Methods

Prepared by

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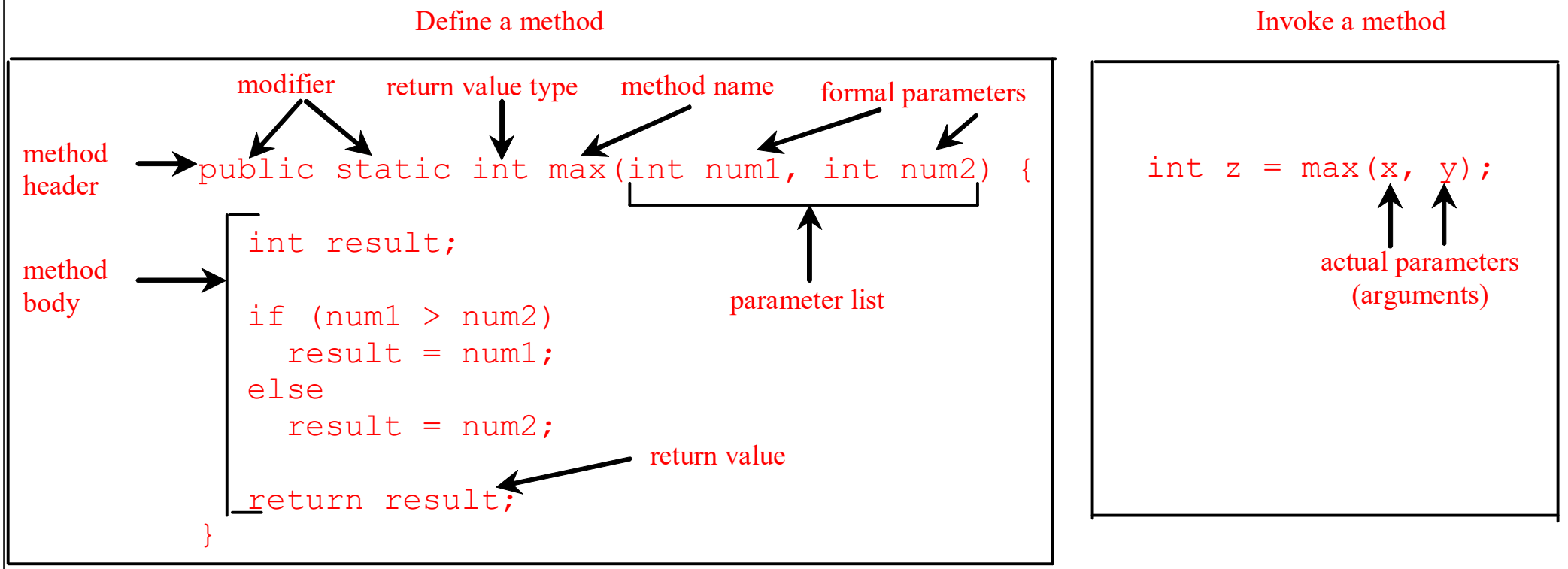
Introducing Methods

A method is a collection of statements that are grouped together to perform an operation.



Introducing Methods, cont.

- *Method signature* is the combination of the method name and the parameter list.
- The variables defined in the method header are known as *formal parameters*.
- When a method is invoked, you pass a value to the parameter. This value is referred to as *actual parameter or argument*.

Introducing Methods, cont.

- A method may return a value. The returnValueType is the data type of the value the method returns. If the method does not return a value, the returnValueType is the keyword void. For example, the returnValueType in the main method is void.

Calling Methods

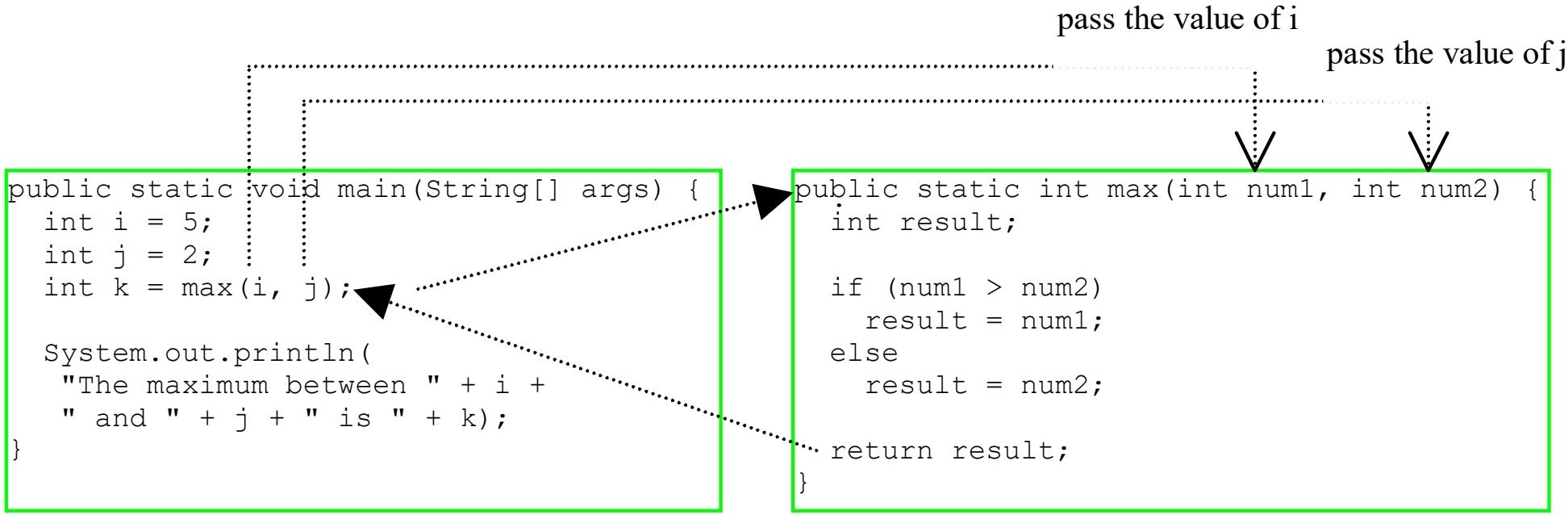
Listing 5.1 Testing the `max` method

This program demonstrates calling a method max to return the largest of the `int` values

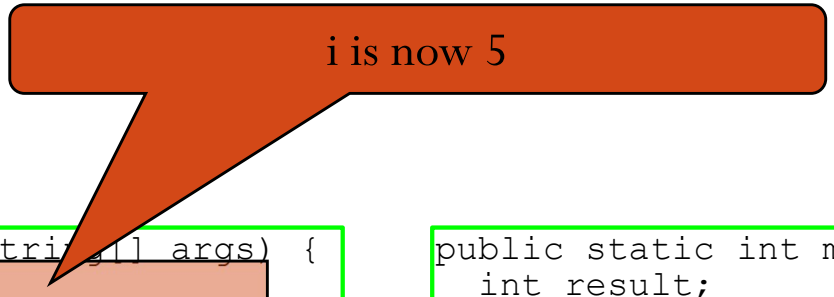
TestMax

Run

Calling Methods, cont.



Trace Method Invocation

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  int k = max(i, j);

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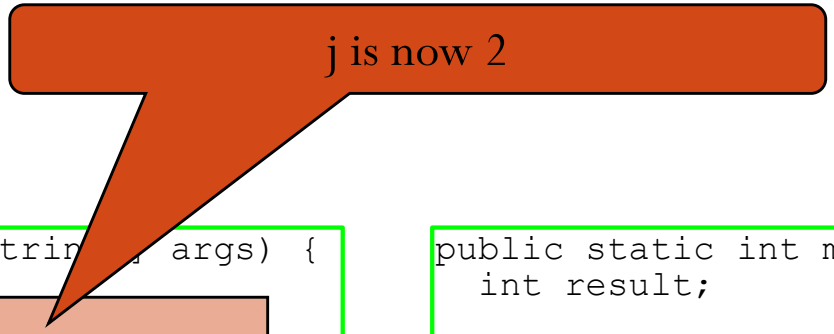


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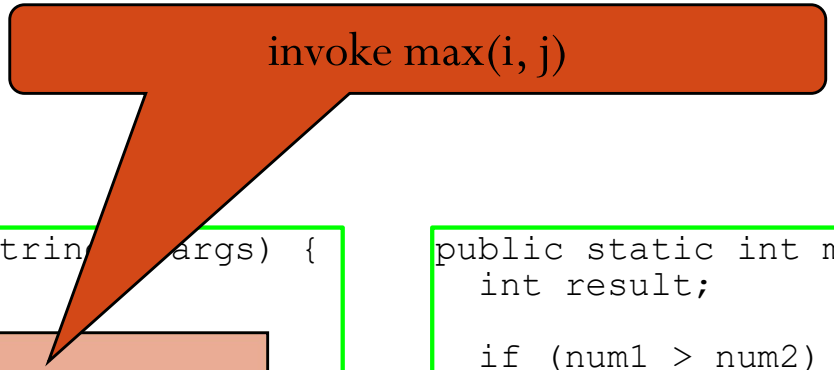


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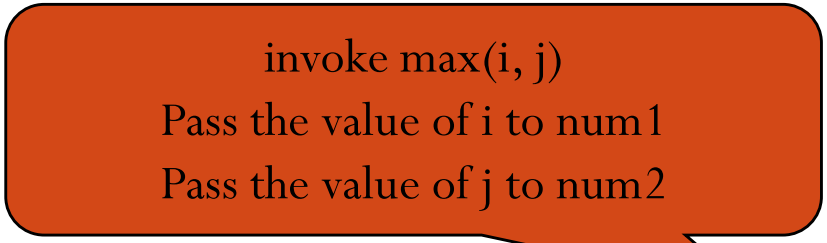


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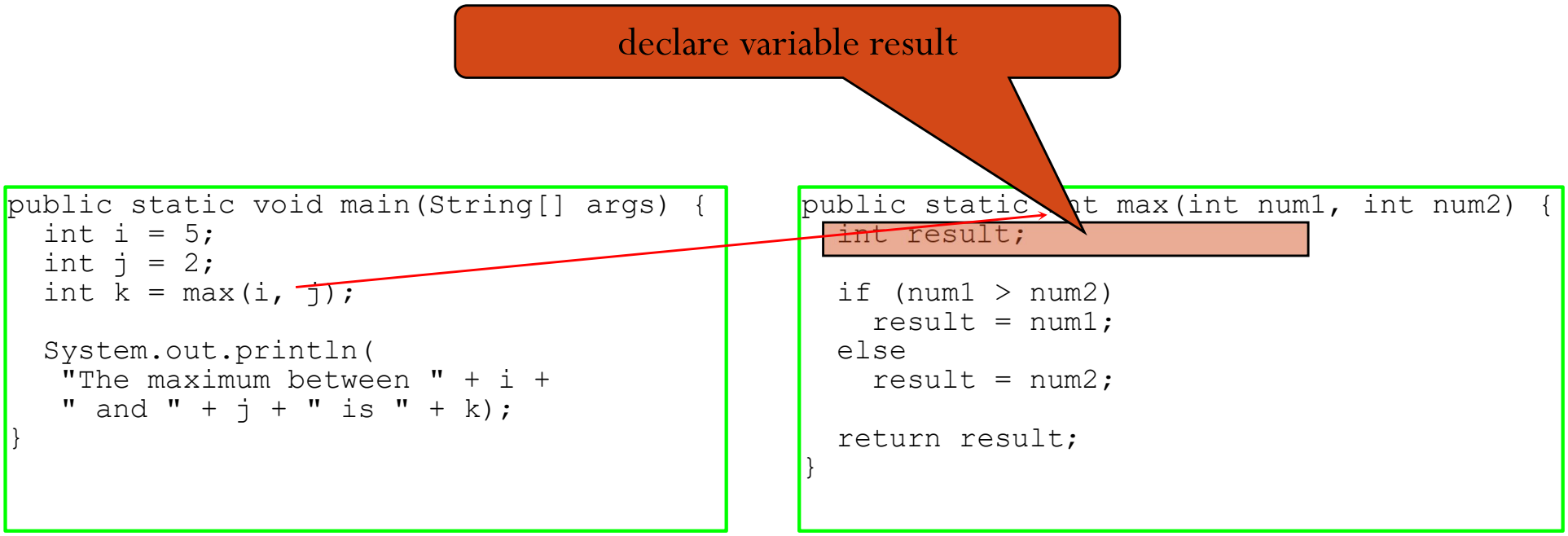

Trace Method Invocation

(num1 > num2) is true since num1 is 5 and num2 is 2

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  int k = max(i, j);

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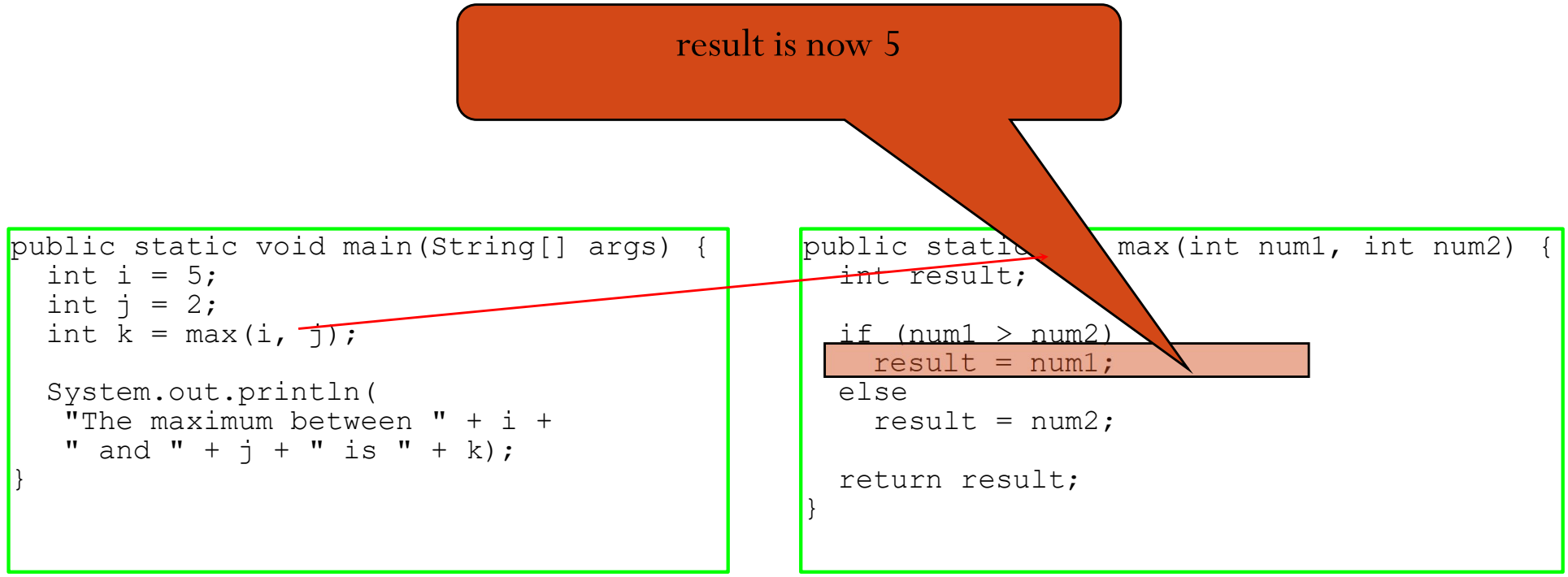

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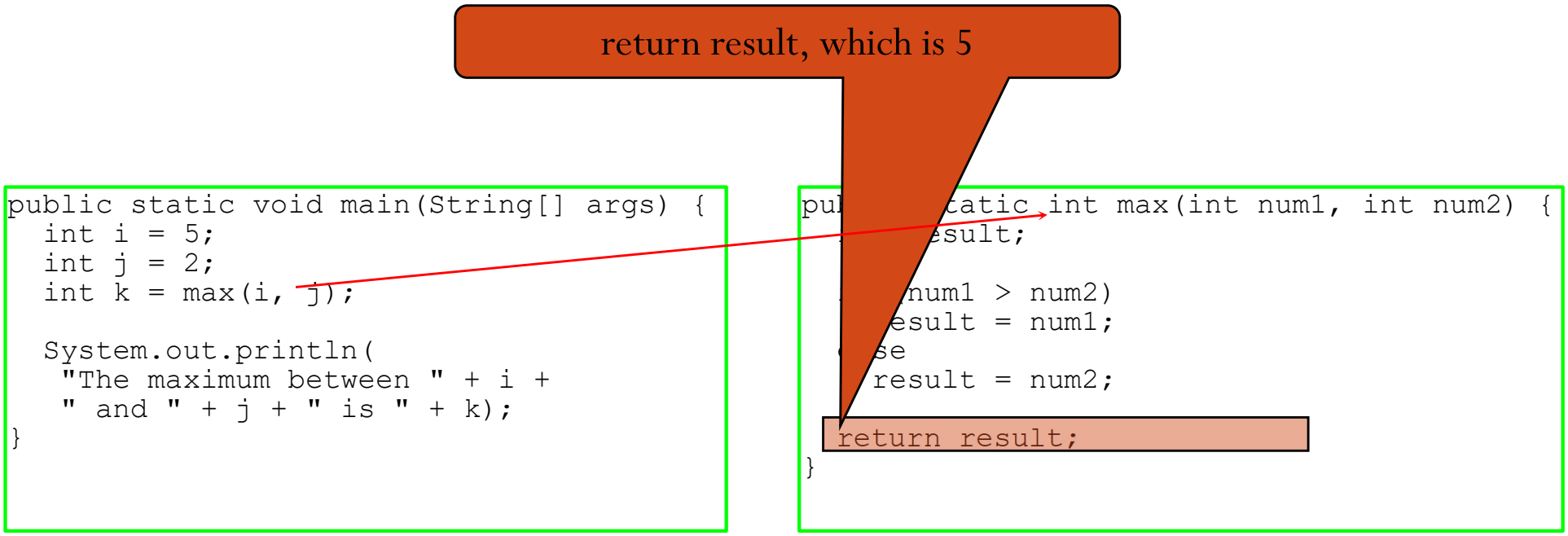

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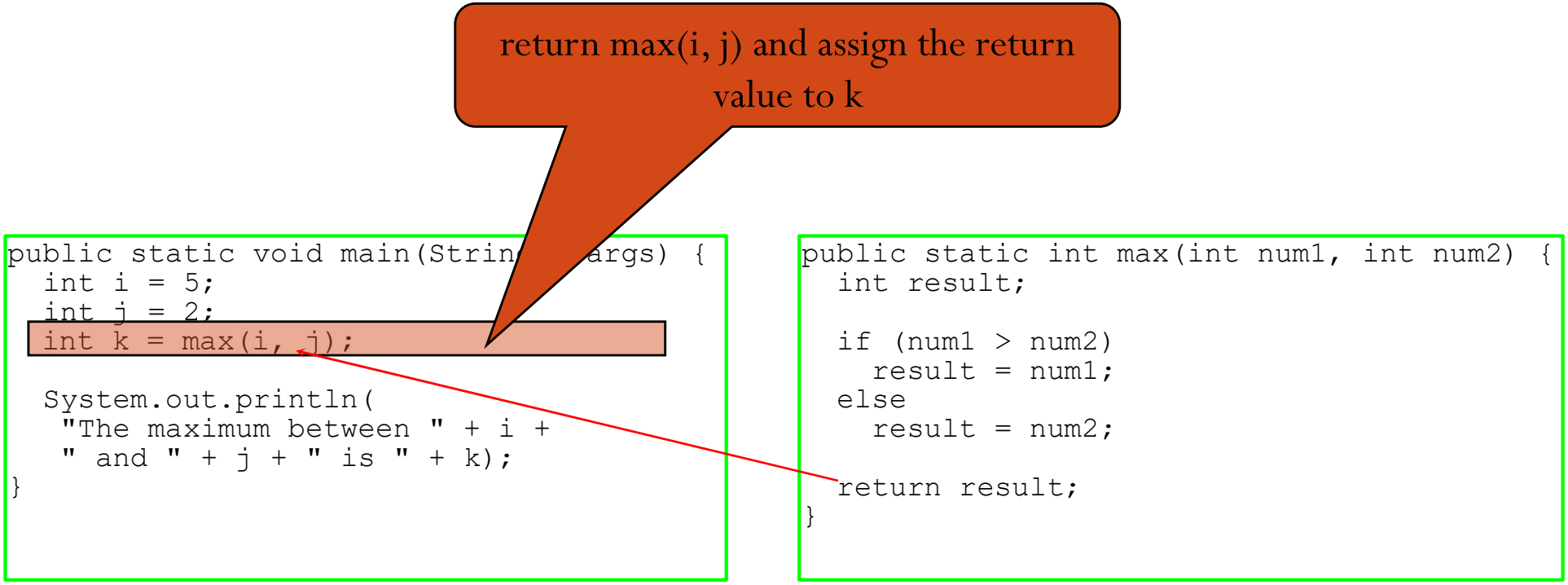

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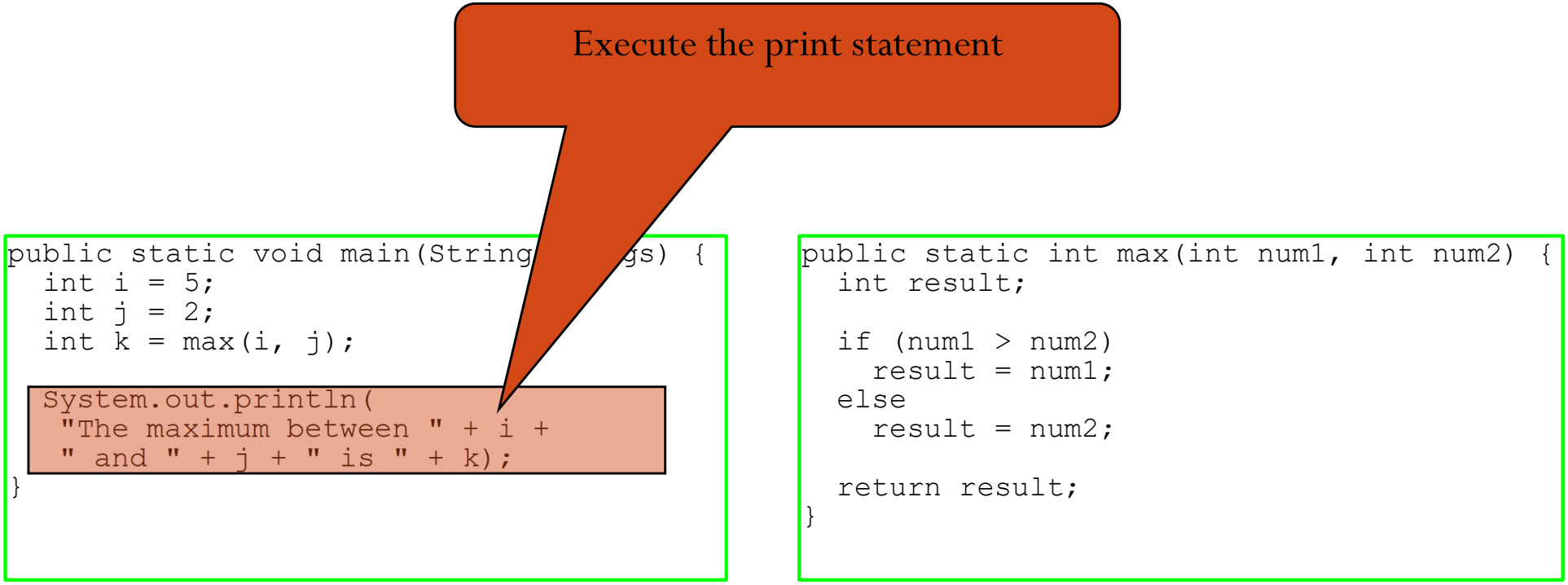


CAUTION

A return statement is required for a nonvoid method. The following method is logically correct, but it has a compilation error, because the Java compiler thinks it possible that this method does not return any value.

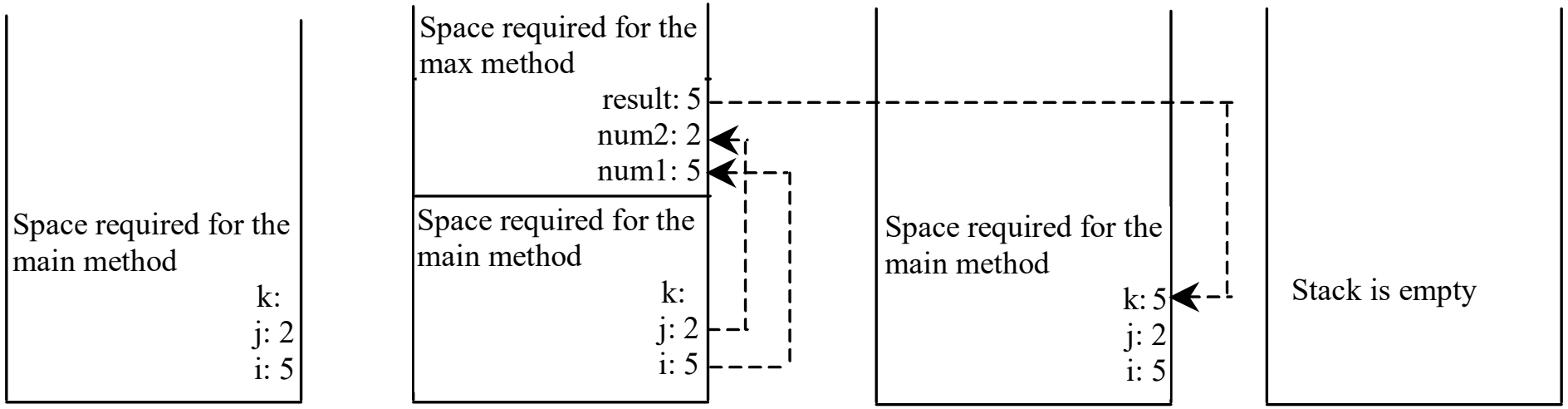
```
public static int sign(int n) {
  if (n > 0) return 1;
  else if (n == 0) return 0;
  else if (n < 0) return -1;
}
```

To fix this problem, delete if (n<0) in the code.

Reuse Methods from Other Classes

NOTE: One of the benefits of methods is for reuse. The max method can be invoked from any class besides TestMax. If you create a new class Test, you can invoke the max method using ClassName.methodName (e.g., TestMax.max).

Call Stacks



The main method is invoked.

The max method is invoked.

The max method is finished and the return value is sent to k.

The main method is finished.

Trace Call Stack

i is declared and initialized

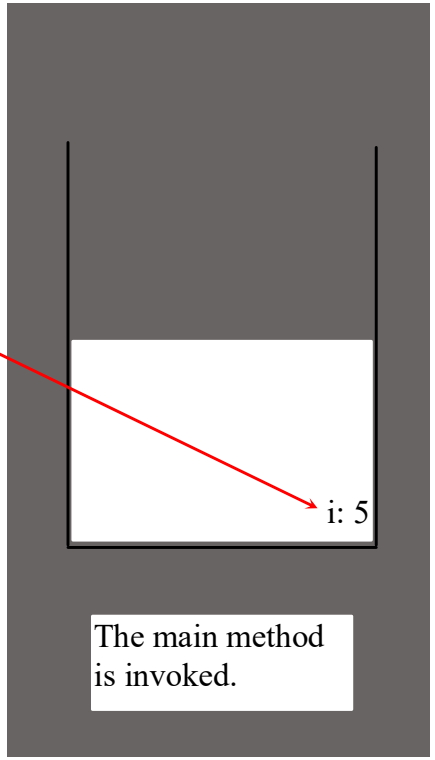
```
public static void main(String[] args) {
  int i = 5;
  int j = 2;
  int k = max(i, j);

  System.out.println(
   "The maximum between " + i +
   " and " + j + " is " + k);
}
```

```
public static int max(int num1, int num2) {
  int result;

  if (num1 > num2)
    result = num1;
  else
    result = num2;

  return result;
}
```



Trace Call Stack

j is declared and initialized

```
public static void main(String[] args) {
  int i = 5;
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  int k = max(i, j);

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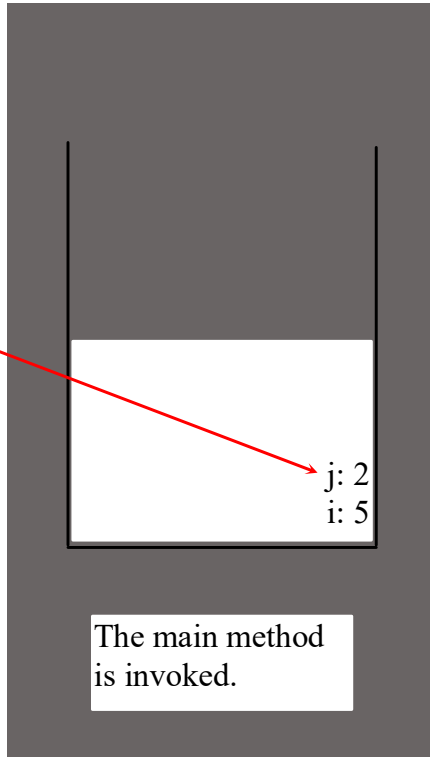

Trace Call Stack

Declare k

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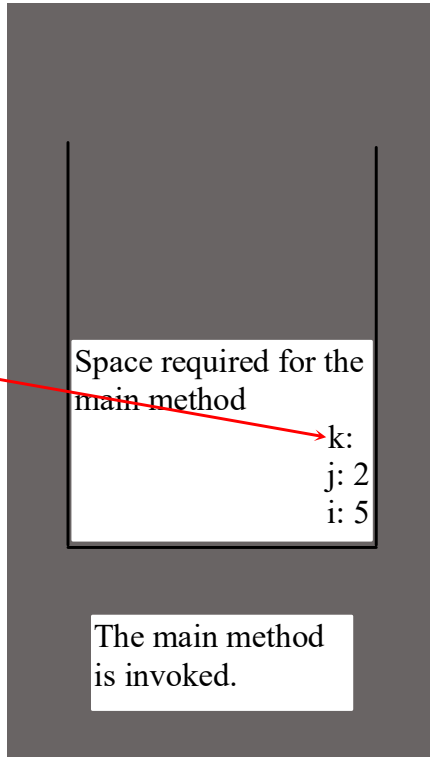

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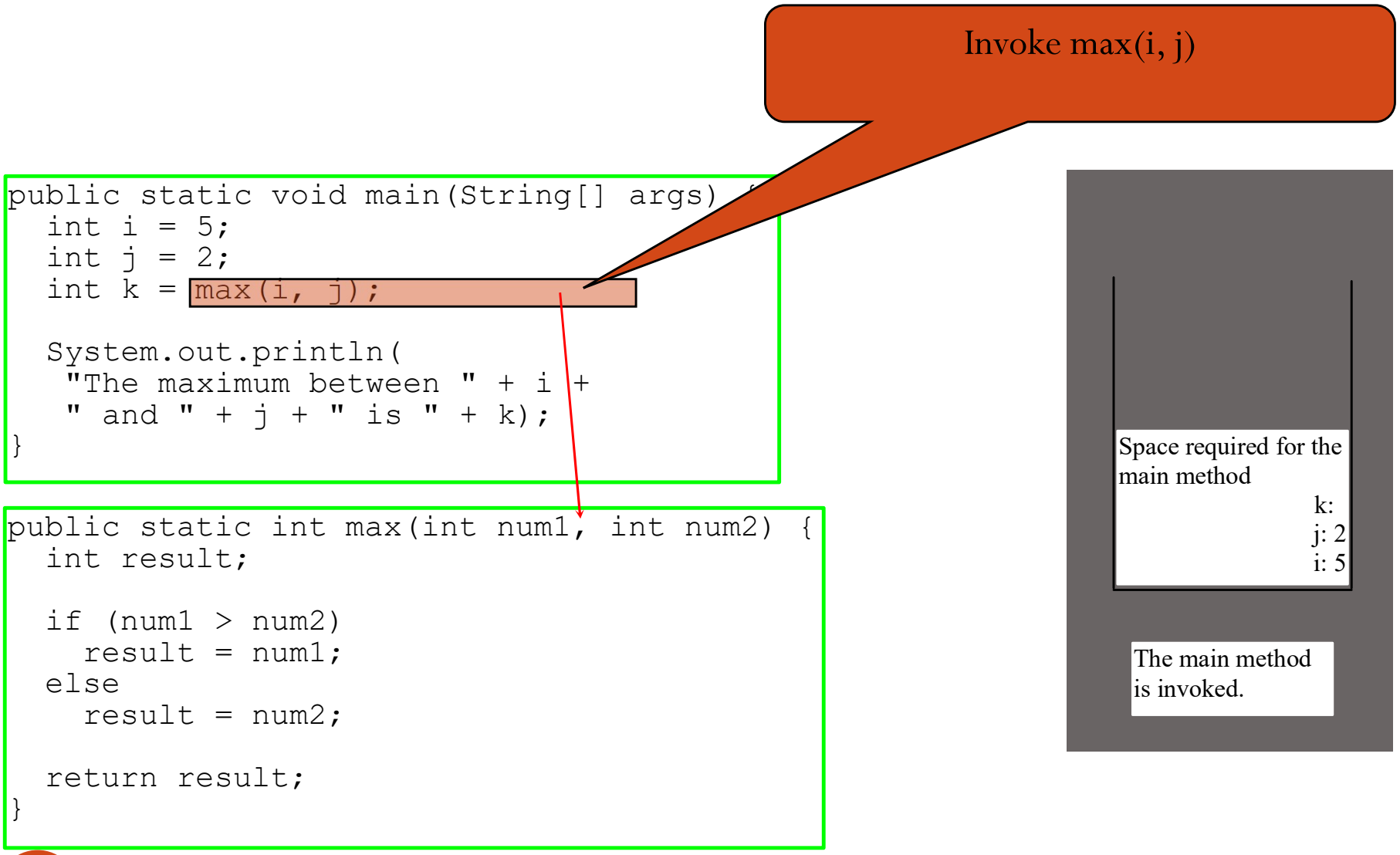

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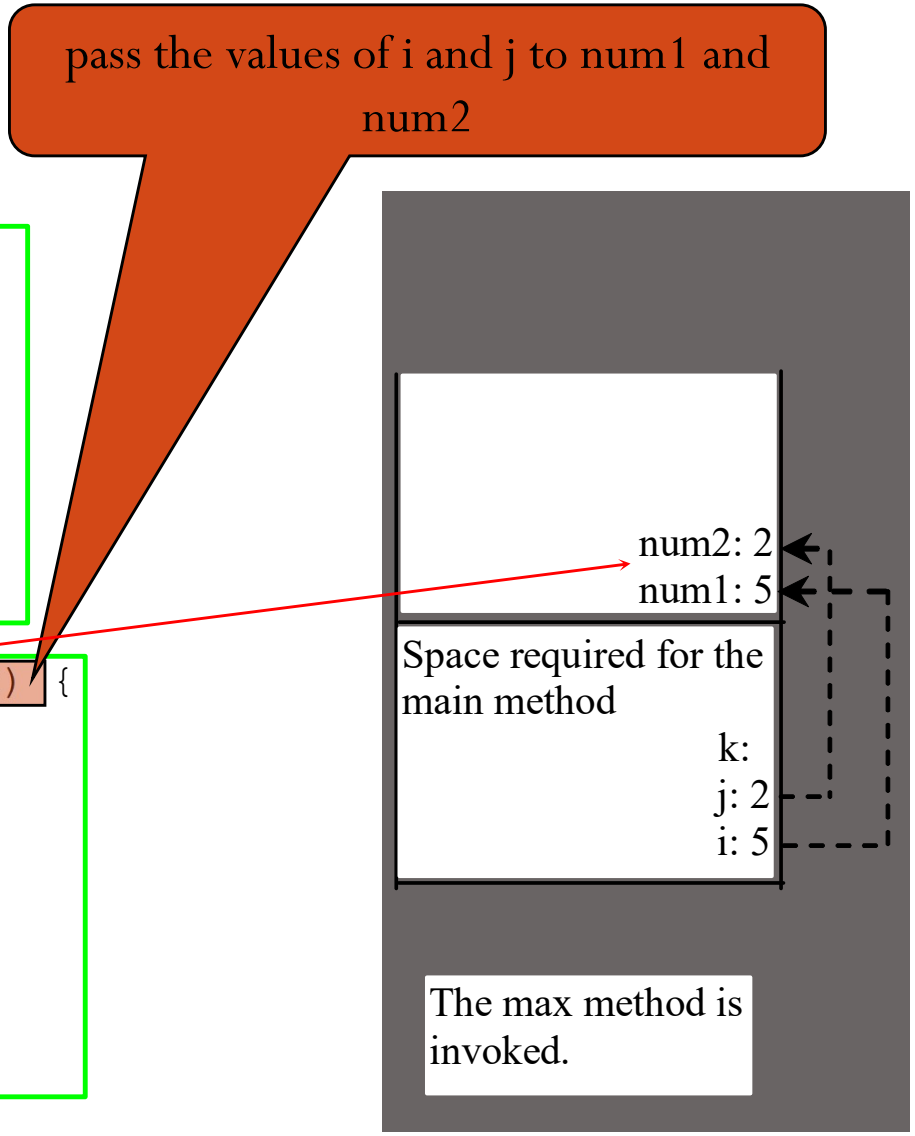

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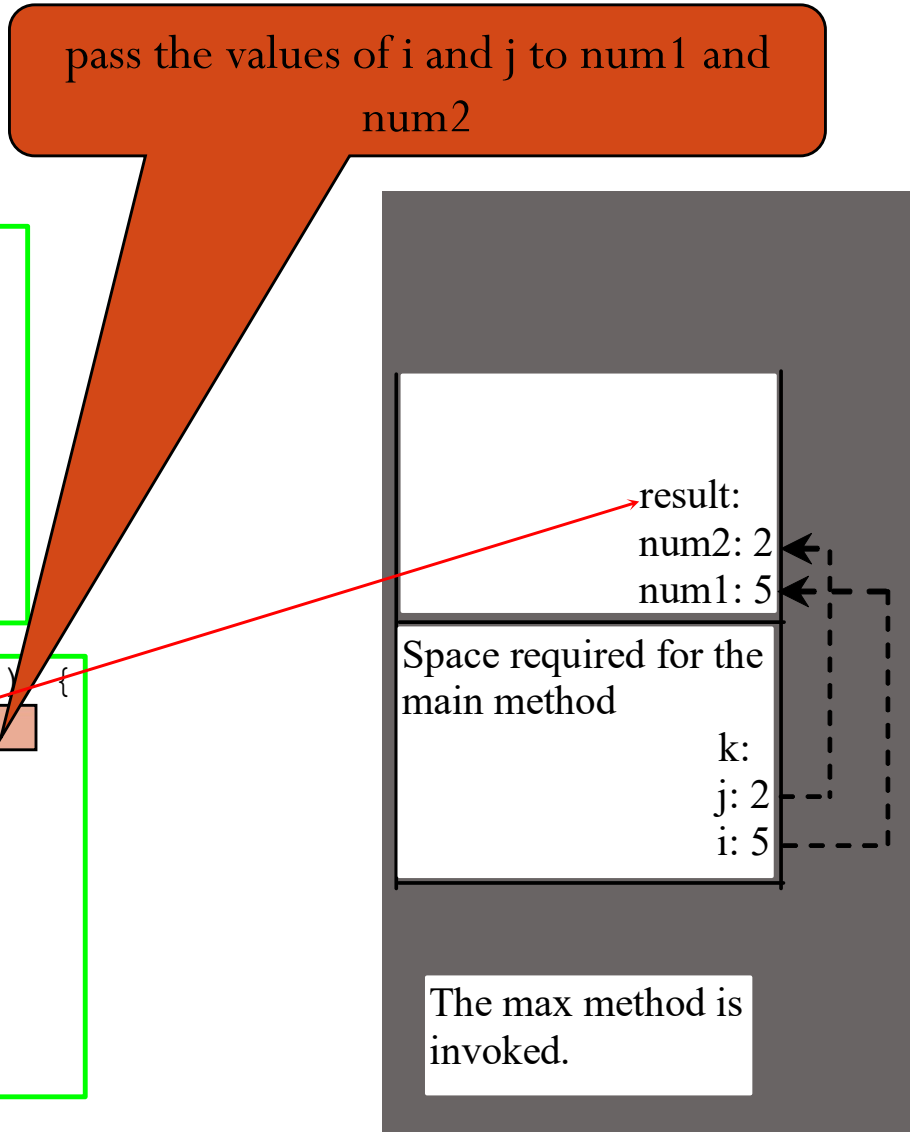

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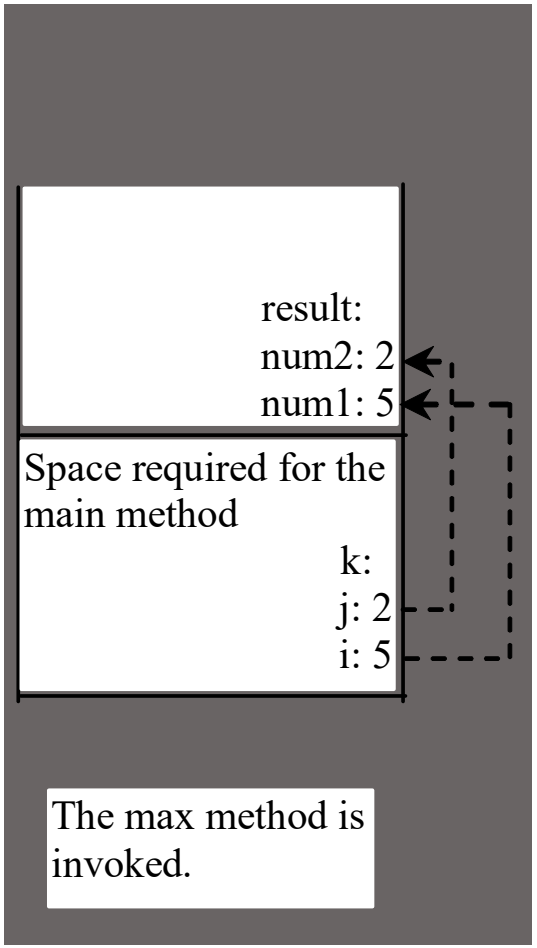
(num1 > num2) is true



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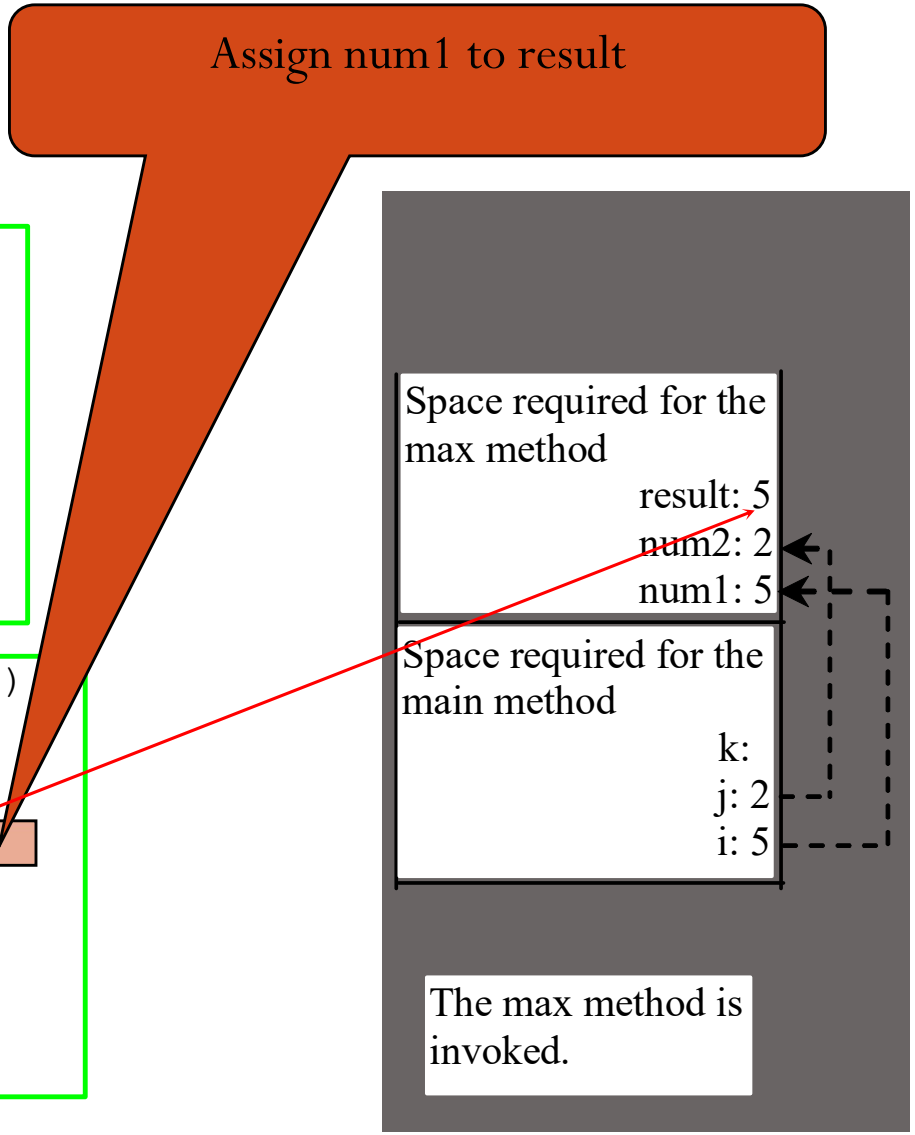

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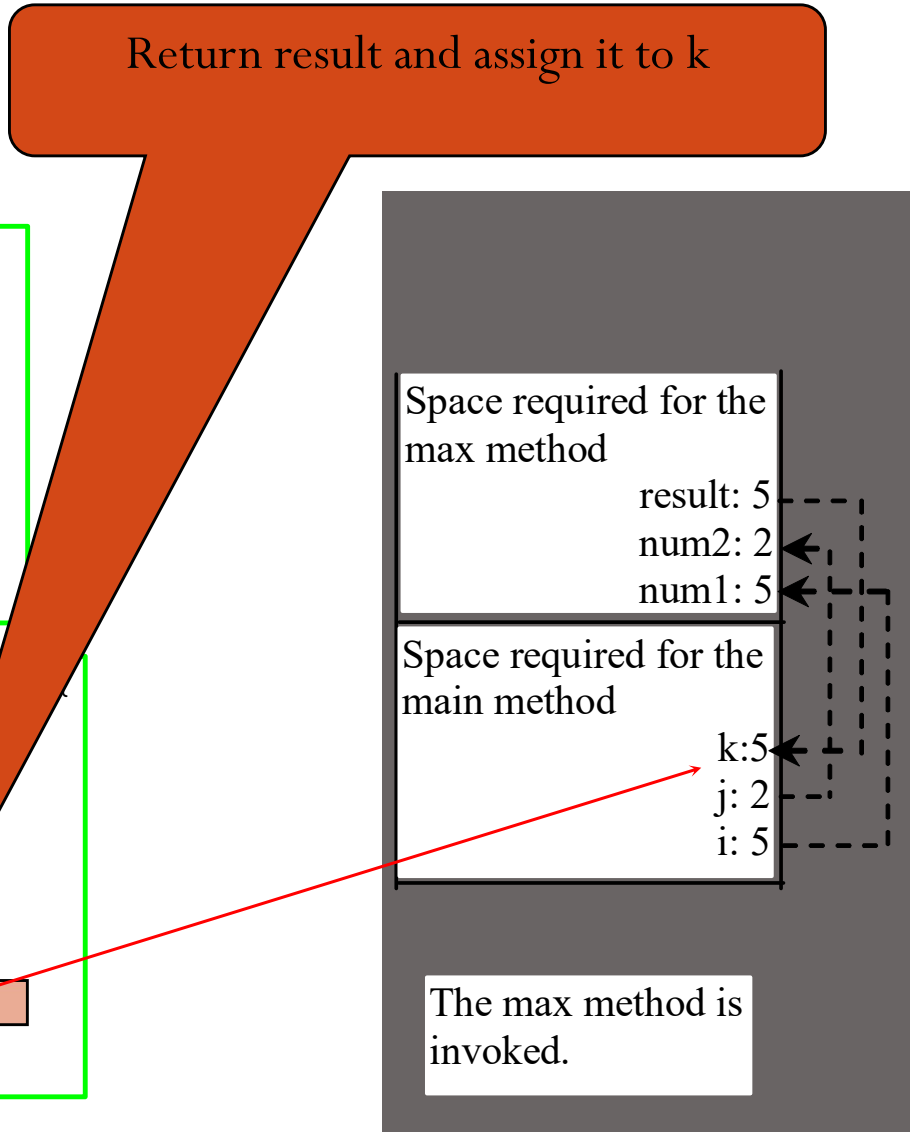

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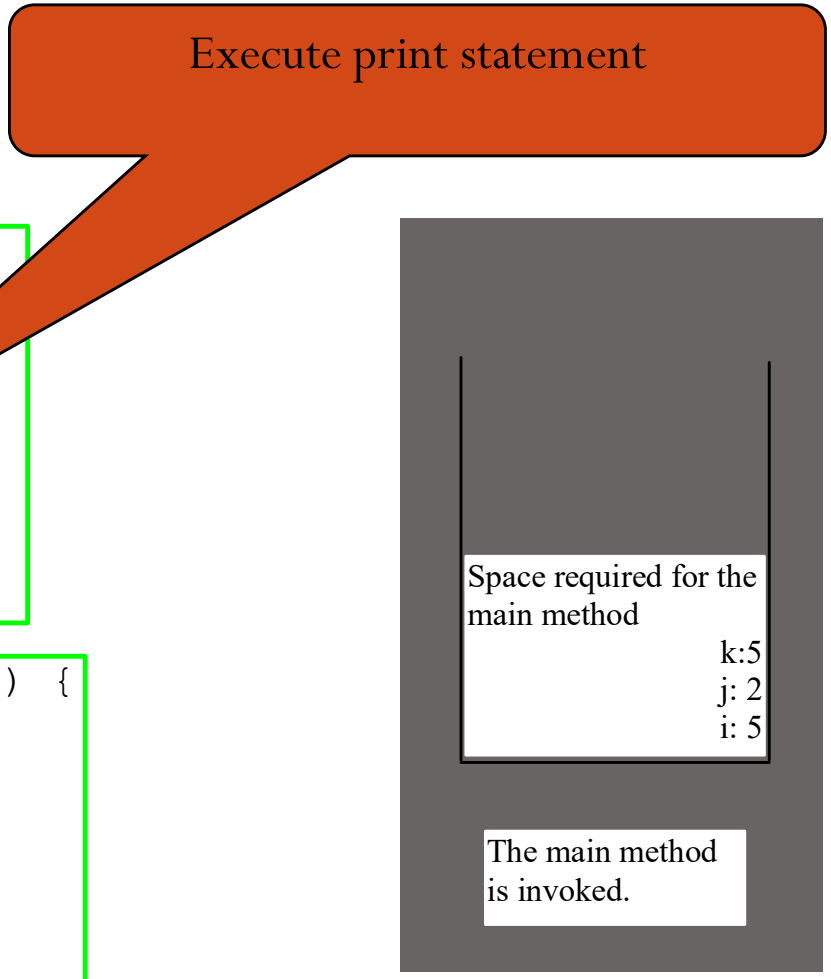

Thank you