

Java Basics Course Study Materials

4. Operators and Expressions

Lecture Content:

Operators: Operators are special symbols that perform specific operations on one, two, or three operands and return a result.

4.1 Arithmetic Operators: Used to perform basic arithmetic operations.

- Addition: +
- Subtraction: -
- Multiplication: *
- Division: /
- Modulus: %

Example:

```
int a = 10;
int b = 5;
int sum = a + b; // 15
int difference = a - b; // 5
int product = a * b; // 50
int quotient = a / b; // 2
int remainder = a % b; // 0
```

4.2 Relational Operators: Used to compare two values and return a boolean result.

- Equal to: ==
- Not equal to: !=
- Greater than: >
- Less than: <

- Greater than or equal to: >=
- Less than or equal to: <=

Example:

```
int x = 10;
int y = 20;
boolean result = x > y; // false
```

4.3 Logical Operators: Used to perform logical operations on boolean values.

- AND: &&
- OR: ||
- NOT: !

Example:

```
boolean a = true;
boolean b = false;
boolean result = a && b; // false
result = a || b; // true
result = !a; // false
```

4.4 Assignment Operators: Used to assign values to variables.

- Simple assignment: =
- Addition assignment: +=
- Subtraction assignment: -=
- Multiplication assignment: *=
- Division assignment: /=
- Modulus assignment: %=
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Example:

```
int a = 10;
a += 5; // 15
a -= 2; // 13
a *= 3; // 39
a /= 3; // 13
a %= 5; // 3
```

4.5 Increment and Decrement Operators: Used to increase or decrease the value of a variable by 1.

- Increment: ++
- Decrement: --

Example:

```
int a = 10;
a++; // 11
a--; // 10
```

4.6 Conditional (Ternary) Operator: A shorthand for an if-else statement that evaluates a boolean expression and returns one of two values.

```
int a = 10;
int b = 5;
int max = (a > b) ? a : b; // max is 10
```

4.7 Instance of Operator: Used to test whether an object is an instance of a specific class or subclass.

```
String s = "Hello";
boolean result = s instanceof String; // true
```