of variables
- Use global variables in methods

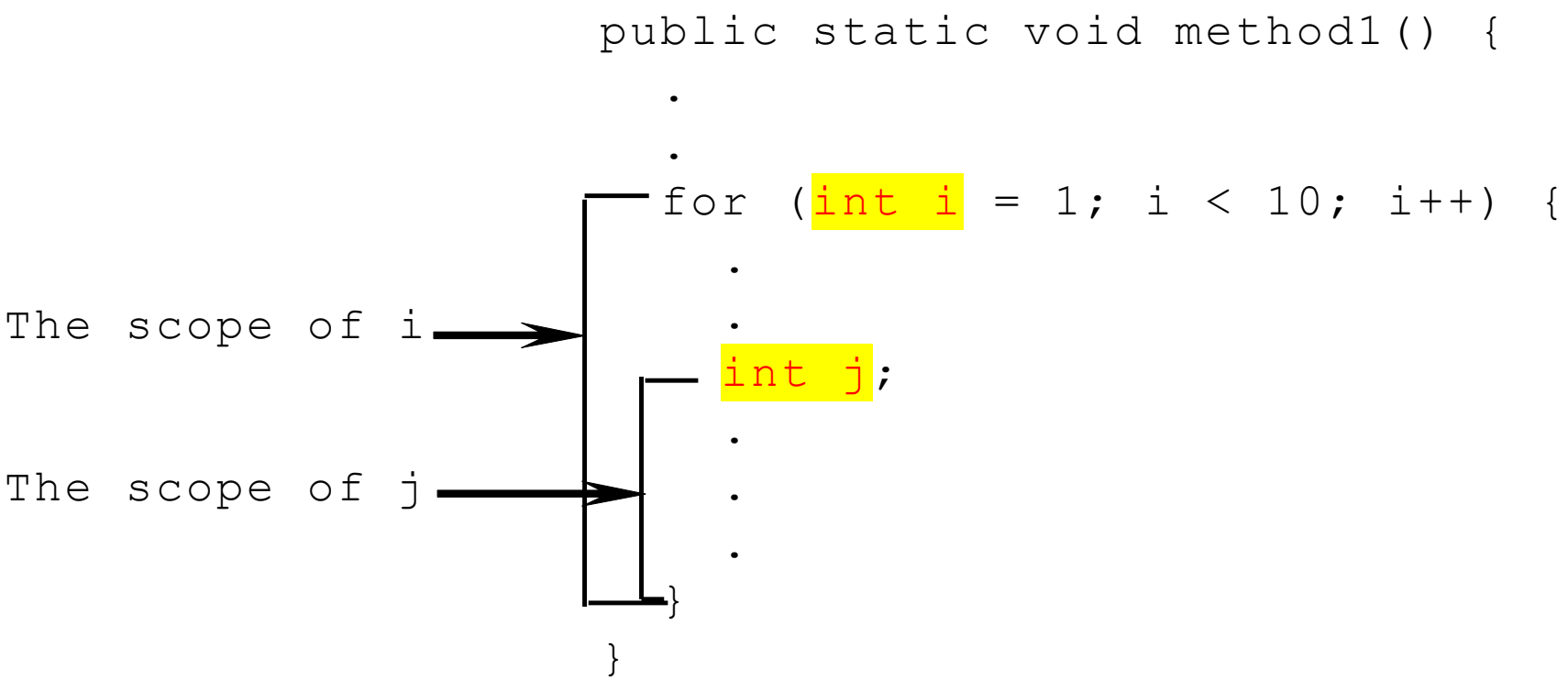
Scope of variables

- Variables don't have meaning everywhere in a program
- A compiler only 'knows' a variable name
  - in the block where it is declared, and
  - after it is declared
- Examples of local variables:
  - A loop counter declared in a for-loop header is local to that for-loop
  - A parameter of a method (or variable declared in a method) is local to that method

Example

Let's write a program called TestScope to examine the idea of the scope of variables.

Scope of Local Variables



Scope of Local Variables, cont.

It is fine to declare i in two non-nesting blocks

```
public static void method1() {
  int x = 1;
  int y = 1;

  for (int i = 1; i < 10; i++) {
    x += i;
  }

  for (int i = 1; i < 10; i++) {
    y += i;
  }
}
```

It is wrong to declare i in two nesting blocks

```
public static void method2() {

  int i = 1;
  int sum = 0;

  for (int i = 1; i < 10; i++)
    sum += i;
  }

}
```

Global variables

- Java allows you to use *global variables*.
- They are declared outside all functions and are accessible to all functions in its scope.
- Non-static global variables can not be used in static methods

Example

```
public class TestScope {
    static int x = 15;
    public static void main(String []args){
       System.out.printf("x is %d ", x);
    }
}
```

```
x is 15
```

Local and Global variables with same name

- If there is a global variable with the same name as local variables in the same scope, local variable has more precedence over the global variable.
- You can use the class name to access the global variable

Example

```
public class TestScope {
   static int x = 15;
   public static void main(String []args){
      int x = 10;
      System.out.printf("Local x is %d\n", x);
      System.out.printf("Global x is %d\n",
                                TestScope.x);
  }
}
```

```
Local x is 10
Global x is 15
```

Scope of Global Variables

Example

```
public class TestScope {
  static int y = 10;
  public static void main(String []args){
     for (int y=0; y<3; ++y){
       System.out.println(TestScope.y);
       f();
     }
  }
  public static void f(){
       TestScope.y += 10;
  }
}
```

```
10
20
30
```

Practice – Letter Grades

- Write a program in Java that given a grade, it prints the correct letter for it. In other words, it prints A for grades between 90 and 100, B for grades 70 or more but less than 90, C for grades 50 or more but less than 70, and F for grades less than 50.

Practice – Counting Words

- Write a program in Java that gets a text from user input and it counts and prints how many words it has. A word is a sequence of non-WS characters that at least has a letter.
- The following shows examples of the problem:

	input	output
1	<Hello world!>	<Hello world!> has 2 words.
2	< Hello world! >	< Hello world! > has 2 words.
3	< Hello world! >	< Hello world! > has 2 words.
4	< Hello world ! >	< Hello world ! > has 2 words.