

# Script generated by TTT

Title: groh: profile1 (20.05.2016)

Date: Fri May 20 09:15:46 CEST 2016

Duration: 90:53 min

Pages: 70

**Kontrollfluss: Methodenaufruf**

```

...
int horst;
int heiner;
int fritz;
horst = 101;
heiner = 2;
fritz = horst + heiner;
horst = 2000;
fritz = doSelfSumSquare(5);
fritz = doSelfSumSquare(heiner);
...
int doSelfSumSquare(int someNumber){
    int a;
    a = someNumber + someNumber;
    a = a * a;
    return a;
}
    
```

Zell-Nr (Adresse)	Zell-Name (Variablenname)	Zell-Inhalt
1124		...
1125	horst	2000
1126	heiner	2
1127		...
1128	fritz	100
2024		...
2025		...
4027		...
4028		int horst;
4029		int heiner;
4030		int fritz;
4029		horst = 101;
4030		heiner = 2;
...		...
8756		int a;
8757		a=someNumber+someNumber;
8758		a = a * a;

**Kontrollfluss: Methodenaufruf**

```

...
int horst;
int heiner;
int fritz;
horst = 101;
heiner = 2;
fritz = horst + heiner;
horst = 2000;
fritz = doSelfSumSquare(5);
fritz = doSelfSumSquare(heiner);
...
int doSelfSumSquare(int someNumber){
    int a;
    a = someNumber + someNumber;
    a = a * a;
    return a;
}
    
```

Zell-Nr (Adresse)	Zell-Name (Variablenname)	Zell-Inhalt
1124		...
1125	horst	2000
1126	heiner	2
1127		...
1128	fritz	100
2024		...
2025		...
4027		...
4028		int horst;
4029		int heiner;
4030		int fritz;
4029		horst = 101;
4030		heiner = 2;
...		...
8756		int a;
8757		a=someNumber+someNumber;
8758		a = a * a;

**Kontrollfluss: Bedingte Verzweigung**

```

...
int horst;
int heiner;
int fritz;
horst = 101;
heiner = 2;
fritz = horst + heiner;
horst = 2000;
if(heiner == 2)
    horst = 10;
else
    horst = 11;
fritz = 17;
...
    
```

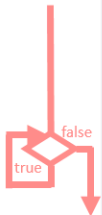
Zell-Nr (Adresse)	Zell-Name (Variablenname)	Zell-Inhalt
1124		...
1125	horst	10
1126	heiner	2
1127		...
1128	fritz	103
...		...
4027		...
4028		int horst;
4029		int heiner;
4030		int fritz;
4029		horst = 101;
4030		heiner = 2;
...		...

Antworten B und D (bedeuten dasselbe) sind richtig!

# Kontrollfluss: Schleife

```

...
int horst;
int heiner;
int fritz;
horst = 101;
heiner = 2;
fritz = horst + heiner;
horst = 2000;
while (heiner > 0)
    heiner = heiner - 1;
    fritz = 17;
...
    
```



## Vereinfachtes Speicher-Modell

Zell-Nr (Adresse)	Zell-Name (Variablenname)	Zell-Inhalt
1124		⋮
1125	horst	2000
1126	heiner	2
1127		
1128	fritz	103
		⋮
4027		
4028		int horst;
4029		int heiner;
4030		int fritz;
4029		horst = 101;
4030		heiner = 2;
		⋮

Daten

Programm

# Mini-Aufgabe – <http://pingo.upb.de>

```

...
int horst;
int heiner;
int fritz;
horst = 101;
heiner = 2;
fritz = horst + heiner;
horst = 2000;
fritz = doSelfSumSquare(5);
fritz = doSelfSumSquare(heiner);
...
    
```



```

int doSelfSumSquare(int someNumber){
    int a;
    a = someNumber + someNumber;
    a = a * a;
    return a;
}
    
```

• was passiert nachdem das Statement ausgeführt worden ist?

Zell-Nr (Adresse)	Zell-Name (Variablenname)	Zell-Inhalt
1124		⋮
1125	horst	2000
1126	heiner	2
1127		
1128	fritz	100
		⋮
2024		
2025		
		⋮

A	heiner wird auf 4 gesetzt
B	fritz wird auf 10000 gesetzt
C	heiner wird auf 10000 gesetzt
D	fritz wird auf 16 gesetzt

8757		a=someNumber+someNumber;
8758		a = a * a;
		⋮

Daten

Programm

# Mini-Aufgabe – <http://pingo.upb.de>

```

...
int horst;
int heiner;
int fritz;
horst = 101;
heiner = 2;
fritz = horst + heiner;
horst = 2000;
fritz = doSelfSumSquare(5);
fritz = doSelfSumSquare(heiner);
...
    
```



```

int doSelfSumSquare(int someNumber){
    int a;
    a = someNumber + someNumber;
    a = a * a;
    return a;
}
    
```

• was passiert nachdem das Statement ausgeführt worden ist?

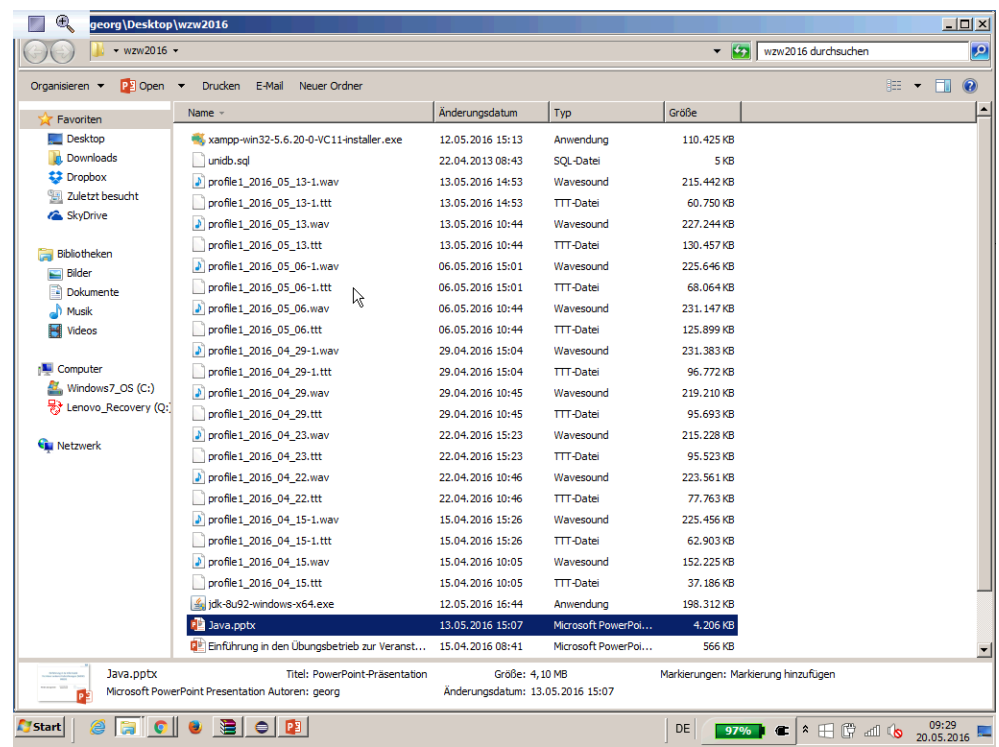
Zell-Nr (Adresse)	Zell-Name (Variablenname)	Zell-Inhalt
1124		⋮
1125	horst	2000
1126	heiner	2
1127		
1128	fritz	100
		⋮
2024		
2025		
		⋮

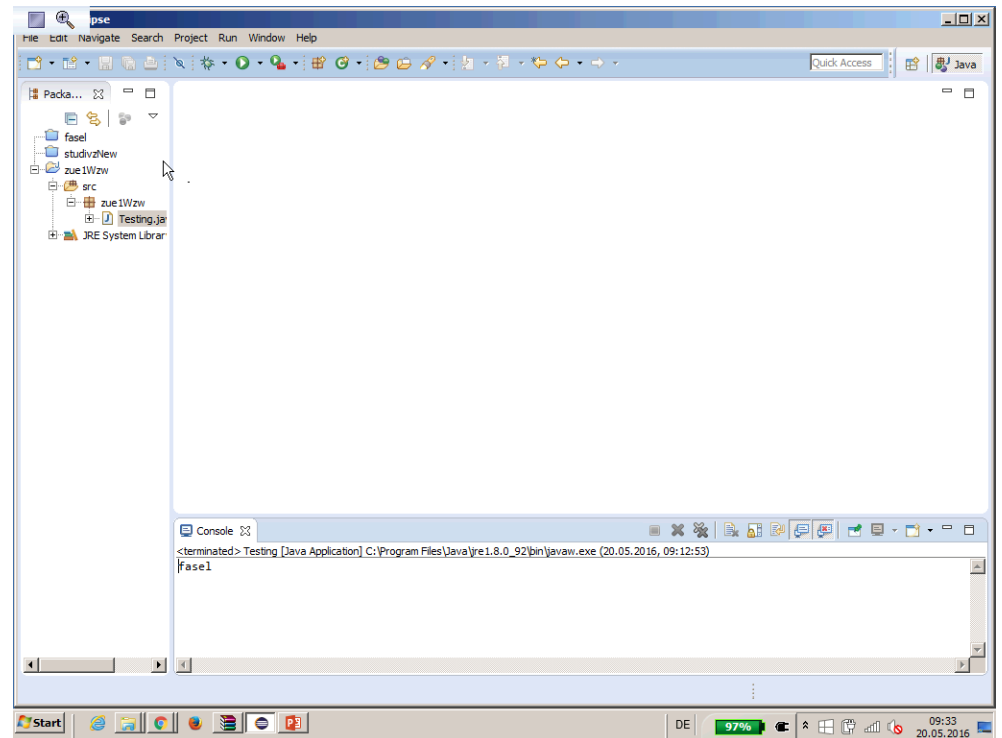
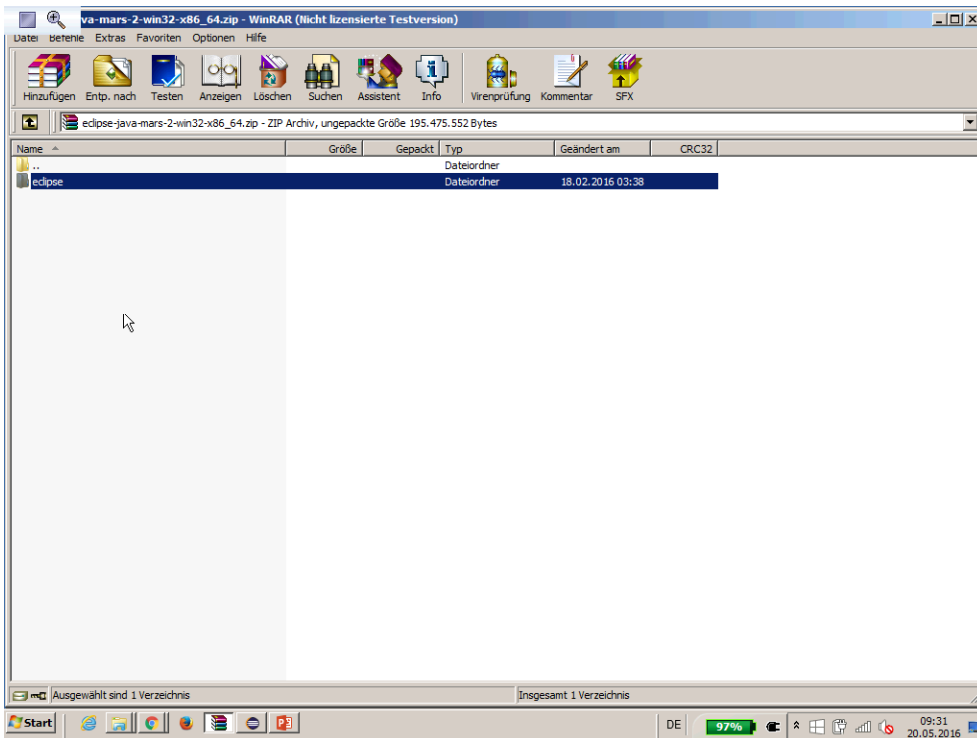
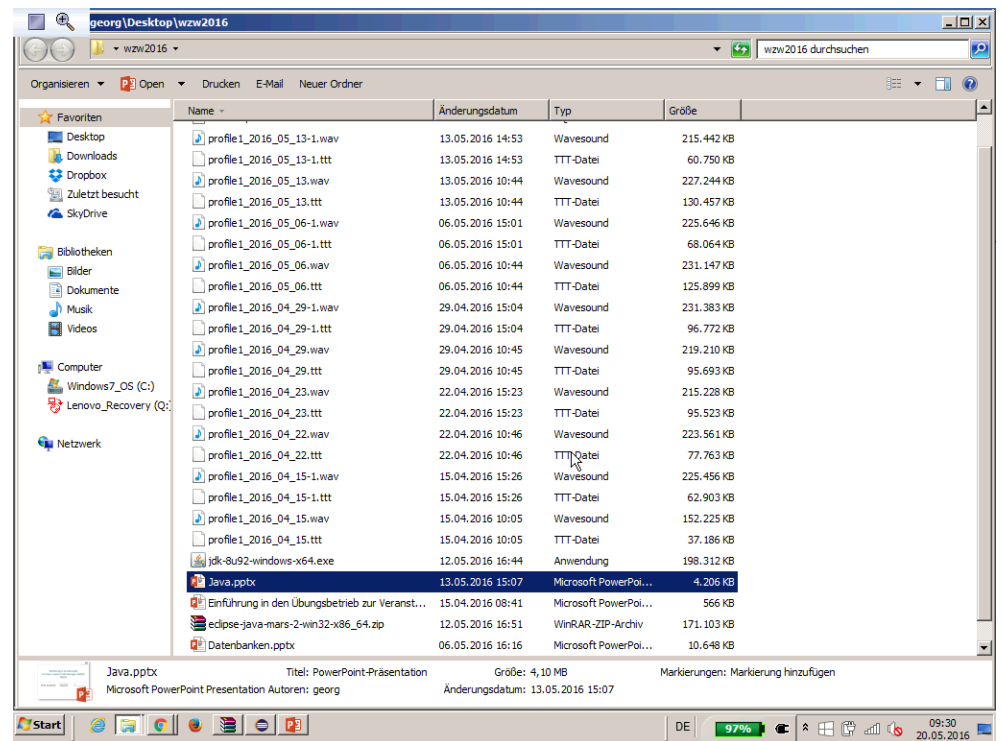
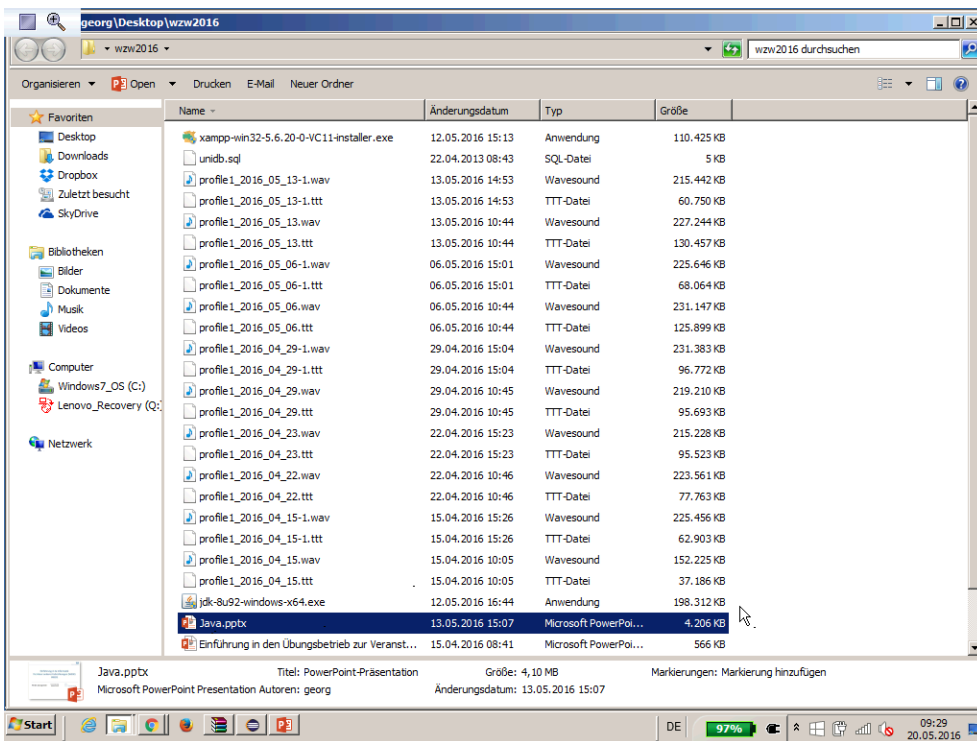
A	heiner wird auf 4 gesetzt
B	fritz wird auf 10000 gesetzt
C	heiner wird auf 10000 gesetzt
D	fritz wird auf 16 gesetzt

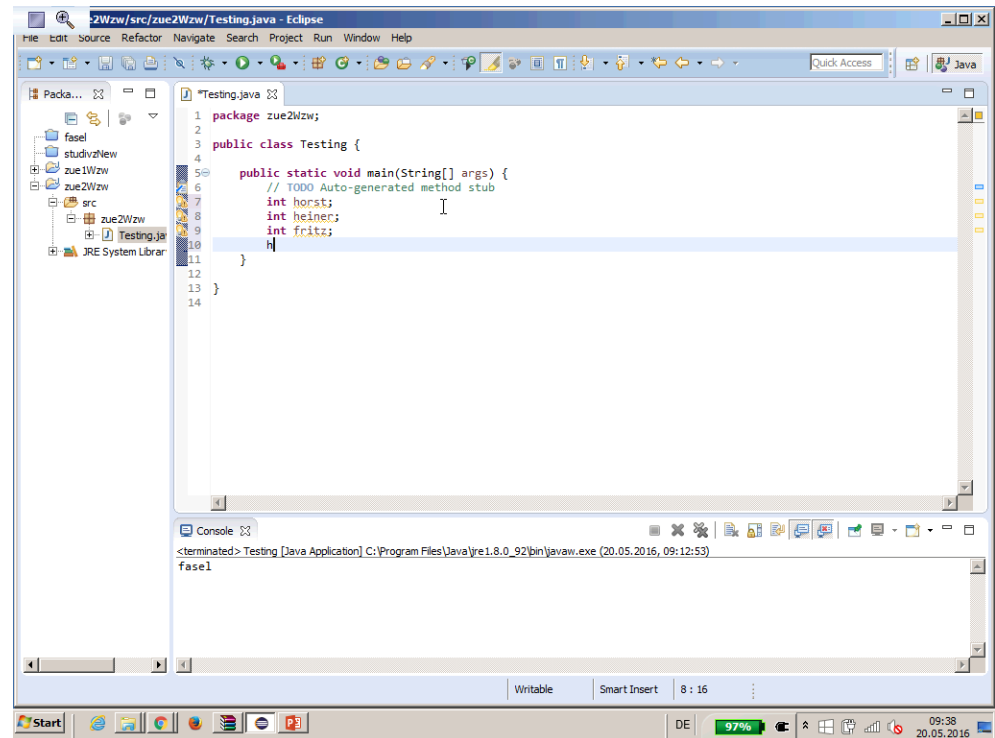
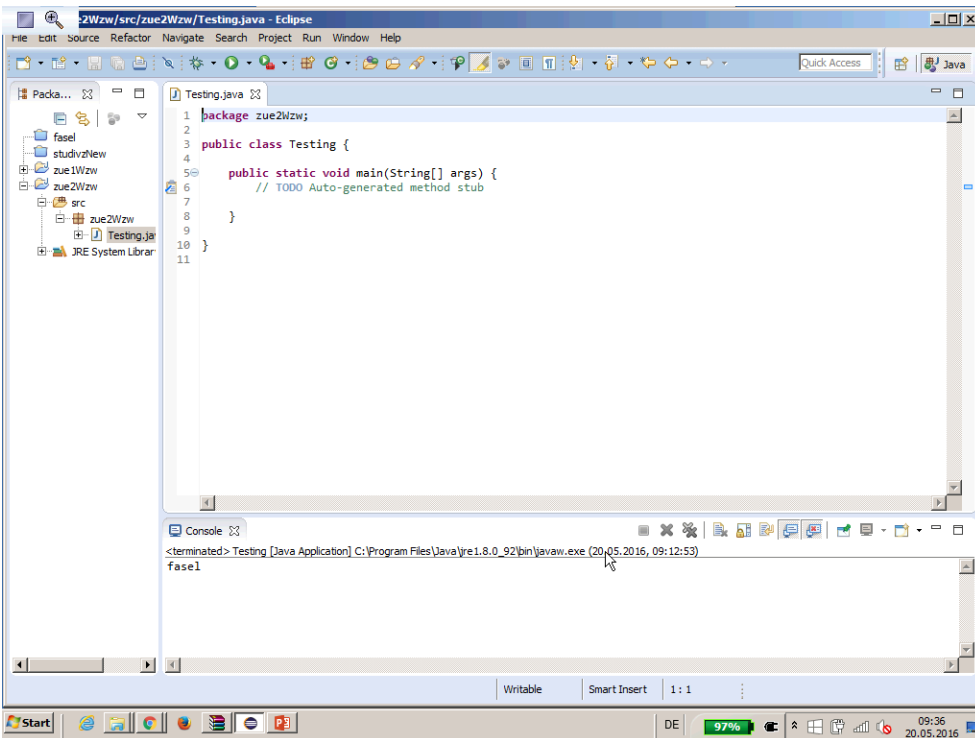
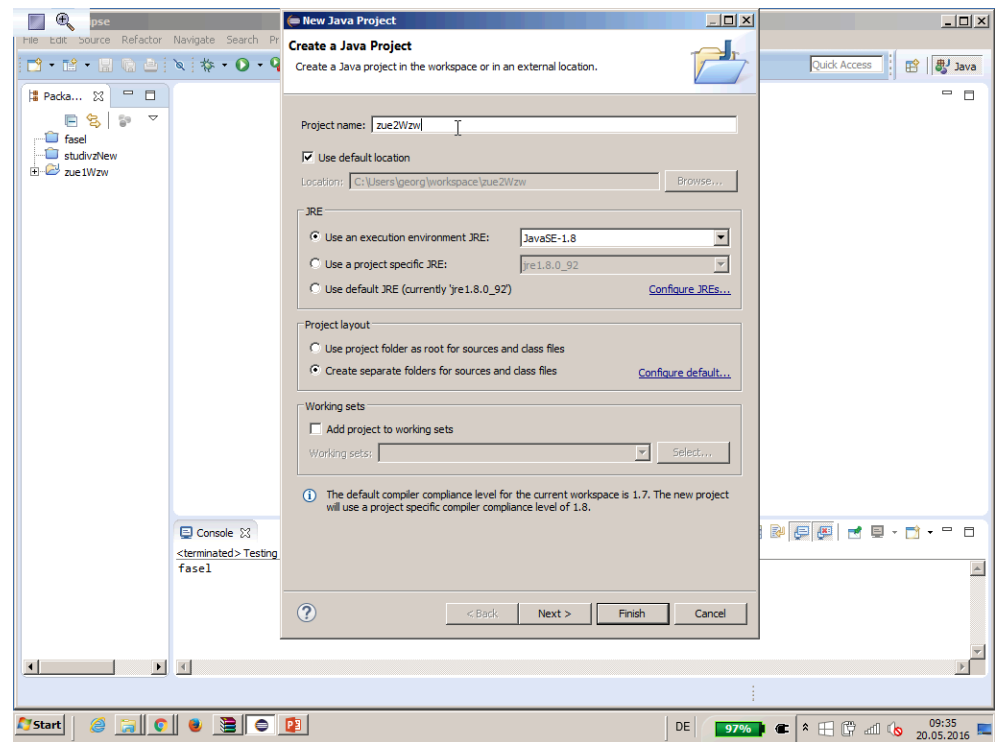
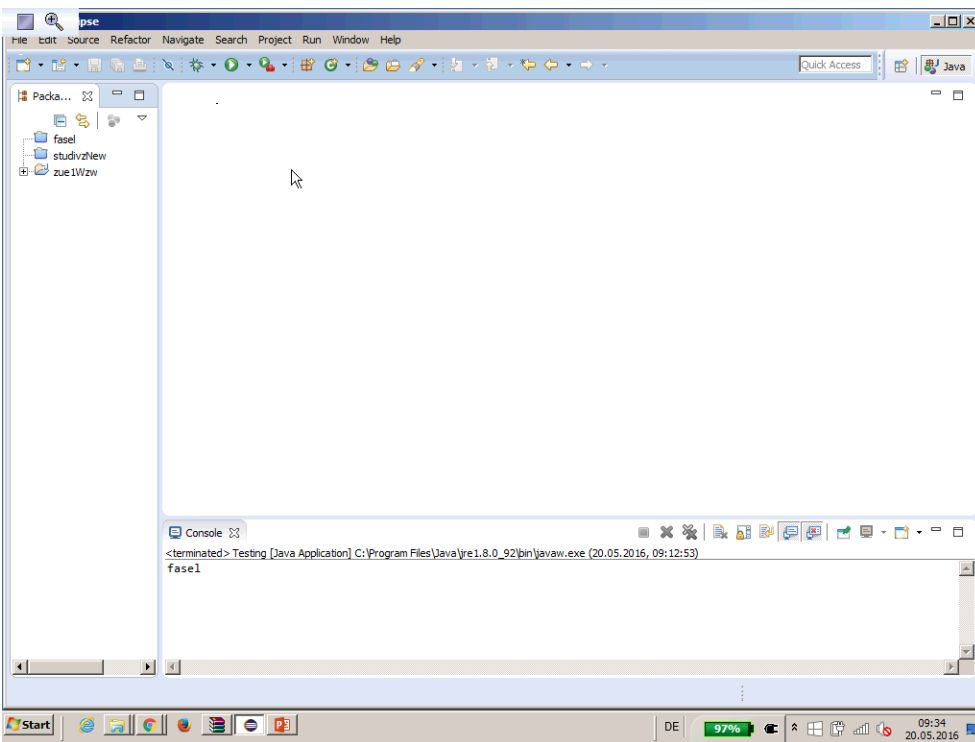
8757		a=someNumber+someNumber;
8758		a = a * a;
		⋮

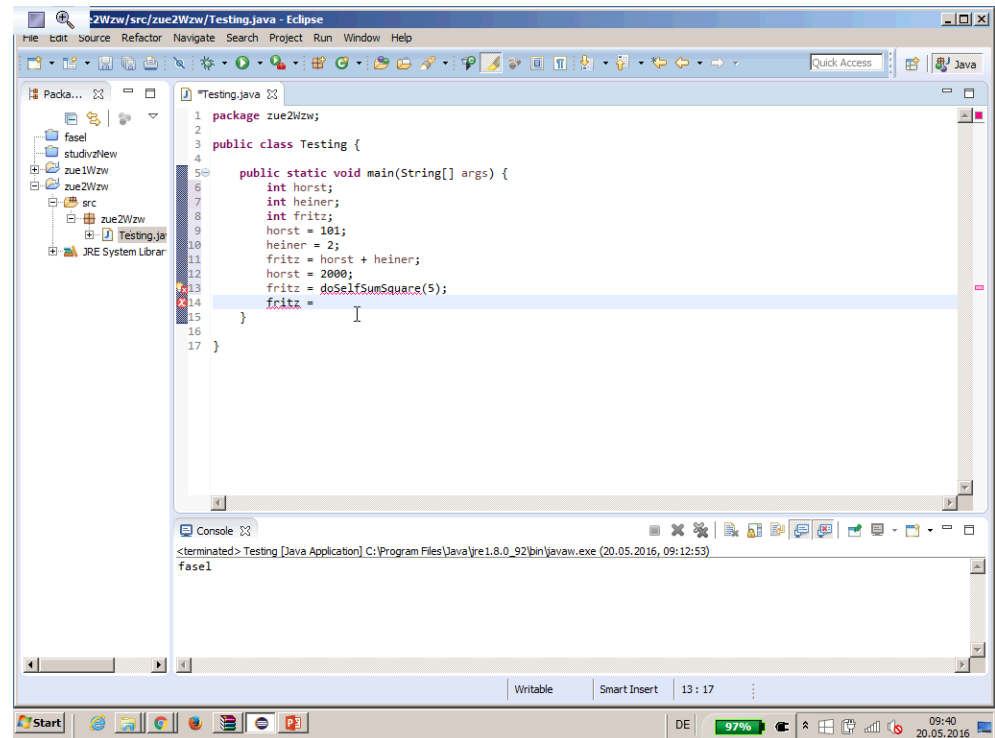
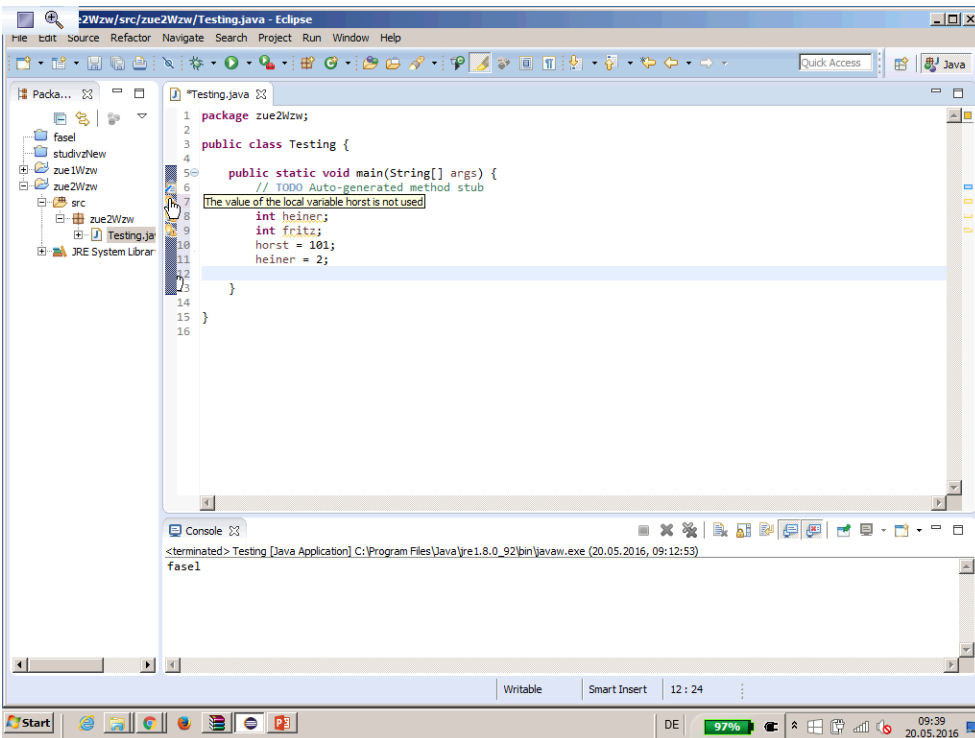
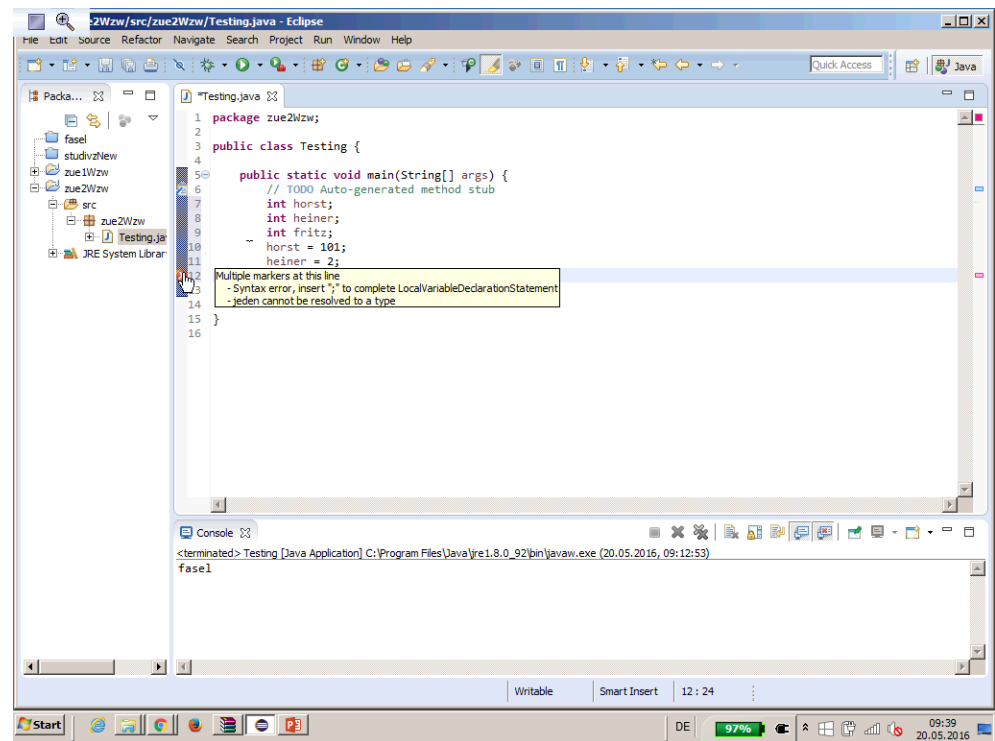
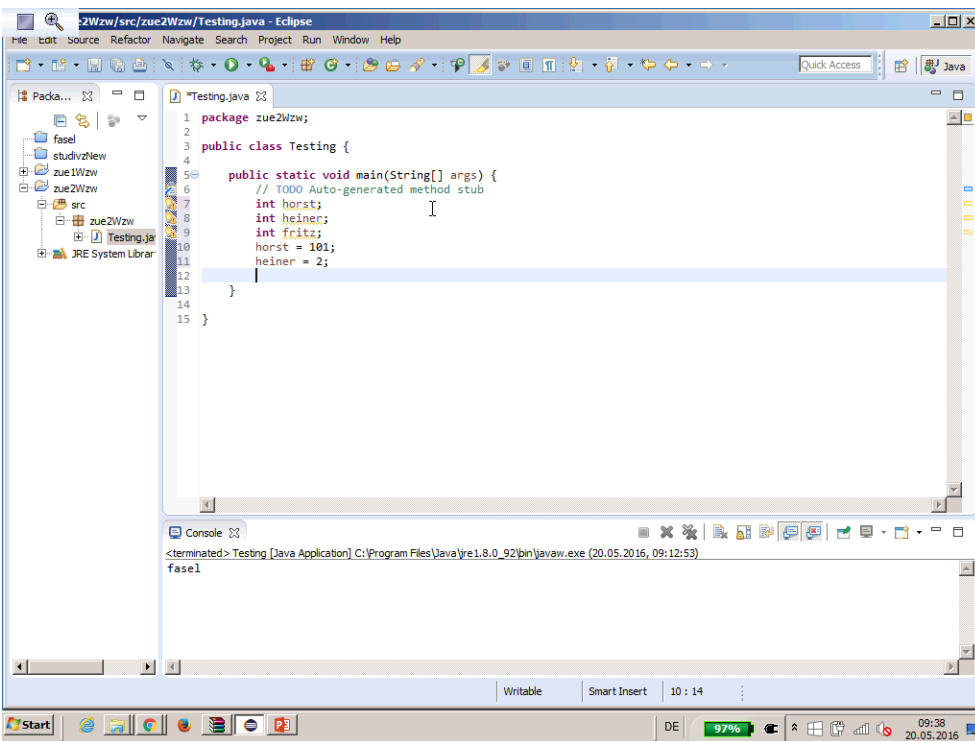
Daten

Programm









```
1 package zue2Wzw;
2
3 public class Testing {
4
5     public static void main(String[] args) {
6         int horst;
7         int heiner;
8         int fritz;
9         horst = 101;
10        heiner = 2;
11        fritz = horst + heiner;
12        horst = 2000;
13        fritz = doSelfSumSquare(5);
14        fritz = doSelfSumSquare(heiner);
15    }
16
17
18
19 }
20
```

Console: <terminated> Testing [Java Application] C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:12:53)  
fasel

```
1 package zue2Wzw;
2
3 public class Testing {
4
5     public static void main(String[] args) {
6         int horst;
7         int heiner;
8         int fritz;
9         horst = 101;
10        heiner = 2;
11        fritz = horst + heiner;
12        horst = 2000;
13        fritz = doSelfSumSquare(5);
14        fritz = doSelfSumSquare(heiner);
15    }
16
17    public int doSelfSumSquare(int someNumber){
18    }
19
20
21
22
23 }
```

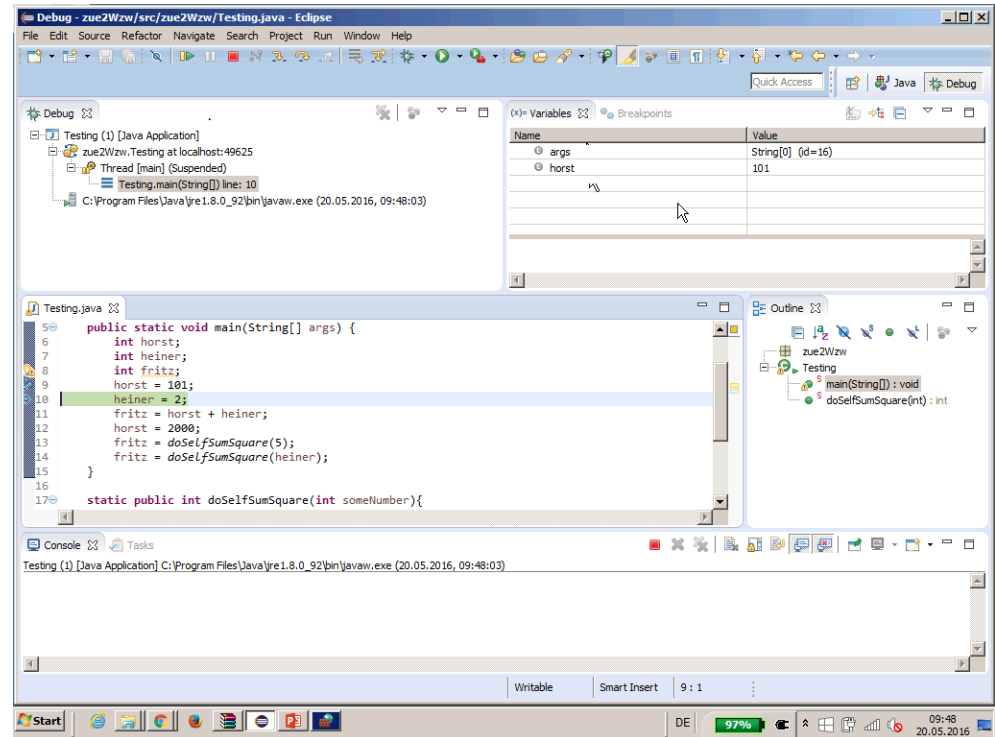
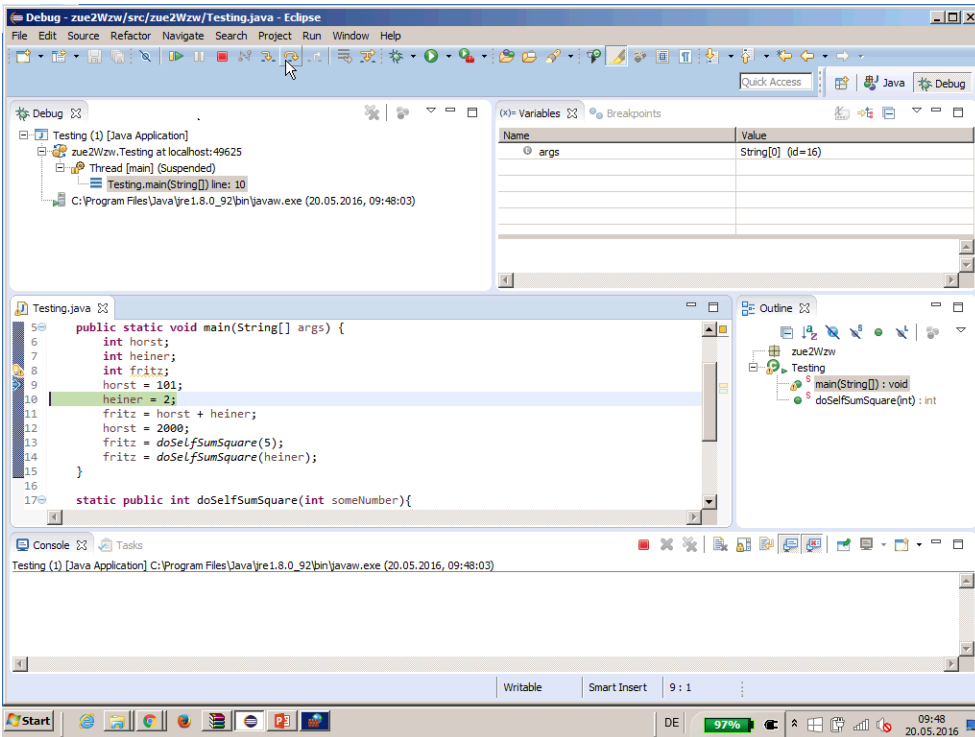
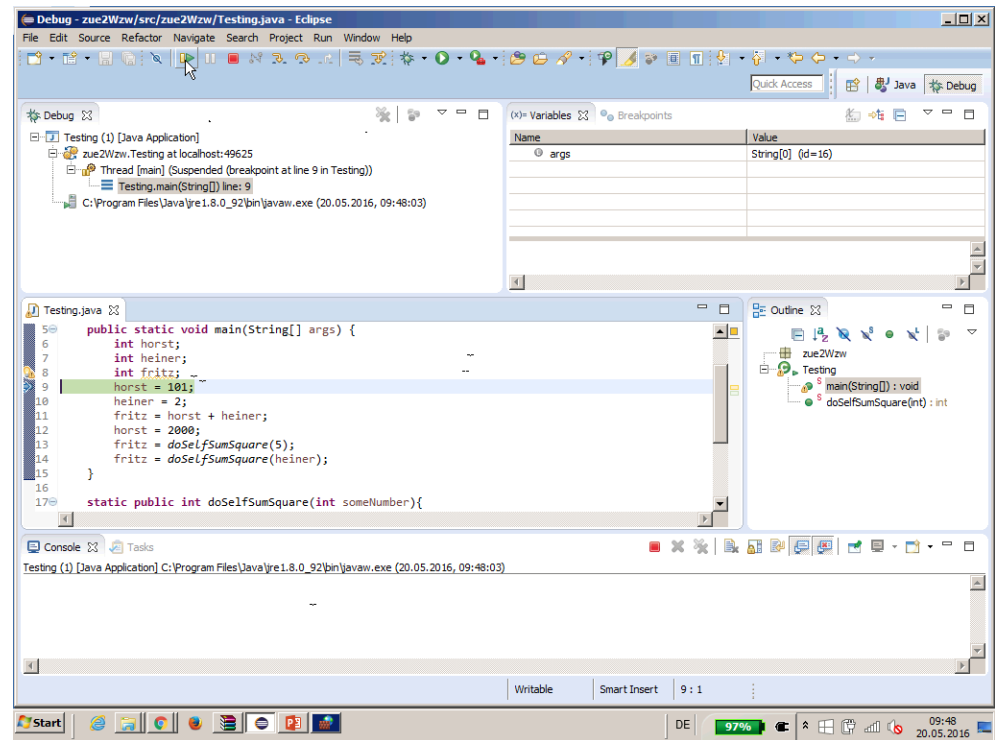
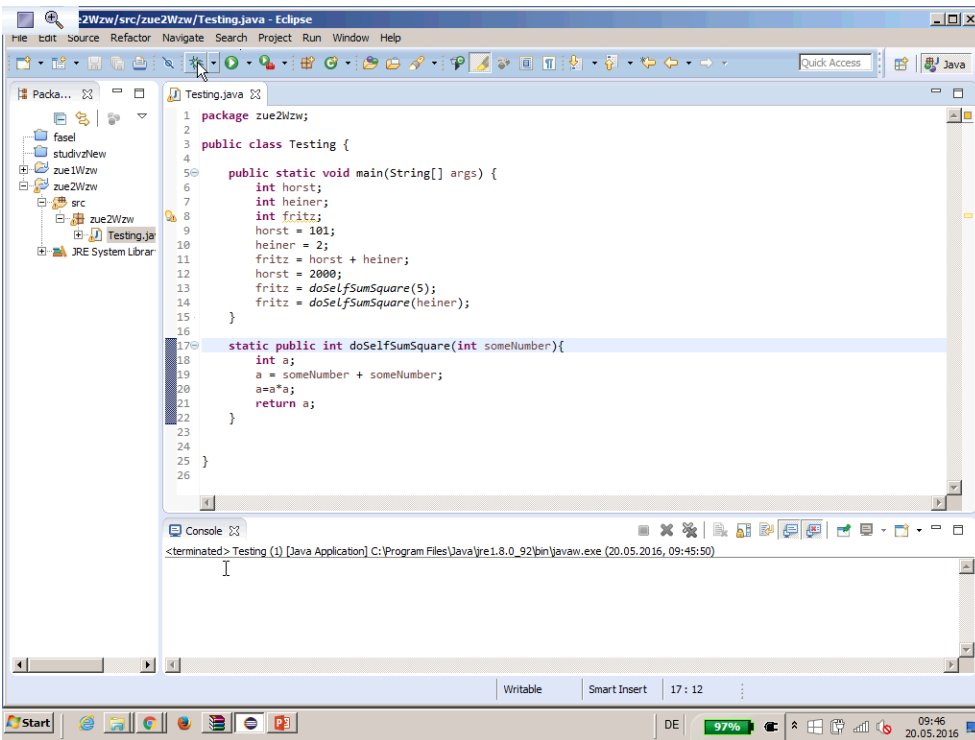
Console: <terminated> Testing [Java Application] C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:12:53)  
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15    }
16
17    public int doSelfSumSquare(int someNumber){
18        int a;
19        a = someNumber + someNumber;
20        a=a*a;
21        return a;
22    }
23
24
25
26 }
```

Console: <terminated> Testing [Java Application] C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:12:53)  
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1 package zue2Wzw;
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17    static public int doSelfSumSquare(int someNumber){
18        int a;
19        a = someNumber + someNumber;
20        a=a*a;
21        return a;
22    }
23
24
25
26 }
```

Console: <terminated> Testing (1) [Java Application] C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:45:50)



Debug - zue2Wzw/src/zue2Wzw/Testing.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Quick Access Java Debug

Debug (1) [Java Application]

- zue2Wzw.Testing at localhost:49625
  - Thread [main] (Suspended)
    - Testing.main(String[]) line: 12

C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:48:03)

Testing.java

```

5 public static void main(String[] args) {
6     int horst;
7     int heiner;
8     int fritz;
9     horst = 101;
10    heiner = 2;
11    fritz = horst + heiner;
12    horst = 2000;
13    fritz = doSelfSumSquare(5);
14    fritz = doSelfSumSquare(heiner);
15 }
16
17 static public int doSelfSumSquare(int someNumber){

```

Outline

- zue2Wzw
  - main(String[]): void
  - doSelfSumSquare(int): int

Console

Testing (1) [Java Application] C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:48:03)

Start DE 97% 09:50 20.05.2016

Debug - zue2Wzw/src/zue2Wzw/Testing.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Quick Access Java Debug

Debug (1) [Java Application]

- zue2Wzw.Testing at localhost:49625
  - Thread [main] (Suspended)
    - Testing.main(String[]) line: 13

C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:48:03)

Testing.java

```

5 public static void main(String[] args) {
6     int horst;
7     int heiner;
8     int fritz;
9     horst = 101;
10    heiner = 2;
11    fritz = horst + heiner;
12    horst = 2000;
13    fritz = doSelfSumSquare(5);
14    fritz = doSelfSumSquare(heiner);
15 }
16
17 static public int doSelfSumSquare(int someNumber){

```

Outline

- zue2Wzw
  - main(String[]): void
  - doSelfSumSquare(int): int

Console

Testing (1) [Java Application] C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:48:03)

Start DE 97% 09:50 20.05.2016

Debug - zue2Wzw/src/zue2Wzw/Testing.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Quick Access Java Debug

Debug (1) [Java Application]

- zue2Wzw.Testing at localhost:49625
  - Thread [main] (Suspended)
    - Testing.main(String[]) line: 14

C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:48:03)

Testing.java

```

5 public static void main(String[] args) {
6     int horst;
7     int heiner;
8     int fritz;
9     horst = 101;
10    heiner = 2;
11    fritz = horst + heiner;
12    horst = 2000;
13    fritz = doSelfSumSquare(5);
14    fritz = doSelfSumSquare(heiner);
15 }
16
17 static public int doSelfSumSquare(int someNumber){

```

Outline

- zue2Wzw
  - main(String[]): void
  - doSelfSumSquare(int): int

Console

Testing (1) [Java Application] C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:48:03)

Start DE 97% 09:51 20.05.2016

Debug - zue2Wzw/src/zue2Wzw/Testing.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Quick Access Java Debug

Debug (1) [Java Application]

- zue2Wzw.Testing at localhost:49625
  - Thread [main] (Suspended)
    - Testing.doSelfSumSquare(int) line: 19
    - Testing.main(String[]) line: 14

C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:48:03)

Testing.java

```

14    fritz = doSelfSumSquare(heiner);
15 }
16
17 static public int doSelfSumSquare(int someNumber){
18     int a;
19     a = someNumber + someNumber;
20     return a;
21 }
22
23 }
24
25 }
26

```

Outline

- zue2Wzw
  - main(String[]): void
  - doSelfSumSquare(int): int

Console

Testing (1) [Java Application] C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:48:03)

Start DE 97% 09:52 20.05.2016



Debug - zue2Wzw/src/zue2Wzw/Testing.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Quick Access Java Debug

Debug (1) [Java Application]

- zue2Wzw.Testing at localhost:49625
  - Thread [main] (Suspended)
    - Testing.doSelfSumSquare(int) line: 20
    - Testing.main(String[]) line: 14

C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:48:03)

Name	Value
someNumber	2
a	4

```

14 fritz = doSelfSumSquare(heiner);
15 }
16
17 static public int doSelfSumSquare(int someNumber){
18     int a;
19     a = someNumber + someNumber;
20     a=a*a;
21     return a;
22 }
23
24
25 }
26
  
```

Outline

- zue2Wzw
  - Testing
    - main(String[]) : void
    - doSelfSumSquare(int) : int

Console

Testing (1) [Java Application] C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:48:03)

Start DE 97% 09:52 20.05.2016

Debug - zue2Wzw/src/zue2Wzw/Testing.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Quick Access Java Debug

Debug (1) [Java Application]

- zue2Wzw.Testing at localhost:49625
  - Thread [main] (Suspended)
    - Testing.main(String[]) line: 14

C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:48:03)

Name	Value
args	String[0] (id=16)
horst	2000
heiner	2
fritz	100

```

5 public static void main(String[] args) {
6     int horst;
7     int heiner;
8     int fritz;
9     horst = 101;
10    heiner = 2;
11    fritz = horst + heiner;
12    horst = 2000;
13    fritz = doSelfSumSquare(5);
14    fritz = doSelfSumSquare(heiner);
15 }
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17 static public int doSelfSumSquare(int someNumber){
  
```

Outline

- zue2Wzw
  - Testing
    - main(String[]) : void
    - doSelfSumSquare(int) : int

Console

Testing (1) [Java Application] C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:48:03)

Start DE 97% 09:53 20.05.2016

Debug - zue2Wzw/src/zue2Wzw/Testing.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Quick Access Java Debug

Debug (1) [Java Application]

- <terminated>Testing (1) [Java Application]
  - <terminated>zue2Wzw.Testing at localhost:49625
    - <terminated, exit value: 1>C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:48:03)

```

5 public static void main(String[] args) {
6     int horst;
7     int heiner;
8     int fritz;
9     horst = 101;
10    heiner = 2;
11    fritz = horst + heiner;
12    horst = 2000;
13    fritz = doSelfSumSquare(5);
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15 }
16
17 static public int doSelfSumSquare(int someNumber){
  
```

Outline

- zue2Wzw
  - Testing
    - main(String[]) : void
    - doSelfSumSquare(int) : int

Console

<terminated> Testing (1) [Java Application] C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:48:03)

Start DE 97% 09:54 20.05.2016

Java - zue2Wzw/src/zue2Wzw/Testing.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Quick Access Java Debug

Package Explorer

- fasel
  - studivzNew
    - zue1Wzw
      - zue2Wzw
        - src
          - Testing.java
- JRE System Librar

```

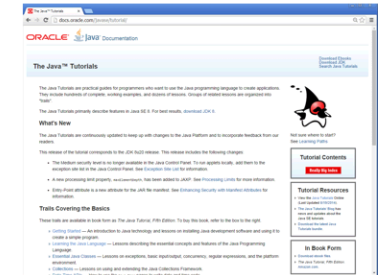
1 package zue2Wzw;
2
3 public class Testing {
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5     public static void main(String[] args) {
6         int horst;
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15    }
16
17    static public int doSelfSumSquare(int someNumber){
18        int a;
19        a = someNumber + someNumber;
20        a=a*a;
21        return a;
22    }
23
24
25 }
26
  
```

Console

<terminated> Testing (1) [Java Application] C:\Program Files\Java\jre1.8.0\_92\bin\javaw.exe (20.05.2016, 09:48:03)

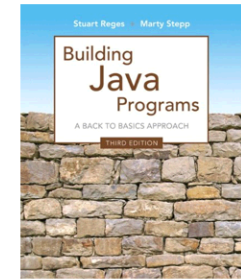
Start DE 97% 09:54 20.05.2016

- **Java Tutorial**  
<http://docs.oracle.com/javase/tutorial/>



Viele Beispiele, Code etc. wird von hier übernommen. Es erfolgt aus Gründen der Lesbarkeit keine separate Zitierung

- **alternativ: S. Reges, M. Stepp: Building Java Programs - A Back to Basics Approach (3rd Edition), Addison-Wesley 2013**

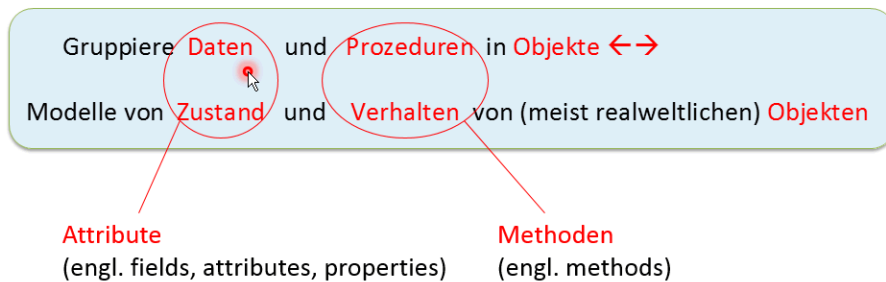


```

Java - zue2Wzw/src/zue2Wzw/Testing.java - Eclipse
File Edit Source Refactor Navigate Search Project Run Window Help
Quick Access Java Debug
Package Explorer: fasel, studivzNew, zue1Wzw, zue2Wzw, src, zue2Wzw, Testing.java, JRE System Librar
Testing.java
1 package zue2Wzw;
2
3 public class Testing {
4
5     public static void main(String[] args) {
6         int horst;
7         int heiner;
8         int fritz;
9         horst = 101;
10        heiner = 2;
11        fritz = horst + heiner;
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13        fritz = doSelfSumSquare(5);
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16
17    static public int doSelfSumSquare(int someNumber){
18        int a;
19        a = someNumber + someNumber;
20        a=a*a;
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22    }
23
24 }
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26
Console
<terminated> Testing (1) [Java Application] C:\Program Files\Java\jre1.8.0_92\bin\javaw.exe (20.05.2016, 09:48:03)
    
```

Objektorientierte Programmierung

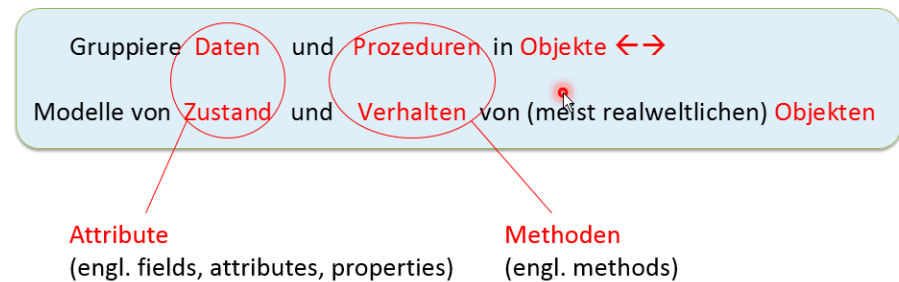
Grundidee:



**Klasse:** Bauplan für Objekte  
**Objekte:** Instanzen ihrer Klasse

Objektorientierte Programmierung

Grundidee:



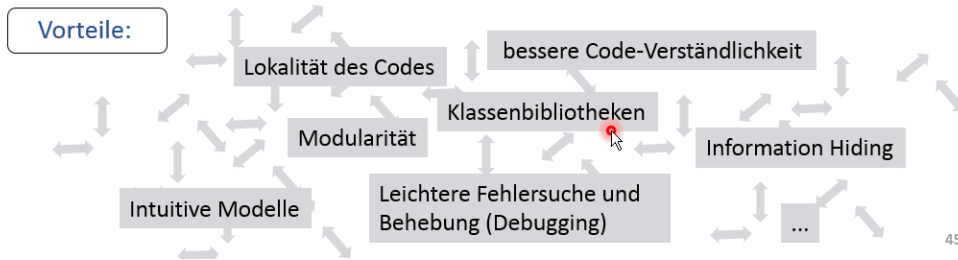
**Klasse:** Bauplan für Objekte  
**Objekte:** Instanzen ihrer Klasse

# Objektorientierte Programmierung

Grundidee:

Gruppieren **Daten** und **Prozeduren** in Objekte  $\leftrightarrow$   
Modelle von **Zustand** und **Verhalten** von (meist realweltlichen) Objekten

**Attribute**  
(engl. fields, attributes, properties)      **Methoden**  
(engl. methods)



# Klassen und Objekte in Java

```
class BicycleDemo {
    public static void main(String[] args) {
        // Create two different Bicycle objects
        Bicycle bike1 = new Bicycle();
        Bicycle bike2 = new Bicycle();

        // Invoke methods on these objects
        bike1.changeCadence(50);
        bike1.speedUp(10);
        bike1.changeGear(2);

        bike2.changeCadence(50);
        bike2.speedUp(10);
        bike2.changeCadence(40);
        bike2.speedUp(10);
        bike2.changeGear(3);
    }
}
```

```
class Bicycle {
    int cadence = 0;
    int speed = 0;
    int gear = 1;

    void changeCadence(int newValue) {
        cadence = newValue;
    }

    void changeGear(int newValue) {
        gear = newValue;
    }

    void speedUp(int increment) {
        speed = speed + increment;
    }

    void applyBrakes(int decrement) {
        speed = speed - decrement;
    }
}
```

# Klassen und Objekte in Java

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class BicycleDemo {
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        bike2.speedUp(10);
        bike2.changeGear(2);
        bike2.changeCadence(40);
        bike2.speedUp(10);
        bike2.changeGear(3);
    }
}
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class Bicycle {
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        bike2.changeCadence(40);
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}
```

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## Datenbanken

## Java

```
public class SomeCode {
    public static void main(String[] args) {
        Professor prof2125 = new Professor("Sokrates", "C4", 226);
        Professor russelTheOldLad = new Professor("Russel", "C4", 232);
        Professor kopiWopi = new Professor("Kopernikus", "C3", 310);
        Professor gtuwegghf678 = new Professor("Popper", "C3", 52);
        Professor gustl = new Professor("Augustinus", "C3", 309);
        Professor oldMary = new Professor("Curie", "C4", 36);
        Professor prof_2144 = new Professor("Kant", "C4", 7);
        ...
    }
}
```

PersNr	Name	Rang	Raum
2125	Sokrates	C4	226
2126	Russel	C4	232
2127	Kopernikus	C3	310
2133	Popper	C3	52
2134	Augustinus	C3	309
2136	Curie	C4	36
2137	Kant	C4	7

```
Professoren: { { PersNr: integer,
                Name: varchar(40),
                Rang: char(3),
                Raum: integer } }
```

```
public class Professor {
    public String name;
    public String rang;
    public int raum;

    public Professor(String name, String rang, int raum){
        this.name = name;
        this.rang = rang;
        this.raum = raum;
    }

    public void teach(){
        System.out.println("... now teaching something :-");
    }
}
```

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## Datenbanken

## Java

???

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public class SomeCode {
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Professoren: { { PersNr: integer,
                Name: varchar(40),
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```
public class Professor {
    public String name;
    public String rang;
    public int raum;

    public Professor(String name, String rang, int raum){
        this.name = name;
        this.rang = rang;
        this.raum = raum;
    }

    public void teach(){
        System.out.println("... now teaching something :-");
    }
}
```

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# Datenbanken

# Java

???

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Professoren: [{ PersNr: integer,  
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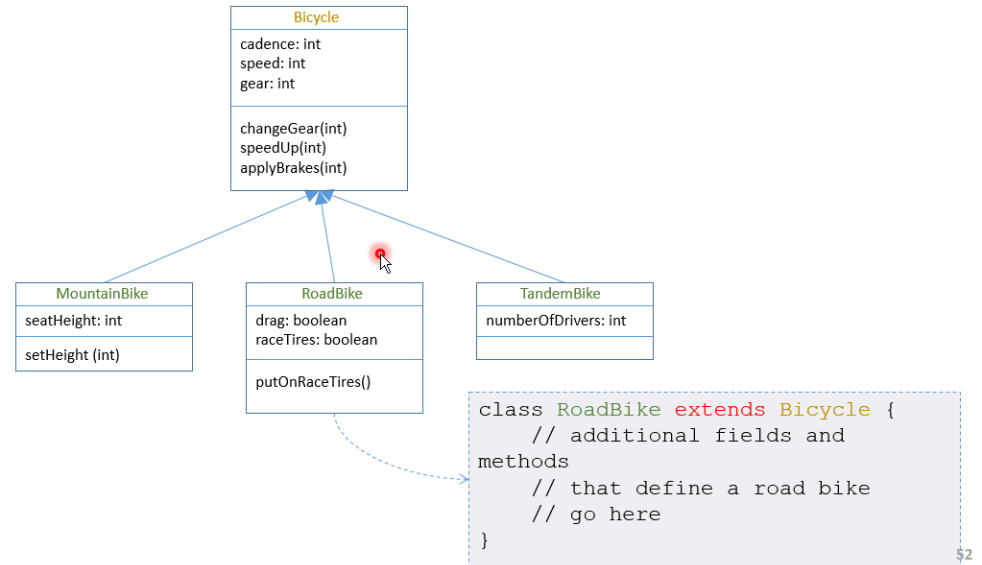
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public class Professor {
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    public int raum;

    public Professor(String name, String rang, int raum){
        this.name = name;
        this.rang = rang;
        this.raum = raum;
    }

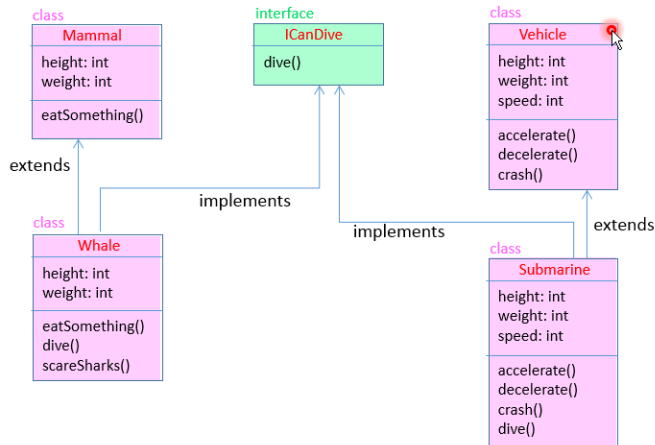
    public void teach(){
        System.out.println("... now teaching something :-");
    }
}
```

# Vererbung

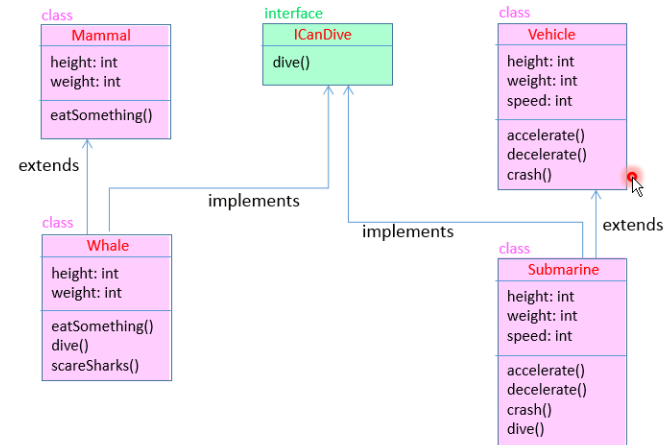
Idee: Leite **speziellere** Klassen von **existierenden** Klassen ab.



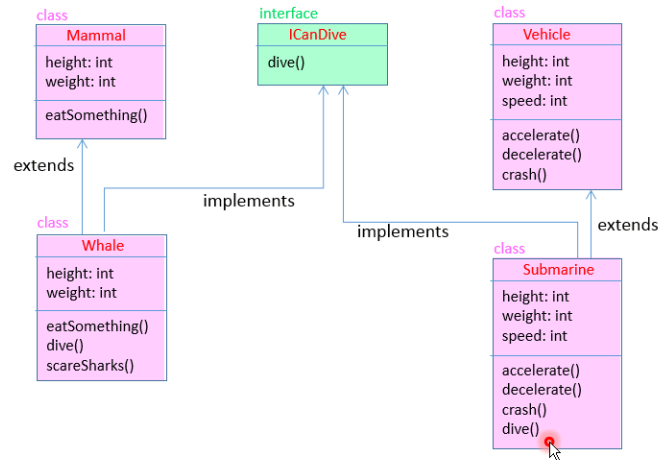
# Interfaces: weiteres Beispiel



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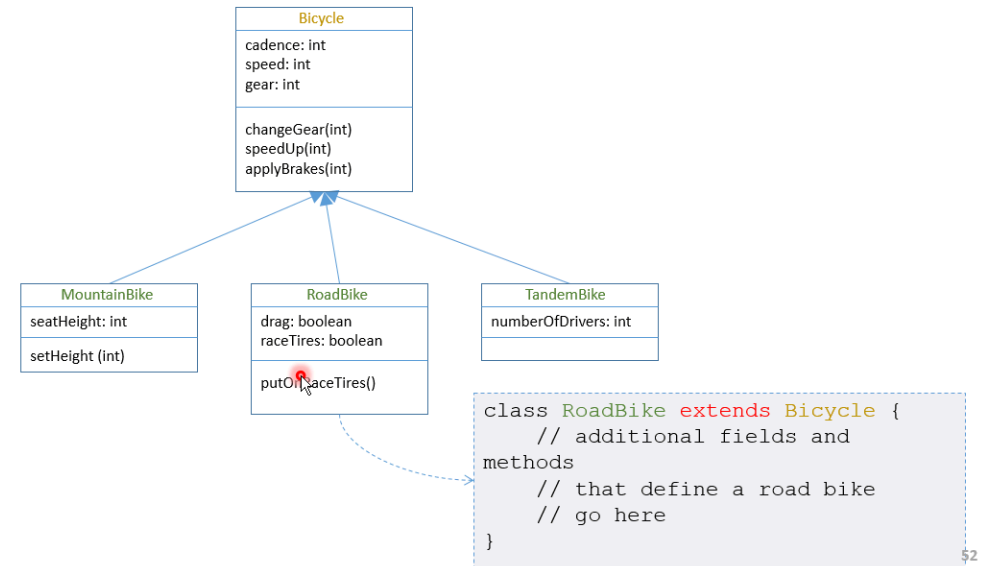
## Interfaces: weiteres Beispiel



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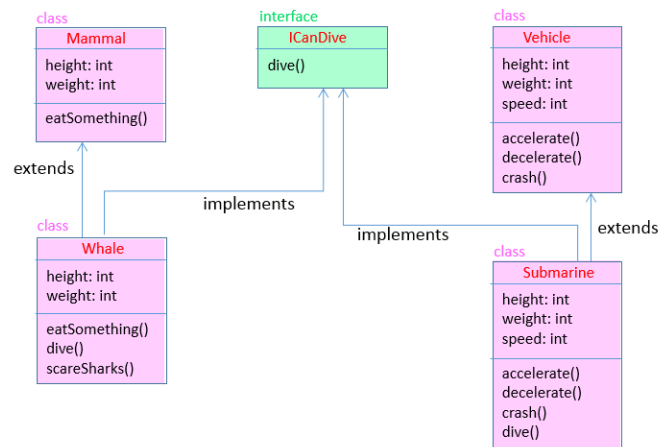
## Vererbung

Idee: Leite **speziellere** Klassen von **existierenden** Klassen ab.



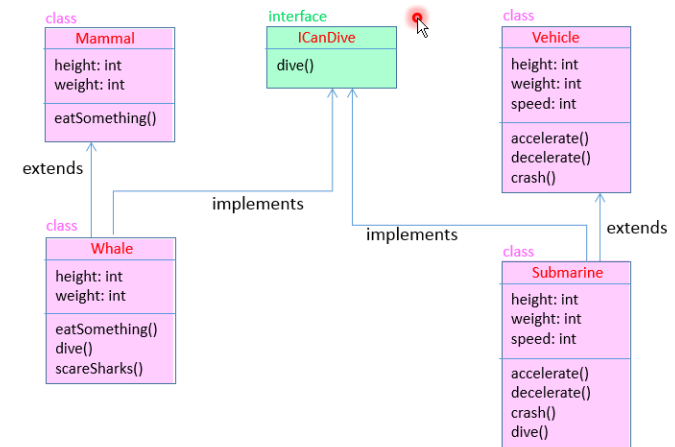
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## Interfaces: weiteres Beispiel



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