

The background of the slide is a reproduction of a painting in a vibrant, impressionistic style, likely by Vincent van Gogh. It depicts a rural landscape with a farmer in a blue coat and a yellow hat working in a field. In the background, there are several houses and rolling hills under a bright sky. The brushstrokes are visible and energetic, with a rich palette of colors including yellows, blues, greens, and reds.

J04 Introductory Java 4

Arrays, Operators, Expressions
Statements, Blocks, Random

Java Arrays

Arrays hold a fixed number of values of a given type (or sub-type) that can be accessed by an index.

- Declaring:

```
int[] values;
```

- Initializing:

```
values = new int[8]; // 8 element array, all zeros
```

```
values = new int[]{1, 2, 3, 4}; // with specific values
```

- Accessing:

```
int x = values[3]; // the 4th element
```

- Copying:

```
System.arraycopy(x, 0, y, 0, 8);
```


Java Operators

- Assignment
=
- Arithmetic
+ - * / % += +-= *= /= %=
- Unary
+ - ++ -- !
- Equality, relational, conditional and instanceof
== != > >= < <= && || instanceof
- Bitwise
~ & ^ | << >> >>>

Expressions

- A construct that evaluates to a **single value**.
- Made up of
 - variables
 - operators
 - method invocations
- Compound expressions follow precedence rules
 - Use parentheses (clarity, disambiguation)

Statements

- A complete unit of execution.
- **Expression** statements (expressions made into statements by terminating with ';'):
 - Assignment expressions
 - Use of ++ or --
 - Method invocations
 - Object creation expressions
- **Declaration** statements
- **Control flow** statements

Blocks

- Zero or more statements between balanced braces ('{' and '}')
- Can be used anywhere a single statement can

The Random Class

The Random class provides a pseudo-random number generator:

```
Random rand = new Random();
```

You can optionally provide a seed (for determinism):

```
Random rand = new Random(12345);
```

You can then generate random numbers of different types:

```
int i = rand.nextInt(10); // number in 0-9
```