UNIVERSITY OF TWENTE.

APPLICATION DEVELOPMENT

LECTURE 1: INTRODUCTION

```
class AppDev {
}
```

Part of SmartProducts

INTRODUCTION

APPLICATION DEVELOPMENT

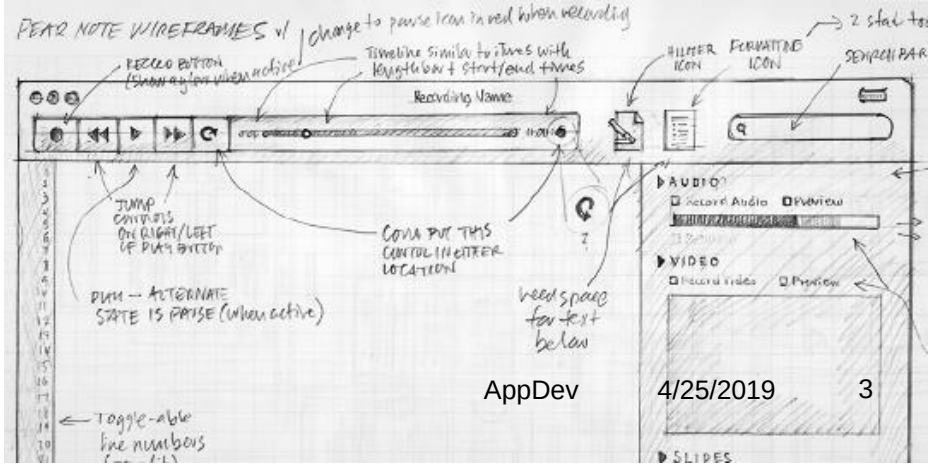
- Intro to course
- Java
- Eclipse
- Assignment

Fjodor van Slooten
W241 *(Horst-wing West)*
f.vanslooten@utwente.nl

slides @ vanslooten.com/appdev

WHAT DOES THIS COURSE OFFER?

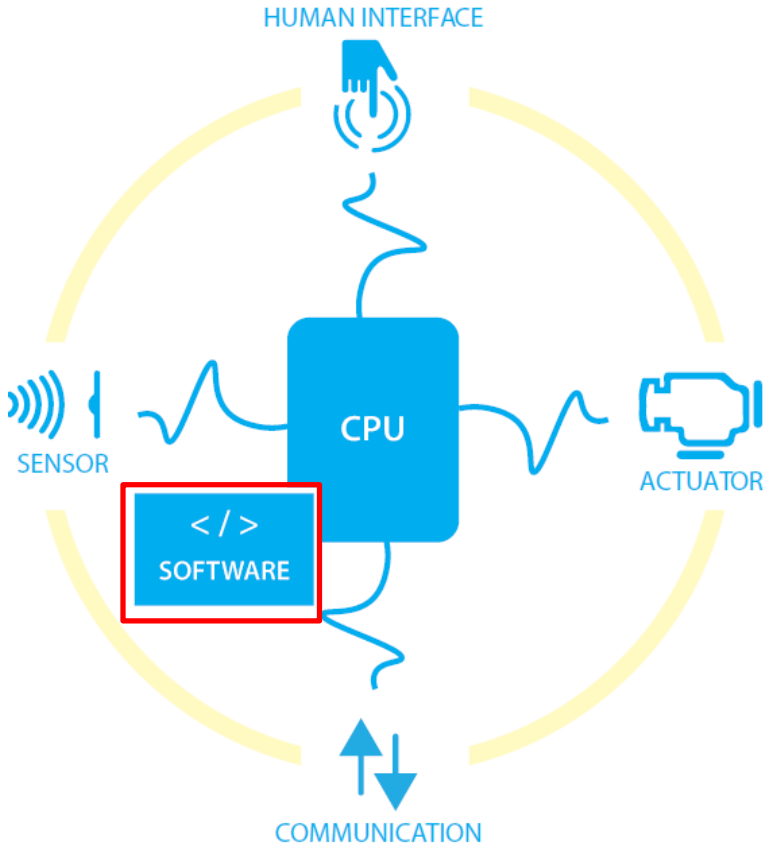
- Understand how computers & apps work
- Create Lego Mindstorms based robots powered by Arduino
- Design & develop applications (software)
  - Apply design & specification methods
  - Function in a team



SOFTWARE: ‘BRAIN’ OF A SMART PRODUCT

- Integrates, connects
- Makes smart

- Applied? Embedded in (small) devices, online, widgets, userinterfaces
- Design, develop, test



Prepare to vote

Internet

1

2

This presentation has been loaded without the Shakespeak add-in.
Want to download the add-in for free? Go to
http://shakespeak.com/en/free-download/.

TXT

1

2

Voting is anonymous

shakespeak

Do you have experience in programming apps?

A. Yes
B. A little
C. No

The question will open when you start your session and slideshow.

Closed

shakespeak

This presentation has been loaded without the Shakespeak add-in.
Want to download the add-in for free? Go to http://shakespeak.com/en/free-download/

Internet This text box will be used to describe the different message sending methods.
TXT The applicable explanations will be inserted after you have started a session. Votes: 0

STRUCTURE OF THIS COURSE

Check full schedule here

- Mostly on Fridays, with few exceptions (see schedule)
- Assessment: exam + assignments
- 3 practical sessions: mandatory attendance*
  - Afternoons: Apr. 26th, 30th & May 3th, 13:45-17:30h
- Time needed per week: 4 hours *learn*, 4 hours *project*, 2 hours *self-study*

Morning: Presentation + tutorial session

Afternoon: Work on project

Focus: *learn*; Work on assignment

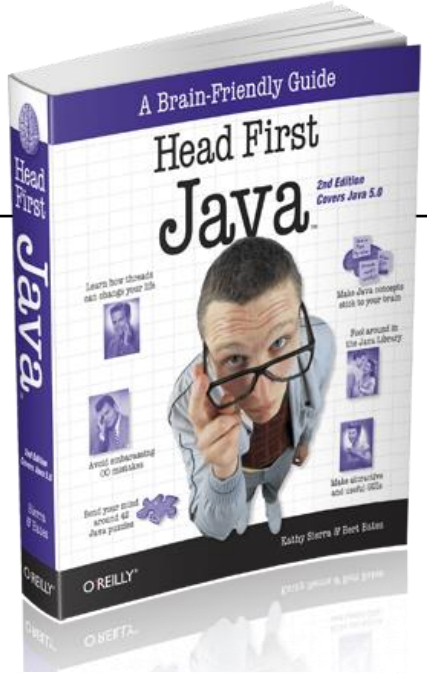
Focus: *apply*; programming & interaction

* if doing project “Smart Products”: you do the practical sessions as a group

STUDY MATERIALS

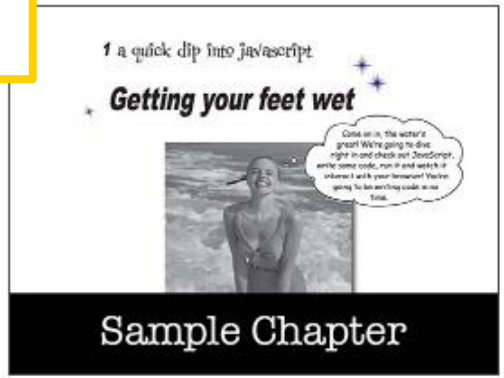
- Site: vanslooten.com/appdev
- Recommended books
- Study-topics in schedule
- Assignments in tutorial-sessions
- Software: Eclipse, Arduino

RECOMMENDED BOOK

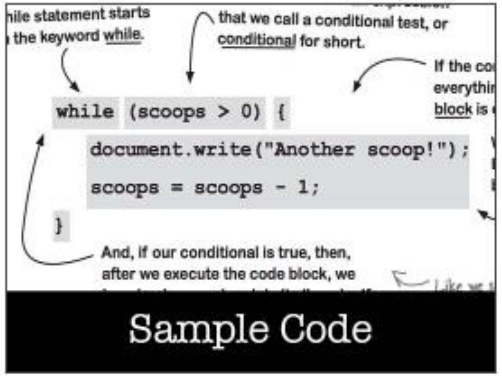


- "Head first Java"
- Via wickedlysmart.com:

Old book? Still OK to use



Download examples



ONLINE TUTORIALS

SELF-STUDY

- @site: additional lesson materials & online tutorials
- Recommended: Tutsplus, Codecademy, JavaTpoint

PRACTICE

- Assignments prepare you for project!
- Advice: do assignments together in duo's (more than 2 not allowed)
- Assistants & teacher available for help
- *Read*! Before you start programming

- Afternoon: project work, teacher available for help

Morning:
Presentation +
Learn

Afternoon:
Apply

ASSESSMENT

- Grade = 0.8 * exam_grade + (number_of_passed_assignments / 3)
- Assignments are sufficient if:
  - Checked before deadline (next lecture)
  - Assessed as sufficient by oral review during tutorial session
  - 6 assignments (no 2 – 7) count towards the grade
- Grade counts towards Module-grade: 17% (details in project-manual)
- Practical sessions (first 3 afternoons) are mandatory for the project-group, if *insufficient result* or *absence*, group must attend a catch-up session

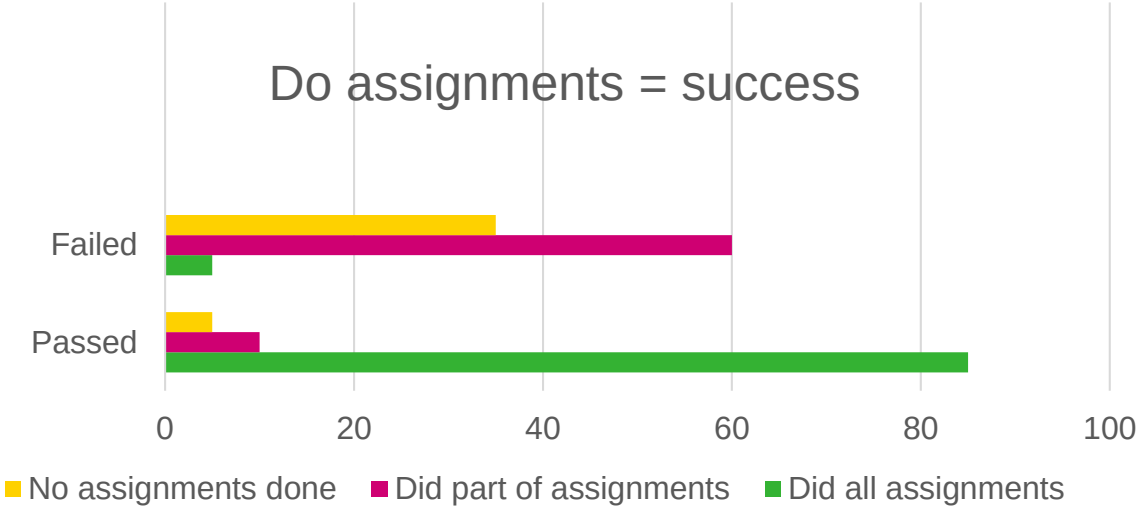
More on exam in last session

Questions? First read the FAQ

WHY DO ASSIGNMENTS?

Guidance

Practice yourself

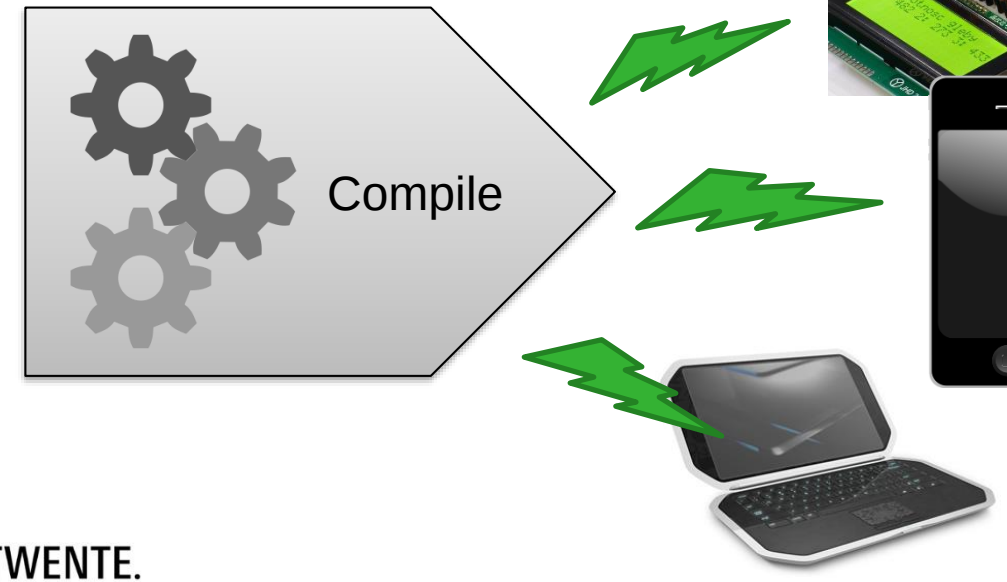


INTRODUCTION TO JAVA

Head First: CH 1 ***Aan de slag met*:** HST 1+2

Java

```
source code;
class LetsParty {
do interactive;
while
(wholeNight)
}
```



Where does this code come from?

```
if ( person.touches(goldenRing) ) {
   person.recievesPoints(10);
}
```

A. An instagram add-in
B. A betting app
C. A game app
D. I don't know/unclear

The question will open when you start your session and slideshow.

Closed

shakespeak

This presentation has been loaded without the Shakespeak add-in.
Want to download the add-in for free? Go to http://shakespeak.com/en/free-download/

Internet This text box will be used to describe the different message sending methods.
TXT The applicable explanations will be inserted after you have started a session. Votes: 0

What does this code do?

```
if ( person.touches(goldenRing) ) {
   person.recievesPoints(10);
}
```

A. Records points for the user
B. Process jewelry
C. Adds jewelry to the inventory
D. I don't know/unclear

The question will open when you start your session and slideshow.

Closed

shakespeak

This presentation has been loaded without the Shakespeak add-in.
Want to download the add-in for free? Go to http://shakespeak.com/en/free-download/

Internet
TXT

Where does this code come from?

```
while ( bike.moves() && sensor.isDark() ) {
   light.on();
}
```

A. A smart lamppost
B. An night light for kids
C. A smart bike light
D. I don't know/unclear

The question will open when you start your session and slideshow.

Closed

shakespeak

This presentation has been loaded without the Shakespeak add-in.
Want to download the add-in for free? Go to http://shakespeak.com/en/free-download/

Internet This text box will be used to describe the different message sending methods.
TXT The applicable explanations will be inserted after you have started a session. Votes: 0

The question will open when you start your session and slideshow.

What does this code do?

```
while ( bike.moves() && sensor.isDark() ) {
   light.on();
}
```

A. Turns light on or off
B. Checks if it is dark, then turns on light
C. Turns on light as long as bike is moving and it is dark
D. I don't know/unclear

Closed

shakespeak

This presentation has been loaded without the Shakespeak add-in.
Want to download the add-in for free? Go to http://shakespeak.com/en/free-download/

Internet This text box will be used to describe the different message sending methods.
TXT The applicable explanations will be inserted after you have started a session. Votes: 0

CLASS: DEFINES *OBJECT*

Head First: p73-76 ***Aan de slag met*:** 2.4, 4.9

```
class Dog {
    // properties:
    int hairLength;
    int age;

    // methods:
    run();
    bark();
    sit();
}
```

Properties: things an object has/knows/ stores

Methods: things an object can **do**

Map

Object

A NEW DOG

```
// let's create a new Dog:
Dog rufus = new Dog();
```

rufus *is an object, defined by a class*


```
// let's make rufus do something:
rufus.sit();
rufus.bark();
```

METHODS

head

```
type name() {
   // body
}
```

Head First: p73-76 **Aan de slag met:** 2.4, 4.9

- Describe what an object can do
- Contains set of instructions
- May have input- and output parameters

head

body
between { }

```
// method which takes care of running:
void run(int speed) {
   // code which drives motors
}

// method which takes care of barking:
void bark(int volume) {
   speaker.play("BARK.mp3", volume);
}
```

CODE STRUCTURE

Java Cheat Sheet on site →

Head First: p7-8 ***Aan de slag met*:** 2.10

```
/**
 * Comment
 * @author
 */

import java-library;

class MyFirstApp {

   public static void main(String[] args) {
         // body of method
         // contains instructions
         System.out.println("Hello world!");
   }

}
```

Opening bracket: start of code

main-method is start of program

Each line of code ends with a **semicolon ;**

Closing bracket: ends code block

What goes in a source file?

```
public class Dog {




} // class
```

What goes in a class?

```
public class Dog {
  void bark() {


  } // method
}
```

What goes in a method?

```
public class Dog {
  void bark() {
        statement1;
        statement1;
  }
}
```

NAMING CONVENTIONS

NAMES SHOULD…

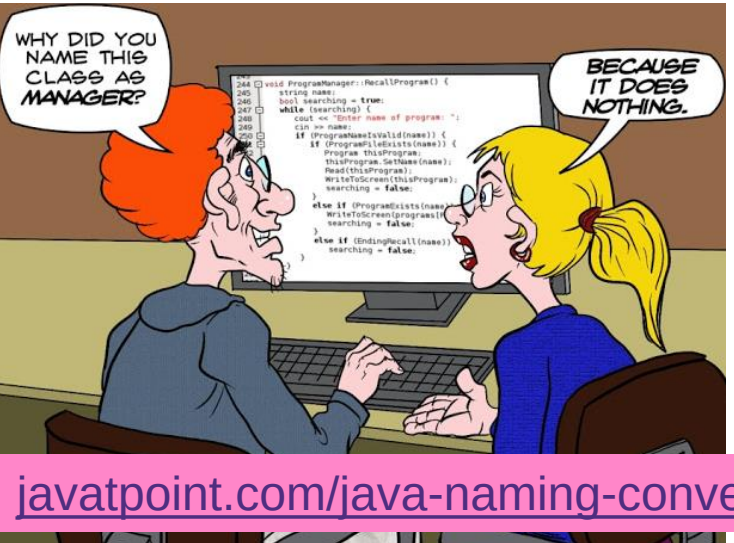
Head First: p53 ***Aan de slag met*:** 2.11

- be short yet meaningful
- not start with a number
- not contain special-characters or spaces

Class name: starts uppercase (capital)

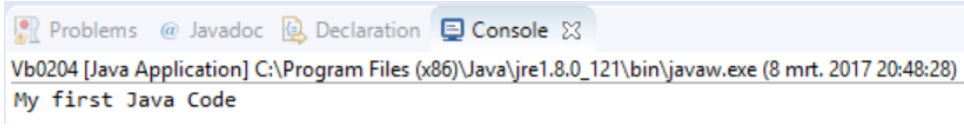
```
class TemperatureSensor {
    // properties:
    double temperature;
    int age;

    // methods:
    double getTemperature() {}
    void probe() {}
    void reset() {}
}
```

Variable & method names: start lowercase



javatpoint.com/java-naming-conventions

TEXT OUTPUT



Head First: p6-13 ***Aan de slag met*:** 5.2.3

- Print a line of text:

```
System.out.println("My first Java Code");
```

Print (a line) to standard output

Text between quotes is a String (of characters)

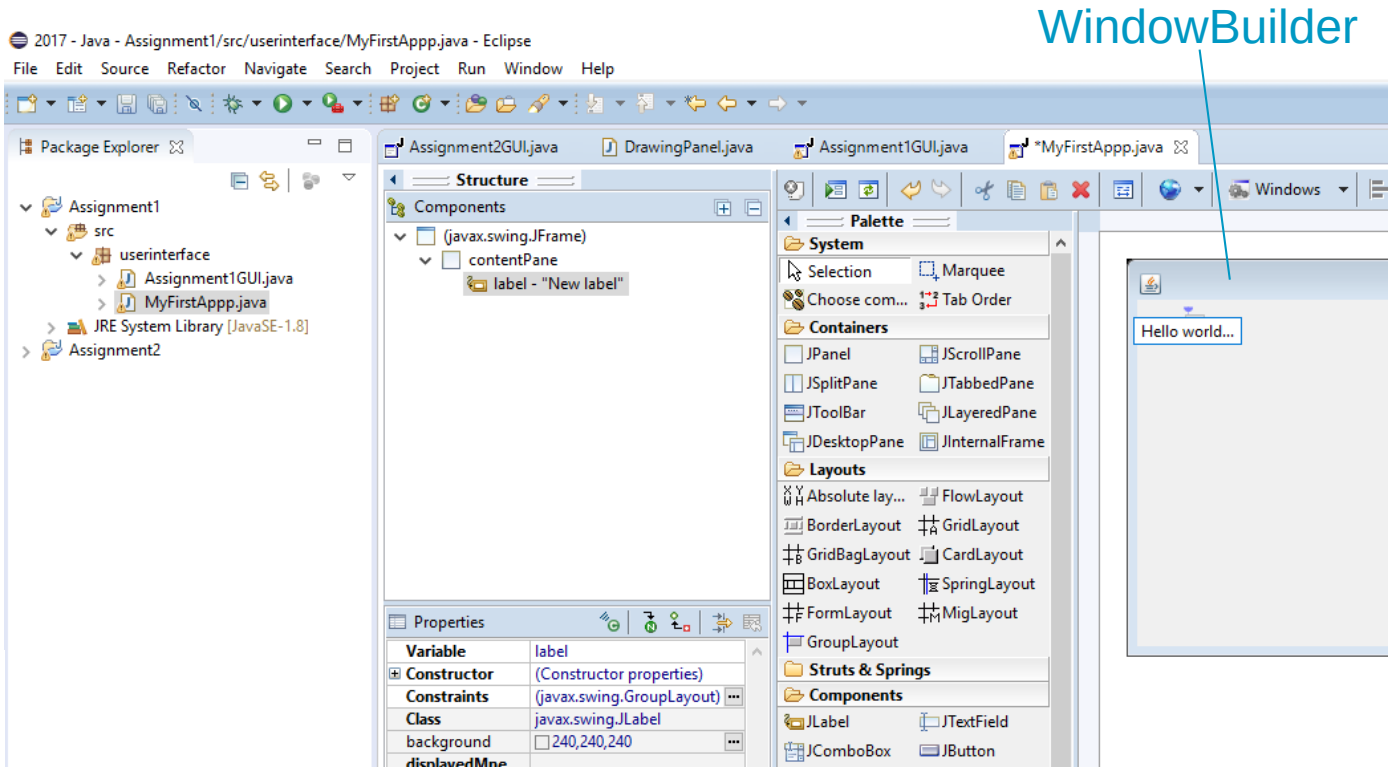
- Print *good morning*… *if* hour is smaller than 12:

```
if ( LocalDateTime.now().getHour() < 12 )
        System.out.println("Good morning");
```

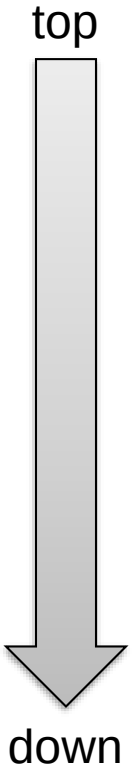
ECLIPSE

INTEGRATED DEVELOPMENT ENVIRONMENT (IDE)

- Create and organize applications
- WindowBuilder: design graphical userinterfaces



DESIGN AN APPLICATION



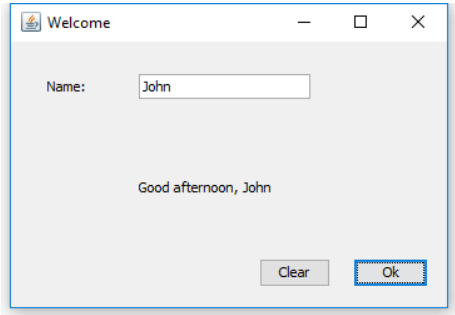
analyze > design >> implement

- Analyze: sketch ideas, think (out loud), find (sub) questions, (re) search, specifications
- Design: sketch (concepts), describe (functions, methods), map (real world→class), pseudo code
- Implement : write code, draw (with computer), detail

Next week: more on designing apps

ASSIGNMENT #1

Deadline of each assignment is the next lecture:
so you can have this assignment checked no later than the next lecture



- Install Eclipse
  - Download ZIP-file **AppDev2019.zip**, extract, do quick install (see installation instructions)
- Do assignment 1
  - Read carefully before you start
  - You may work in duo's
  - Have your work checked during lecture!
- Try examples/self-study
  (explained in appendix of assignment 1)

12:00h: closing presentation
13:45h: Lego Mindstorms/Arduino practical session (mandatory attendance if you do project)

Slides, assignments etc @ vanslooten.com/appdev

Did you succeed installing Eclipse?

A. Yes
B. No

The question will open when you start your session and slideshow.

Closed

shakespeak

This presentation has been loaded without the Shakespeak add-in.
Want to download the add-in for free? Go to http://shakespeak.com/en/free-download/

Internet This text box will be used to describe the different message sending methods.
TXT The applicable explanations will be inserted after you have started a session. Votes: 0

Did you finish assignment 1?

A. Yes
B. Almost, but welcome-message does not appear yet
C. Almost, finishing up
D. No, I was unable to complete it
E. No, I did not do this assignment

The question will open when you start your session and slideshow.

Closed

shakespeak

This presentation has been loaded without the Shakespeak add-in.
Want to download the add-in for free? Go to http://shakespeak.com/en/free-download/

Internet
TXT
This text box will be used to describe the different message sending methods.
The applicable explanations will be inserted after you have started a session.
Votes: 0

What is a method?

A. A way to write Java code
B. A set of parameters separated by comma's which form a module
C. Part of a class with a head and body. The body contains one or more instructions.
D. I do not know.

The question will open when you start your session and slideshow.

Closed

shakespeak

This presentation has been loaded without the Shakespeak add-in.
Want to download the add-in for free? Go to http://shakespeak.com/en/free-download/

Internet
TXT
The applicable explanations will be inserted after you have started a session.

Java has a naming convention for certain elements. What is the element described by:

```
getTemperature()
```

A. object
B. method
C. class
D. variable

The question will open when you start your session and slideshow.

Closed

shakespeak

This presentation has been loaded without the Shakespeak add-in. Want to download the add-in for free? Go to http://shakespeak.com/en/free-download/

Internet This text box will be used to describe the different message sending methods.
TXT The applicable explanations will be inserted after you have started a session. Votes: 0