softserve experience matters

Java Core

Conditional statements

IT Academy
04/2016

Agenda

- Operators
- Conditional statements
- Enum
- Comparing objects
- JUnit
- Practical tasks

Arithmetic operators

Simple Assignment Operator

= Simple assignment operator

Arithmetic Operators

+ Additive operator (also used for String concatenation)

- Subtraction operator

***** Multiplication operator

/ Division operator

% Remainder operator

```
int x = 11;
int y = 7;

int a = x + y;  // a = 18
int s = x - y;  // s = 4
int m = x * y;  // m = 77
int d = x / y;  // d = 1
int r = x % y;  // r = 4
```

Unary Operators

Unary Operators

+ Unary plus; indicates positive value

- Unary minus; negates an expression

++ Increment operator; increments a value by 1

-- Decrement operator; decrements a value by 1

! Logical complement operator; inverts the value of a boolean

```
int x = 5;
int a, b;
a = x++;  // a = 5 x = 6
x--;      // x = 5
b = ++x;  // b = 6 x = 6
++x;      // x = 7
boolean bool = true;
// true
System.out.println(bool);
// false
System.out.println(!bool);
```

Equality and Relational Operators

Equality and Relational Operators

==Equal to

!= Not equal to

> Greater than

>=Greater than or equal to

< Less than

<=Less than or equal to

```
int x = 5;
int y = -5;
System.out.println(x == y); // false
System.out.println(x != y); // true
System.out.println(x >= y); // true
```

Conditional Operators

The && and || operators perform Conditional-AND and Conditional-OR operations on two boolean expressions.

&& Conditional-AND

|| Conditional-OR

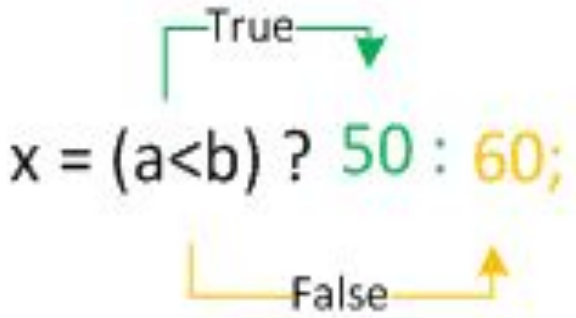
```
score >= 3 && score <= 5
day == "Saturday" || day == "Sunday"
```

What is the result?

```
int t = 5, s = 4, v = 7;
System.out.println(t > s && t > v || s < v);
System.out.println((t < v || s > v) && t < s);
```

Ternary Operator ? :

Ternary (conditional operator) consists of three operands and is used to evaluate Boolean expressions. The goal of the operator is to decide which value should be assigned to the variable.




```
condition ? value1 : value2
```

What are the values of variable str1 and str2?

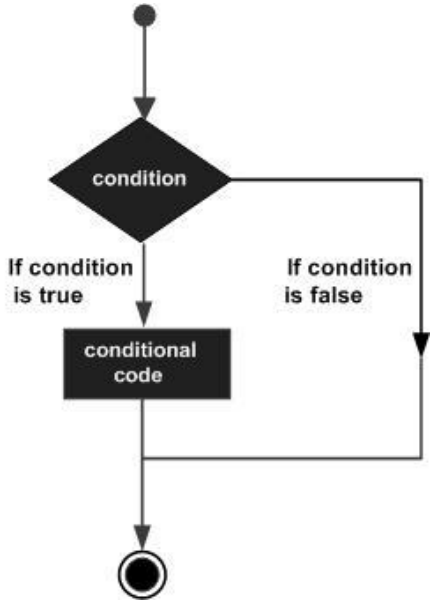
```
int t = 5, s = 4;
String str1 = t >= ++s? "yes" : "no";

int a = 3, b = 2;
String str2 = a-- == b ? "yes" : "no";
```

Statement if

The if-then statement tells your program to execute a certain section of code only if a particular test evaluates to true.

```
if (condition) {
    then-statement;
}
```

```
if (condition) {
    then-statement;
} else {
    else-statement;
}
```




```
if (temperature<10) {
        System.out.println("It's too cold");
} else {
   System.out.println("It's Ok"); ;
}
```

switch

A switch statement allows a variable to be tested for equality against a list of values. Each value is called a case, and the variable being switched on is checked for each case.

```
switch (expression)
{
     case const-expr1 :
    statement(s);
    break;
     case const-expr1 :
    statement(s);
    break;
     default :
    statement(s);
    break;
}
```

Example

```
BufferedReader br = new BufferedReader(
                    new InputStreamReader(System.in));
System.out.println("Do you enjoy Java? (yes/no/maybe)");
String input = br.readLine();

switch (input.toLowerCase()) {
case "yes":
case "maybe":
    System.out.println("Great!");
    break;
case "no":
    System.out.println("Too bad!");
    break;
default:
    System.out.println("Wrong!");
}
```

Enum

An *enum type* is a special data type that enables for a variable to be a set of predefined constants. The variable must be equal to one of the values that have been predefined for it.

```
public enum Season {
    WINTER, SPRING, SUMMER, AUTUMN
}

Season season;
season = Season.WINTER;
```

Example

```
Season season;
...
switch (month) {
case "Desember": case "January": case "February":
season = Season.WINTER; break;
case "Marth": case "April": case "May":
season = Season.SPRING; break;
case "June": case "Jule": case "August":
season = Season.SUMMER; break;
case "September": case "October": case "November":
season = Season.AUTUMN; break;
default:
System.out.println("No this month");
System.exit(0);
}
```

Comparing objects

```
public class Student {
    private String name;
    private int age;

    public Student(String name, int age) {
        this.name = name;
        this.age = age;
    }
    getters, setters ...
}
```

```
Which will be the results?
Student student1 = new Student("Ira", 25);
Student student2 = new Student("Ira", 25);
System.out.println(student1 == student2);
System.out.println(student1.equals(student2));
```

hashCode

```
@Override
public int hashCode() {
    final int prime = 31;
    int result = 1;
    result = prime * result + age;
    result = prime * result
        + ((name == null) ? 0 : name.hashCode());
    return result;
}
```

equals

```
@Override
public boolean equals(Object obj) {
    if (this == obj) return true;
    if (obj == null) return false;
    if (getClass() != obj.getClass()) return false;
    Student other = (Student) obj;
    if (age != other.age) return false;
    if (name == null) {
        if (other.name != null) return false;
    } else if (!name.equals(other.name)) return false;
    return true;
}
```

```
Which will be the results?
Student student1 = new Student("Ira", 25);
Student student2 = new Student("Ira", 25);
System.out.println(student1 == student2);
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```

JUnit Framework

JUnit is a unit testing framework for the Java programming language.

JUnit has been important in the development of test-driven development, and is one of a family of unit testing frameworks collectively known as xUnit that originated with SUnit.

Testing Problems

- Programmers should write tests
- As you probably know programmers always busy, and they have no time to write tests
- They need some tool that can help them
- Main requirements for this tool:
  - A few lines of code then test should run
  - To write test that won't run, then write the code that will make run

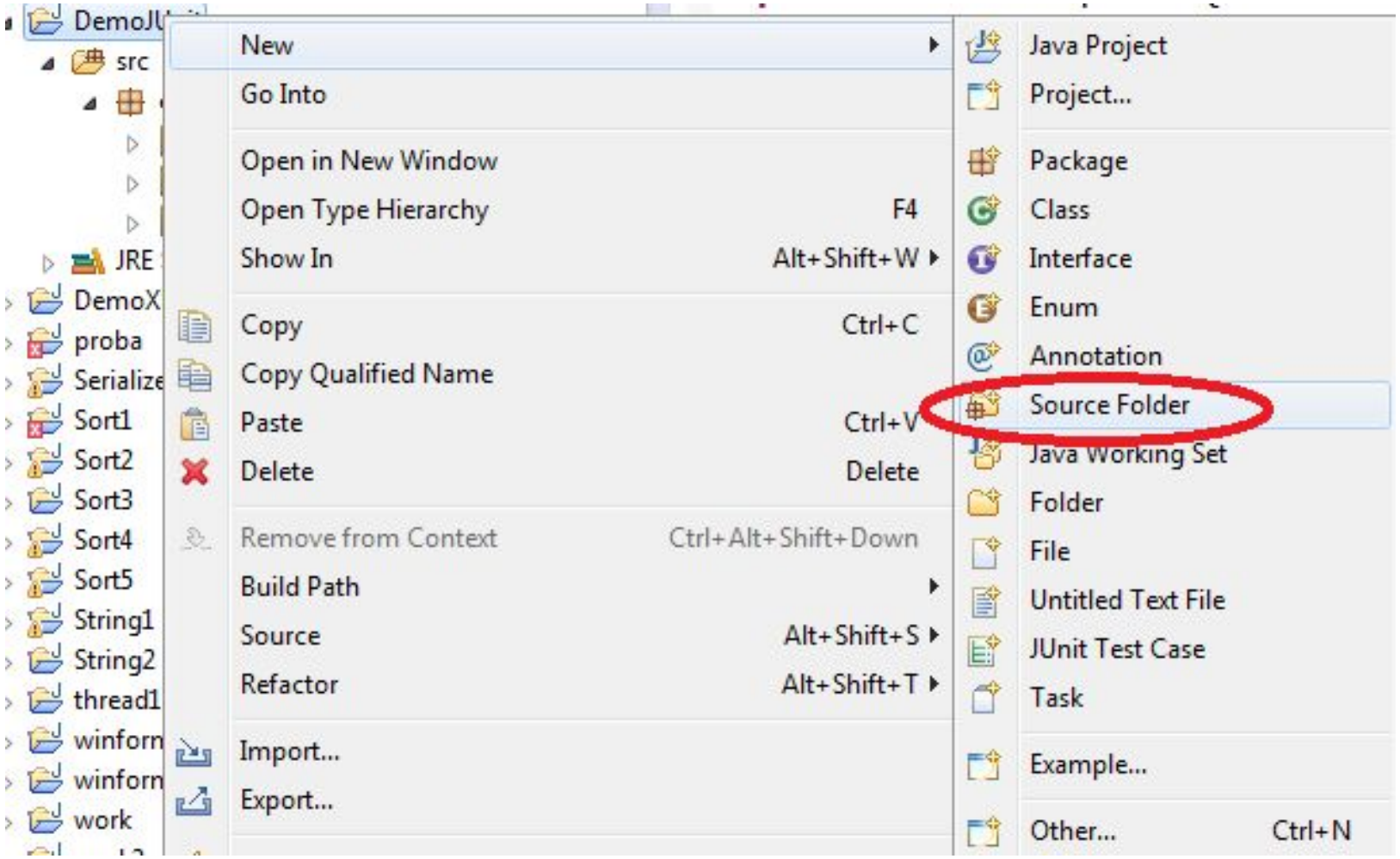
JUnit plugin for Eclipse IDE

- Mr. Erich Gamma who is a one of developers of JUnit framework also known as a Eclipse IDE developer
- JUnit well integrated into Eclipse IDE

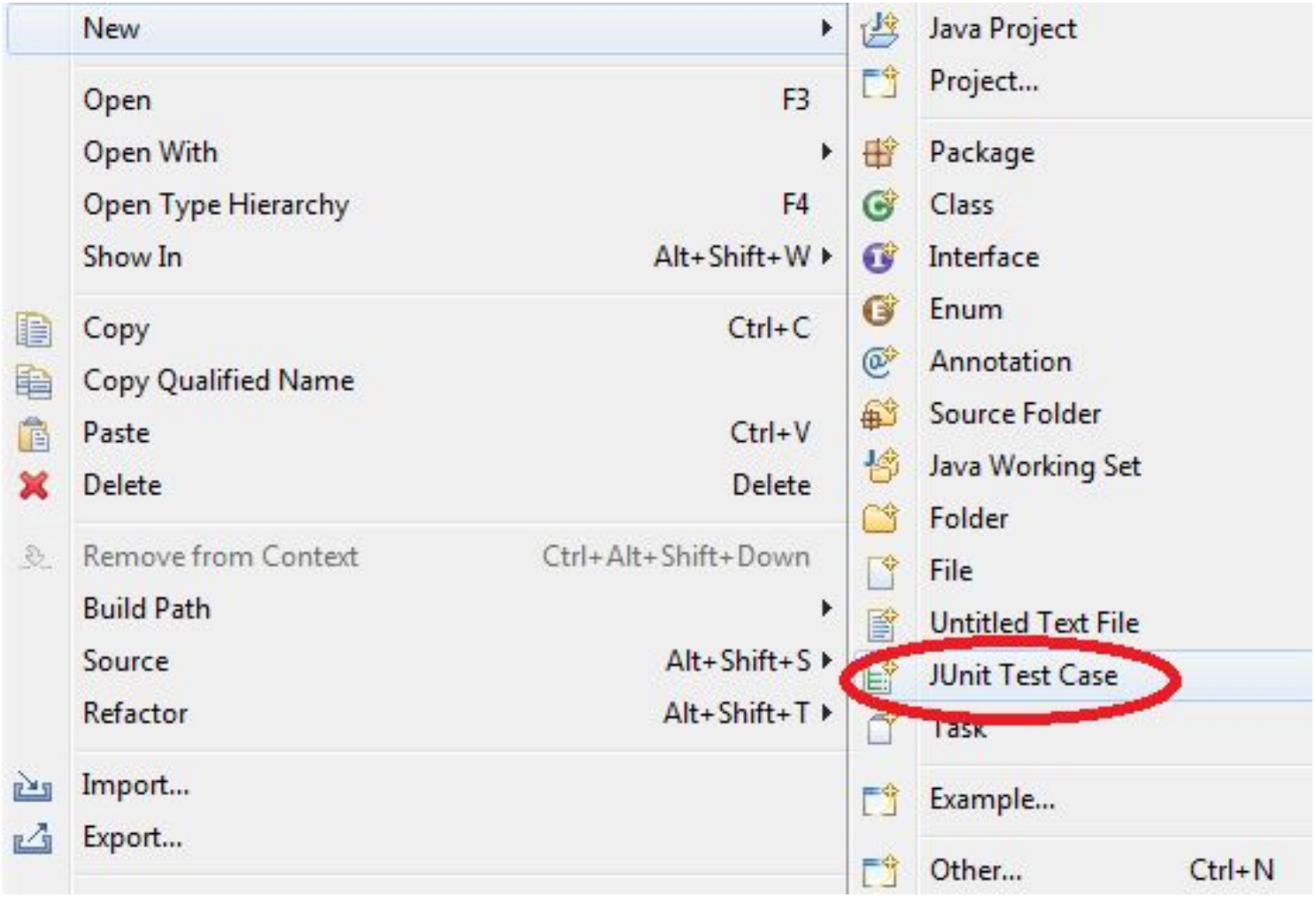
JUnit assertion methods

Method	Description
assertEquals()	See if two objects or primitives have the same value
assertNotEquals()	
assertSame()	See if two objects are the same object
assertNotSame()	
assertTrue()	Test a Boolean expression
assertFalse()	
assertNull()	Test for a null object
assertNotNull()	

JUnit


DemoJU
src
JRE
DemoX
proba
Serialize
Sort1
Sort2
Sort3
Sort4
Sort5
String1
String2
thread1
winform
winform
work
New
Go Into
Open in New Window
Open Type Hierarchy F4
Show In Alt+Shift+W
Copy Ctrl+C
Copy Qualified Name
Paste Ctrl+V
Delete Delete
Remove from Context Ctrl+Alt+Shift+Down
Build Path
Source Alt+Shift+S
Refactor Alt+Shift+T
Import...
Export...
Java Project
Project...
Package
Class
Interface
Enum
Annotation
Source Folder
Java Working Set
Folder
File
Untitled Text File
JUnit Test Case
Task
Example...
Other... Ctrl+N

JUnit


New
Open F3
Open With
Open Type Hierarchy F4
Show In Alt+Shift+W
Copy Ctrl+C
Copy Qualified Name
Paste Ctrl+V
Delete Delete
Remove from Context Ctrl+Alt+Shift+Down
Build Path
Source Alt+Shift+S
Refactor Alt+Shift+T
Import...
Export...
Java Project
Project...
Package
Class
Interface
Enum
Annotation
Source Folder
Java Working Set
Folder
File
Untitled Text File
JUnit Test Case
Task
Example...
Other... Ctrl+N

Class Calc

```
public class Calc {

    public int add(int a, int b) {
        return a + b;
    }

    public int div(int a, int b){
        return a / b;
    }
}
```

Class CalcTest

```
import static org.junit.Assert.*;
import org.junit.Test;
public class CalcTest {
    Calc calc = new Calc();

    @Test
    public void testAdd() { assertTrue(calc.add(1, 5) == 6);}

    @Test
    public void testDivPositive() {
        int actual = 4;
        int expected = calc.div(9, 2);
        assertEquals(actual, expected);
    }

    @Test(expected = Exception.class)
    public void testDivZero() {
        int actual = calc.div(23, 0);
    }
}
```

Practical tasks

1. Enter three numbers. Find out how many of them are odd.
2. Enter the number of the day of the week. Display the name in three languages.
3. Enter the name of the country. Print the name of the continent. (Declare enum with names of continents)
4. Create class ***Product*** with fields *name*, *price* and *quantity*.

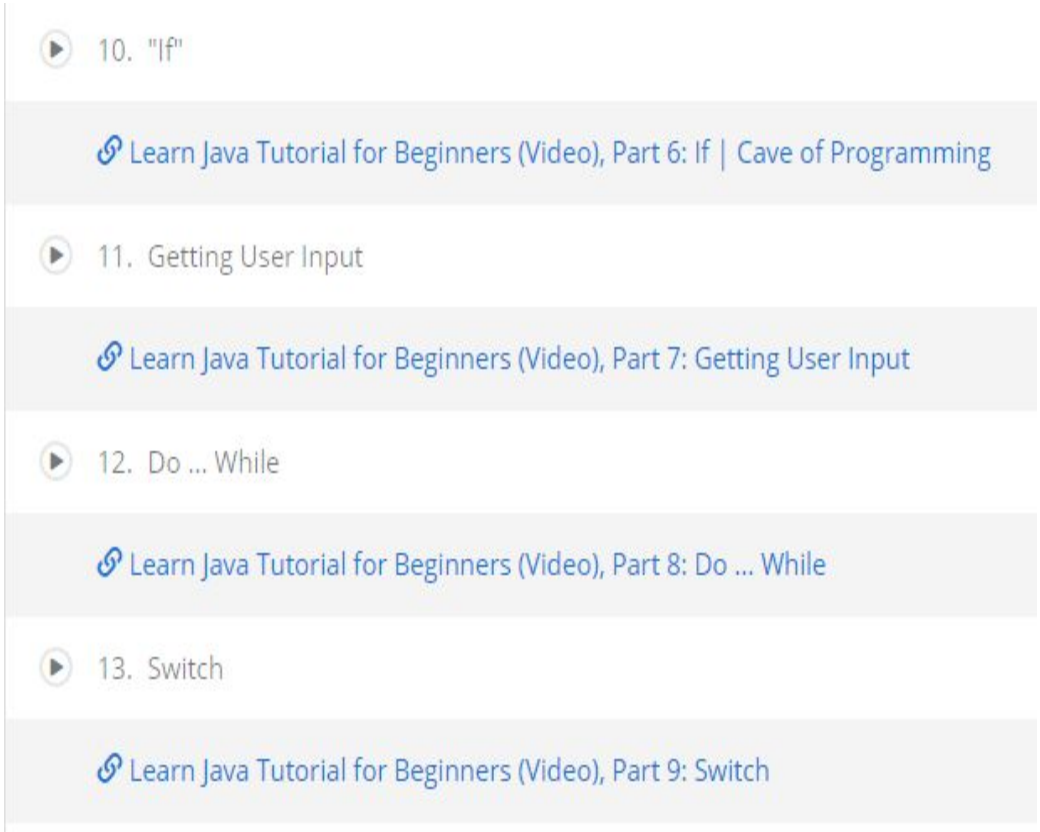
Create four instances of type *Product*.

Display the name and quantity of the most expensive item.

Display the name of the items, which has the biggest quantity.

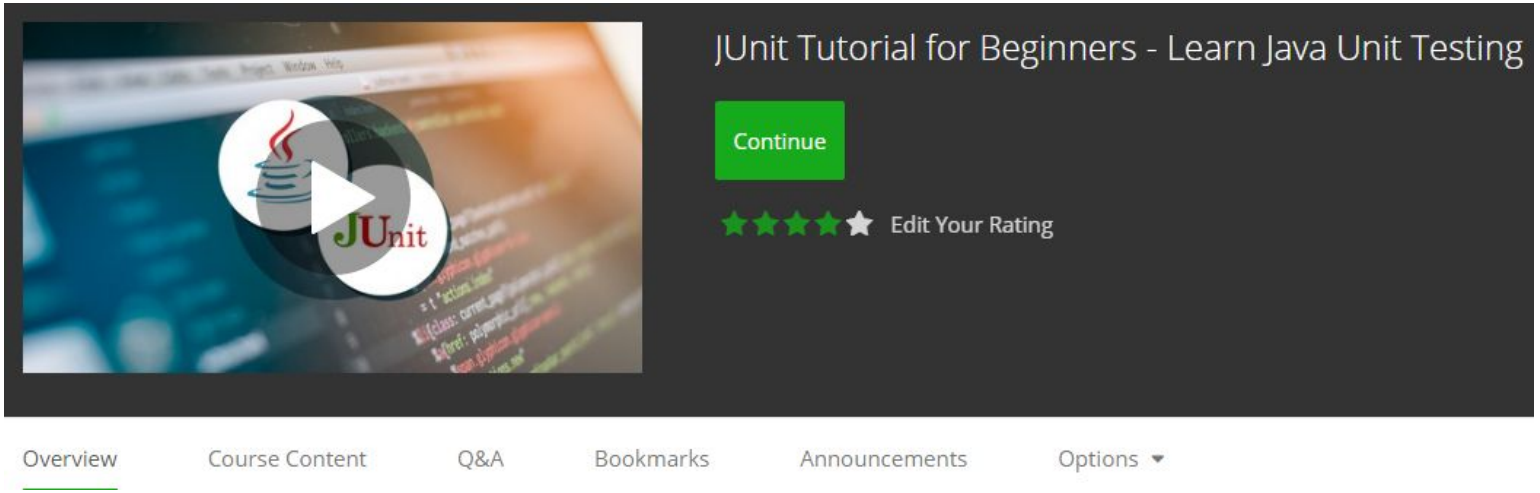
HomeWork (online course)

- UDEMY course "Java Tutorial for Complete Beginners": https://www.udemy.com/java-tutorial/
- Complete lessons 10, 11, 13:



Unit Testing with JUnit

- Short step-by-step online course: https://www.udemy.com/junit-tutorial-for-beginners-with-java-examples/learn/v4/overview



Homework

1. Solve the next tasks:
   a) read 3 float numbers and check: are they all belong to the range [-5,5];
   b) read 3 integer numbers and write max and min of them;
   c) read number of HTTP Error (400, 401,402, ...) and write the name of this error (Declare enum HTTPError)
2. Create class ***Dog*** with fields *name*, *breed*, *age*.

a) Declare *enum* for field *breed*.

b) Create 3 instances of type *Dog*.

c) Check if there is no two dogs with the same name.

d) Display the name and the kind of the oldest dog.

3. *Add Unit Tests to each task, publish code on GitHub

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The end

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