

### Revision: Variables and Expressions

- To make use of the CPU memory in a high level language like Java, you use **variables**.
- Each variable has a name, and has a type associated with it.
- Java provide many basic types, some for integers (long, int, short, byte), some for real numbers (double, float), one for characters (char) and one for truth values (boolean).
- A more complicated type can be built using basic type, e.g. String.
- A variable can be made by a variable declaration statement.
- A value can be assigned as content of a variable, by using an assignment statement.

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### Revision: Variables and Expressions (cont)

- Value in Java is given by **expressions**, built using **operators**, **constants** and **variables**.
- The compiler groups the expression by using the precedence rule and the associative rule.
- The computer finds the value of an expression from left to right.
- You can use parenthesis to modify the grouping.
- An expression also has a type, determined by its operands.

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### Building brick from the mud

A Java program consists of Java statements, and so far we only know simple statements.

One type of simple statements allow you to output something to the screen, and it looks like

```
System.out.println(Expression);
```

Another type of simple statement allow you to declare a variable:

```
variable_type variable_name;
```

Yet another type of simple statement allow you to assign a new value to a variable that is declared before.

```
variable_name = Expression;
```

A single statement can declare a variable and give it a value:

```
variable_type variable_name = Expression;
```

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### The possible expressions so far

An expression expresses a temporary value. It is something like a CPU register. It can be:

- the name of a variable, which has the value being the content of the variable;
- a constant, which has the value indicated by the constant;
- an operation (one of +, -, \*, /, %) on two expressions, which has the result of that operation as the value;
- a pair of parentheses containing an expression, which has the value of the inner expression.

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### Example: day of the week

The following steps produce the day of the week of a date (dd/mm/yyyy):

1. Add 9 to the mm.
2. Subtract 1 from the yyyy.
3. Divide the result of step 1 by 12 to get the quotient and remainder. Call the remainder (m).
4. Add the quotient in step 3 to the result of step 2.
5. Treat the result in step 4 as a year, and break it down to a century number (cc) and a two-digit year (yy).
6. Find  $146097 * cc / 4$ ,  $1461 * yy / 4$ ,  $(153m + 2) / 5$ , all divisions are done in integers.
7. Sum up all the results of step 6, add it to the day number (dd) and then 2. Find the remainder when dividing by 7, and you'll get the day of the week.

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### As a program. . .

```
public class DayOfWeek {
    public static void main(String[] args) {

    }
}
```

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