

Script generated by TTT

Title: groh: profile1 (20.06.2014)

Date: Fri Jun 20 09:10:57 CEST 2014

Duration: 99:12 min

Pages: 96

The screenshot shows the Eclipse IDE interface. The Package Explorer view on the left lists several Java packages and classes, including BeesAndFlowers, BicycleDemo, ControlFlowDemo, DritteJebung, Erathostenes, Exceptions, Fakultaet, FloodFill, Histogram, ImageDemo, InterfaceDemo, OverloadAndOverride, Polymorphism, Quicksort, SimpleRecursion, StatementsAndOperators, uebung1, and uebung2. The central editor window displays the code for `Demo.java`:

```
package uebung2;
public class Demo {
    public static void main(String[] args) {
        Demo ddd = new Demo();
        double eee = ddd.expo(5.0);
        System.out.println(eee);
    }
    double expo(double x){
        double result = 1;
        double help = 1;
        double help2 = 1;
        for (int i=0; i<11; i++){
            help = help * x;
            help2 = fakultaet(i);
            result = result + (help / help2);
        }
        return result;
    }
    long fakultaet(int n){
        long result = 1;
        while (n>1){
            result *= n;
            n--;
        }
        return result;
    }
}
```

The bottom right corner shows the Windows taskbar with the date and time as 09:10 20.06.2014.

The screenshot shows two Microsoft PowerPoint slides. The left slide, titled "2 Language Basics – Expressions, Statements, Blocks", contains the following content:

Statements

- **Statement:** Complete unit of execution (ends with ";")
 - **Expression statements:**
 - Assignment expressions `a = (17 + (3 * 9)) % 3;`
 - Use of ++ or -- `a++;`
 - Method invocations `someObject.methodOne();`
 - Object creation expressions `new SomeClass();`
 - Declaration statements `int a;`
 - Blocks
 - (next slide)
 - Control flow statements
 - (later)

The right slide, titled "2 Language Basics – Control Flow Statements", contains the following content:

- if and if else have a straightforward meaning:

```
void applyBrakes(){
    if (speed > 0) {
        speed = speed - 1;
    }
}

void applyBrakes(){
    if (speed > 10) {
        speed = speed - 2; // break really hard
    } else if (speed > 0) {
        speed--;
    } else {
        System.out.println(
            "The bicycle has already stopped!");
    }
}
```
- switch: Equivalent to sequence of chained if else statements

Introduction to Java Basics.pptx - PowerPoint

DATEI START EINFÜGEN ENTWURF ÜBERGÄNGE ANIMATIONEN BILDSCHEINPRÄSENTATION ÜBERPRÜFEN ANSICHT Anmelden

Einfügen F K U \$ abc AV Aa | Absatz Zeichnung Bearbeiten

Zwischenablage Foliens Schriftart Absatz Zeichnung Bearbeiten

47 12 11 10 9 8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8 9 10 11 12

2 Language Basics – Control Flow Statements

- if and if else have a straightforward meaning:

```
void applyBrakes() {
    if (speed > 0) {
        speed = speed - 1;
    }
}

void applyBrakes() {
    if (speed > 10) {
        speed = speed - 2; // break really hard
    } else if (speed > 0) {
        speed--;
    } else {
        System.out.println(
            "The bicycle has already stopped!");
    }
}
```

- switch: Equivalent to sequence of chained if else statements

Klicken Sie, um Notizen hinzuzufügen

FOLIE 52 VON 168 ENGLISCH (USA) DEUTSCH (DEUTSCHLAND) 100% 09:19 20.06.2014

Introduction to Java Basics.pptx - PowerPoint

DATEI START EINFÜGEN ENTWURF ÜBERGÄNGE ANIMATIONEN BILDSCHEINPRÄSENTATION ÜBERPRÜFEN ANSICHT FORMAT Anmelden

Einfügen F K U \$ abc AV Aa | Absatz Zeichnung Bearbeiten

Zwischenablage Foliens Schriftart Absatz Zeichnung Bearbeiten

47 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

2 Language Basics – Control Flow Statements

- if and if else have a straightforward meaning:

```
void applyBrakes() {
    if (speed > 0) {
        speed = speed - 1;
    }
}

void applyBrakes() {
    if (speed > 10) {
        speed = speed - 2; // break really hard
    } else if (speed > 0) {
        speed--;
    } else {
        System.out.println(
            "The bicycle has already stopped!");
    }
}
```

- switch: Equivalent to sequence of chained if else statements

Klicken Sie, um Notizen hinzuzufügen

FOLIE 52 VON 168 ENGLISCH (USA) DEUTSCH (DEUTSCHLAND) 100% 09:20 20.06.2014

Introduction to Java Basics.pptx - PowerPoint

DATEI START EINFÜGEN ENTWURF ÜBERGÄNGE ANIMATIONEN BILDSCHEINPRÄSENTATION ÜBERPRÜFEN ANSICHT FORMAT Anmelden

Einfügen F K U \$ abc AV Aa | Absatz Zeichnung Bearbeiten

Zwischenablage Foliens Schriftart Absatz Zeichnung Bearbeiten

50 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

2 Language Basics – Control Flow Statements

- for: usually means to do something for a fixed number of times:

```
for (int i=0; i<7; i++) { // loop will be executed 7 times
    System.out.print("#:" + i + " ");
}
```

→ output will be: #:#:#:#:#:#:#

- General form:

```
for (initialization; termination; update)
    statement*
```

- initialization expression: Executed once at the beginning of first loop
- termination expression: If true then execute statement(s), else exit loop
- update expression: Executed after each iteration of the loop

Klicken Sie, um Notizen hinzuzufügen

FOLIE 54 VON 168 DEUTSCH (DEUTSCHLAND) 100% 09:27 20.06.2014

uebung2/src/uebung2/Demo.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Quick Access Java Debug

Package Explorer Demo.java

```
package uebung2;

public class Demo {

    public static void main(String[] args) {
        Demo ddd = new Demo();
        double eee = ddd.expo(5.0);
        System.out.println(eee);
    }

    double expo(double x){}
        double result = 1;
        double help = 1;
        double help2 = 1;
        for (int i=0; i<11; i++){
            help = help * x;
            help2 = faktultaet(i);
            result = result + (help / help2);
        }
        return result;
    }

    long faktultaet(int n){
        long result = 1;
        while (n>1){
    }
```

Console No consoles to display at this time.

Writable Smart Insert

Start DEUTSCH (DEUTSCHLAND) 100% 09:29 20.06.2014

Eclipse IDE screenshot showing the Java code for 'Demo.java' in the 'uebung2' package. The code implements a factorial function using recursion and loops.

```
package uebung2;

public class Demo {

    public static void main(String[] args) {
        Demo ddd = new Demo();
        double eee = ddd.expo(5.0);
        System.out.println(eee);
    }

    double expo(double x){
        double result = 1;
        double help = 1;
        double help2 = 1;
        for (int i=0; i<1; i++){
            help = help * x;
            help2 = fakultaet(i);
            result = result + (help / help2);
        }
        return result;
    }

    long fakultaet(int n){
        long result = 1;
        while (n>1){
            result = result * n;
            n = n - 1;
        }
        return result;
    }
}
```

Eclipse IDE screenshot showing the Java code for 'Demo.java' in the 'uebung2' package. The code is identical to the one in the first window, but the cursor is positioned at the end of the 'expo' method's body.

```
package uebung2;

public class Demo {

    public static void main(String[] args) {
        Demo ddd = new Demo();
        double eee = ddd.expo(5.0);
        System.out.println(eee);
    }

    double expo(double x){
        double result = 1;
        double help = 1;
        double help2 = 1;
        for (int i=0; i<1; i++){
            help = help * x;
            help2 = fakultaet(i);
            result = result + (help / help2);
        }
        return result;
    }

    long fakultaet(int n){
        long result = 1;
        while (n>1){
            result = result * n;
            n = n - 1;
        }
        return result;
    }
}
```

Eclipse IDE screenshot showing the Java code for 'Demo.java' in the 'uebung2' package. The code is identical to the previous windows, but the cursor is now at the end of the 'fakultaet' method's body.

```
package uebung2;

public class Demo {

    public static void main(String[] args) {
        Demo ddd = new Demo();
        double eee = ddd.expo(5.0);
        System.out.println(eee);
    }

    double expo(double x){
        double result = 1;
        double help = 1;
        double help2 = 1;
        for (int i=0; i<1; i++){
            help = help * x;
            help2 = fakultaet(i);
            result = result + (help / help2);
        }
        return result;
    }

    long fakultaet(int n){
        long result = 1;
        while (n>1){
            result = result * n;
            n = n - 1;
        }
        return result;
    }
}
```

Eclipse IDE screenshot showing the Java code for 'Demo.java' in the 'uebung2' package. The code is identical to the previous windows, but the cursor is now at the end of the 'Demo' class's body.

```
package uebung2;

public class Demo {

    public static void main(String[] args) {
        Demo ddd = new Demo();
        double eee = ddd.expo(5.0);
        System.out.println(eee);
    }

    double expo(double x){
        double result = 1;
        double help = 1;
        double help2 = 1;
        for (int i=0; i<1; i++){
            help = help * x;
            help2 = fakultaet(i);
            result = result + (help / help2);
        }
        return result;
    }

    long fakultaet(int n){
        long result = 1;
        while (n>1){
            result = result * n;
            n = n - 1;
        }
        return result;
    }
}
```

Screenshot 1: Eclipse IDE showing the Java code for 'Demo.java'. The code implements the Euler method for calculating e^x. It includes a main method, an expo function, and a fakultaet function.

```
public static void main(String[] args) {
    Demo ddd = new Demo();
    double eee = ddd.expo(5.0);
    System.out.println(eee);
}

double expo(double x){
    double result = 1;
    double help = 1;
    double help2 = 1;
    for (int i=0; i<1; i++){
        help = help * x;
        help2 = fakultaet(i);
        result = result + (help / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}
```

Screenshot 2: Eclipse IDE showing the Java code for 'Demo.java'. The code is identical to Screenshot 1, but the variable names 'help' and 'help2' have been renamed to 'help1' and 'help2' respectively.

```
public static void main(String[] args) {
    Demo ddd = new Demo();
    double eee = ddd.expo(5.0);
    System.out.println(eee);
}

double expo(double x){
    double result = 1.0;
    double help1 = 1.0;
    double help2 = 1.0;
    for (int i=0; i<1; i++){
        help1 = help1 * x;
        help2 = fakultaet(i);
        result = result + (help1 / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}
```

Screenshot 3: Eclipse IDE showing the Java code for 'Demo.java'. The code is identical to Screenshot 1, but the variable names 'help' and 'help2' have been renamed to 'help1' and 'help2' respectively.

```
public static void main(String[] args) {
    Demo ddd = new Demo();
    double eee = ddd.expo(5.0);
    System.out.println(eee);
}

double expo(double x){
    double result = 1.0;
    double help1 = 1.0;
    double help2 = 1.0;
    for (int i=0; i<1; i++){
        help1 = help1 * x;
        help2 = fakultaet(i);
        result = result + (help1 / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}
```

Screenshot 4: Eclipse IDE showing the Java code for 'Demo.java'. The code is identical to Screenshot 1, but the variable names 'help' and 'help2' have been renamed to 'help1' and 'help2' respectively.

```
public static void main(String[] args) {
    Demo ddd = new Demo();
    double eee = ddd.expo(5.0);
    System.out.println(eee);
}

double expo(double x){
    double result = 1.0;
    double help1 = 1.0;
    double help2 = 1.0;
    for (int i=0; i<1; i++){
        help1 = help1 * x;
        help2 = fakultaet(i);
        result = result + (help1 / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}
```

Screenshot 1: Eclipse IDE showing the Java code for 'Demo.java'. The code contains two methods: 'expo' and 'fakultaet'. The 'expo' method calculates e^x using a series expansion. The 'fakultaet' method calculates the factorial of a number. A cursor is positioned at the line 'double help = 1.0;' in the 'expo' method.

```
public static void main(String[] args) {
    Demo ddd = new Demo();
    double eee = ddd.expo(5.0);
    System.out.println(eee);
}

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=0; i<11; i++){
        help = help * x;
        help2 = fakultaet(i);
        result = result + (help / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}
```

Screenshot 2: Eclipse IDE showing the Java code for 'Demo.java'. The code is identical to Screenshot 1. The cursor is now positioned at the line 'help2 = fakultaet(i);' in the 'expo' method.

```
public static void main(String[] args) {
    Demo ddd = new Demo();
    double eee = ddd.expo(5.0);
    System.out.println(eee);
}

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=0; i<11; i++){
        help = help * x;
        help2 = fakultaet(i);
        result = result + (help / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}
```

Screenshot 3: Eclipse IDE showing the Java code for 'Demo.java'. The code is identical to Screenshot 1. The cursor is now positioned at the line 'return result;' in the 'fakultaet' method.

```
public static void main(String[] args) {
    Demo ddd = new Demo();
    double eee = ddd.expo(5.0);
    System.out.println(eee);
}

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=0; i<11; i++){
        help = help * x;
        help2 = fakultaet(i);
        result = result + (help / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}
```

Screenshot 4: Eclipse IDE showing the Java code for 'Demo.java'. The code is identical to Screenshot 1. The cursor is now positioned at the line 'result = result * n;' in the 'fakultaet' method.

```
public static void main(String[] args) {
    Demo ddd = new Demo();
    double eee = ddd.expo(5.0);
    System.out.println(eee);
}

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=0; i<11; i++){
        help = help * x;
        help2 = fakultaet(i);
        result = result + (help / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}
```

Eclipse IDE screenshot showing the Java code for 'Demo.java'.

```
public static void main(String[] args) {
    Demo ddd = new Demo();
    double eee = ddd.expo(5.0);
    System.out.println(eee);
}

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=0; i<1; i++){
        help = help * x;
        help2 = fakultaet(i);
        result = result + (help / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}
```

The code implements a factorial function using a loop instead of recursion. It also contains a bug where the loop condition is set to i < 1, resulting in an infinite loop.

Eclipse IDE screenshot showing the Java code for 'Demo.java'.

```
public static void main(String[] args) {
    Demo ddd = new Demo();
    double eee = ddd.expo(5.0);
    System.out.println(eee);
}

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=0; i<1; i++){
        help = help * x;
        help2 = fakultaet(i);
        result = result + (help / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}
```

This version of the code is identical to the first one but lacks the bug in the loop condition.

Eclipse IDE screenshot showing the Java code for 'Demo.java'.

```
public static void main(String[] args) {
    Demo ddd = new Demo();
    double eee = ddd.expo(5.0);
    System.out.println(eee);
}

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=0; i<1; i++){
        help = help * x;
        help2 = fakultaet(i);
        result = result + (help / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}
```

This version of the code is identical to the first one but lacks the bug in the loop condition.

Eclipse IDE screenshot showing the Java code for 'Demo.java'.

```
public static void main(String[] args) {
    Demo ddd = new Demo();
    double fff = ddd.fakultaet(5);
    System.out.println(fff);
    double eee = ddd.expo(5.0);
    System.out.println(eee);
}

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=0; i<1; i++){
        help = help * x;
        help2 = fakultaet(i);
        result = result + (help / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}
```

This version of the code includes an additional call to the 'fakultaet' method and prints its result to the console before calculating the exponential value.

Screenshot of Eclipse IDE showing the Java code for Demo.java:

```
public static void main(String[] args) {
    Demo ddd = new Demo();
    double fff = ddd.fakultaet(5);
    System.out.println(fff);
    double eee = ddd.expo(5.0);
    System.out.println(eee);
}

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=0; i<1; i++){
        help = help * x;
        help2 = fakultaet(i);
        result = result + (help / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}
```

Screenshot of Eclipse IDE showing the Java code for Demo.java:

```
public static void main(String[] args) {
    Demo ddd = new Demo();
    long fff = ddd.fakultaet(5);
    System.out.println(fff);
    double eee = ddd.expo(5.0);
    System.out.println(eee);
}

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=0; i<1; i++){
        help = help * x;
        help2 = fakultaet(i);
        result = result + (help / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}
```

Screenshot of Eclipse IDE showing the Java code for Demo.java and its execution output in the Console:

```
public static void main(String[] args) {
    Demo ddd = new Demo();
    long fff = ddd.fakultaet(5);
    System.out.println(fff);
    double eee = ddd.expo(5.0);
    System.out.println(eee);
}

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=0; i<1; i++){
        help = help * x;
        help2 = fakultaet(i);
        result = result + (help / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}
```

Console Output:

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 09:43:24)
732.9030051256614
```

Screenshot of Eclipse IDE showing the Java code for Demo.java and its execution output in the Console:

```
public static void main(String[] args) {
    Demo ddd = new Demo();
    long fff = ddd.fakultaet(5);
    System.out.println(fff);
    double eee = ddd.expo(5.0);
    System.out.println(eee);
}

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=0; i<1; i++){
        help = help * x;
        //help2 = fakultaet(i);
        help2 = help2 * i;
        result = result + (help / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}
```

Console Output:

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 09:43:24)
120
732.9030051256614
```

Eclipse IDE screenshot showing the Java code for 'Demo.java'.

```

public static void main(String[] args) {
    Demo ddd = new Demo();
    long fff = ddd.fakultaet(5);
    System.out.println(fff);
    double eee = ddd.expo(5.0);
    System.out.println(eee);
}

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=1; i<1; i++){
        help = help * x;
        //help2 = fakultaet(i);
        help2 = help2 * i;
        System.out.println("# " + help2);
        result = result + (help / help2);
    }
}

```

The code calculates the exponential value of 5.0 using a loop and prints intermediate results. The output in the Console tab shows the following values:

```

# 1.0
# 2.0
# 6.0
# 24.0
# 120.0
# 720.0
# 5040.0
# 40320.0
# 362880.0
# 3628800.0
146.38060102513225

```

Eclipse IDE screenshot showing the Java code for 'Demo.java'.

```

Demo ddd = new Demo();
long fff = ddd.fakultaet(5);
System.out.println(fff);
double eee = ddd.expo(5.0);
System.out.println(eee);

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=1; i<1; i++){
        help = help * x;
        //help2 = fakultaet(i);
        help2 = help2 * i;
        System.out.println("# " + help2);
        result = result + (help / help2);
    }
}

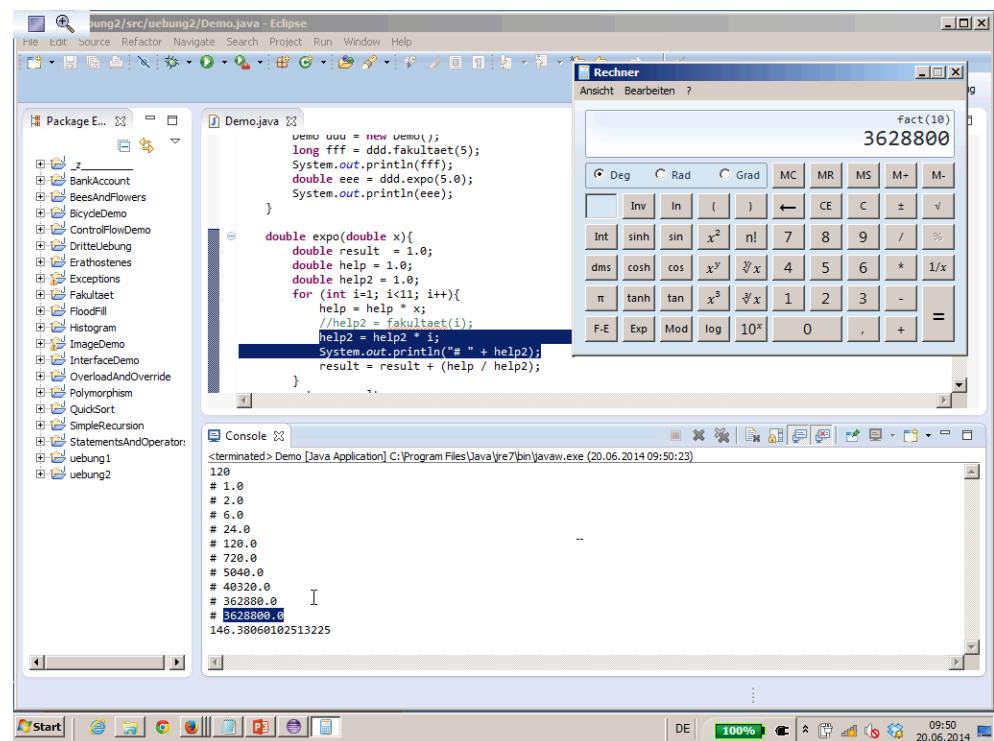
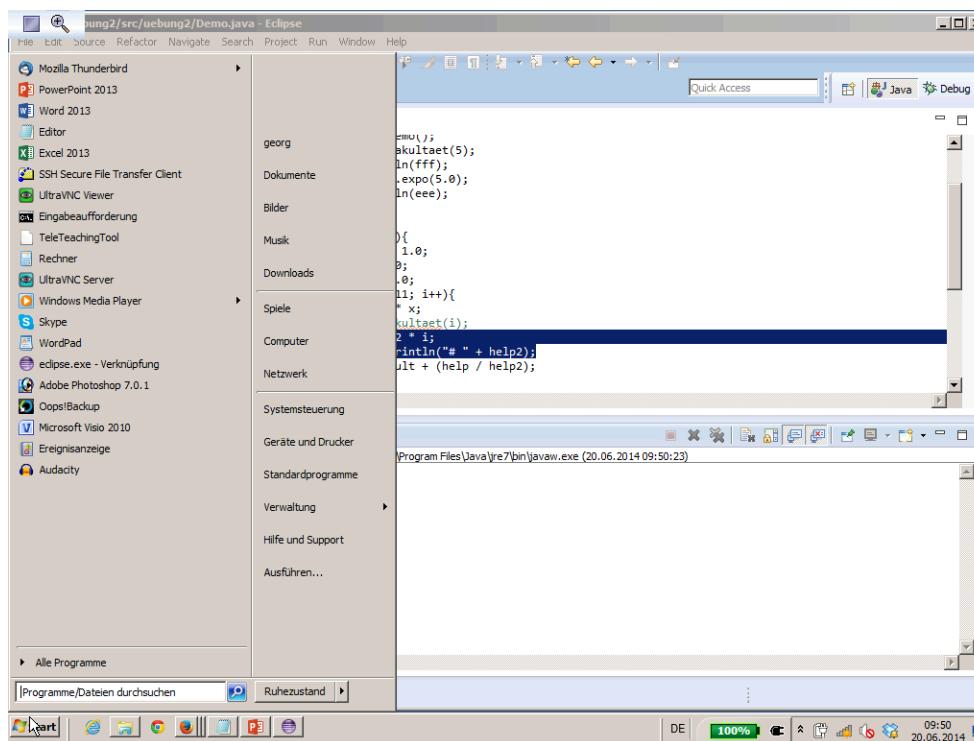
```

The code calculates the exponential value of 5.0 using a loop and prints intermediate results. The output in the Console tab shows the following values:

```

# 1.0
# 2.0
# 6.0
# 24.0
# 120.0
# 720.0
# 5040.0
# 40320.0
# 362880.0
# 3628800.0
146.38060102513225

```



Eclipse IDE screenshot showing Java code execution.

Java code in Demo.java:

```
        demo.uuu = new uuu();
    long fff = ddd.fakultaet(5);
    System.out.println(fff);
    double eee = ddd.expo(5.0);
    System.out.println(eee);
```

Calculator window showing result of fact(10):

fact(10)
3628800

Console output:

```
120
# 1.0
# 2.0
# 6.0
# 24.0
# 120.0
# 720.0
# 5040.0
# 40320.0
# 362880.0
# 3628800.0
146.38069102513225
```

Eclipse IDE screenshot showing Java code execution.

Java code in Demo.java:

```
        demo.uuu = new uuu();
    long fff = ddd.fakultaet(5);
    System.out.println(fff);
    double eee = ddd.expo(5.0);
    System.out.println(eee);
```

Calculator window showing result of expo(5.0):

expo(5)

double expo(double x){
 double result = 1.0;
 double help = 1.0;
 double help2 = 1.0;
 for (int i=1; i<11; i++){
 help = help * x;
 //help2 = fakultaet(i);
 help2 = help2 * i;
 System.out.println("# " + help2);
 result = result + (help / help2);
 }
}

Console output:

```
120
# 1.0
# 2.0
# 6.0
# 24.0
# 120.0
# 720.0
# 5040.0
# 40320.0
# 362880.0
# 3628800.0
146.38069102513225
```

Eclipse IDE screenshot showing Java code execution.

Java code in Demo.java:

```
        demo.uuu = new uuu();
    long fff = ddd.fakultaet(5);
    System.out.println(fff);
    double eee = ddd.expo(5.0);
    System.out.println(eee);
```

Calculator window showing result of expo(5.0):

expo(5)

double expo(double x){
 double result = 1.0;
 double help = 1.0;
 double help2 = 1.0;
 for (int i=1; i<11; i++){
 help = help * x;
 //help2 = fakultaet(i);
 help2 = help2 * i;
 System.out.println("# " + help2);
 result = result + (help / help2);
 }
}

Console output:

```
3628800.0
# 3.99168E7
# 4.790016E8
# 6.2270208E9
# 8.71782912E10
# 1.307674268E12
# 2.0922789888E13
# 3.55687428896E14
# 6.402373785728E15
# 1.21645100408832E17
# 2.43299200817664E18
148.4131470673818
```

Eclipse IDE screenshot showing Java code execution.

Java code in Demo.java:

```
        demo.uuu = new uuu();
    long fff = ddd.fakultaet(5);
    System.out.println(fff);
    double eee = ddd.expo(5.0);
    System.out.println(eee);
```

Calculator window showing result of expo(5.0):

expo(5)

double expo(double x){
 double result = 1.0;
 double help = 1.0;
 double help2 = 1.0;
 for (int i=1; i<11; i++){
 help = help * x;
 //help2 = fakultaet(i);
 help2 = help2 * i;
 System.out.println("# " + help2);
 result = result + (help / help2);
 }
}

Console output:

```
3628800.0
# 3.99168E7
# 4.790016E8
# 6.2270208E9
# 8.71782912E10
# 1.307674268E12
# 2.0922789888E13
# 3.55687428896E14
# 6.402373785728E15
# 1.21645100408832E17
# 2.43299200817664E18
148.4131470673818
```

Screenshot 1: Eclipse IDE showing Java code in Demo.java and a calculator application window.

The Java code calculates powers and exponentials:

```
    Demo ddd = new Demo();
    long fff = ddd.fakultaet(5);
    System.out.println(fff);
    double eee = ddd.expo(5.0);
    System.out.println(eee);
```

The calculator application shows the result of powe(5) as 148,41315910257560342111558004055.

Console output:

```
terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 09:53:28)
# 2.4329200817664E18
# 5.109904217170944E19
# 1.1249007277766767E21
# 2.58520167388849E22
# 6.204484017352394E23
# 1.5511210043330986E25
# 4.0329146112660565E26
# 1.0888869450418352E28
# 3.0488834461171384E29
# 8.841761993739701E30
# 2.6525285981219103E32
148.4131591025759
```

Screenshot 2: Eclipse IDE showing Java code in Demo.java and a calculator application window.

The Java code calculates powers and exponentials:

```
    Demo ddd = new Demo();
    long fff = ddd.fakultaet(5);
    System.out.println(fff);
    double eee = ddd.expo(5.0);
    System.out.println(eee);
```

The calculator application shows the result of powe(5) as 148,41315910257560342111558004055.

Console output:

```
terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 09:53:28)
# 2.4329200817664E18
# 5.109904217170944E19
# 1.1249007277766767E21
# 2.58520167388849E22
# 6.204484017352394E23
# 1.5511210043330986E25
# 4.0329146112660565E26
# 1.0888869450418352E28
# 3.0488834461171384E29
# 8.841761993739701E30
# 2.6525285981219103E32
148.4131591025759
```

Screenshot 3: Eclipse IDE showing Java code in Demo.java and a calculator application window.

The Java code calculates powers and exponentials:

```
    Demo ddd = new Demo();
    long fff = ddd.fakultaet(5);
    System.out.println(fff);
    double eee = ddd.expo(5.0);
    System.out.println(eee);
```

The calculator application shows the result of powe(5) as 148,41315910257560342111558004055.

Console output:

```
terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 09:55:39)
# 2.4329200817664E18
# 49290049192148E18
# -1.25066971867496858E18
# 8.128819161789426E18
# -7.8351859813292442E18
# 7.0345352775739638E18
# -1.56952352017245798E18
# -5.4036468972372623E18
# -5.9681605329669325E18
# -7.0559587926550774E18
# -8.7645789688472535E18
7.23931024076262
```

Screenshot 4: Eclipse IDE showing Java code in Demo.java and a calculator application window.

The Java code calculates powers and exponentials:

```
    Demo ddd = new Demo();
    long fff = ddd.fakultaet(5);
    System.out.println(fff);
    double eee = ddd.expo(5.0);
    System.out.println(eee);
```

The calculator application shows the result of powe(5) as 148,41315910257560342111558004055.

Console output:

```
terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 09:56:00)
120
7.23931024076262
```

Eclipse IDE screenshot showing the Java code for calculating e^x using a series expansion. The code uses a helper variable 'help2' which is cast to double inside the loop.

```
System.out.println();
double eee = ddd.exp(5.0);
System.out.println(eee);

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=1; i<31; i++){
        help = help * x;
        help2 = (double)fakultaet(i);
        //help2 = help2 * i;
        //System.out.println("# " + help2);
        result = result + (help / help2);
    }
    return result;
}
```

The console output shows the result of the calculation.

Eclipse IDE screenshot showing the same Java code as the first one, but with a modification: the line `//help2 = help2 * i;` is removed. This causes a ClassCastException at runtime because `fakultaet(i)` returns an int, and it is being cast to a double.

```
System.out.println();
double eee = ddd.exp(5.0);
System.out.println(eee);

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=1; i<31; i++){
        help = help * x;
        help2 = (double)fakultaet(i);
        //help2 = help2 * i;
        //System.out.println("# " + help2);
        result = result + (help / help2);
    }
    return result;
}
```

The console output shows the error message: `java.lang.ClassCastException: java.lang.Integer cannot be cast to java.lang.Double`.

Eclipse IDE screenshot showing the Java code for calculating e^x using a series expansion. The code uses a helper variable 'help2' which is cast to double inside the loop. The variable 'i' is decremented from 1 to 31.

```
System.out.println();
double eee = ddd.exp(5.0);
System.out.println(eee);

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=1; i<31; i++){
        help = help * x;
        help2 = (double)fakultaet(i-1);
        //help2 = help2 * i;
        //System.out.println("# " + help2);
        result = result + (help / help2);
    }
    return result;
}
```

The console output shows the result of the calculation.

Eclipse IDE screenshot showing the Java code for calculating e^x using a series expansion. The code uses a helper variable 'help2' which is cast to double inside the loop. The variable 'i' is decremented from 1 to 31. A separate long method 'fakultaet' calculates the factorial of n.

```
System.out.println();
double eee = ddd.exp(5.0);
System.out.println(eee);

double expo(double x){
    double result = 1.0;
    double help = 1.0;
    double help2 = 1.0;
    for (int i=1; i<31; i++){
        help = help * x;
        help2 = (double)fakultaet(i-1);
        //help2 = help2 * i;
        //System.out.println("# " + help2);
        result = result + (help / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
}
```

The console output shows the result of the calculation.

Eclipse IDE screenshot showing the Java code for calculating the power of a number using a loop. The code uses a helper variable to calculate the factorial of the exponent.

```
double expo(double x){  
    double result = 1.0;  
    double help = 1.0;  
    double help2 = 1.0;  
    for (int i=1; i<31; i++){  
        help = help * x;  
        //help2 = (double)(fakultaet(i-1));  
        help2 = help2 * i;  
        //System.out.println("# " + help2);  
        result = result + (help / help2);  
    }  
    return result;  
}  
  
long fakultaet(int n){  
    long result = 1;  
    while (n>1){  
        result = result * n;  
        n = n - 1;  
    }  
    return result;  
}  
  
double power(double x, int n){  
}
```

Eclipse IDE screenshot showing the Java code for calculating the power of a number using a loop. The code uses a helper variable to calculate the factorial of the exponent.

```
double expo(double x){  
    double help2 = 1.0;  
    for (int i=1; i<31; i++){  
        help = help * x;  
        //help2 = (double)(fakultaet(i-1));  
        help2 = help2 * i;  
        //System.out.println("# " + help2);  
        result = result + (help / help2);  
    }  
    return result;  
}  
  
long fakultaet(int n){  
    long result = 1;  
    while (n>1){  
        result = result * n;  
        n = n - 1;  
    }  
    return result;  
}  
  
double power(double x, int n){  
}
```

Eclipse IDE screenshot showing the Java code for calculating the power of a number using a loop. The code uses a helper variable to calculate the factorial of the exponent.

```
double expo(double x){  
    double result = 1.0;  
    double help = 1.0;  
    double help2 = 1.0;  
    for (int i=1; i<31; i++){  
        help = help * x;  
        //help2 = (double)(fakultaet(i-1));  
        help2 = help2 * i;  
        //System.out.println("# " + help2);  
        result = result + (help / help2);  
    }  
    return result;  
}  
  
long fakultaet(int n){  
    long result = 1;  
    while (n>1){  
        result = result * n;  
        n = n - 1;  
    }  
    return result;  
}  
  
double power(double x, int n){  
    double result;  
}
```

Eclipse IDE screenshot showing the Java code for calculating the power of a number using a loop. The code uses a helper variable to calculate the factorial of the exponent.

```
double expo(double x){  
    double help2 = 1.0;  
    for (int i=1; i<31; i++){  
        help = help * x;  
        //help2 = (double)(fakultaet(i-1));  
        help2 = help2 * i;  
        //System.out.println("# " + help2);  
        result = result + (help / help2);  
    }  
    return result;  
}  
  
long fakultaet(int n){  
    long result = 1;  
    while (n>1){  
        result = result * n;  
        n = n - 1;  
    }  
    return result;  
}  
  
double power(double x, int n){  
    double result = 1.0;  
}
```

Eclipse IDE screenshot showing the Java code for calculating factorials and powers.

```
    double help = 1.0;
    for (int i=1; i<31; i++){
        help = help * x;
        //help2 = (double)(fakultaet(i-1));
        help2 = help2 * i;
        //System.out.println("# " + help2);
        result = result + (help / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}

double power(double x, int n){
    double result = 1.0;
    for(int i=1; i<n+1; i++)
        result *= x;
    return result;
}
```

The code calculates the factorial of a number and the power of a base to an exponent. It uses loops and helper variables to perform the calculations.

Eclipse IDE screenshot showing the Java code for calculating factorials and powers, similar to the first one but with slight differences in variable names and logic.

```
    double help = 1.0;
    for (int i=1; i<31; i++){
        help = help * x;
        //help2 = (double)(fakultaet(i-1));
        help2 = help2 * i;
        //System.out.println("# " + help2);
        result = result + (help / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}

double power(double x, int n){
    double result = 1.0;
    for(int i=1; i<n+1; i++)
        result *= x;
    return result;
}
```

The code calculates the factorial of a number and the power of a base to an exponent. It uses loops and helper variables to perform the calculations.

Eclipse IDE screenshot showing the Java code for calculating factorials and powers, with additional println statements.

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

    double expo(double x){
        double result = 1.0;
        double help = 1.0;
        double help2 = 1.0;
        for (int i=1; i<31; i++){
            help = help * x;
            //help2 = (double)(fakultaet(i-1));
            help2 = help2 * i;
            //System.out.println("# " + help2);
            result = result + (help / help2);
        }
        return result;
    }

    long fakultaet(int n){
        long result = 1;
        while (n>1){
            result = result * n;
            n = n - 1;
        }
        return result;
    }
```

The code calculates the factorial of a number and the power of a base to an exponent. It includes several println statements to output intermediate values. It uses loops and helper variables to perform the calculations.

Eclipse IDE screenshot showing the Java code for calculating factorials and powers, with additional println statements and variable assignments.

```
    fff = ddd.fakultaet();
    System.out.println(fff);
    double eee = ddd.expo(5.0);
    System.out.println(eee);
    double ggg = ddd.power();

    double expo(double x){
        double result = 1.0;
        double help = 1.0;
        double help2 = 1.0;
        for (int i=1; i<31; i++){
            help = help * x;
            //help2 = (double)(fakultaet(i-1));
            help2 = help2 * i;
            //System.out.println("# " + help2);
            result = result + (help / help2);
        }
        return result;
    }

    long fakultaet(int n){
        long result = 1;
        while (n>1){
            result = result * n;
            n = n - 1;
        }
        return result;
    }
```

The code calculates the factorial of a number and the power of a base to an exponent. It includes several println statements to output intermediate values. It uses loops and helper variables to perform the calculations.

Eclipse IDE screenshot showing the Java code for Demo.java:

```
package uebung2;

public class Demo {
    public static void main(String[] args) {
        Demo ddd = new Demo();
        long fff = ddd.fakultaet(5);
        System.out.println(fff);
        double eee = ddd.expo(5.0);
        System.out.println(eee);
        double ggg = ddd.power(2.0, 10);
        System.out.println(ggg);
    }

    double expo(double x){
        double result = 1.0;
        double help = 1.0;
        double help2 = 1.0;
        for (int i=1; i<31; i++){
            help = help * x;
            //help2 = (double)(fakultaet(i-1));
            help2 = help2 * i;
            //System.out.println("# " + help2);
            result = result + (help / help2);
        }
        return result;
    }
}
```

The console output shows the results of the calculations:

```
120
148.41315910257592
1024.0
```

Eclipse IDE screenshot showing the Java code for Demo.java:

```
package uebung2;

public class Demo {
    public static void main(String[] args) {
        Demo ddd = new Demo();
        long fff = ddd.fakultaet(5);
        System.out.println(fff);
        double eee = ddd.expo(5.0);
        System.out.println(eee);
        double ggg = ddd.power(2.0, 10);
        System.out.println(ggg);
    }

    double expo(double x){
        double result = 1.0;
        double help = 1.0;
        double help2 = 1.0;
        for (int i=1; i<31; i++){
            help = help * x;
            //help2 = (double)(fakultaet(i-1));
            help2 = help2 * i;
            //System.out.println("# " + help2);
            result = result + (help / help2);
        }
        return result;
    }
}
```

The console output shows the results of the calculations:

```
120
148.41315910257592
1024.0
```

Eclipse IDE screenshot showing the Java code for Demo.java:

```
package uebung2;

public class Demo {
    public static void main(String[] args) {
        Demo ddd = new Demo();
        long fff = ddd.fakultaet(5);
        System.out.println("# " + help2);
        result = result + (help / help2);
    }
    return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}

double power(double x, int n){
    double result = 1.0;
    for(int i=1; i<n; i++){
        result = result * x;
    }
    return result;
}

double innerProduct(double[] arr1, double[] arr2) {
    double result = 0.0;
    for (int i=0; i<arr1.length; i++) {
        result += arr1[i] * arr2[i];
    }
    return result;
}
}
```

The console output shows the results of the calculations:

```
120
148.41315910257592
1024.0
```

Syntax error, insert ";" to complete FieldDeclaration

Eclipse IDE screenshot showing the Java code for Demo.java:

```
package uebung2;

public class Demo {
    public static void main(String[] args) {
        Demo ddd = new Demo();
        long fff = ddd.fakultaet(5);
        System.out.println(fff);
        double eee = ddd.expo(5.0);
        System.out.println(eee);
        double ggg = ddd.power(2.0, 10);
        System.out.println(ggg);
    }

    long fakultaet(int n){
        long result = 1;
        while (n>1){
            result = result * n;
            n = n - 1;
        }
        return result;
    }

    double power(double x, int n){
        double result = 1.0;
        for(int i=1; i<n; i++){
            result = result * x;
        }
        return result;
    }

    double innerProduct(double[] arr1, double[] arr2) {
        double result = 0.0;
        for (int i=0; i<arr1.length; i++) {
            result += arr1[i] * arr2[i];
        }
        return result;
    }
}
```

The console output shows the results of the calculations:

```
120
148.41315910257592
1024.0
```

This method must return a result of type double

Eclipse IDE screenshot showing the Java code for Demo.java:

```
    }
    return result;
}

long faktultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}

double power(double x, int n){
    double result = 1.0;
    for(int i=1; i<n; i++){
        result = result * x;
    }
    return result;
}

double innerProduct(double[] a, double[] b){
    double result = 0.0;
    for(int i=0; i<a.length; i++){
        result = result + a[i] * b[i];
    }
    return result;
}
```

The code implements three methods: faktultaet, power, and innerProduct. The innerProduct method uses a for loop to iterate from 0 to a.length-1.

Eclipse IDE screenshot showing the Java code for Demo.java:

```
    }
    return result;
}

long faktultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}

double power(double x, int n){
    double result = 1.0;
    for(int i=1; i<n; i++){
        result = result * x;
    }
    return result;
}

double innerProduct(double[] a, double[] b){
    double result = 0.0;
    for(int i=0; i<a.length; i++){
        result = result + a[i] * b[i];
    }
    return result;
}
```

The code is identical to the one in the first screenshot, with the innerProduct method using a for loop to iterate from 0 to a.length-1.

Eclipse IDE screenshot showing the Java code for Demo.java:

```
    }
    return result;
}

long faktultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}

double power(double x, int n){
    double result = 1.0;
    for(int i=1; i<n; i++){
        result = result * x;
    }
    return result;
}

double innerProduct(double[] a, double[] b){
    double result = 0.0;
    for(int i=0; i<a.length; i++){
        result = result + a[i] * b[i];
    }
    return result;
}
```

The code is identical to the previous screenshots, with the innerProduct method using a for loop to iterate from 0 to a.length-1.

Eclipse IDE screenshot showing the Java code for Demo.java:

```
    }
    return result;
}

long faktultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}

double power(double x, int n){
    double result = 1.0;
    for(int i=1; i<n; i++){
        result = result * x;
    }
    return result;
}

double innerProduct(double[] a, double[] b){
    double result = 0.0;
    for(int i=0; i<a.length; i++){
        result = result + a[i] * b[i];
    }
    return result;
}
```

The code is identical to the previous screenshots, with the innerProduct method using a for loop to iterate from 0 to a.length-1.

Eclipse IDE screenshot showing the Java code for 'Demo.java' in the 'uebung2' package. The code contains three methods: fakultaet, power, and innerProduct. The innerProduct method is currently selected.

```
    long fakultaet(int n){  
        long result = 1;  
        while (n>1){  
            result = result * n;  
            n = n - 1;  
        }  
        return result;  
    }  
  
    double power(double x, int n){  
        double result = 1.0;  
        for(int i=1; i<n; i++){  
            result = result * x;  
        }  
        return result;  
    }  
  
    double innerProduct(double[] a, double[] b){  
        double result = 0.0;  
        for(int i=0; i<a.length; i++){  
            result = result + a[i] * b[i];  
        }  
        return result;  
    }  

```

The 'Console' view shows the output of the application:

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:04:26)  
120  
148.41315910257592  
1024.0
```

Eclipse IDE screenshot showing the Java code for 'Demo.java' in the 'uebung2' package. The code is identical to the first screenshot, but the innerProduct method has been modified to use a for loop instead of a while loop.

```
    long fakultaet(int n){  
        long result = 1;  
        while (n>1){  
            result = result * n;  
            n = n - 1;  
        }  
        return result;  
    }  
  
    double power(double x, int n){  
        double result = 1.0;  
        for(int i=1; i<n; i++){  
            result = result * x;  
        }  
        return result;  
    }  
  
    double innerProduct(double[] a, double[] b){  
        double result = 0.0;  
        for(int i=0; i<a.length; i++){  
            result = result + a[i] * b[i];  
        }  
        return result;  
    }  

```

The 'Console' view shows the output of the application:

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:04:26)  
120  
148.41315910257592  
1024.0
```

Eclipse IDE screenshot showing the Java code for 'Demo.java' in the 'uebung2' package. The code includes a main method that creates an instance of Demo and calls its methods. It also includes an expo method with a for loop.

```
package uebung2;  
  
public class Demo {  
  
    public static void main(String[] args) {  
        Demo ddd = new Demo();  
        long fff = ddd.fakultaet(5);  
        System.out.println(fff);  
        double eee = ddd.expo(5.0);  
        System.out.println(eee);  
        double ggg = ddd.power(2.0, 10);  
        System.out.println(ggg);  
    }  
  
    double expo(double x){  
        double result = 1.0;  
        double help = 1.0;  
        double help2 = 1.0;  
        for (int i=1; i<3; i++){  
            help = help * x;  
            //help2 = (double)(fakultaet(i-1));  
            help2 = help2 * i;  
            //System.out.println("# " + help2);  
            result = result + (help / help2);  
        }  
        return result;  
    }  

```

The 'Console' view shows the output of the application:

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:04:26)  
120  
148.41315910257592  
1024.0
```

Eclipse IDE screenshot showing the Java code for 'Demo.java' in the 'uebung2' package. The code is identical to the third screenshot, but the expo method uses a for loop instead of a while loop.

```
package uebung2;  
  
public class Demo {  
  
    public static void main(String[] args) {  
        Demo ddd = new Demo();  
        long fff = ddd.fakultaet(5);  
        System.out.println(fff);  
        double eee = ddd.expo(5.0);  
        System.out.println(eee);  
        double ggg = ddd.power(2.0, 10);  
        System.out.println(ggg);  
        doubleVector firstVector = null;  
    }  
  
    double expo(double x){  
        double result = 1.0;  
        double help = 1.0;  
        double help2 = 1.0;  
        for (int i=1; i<3; i++){  
            help = help * x;  
            //help2 = (double)(fakultaet(i-1));  
            help2 = help2 * i;  
            //System.out.println("# " + help2);  
            result = result + (help / help2);  
        }  
        return result;  
    }  

```

The 'Console' view shows the output of the application:

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:04:26)  
120  
148.41315910257592  
1024.0
```

Eclipse IDE screenshot showing the Java code for 'Demo.java' in the 'uebung2' package. The code includes a main method, an 'expo' method using a loop, and a 'fakultaet' method using a recursive while loop. The 'power' and 'innerProduct' methods are also defined.

```
package uebung2;
public class Demo {
    public static void main(String[] args) {
        Demo ddd = new Demo();
        long fff = ddd.fakultaet(5);
        System.out.println(fff);
        double eee = ddd.expo(5.0);
        System.out.println(eee);
        double ggg = ddd.power(2.0, 10);
        System.out.println(ggg);
        double[] firstVector = {1.0, 2.0, 3.0};
        double[] secondVector = {3.0, 2.0, 1.0};
    }

    double expo(double x){
        double result = 1.0;
        double help = 1.0;
        double help2 = 1.0;
        for (int i=1; i<3; i++){
            help = help * x;
            //help2 = (double)(fakultaet(i-1));
            help2 = help2 * i;
            //System.out.println("# " + help2);
            result = result + (help / help2);
        }
        return result;
    }

    long fakultaet(int n){
        long result = 1;
        while (n>1){
            result = result * n;
            n = n - 1;
        }
        return result;
    }

    double power(double x, int n){
        double result = 1.0;
        for(int i=1; i<n; i++){
            result = result * x;
        }
        return result;
    }

    double innerProduct(double[] a, double[] b){
        double result = 0.0;
        for(int i=0; i<a.length; i++){
    }
```

Console output:

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:04:26)
120
148.41315910257592
1024.0
```

Eclipse IDE screenshot showing the Java code for 'Demo.java' in the 'uebung2' package. The code includes a main method, an 'expo' method using a loop, and a 'power' method using a recursive while loop. The 'innerProduct' method is also defined.

```
public class Demo {
    public static void main(String[] args) {
        Demo ddd = new Demo();
        long fff = ddd.fakultaet(5);
        System.out.println(fff);
        double eee = ddd.expo(5.0);
        System.out.println(eee);
        double ggg = ddd.power(2.0, 10);
        System.out.println(ggg);
        double[] firstVector = {1.0, 2.0, 3.0};
        double[] secondVector = {3.0, 2.0, 1.0};
        double uuu = ddd.innerProduct(firstVector, secondVector);
        System.out.println(uuu);
    }

    double expo(double x){
        double result = 1.0;
        double help = 1.0;
        double help2 = 1.0;
        for (int i=1; i<3; i++){
            help = help * x;
            //help2 = (double)(fakultaet(i-1));
            help2 = help2 * i;
            //System.out.println("# " + help2);
            result = result + (help / help2);
        }
        return result;
    }

    long fakultaet(int n){
        long result = 1;
        while (n>1){
            result = result * n;
            n = n - 1;
        }
        return result;
    }

    double power(double x, int n){
        double result = 1.0;
        for(int i=1; i<n; i++){
            result = result * x;
        }
        return result;
    }

    double innerProduct(double[] a, double[] b){
        double result = 0.0;
        for(int i=0; i<a.length; i++){
    }
```

Console output:

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:04:26)
120
148.41315910257592
1024.0
```

Eclipse IDE screenshot showing the Java code for 'Demo.java' in the 'uebung2' package. The code includes a main method, an 'expo' method using a loop, and a 'power' method using a recursive while loop. The 'innerProduct' method is also defined.

```
public class Demo {
    public static void main(String[] args) {
        Demo ddd = new Demo();
        long fff = ddd.fakultaet(5);
        System.out.println(fff);
        double eee = ddd.expo(5.0);
        System.out.println(eee);
        double ggg = ddd.power(2.0, 10);
        System.out.println(ggg);
        double[] firstVector = {1.0, 2.0, 3.0};
        double[] secondVector = {3.0, 2.0, 1.0};
        double uuu = ddd.innerProduct(firstVector, secondVector);
        System.out.println(uuu);
    }

    double expo(double x){
        double result = 1.0;
        double help = 1.0;
        double help2 = 1.0;
        for (int i=1; i<3; i++){
            help = help * x;
            //help2 = (double)(fakultaet(i-1));
            help2 = help2 * i;
            //System.out.println("# " + help2);
            result = result + (help / help2);
        }
        return result;
    }

    long fakultaet(int n){
        long result = 1;
        while (n>1){
            result = result * n;
            n = n - 1;
        }
        return result;
    }

    double power(double x, int n){
        double result = 1.0;
        for(int i=1; i<n; i++){
            result = result * x;
        }
        return result;
    }

    double innerProduct(double[] a, double[] b){
        double result = 0.0;
        for(int i=0; i<a.length; i++){
    }
```

Console output:

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:16:44)
148.41315910257592
1024.0
10.0
```

Eclipse IDE screenshot showing the Java code for 'Demo.java' in the 'uebung2' package. The code includes a main method, an 'expo' method using a loop, and a 'power' method using a recursive while loop. The 'innerProduct' method is also defined.

```
public class Demo {
    public static void main(String[] args) {
        Demo ddd = new Demo();
        long fff = ddd.fakultaet(5);
        System.out.println(fff);
        double eee = ddd.expo(5.0);
        System.out.println(eee);
        double ggg = ddd.power(2.0, 10);
        System.out.println(ggg);
        double[] firstVector = {1.0, 2.0, 3.0};
        double[] secondVector = {3.0, 2.0, 1.0};
        double uuu = ddd.innerProduct(firstVector, secondVector);
        System.out.println(uuu);
    }

    double expo(double x){
        double result = 1.0;
        double help = 1.0;
        double help2 = 1.0;
        for (int i=1; i<3; i++){
            help = help * x;
            //help2 = (double)(fakultaet(i-1));
            help2 = help2 * i;
            //System.out.println("# " + help2);
            result = result + (help / help2);
        }
        return result;
    }

    long fakultaet(int n){
        long result = 1;
        while (n>1){
            result = result * n;
            n = n - 1;
        }
        return result;
    }

    double power(double x, int n){
        double result = 1.0;
        for(int i=1; i<n; i++){
            result = result * x;
        }
        return result;
    }

    double innerProduct(double[] a, double[] b){
        double result = 0.0;
        for(int i=0; i<a.length; i++){
    }
```

Console output:

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:16:44)
148.41315910257592
1024.0
10.0
```

Eclipse IDE screenshot showing the Java code for calculating factorials and powers.

```
    //System.out.println("# " + help2);
    result = result + (help / help2);
}

return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}

double power(double x, int n){
    double result = 1.0;
    for(int i=1; i<n; i++){
        result = result * x;
    }
    return result;
}

double innerProduct(double[] a, double[] b){
    double result = 0.0;
    for(int i=0; i<a.length; i++){
        result = result + a[i] * b[i];
    }
    return result;
}
```

Console output:

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:16:44)
148.41315910257592
1024.0
10.0
```

Eclipse IDE screenshot showing the Java code for calculating factorials and powers.

```
for (int i=1; i<31; i++){
    help = help * x;
    //help2 = (double)(fakultaet(i-1));
    help2 = help2 * i;
    //System.out.println("# " + help2);
    result = result + (help / help2);
}

return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}

double power(double x, int n){
    double result = 1.0;
    for(int i=1; i<n; i++){
        result = result * x;
    }
    return result;
}
```

Console output:

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:16:44)
148.41315910257592
1024.0
10.0
```

Eclipse IDE screenshot showing the Java code for calculating factorials and powers.

```
package uebung2;

public class Demo {

    public static void main(String[] args) {
        Demo ddd = new Demo();
        long fff = ddd.fakultaet(5);
        System.out.println(fff);
        double eee = ddd.expo(5.0);
        System.out.println(eee);
        double ggg = ddd.power(2.0, 10);
        System.out.println(ggg);
        double[] firstVector = {1.0, 2.0, 3.0};
        double[] secondVector = {3.0, 2.0, 1.0};
        double uuu = ddd.innerProduct(firstVector, secondVector);
        System.out.println(uuu);
    }

    double expo(double x){
        double result = 1.0;
        double help = 1.0;
        double help2 = 1.0;
        for (int i=1; i<31; i++){
            help = help * x;
            //help2 = (double)(fakultaet(i-1));
            help2 = help2 * i;
        }
        return result;
    }

    long fakultaet(int n){
        long result = 1;
        while (n>1){
            result = result * n;
            n = n - 1;
        }
        return result;
    }

    double power(double x, int n){
        double result = 1.0;
        for(int i=1; i<n; i++){
            result = result * x;
        }
        return result;
    }

    double innerProduct(double[] a, double[] b){
        double result = 0.0;
        for(int i=0; i<a.length; i++){
            result = result + a[i] * b[i];
        }
        return result;
    }
}
```

Console output:

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:16:44)
148.41315910257592
1024.0
10.0
```

Eclipse IDE screenshot showing the Java code for calculating factorials and powers.

```
//help2 = (double)(fakultaet(i-1));
help2 = help2 * i;
//System.out.println("# " + help2);
result = result + (help / help2);

}

return result;
}

long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}

double power(double x, int n){
    double result = 1.0;
    for(int i=1; i<n; i++){
        result = result * x;
    }
    return result;
}

double innerProduct(double[] a, double[] b){
    double result = 0.0;
    for(int i=0; i<a.length; i++){
        result = result + a[i] * b[i];
    }
    return result;
}
```

Console output:

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:16:44)
148.41315910257592
1024.0
10.0
```

Eclipse IDE screenshot showing the Java editor and console.

Java Editor:

```
package uebung2;

public class Demo {
    public static void main(String[] args) {
        Demo ddd = new Demo();
        long fff = ddd.fakultaet(5);
        System.out.println(fff);
        double eee = ddd.expo(5.0);
        System.out.println(eee);
        double ggg = ddd.power(2.0, 10);
        System.out.println(ggg);
        double[] firstVector = {1.0, 2.0, 3.0};
        double[] secondVector = {3.0, 2.0, 1.0};
        double uuu = ddd.innerProduct(firstVector, secondVector);
        System.out.println(uuu);
    }

    double expo(double x){
        double result = 1.0;
        double help = 1.0;
        double help2 = 1.0;
        for (int i=1; i<3; i++){
            help = help * x;
            //help2 = (double)(fakultaet(i-1));
            help2 = help2 * i;
        }
        return result;
    }

    long fakultaet(int n){
        long result = 1;
        while (n>1){
            result = result * n;
            n = n - 1;
        }
        return result;
    }

    double power(double x, int n){
        double result = 1;
        while (n>0){
            result = result * x;
            n = n - 1;
        }
        return result;
    }

    double innerProduct(double[] firstVector, double[] secondVector){
        double result = 0;
        for (int i=0; i<3; i++){
            result = result + firstVector[i] * secondVector[i];
        }
        return result;
    }
}
```

Console:

```
terminated>Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:16:44)
148.41315910257592
1024.0
10.0
```

Eclipse IDE screenshot showing the Java editor and console.

Java Editor:

```
package uebung2;

public class Demo {
    public static void main(String[] args) {
        Demo ddd = new Demo();
        long fff = ddd.fakultaet(5);
        System.out.println(fff);
        double eee = ddd.expo(5.0);
        System.out.println(eee);
        double ggg = ddd.power(2.0, 10);
        System.out.println(ggg);
        double[] firstVector = {1.0, 2.0, 3.0};
        double[] secondVector = {3.0, 2.0, 1.0};
        double uuu = ddd.innerProduct(firstVector, secondVector);
        System.out.println(uuu);
    }

    double expo(double x){
        double result = 1.0;
        double help = 1.0;
        double help2 = 1.0;
        for (int i=1; i<3; i++){
            help = help * x;
            //help2 = (double)(fakultaet(i-1));
            help2 = help2 * i;
        }
        return result;
    }

    long fakultaet(int n){
        long result = 1;
        while (n>1){
            result = result * n;
            n = n - 1;
        }
        return result;
    }

    double power(double x, int n){
        double result = 1;
        while (n>0){
            result = result * x;
            n = n - 1;
        }
        return result;
    }

    double innerProduct(double[] firstVector, double[] secondVector){
        double result = 0;
        for (int i=0; i<3; i++){
            result = result + firstVector[i] * secondVector[i];
        }
        return result;
    }
}
```

Console:

```
terminated>Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:16:44)
148.41315910257592
1024.0
10.0
```

Eclipse IDE screenshot showing the Java editor and debugger.

Java Editor:

```
long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}

double power(double x, int n){
    double result = 1;
    while (n>0){
        result = result * x;
        n = n - 1;
    }
    return result;
}
```

Debugger:

Breakpoint at Demo.fakultaet(int) line: 35

Name	Value
this	Demo (id=19)
n	5

Console:

```
Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:24:23)
```

Eclipse IDE screenshot showing the Java editor and debugger.

Java Editor:

```
long fakultaet(int n){
    long result = 1;
    while (n>1){
        result = result * n;
        n = n - 1;
    }
    return result;
}

double power(double x, int n){
    double result = 1;
    while (n>0){
        result = result * x;
        n = n - 1;
    }
    return result;
}
```

Debugger:

Breakpoint at Demo.fakultaet(int) line: 36

Name	Value
this	Demo (id=19)
n	5
result	5

Outline:

- uebung2
- Demo
- main(String[]) : void
- expo(double) : double
- fakultaet(int) : long
- power(double, int) : double
- innerProduct(double[], double[]) : double

Console:

```
Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:24:23)
```

Ebung2/src/uebung2/Demo.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Debug [Java Application]

Demo [Demo] at localhost:55311

Thread [main] (Suspended)

Demo.main(String[]) line: 7

C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:24:23)

Variables

Name	Value
args	String[0] (id=16)
ddd	Demo (id=19)
fff	120

Outline

- uebung2
- Demo
 - \$ main(String[]) : void
 - exp(double) : double
 - fakultaet(int) : long
 - power(double, int) : double
 - innerProduct(double[], double[])

Demo.java

```
public static void main(String[] args) {  
    Demo ddd = new Demo();  
    long fff = ddd.fakultaet(5);  
    System.out.println(fff);  
    double eee = ddd.exp(5.0);  
    System.out.println(eee);  
    double ggg = ddd.power(2.0, 10);  
    System.out.println(ggg);  
    double[] firstVector = {1.0, 2.0, 3.0};  
    double[] secondVector = {3.0, 2.0, 1.0};  
    double uuu = ddd.innerProduct(firstVector, secondVector);  
    System.out.println(uuu);  
}
```

Console

```
Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:24:23)  
120
```

Start | Taskbar | Smart Insert | Writable | 40 : 1 | DE | 100% | 20.06.2014

Ebung2/src/uebung2/Demo.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Debug [Java Application]

Demo [Demo] at localhost:55311

Thread [main] (Suspended)

Demo.exp(double) line: 20

C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:24:23)

Variables

Name	Value
this	Demo (id=19)
x	5.0
result	138.30716765873015
help	390625.0

Outline

- uebung2
- Demo
 - \$ main(String[]) : void
 - exp(double) : double
 - fakultaet(int) : long
 - power(double, int) : double
 - innerProduct(double[], double[])

Demo.java

```
double exp(double x){  
    double result = 1.0;  
    double help = 1.0;  
    double help2 = 1.0;  
    for (int i=1; i<31; i++){  
        help = help * x;  
        //help2 = (double)(fakultaet(i-1));  
        help2 = help2 * i;  
        //System.out.println("# " + help2);  
        result = result + (help / help2);  
    }  
    return result;  
}
```

Console

```
Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:24:23)  
120
```

Start | Taskbar | Smart Insert | Writable | 9 : 1 | DE | 100% | 20.06.2014

Ebung2/src/uebung2/Demo.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Debug [Java Application]

Demo [Demo] at localhost:55311

Thread [main] (Suspended)

Demo.main(String[]) line: 11

C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:24:23)

Variables

Name	Value
args	String[0] (id=16)
ddd	Demo (id=19)
fff	120
eee	148.41315910257592

Outline

- uebung2
- Demo
 - \$ main(String[]) : void
 - exp(double) : double
 - fakultaet(int) : long
 - power(double, int) : double
 - innerProduct(double[], double[])

Demo.java

```
public static void main(String[] args) {  
    Demo ddd = new Demo();  
    long fff = ddd.fakultaet(5);  
    System.out.println(fff);  
    double eee = ddd.exp(5.0);  
    System.out.println(eee);  
    double ggg = ddd.power(2.0, 10);  
    System.out.println(ggg);  
    double[] firstVector = {1.0, 2.0, 3.0};  
    double[] secondVector = {3.0, 2.0, 1.0};  
    double uuu = ddd.innerProduct(firstVector, secondVector);  
    System.out.println(uuu);  
}
```

Console

```
Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:24:23)  
120
```

Start | Taskbar | Smart Insert | Writable | 23 : 1 | DE | 100% | 20.06.2014

Ebung2/src/uebung2/Demo.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Debug [Java Application]

Demo [Demo] at localhost:55311

Thread [main] (Suspended)

Demo.main(String[]) line: 11

C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:24:23)

Variables

Name	Value
args	String[0] (id=16)
ddd	Demo (id=19)
fff	120
eee	148.41315910257592

Outline

- uebung2
- Demo
 - \$ main(String[]) : void
 - exp(double) : double
 - fakultaet(int) : long
 - power(double, int) : double
 - innerProduct(double[], double[])

Demo.java

```
public static void main(String[] args) {  
    Demo ddd = new Demo();  
    long fff = ddd.fakultaet(5);  
    System.out.println(fff);  
    double eee = ddd.exp(5.0);  
    System.out.println(eee);  
    double ggg = ddd.power(2.0, 10);  
    System.out.println(ggg);  
    double[] firstVector = {1.0, 2.0, 3.0};  
    double[] secondVector = {3.0, 2.0, 1.0};  
    double uuu = ddd.innerProduct(firstVector, secondVector);  
    System.out.println(uuu);  
}
```

Console

```
Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:24:23)  
120  
148.41315910257592
```

Start | Taskbar | Smart Insert | Writable | 23 : 1 | DE | 100% | 20.06.2014

3 Classes, Objects, Inheritance

Recommended reading:

<http://docs.oracle.com/javase/tutorial/java/javaOO/classes.html>
<http://docs.oracle.com/javase/tutorial/java/javaOO/objects.html>
<http://docs.oracle.com/javase/tutorial/java/javaOO/more.html>
<http://docs.oracle.com/javase/tutorial/java/landi/subclasses.html>
<http://docs.oracle.com/javase/tutorial/essential/exceptions/index.html>

3 Classes, Objects, Inheritance

Recommended reading:

<http://docs.oracle.com/javase/tutorial/java/javaOO/classes.html>
<http://docs.oracle.com/javase/tutorial/java/javaOO/objects.html>
<http://docs.oracle.com/javase/tutorial/java/javaOO/more.html>
<http://docs.oracle.com/javase/tutorial/java/landi/subclasses.html>
<http://docs.oracle.com/javase/tutorial/essential/exceptions/index.html>

3 Classes, Objects, Inheritance

```
class Bicycle {  
    public int cadence = 0;  
    public int speed = 0;  
    public int gear = 1;  
  
    public Bicycle(int startCadence, int startSpeed, int startGear) {  
        gear = startGear;  
        cadence = startCadence;  
        speed = startSpeed;  
    }  
  
    public void changeCadence(int newValue) {  
        cadence = newValue;  
    }  
    public void changeGear(int newValue) {  
        gear = newValue;  
    }  
    public void speedUp(int increment) {  
        speed = speed + increment;  
    }  
    public void applyBrakes(int decrement) {  
        speed = speed - decrement;  
    }  
    public void setHeight(int newValue) {  
        seatHeight = newValue;  
    }  
}
```

Source: [JTutorial]

3 Classes, Objects, Inheritance

```
class Bicycle {  
    public int cadence = 0;  
    public int speed = 0;  
    public int gear = 1;  
  
    public Bicycle(int startCadence, int startSpeed, int startGear) {  
        gear = startGear;  
        cadence = startCadence;  
        speed = startSpeed;  
    }  
  
    public void changeCadence(int newValue) {  
        cadence = newValue;  
    }  
    public class MountainBike extends Bicycle {  
        public int seatHeight;  
  
        public MountainBike(int startHeight, int startCadence,  
                            int startSpeed, int startGear)  
        {  
            super(startCadence, startSpeed, startGear);  
            seatHeight = startHeight;  
        }  
  
        public void setHeight(int newValue) {  
            seatHeight = newValue;  
        }  
    }  
}
```

Source: [JTutorial]

3 Classes, Objects, Inheritance

```
class Bicycle {  
    public int cadence = 0;  
    public int speed = 0;  
    public int gear = 1;  
  
    public void changeGear(int newValue) {  
        gear = newValue;  
    }  
  
    public void speedUp(int startSpeed, int startGear)  
    {  
        super(cadence, startSpeed, startGear);  
        seatHeight = startHeight;  
    }  
  
    public void applyBrakes(int startSpeed)  
    {  
        speed = startSpeed;  
    }  
  
    public void setHeight(int newValue)  
    {  
        seatHeight = newValue;  
    }  
}
```

Source: [JTutorial]

- Class definition (general form):
`modifier class MyClass extends MySuperClass
 implements YourInterface1, ...,
 YourInterfaceN`
- (Access) modifier (for classes):
certain combinations of {public, protected, private, static, final, abstract}

```
public class MountainBike extends Bicycle {  
    public int seatHeight;  
  
    public MountainBike(int startHeight, int startCadence,  
                        int startSpeed, int startGear)  
    {  
        super(startCadence, startSpeed, startGear);  
        seatHeight = startHeight;  
    }  
  
    public void setHeight(int newValue)  
    {  
        seatHeight = newValue;  
    }  
}
```

3 Classes, Objects, Inheritance

```
class Bicycle {  
    public int cadence = 0;  
    public int speed = 0;  
    public int gear = 1;  
  
    public void changeGear(int newValue) {  
        gear = newValue;  
    }  
  
    public void speedUp(int startSpeed, int startGear)  
    {  
        super(cadence, startSpeed, startGear);  
        seatHeight = startHeight;  
    }  
  
    public void applyBrakes(int startSpeed)  
    {  
        speed = startSpeed;  
    }  
  
    public void setHeight(int newValue)  
    {  
        seatHeight = newValue;  
    }  
}
```

Source: [JTutorial]

- Field declaration (general form):
`modifier type name;`
- (Access) modifier (for fields):
certain combinations of {public, protected, private, static, final}
- type: Any primitive or reference type

```
public class MountainBike extends Bicycle {  
    public int seatHeight;  
  
    public MountainBike(int startHeight, int startCadence,  
                        int startSpeed, int startGear)  
    {  
        super(startCadence, startSpeed, startGear);  
        seatHeight = startHeight;  
    }  
  
    public void setHeight(int newValue)  
    {  
        seatHeight = newValue;  
    }  
}
```

3 Classes, Objects, Inheritance

```
class Bicycle {  
    public int cadence = 0;  
    public int speed = 0;  
    public int gear = 1;  
  
    public void changeGear(int newValue) {  
        gear = newValue;  
    }  
  
    public void speedUp(int startSpeed, int startGear)  
    {  
        super(cadence, startSpeed, startGear);  
        seatHeight = startHeight;  
    }  
  
    public void applyBrakes(int startSpeed)  
    {  
        speed = startSpeed;  
    }  
  
    public void setHeight(int newValue)  
    {  
        seatHeight = newValue;  
    }  
}
```

Source: [JTutorial]

- Class definition (general form):
`modifier class MyClass extends MySuperClass
 implements YourInterface1, ...,
 YourInterfaceN`
- (Access) modifier (for classes):
certain combinations of {public, protected, private, static, final, abstract}

```
public class MountainBike extends Bicycle {  
    public int seatHeight;  
  
    public MountainBike(int startHeight, int startCadence,  
                        int startSpeed, int startGear)  
    {  
        super(startCadence, startSpeed, startGear);  
        seatHeight = startHeight;  
    }  
  
    public void setHeight(int newValue)  
    {  
        seatHeight = newValue;  
    }  
}
```

3 Classes, Objects, Inheritance

```
class Bicycle {  
    public int cadence = 0;  
    public int speed = 0;  
    public int gear = 1;  
  
    public void changeGear(int newValue) {  
        gear = newValue;  
    }  
  
    public void speedUp(int startSpeed, int startGear)  
    {  
        super(cadence, startSpeed, startGear);  
        seatHeight = startHeight;  
    }  
  
    public void applyBrakes(int startSpeed)  
    {  
        speed = startSpeed;  
    }  
  
    public void setHeight(int newValue)  
    {  
        seatHeight = newValue;  
    }  
}
```

Source: [JTutorial]

- Method declaration (general form):
`modifier typeOfReturnValue name (parameter*) throwsClause {
 statement*`
- (Access) modifier (for methods):
certain combinations of {public, protected, private, static, final, abstract}
- typeOfReturnValue: Any primitive or reference type
- parameter*: (later)
- throwsClause*: (later)
- statement*: statement(s) to execute

```
public void setHeight(int newValue)  
{  
    seatHeight = newValue;  
}
```

3 Classes, Objects, Inheritance

```
class Bicycle {  
    public int cadence = 0;  
    public int speed = 0;  
    public int gear = 1;  
  
    public void changeGear(int newValue) {  
        gear = newValue;  
    }  
  
    public void speedUp(int startSpeed, int startGear)  
    {  
        super(startCadence, startSpeed, startGear);  
        seatHeight = startHeight;  
    }  
  
    public void applyBrakes(int startSpeed, int startGear)  
    {  
        speed = startSpeed;  
    }  
  
    public void setHeight(int newValue) {  
        seatHeight = newValue;  
    }  
}
```

Source: [JTutorial]

- Method declaration (general form):
modifier typeOfReturnValue name (parameter) throwsClause { statement* }*
- (Access) **modifier** (for methods):
certain combinations of { public, protected, private, static, final, abstract }
- typeOfReturnValue**: Any primitive or reference type
- parameter***: (later)
- throwsClause***: (later)
- statement***: statement(s) to execute

3 Classes, Objects, Inheritance

```
class Bicycle {  
    public int cadence = 0;  
    public int speed = 0;  
    public int gear = 1;  
  
    public void changeGear(int newValue) {  
        gear = newValue;  
    }  
  
    public void speedUp(int startSpeed, int startGear)  
    {  
        super(startCadence, startSpeed, startGear);  
        seatHeight = startHeight;  
    }  
  
    public void applyBrakes(int startSpeed, int startGear)  
    {  
        speed = startSpeed;  
    }  
  
    public void setHeight(int newValue) {  
        seatHeight = newValue;  
    }  
}  
  
public class MountainBike extends Bicycle {  
    public int seatHeight;  
  
    public MountainBike(int startHeight, int startCadence,  
                        int startSpeed, int startGear)  
    {  
        super(startCadence, startSpeed, startGear);  
        seatHeight = startHeight;  
    }  
  
    public void setHeight(int newValue) {  
        seatHeight = newValue;  
    }  
}
```

Source: [JTutorial]

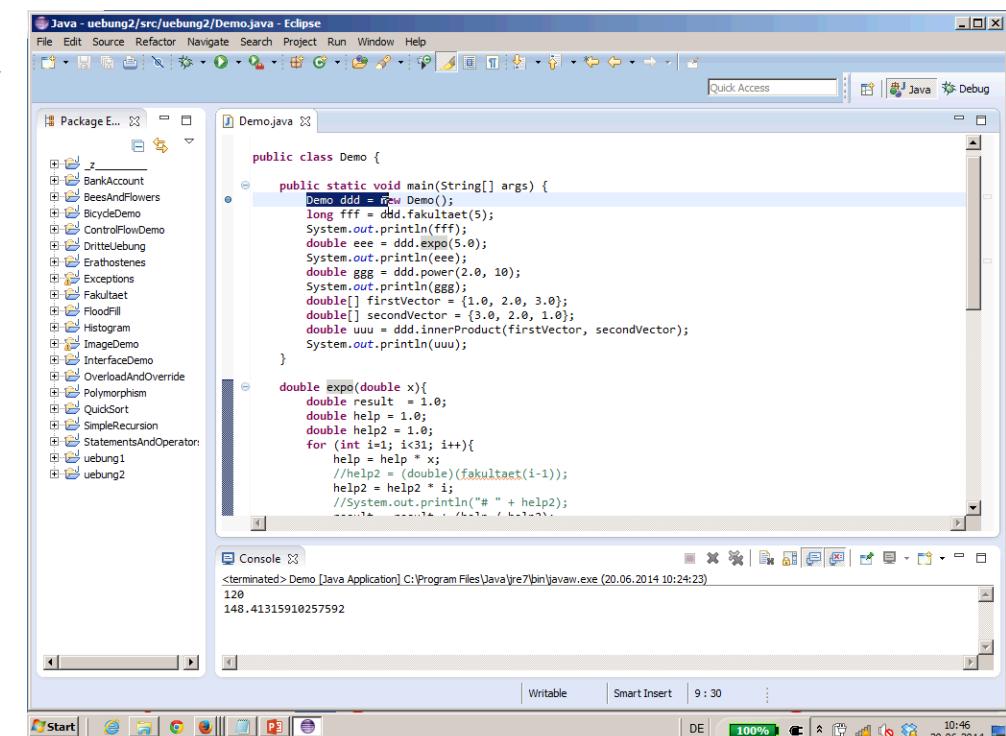
- Field declaration (general form):
modifier type name;
- (Access) **modifier** (for fields):
certain combinations of { public, protected, private, static, final }
- type**: Any primitive or reference type

3 Classes, Objects, Inheritance

```
class Bicycle {  
    public int cadence = 0;  
    public int speed = 0;  
    public int gear = 1;  
  
    public void changeGear(int newValue) {  
        gear = newValue;  
    }  
  
    public void speedUp(int startSpeed, int startGear)  
    {  
        super(startCadence, startSpeed, startGear);  
        seatHeight = startHeight;  
    }  
  
    public void applyBrakes(int startSpeed, int startGear)  
    {  
        speed = startSpeed;  
    }  
  
    public void setHeight(int newValue) {  
        seatHeight = newValue;  
    }  
}
```

Source: [JTutorial]

- Field declaration (general form):
modifier type name;
- (Access) **modifier** (for fields):
certain combinations of { public, protected, private, static, final }
- type**: Any primitive or reference type



Java - uebung2/src/uebung2/Demo.java - Eclipse

```
public class Demo {  
    public static void main(String[] args) {  
        Demo ddd = new Demo();  
        long fff = ddd.fakultaet(5);  
        System.out.println(fff);  
        double eee = ddd.expo(5.0);  
        System.out.println(eee);  
        double ggg = ddd.power(2.0, 10);  
        System.out.println(ggg);  
        double[] firstVector = {1.0, 2.0, 3.0};  
        double[] secondVector = {3.0, 2.0, 1.0};  
        double uuu = ddd.innerProduct(firstVector, secondVector);  
        System.out.println(uuu);  
    }  
  
    double expo(double x){  
        double result = 1.0;  
        double help = 1.0;  
        double help2 = 1.0;  
        for (int i=1; i<31; i++){  
            help = help * x;  
            //help2 = (double)(fakultaet(i-1));  
            help2 = help2 * i;  
            //System.out.println("# " + help2);  
        }  
    }  
}
```

Console

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:24:23)  
120  
148.41315910257592
```

Java - uebung2/src/uebung2/Demo.java - Eclipse

```
public class Demo {  
    public static void main(String[] args) {  
        Demo ddd = new Demo();  
        long fff = ddd.fakultaet(5);  
        System.out.println(fff);  
        double eee = ddd.expo(5.0);  
        System.out.println(eee);  
        double ggg = ddd.power(2.0, 10);  
        System.out.println(ggg);  
        double[] firstVector = {1.0, 2.0, 3.0};  
        double[] secondVector = {3.0, 2.0, 1.0};  
        double uuu = ddd.innerProduct(firstVector, secondVector);  
        System.out.println(uuu);  
    }  
  
    static double expo(double x){  
        double result = 1.0;  
        double help = 1.0;  
        double help2 = 1.0;  
        for (int i=1; i<31; i++){  
            help = help * x;  
            //help2 = (double)(fakultaet(i-1));  
            help2 = help2 * i;  
            //System.out.println("# " + help2);  
        }  
    }  
}
```

Console

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:24:23)  
120  
148.41315910257592
```

Java - uebung2/src/uebung2/Demo.java - Eclipse

```
public class Demo {  
    public static void main(String[] args) {  
        Demo ddd = new Demo();  
        long fff = ddd.fakultaet(5);  
        //System.out.println(fff);  
        //double eee = ddd.expo(5.0);  
        expo(5.0);  
        System.out.println(eee);  
        double ggg = ddd.power(2.0, 10);  
        System.out.println(ggg);  
        double[] f1 = new double[3];  
        Note: The attached Javadoc could not be retrieved as the specified Javadoc location is either wrong or currently not accessible.  
        double[] se = new double[3];  
        double uuu = ddd.innerProduct(f1, se);  
        System.out.println(uuu);  
    }  
  
    static double expo(double x){  
        double result = 1.0;  
        double help = 1.0;  
        double help2 = 1.0;  
        for (int i=1; i<31; i++){  
            help = help * x;  
            //help2 = (double)(fakultaet(i-1));  
            help2 = help2 * i;  
            //System.out.println("# " + help2);  
        }  
    }  
}
```

Console

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:24:23)  
120  
148.41315910257592
```

Java - uebung2/src/uebung2/Demo.java - Eclipse

```
public class Demo {  
    public static void main(String[] args) {  
        Demo ddd = new Demo();  
        long fff = ddd.fakultaet(5);  
        //System.out.println(fff);  
        //double eee = ddd.expo(5.0);  
        double eee = expo(5.0);  
        System.out.println(eee);  
        double ggg = ddd.power(2.0, 10);  
        System.out.println(ggg);  
        double[] firstVector = {1.0, 2.0, 3.0};  
        double[] secondVector = {3.0, 2.0, 1.0};  
        double uuu = ddd.innerProduct(firstVector, secondVector);  
        System.out.println(uuu);  
    }  
  
    static double expo(double x){  
        double result = 1.0;  
        double help = 1.0;  
        double help2 = 1.0;  
        for (int i=1; i<31; i++){  
            help = help * x;  
            //help2 = (double)(fakultaet(i-1));  
            help2 = help2 * i;  
            //System.out.println("# " + help2);  
        }  
    }  
}
```

Console

```
<terminated> Demo [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (20.06.2014 10:24:23)  
120  
148.41315910257592
```

