

Variables and Constants

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Declaring Variables

- A variable is a name for a value stored in memory. Variables are used in programs so that values can be represented with meaningful names.
- A variable must be declared before it is used. A declaration takes the form:

`<type> <name>`

Using Variables

- The value of a variable is changed through assignment. An assignment statement is formed with the variable name on the left side of an equal sign and the value it is to receive on the right side of the equal sign.
- An assignment statement can be part of a variable declaration. In addition to being declared, the variable is initialized.

Primitive Data Types

- byte
- short
- int
- long
- float
- double
- char
- boolean

Abstract Data Types

- In addition to primitive data types, a variables can be declared using an abstract data type. One kind of abstract data type is the class.
- A variables declared with a class is called an object. The variable itself actually stores a reference to the area in memory where the object's data and methods are stored.



Java Packages

- Java SE includes numerous packages as part of the JDK. End-users will have the packages as part of the J2SE Runtime Environment (JRE).
- Packages follow a certain naming convention. Java packages start with java followed by a dot and then the package name. Companies and other organizations will often name a package with the organization name followed by a dot and then the package name.

Java Packages

- The import statement is used to make the members of a package accessible to an application.
- To make a single class from a package accessible, a statement similar to the following is used:

```
import java.util.Scanner;
```

- If several classes in a package are to be accessible, import statement, then the statement that imports the entire package may be used:

```
import java.util.*;
```

Obtaining a Value from the User

- An application is more flexible when values can be read from an input stream. Input stream is the sequence of characters received from an input device, such as keyboard.
- To process data in the input stream, Java includes the Scanner class with methods for reading integers, floating point numbers, and strings.

Type Casting

- Type casting converts a number (other types) of one type to a number of a different, but compatible type.
- Java will implicit type cast operands in a mixed expression to match the precision of the variable storing the result.

Formatting Numeric Output

- The `NumberFormat` class, which is part of `java.text` package, is used to create objects that format numbers. `NumberFormat` objects return a string that contains a formatted number.

`getCurrencyInstance();`

`getIntegerInstance();`

`getNumberInstance();`

`getPercentInstance();`

Assignment Operators

- In an assignment statement, the expression on the right side of the equal sign is evaluated first and then that value is given to the variable on the left. Because the expression on the right is evaluated before an assignment is made, it is possible to use the current value of the variable in the expression itself.

Assignment Operators

- `+=`
- `-=`
- `*=`
- `/=`
- `%=`
- ...

Using Named Constants

- A constant is a name for a memory location that stores a value that cannot be changed from its initial assignment. Constants, like variables, are used in programs so that values can be represented with meaningful names. A constant declaration is a variable declared final and takes the form:

`final <type> <identifier> = <value>`

Identifiers and Keywords

- Identifiers in Java must begin with a letter and may contain letters, numbers, and some special symbols. Periods and spaces are not allowed.
- Identifiers are also case sensitive, which mean that an uppercase letter is different from the same letter in lowercase.

Identifiers and Keywords

- Java language contains keywords, which have special meaning to the Java compiler and therefore cannot be used for a variable or constant identifier.