7. Expressions, Statements, and Blocks

Java

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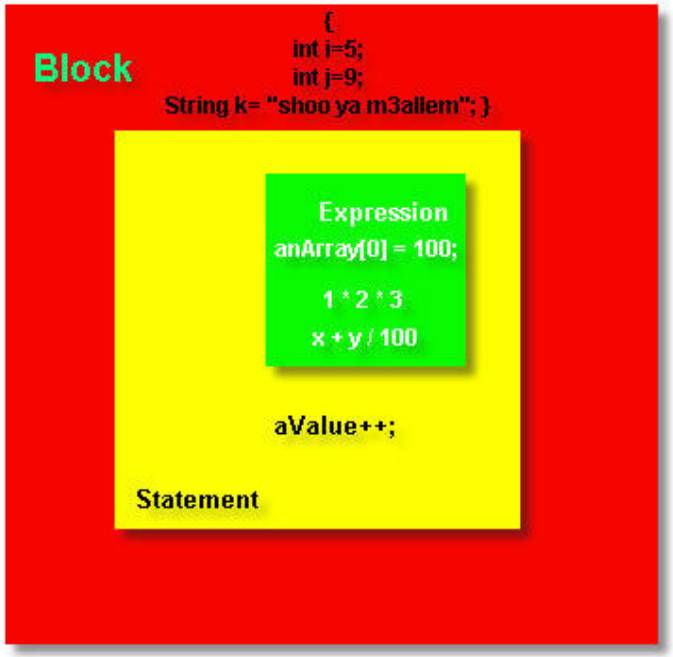
Outline

- Expressions
- Statements
- Blocks
- References

Expressions, Statements, and Blocks

- Operators may used in building expressions
- Expressions are the core components of statements
- Statements may be grouped into blocks



Expressions

Expressions

- An **expression** is a construct made up of:
  - variables
  - operators
  - method invocations
- Expressions perform operations on data and move data around.
- An expression can have three kinds of result:
  - a value, such as the result of: (4 * i)
  - a variable, such as the result of: i = 4
  - nothing (in the case of an invocation of a method declared as void)

Expressions

- Examples of expressions, illustrated in bold below:
  - int **cadence = 0** ;
  - **anArray[0] = 100** ;
  - System.out.println**("Element 1 at index 0: " + anArray[0]**);
  - int **result = 1 + 2** ; // result is now 3
  - if(**value1 == value2**) System.out.println(**"value1 == value2"**);

Expressions

- The data type of the value returned by an expression depends on the elements used in the expression.
- The expression cadence = 0 returns an int because the assignment operator returns a value of the same data type as its left-hand operand; in this case, cadence is an int.
- As you can see from the other expressions, an expression can return other types of values as well, such as boolean or String.

Compound expression

- Here's an example of a compound expression:
  - 1 * 2 * 3
  - In this example, the order in which the expression is evaluated is unimportant.
- The following expression gives different results, depending on whether you perform the addition or the division operation first:
  - x + y / 100 // ambiguous
  - (x + y) / 100 // unambiguous, recommended
  - x + (y / 100) // unambiguous, recommended

Compound expression

- When writing compound expressions, be explicit and indicate with parentheses which operators should be evaluated first.
- This makes code easier to read and to maintain.

Statements

Statements

- A statement forms a complete unit of execution.
- Each statement in Java is terminated with a semicolon character (;).
- Kinds of statements:
  - expression statements
  - declaration statements
  - control flow statements

Expression statements

- The following types of expressions can be made into a **expression statement** by terminating the expression with a semicolon (;):
  - Assignment expressions
  - Any use of ++ or --
  - Method invocations
  - Object creation expressions
- Examples of expression statements:
  - aValue = 8933.234; // assignment statement
  - aValue++; // increment statement
  - System.out.println("Hello World!"); // method invocation statement
  - Bicycle myBike = new Bicycle(); // object creation statement

Declaration statements

- A declaration statement declares a variable.
- Examples of declaration statement:
  - double aValue = 8933.234; // declaration statement

Control flow statements

- Control flow statements regulate the order in which statements get executed.
- You'll learn about control flow statements later.

Statements

- A programmer can put more than one statement on a line, and it will compile successfully, as in the following example:

```
int cadence = 0 ; anArray[0] = 100 ;
```

Blocks

Blocks

- Statements in Java are grouped using the opening brace ({) and closing brace (}).
- A group of statements organized between these characters is called a ***block.***

Blocks

```
class BlockDemo {
    public static void main(String[] args) {
        boolean condition = true;
        if (condition) { // begin block 1
            System.out.println("Condition is true.");
        } // end block one
        else { // begin block 2
            System.out.println("Condition is false.");
        } // end block 2
    }
}
```

References

References

- S. Zakhour, S. Hommel, J. Royal, I. Rabinovitch, T. Risser, M. Hoeber, **The Java Tutorial: A Short Course on the Basics**, 4th Edition, Prentice Hall, 2006. (Chapter 3)

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