

A painting of a landscape. In the foreground, there is a field of yellow flowers, possibly rapeseed, with some blue flowers in the lower left. In the middle ground, there are several large, leafy trees. In the background, a village with a church and other buildings is situated on a hill. The sky is a mix of green and blue, suggesting a hazy or overcast day.

J03 Introductory Java 3

Naming
Literals
Primitives

Java Packages

Which Mary?

Mary Queen of Scots

'Queen of Scots' provides a namespace within which 'Mary' is well defined. In Java a **package** provides a namespace.



Java Modules

- A module is a named group of packages and related resources
- Strong encapsulation
- Explicit dependencies

```
module java.sql {  
    requires transitive java.logging;  
    requires transitive java.transaction.xa;  
    requires transitive java.xml;  
  
    exports java.sql;  
    exports javax.sql;  
  
    uses java.sql.Driver;  
}
```

Java Variables

- **Instance** (non-static fields, object-local)
 - Each object has its own version (instance) of the field
- **Class** (static fields, global)
 - Exactly one version of the field exists
- **Local**
 - Temporary state, limited to execution scope of code
- **Parameters**
 - Temporary state, limited to execution scope, passed from one method to another

Java Naming

- Java names are case-sensitive
 - Whitespace not permitted
 - \$, _ to be avoided
 - Java keywords and reserved words cannot be used
- Capitalization conventions
 - Class names start with capital letters (Bike)
 - Variable names start with lower case, and use upper case for subsequent words (currentGear)
 - Constant names use all caps and underscores (MAX_GEAR_RATIO)

Java's Primitive Data Types

In addition to objects, Java has 8 special, built-in 'primitive' data types.

type	Description	Range	Default
byte	8-bit signed 2's complement integer	-128 - 127	0
short	16-bit signed 2's complement integer	-32768 - 32767	0
int	32-bit signed 2's complement integer	$-2^{31} - 2^{31}-1$	0
long	64-bit signed 2's complement integer	$-2^{63} - 2^{63}-1$	0L
float	single precision 32-bit IEEE 754 floating point number		0.0f
double	double precision 64-bit IEEE 754 floating point number		0.0d
boolean	logically just a single bit: true or false	true, false	false
char	16-bit Unicode character	0 - 65535	0

Java Literals

- When a numerical value (e.g. '1') appears, the compiler normally knows exactly what it means.
- Special cases:
 - An integer value is a long if it ends with 'l' or 'L'
 - The prefix 0x indicates hexadecimal, 0b is binary, 0 octal:
 - `0x30 // 48 expressed in hex`
 - `0b110000 // 48 expressed in binary`
 - `060 // 48 expressed in octal`
 - An 'f' indicates a float, while 'd' indicates double.
 - Underscores may be used to break up numbers:
 - `long creditCardNumber = 1234_5678_9012_3456L;`