Script generated by TTT

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main - Methode

- In einer Klasse eine spezielle Klassenmethode main mit festgelegter Signatur (Name + Sequenz der Parametertypen) und Modifiern

```
public static void main(String[] args)
```

- wird einmal beim Programmstart aufgerufen (<---> Computer muss wissen wo er anfangen soll)

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

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


Overriding

Overriding: In einer Unterklasse Methode mit gleichem Namen, und gleicher Parameterliste wie in Oberklasse:

```
class Bicycle {
    int speed;
    public void speedUp(int increment) {
        speed = speed + increment;
        System.out.println("superclass instance-method");
    }
}
```

Variante mit `super`

```
class MountainBike extends Bicycle {
    public void speedUp(int increment) {
        super.speedUp(2 * increment); // call overridden method of superclass
        System.out.println("subclass instance-method");
    }
}
```

```
MountainBike mb = new MountainBike();
mb.speedUp(10);                          // mb.speed == 20
```

⇨ Ausgabe:
```
superclass instance-method
subclass instance-method
```

Sinn: Unterklasse bietet speziellere Version der Methode an (Aspekt von Polymorphie)

Hiding

Hiding: Analog zu Overriding aber für Klassenmethoden (`static`)

```
class Bicycle {
    public static void myClassMethod(int someInt) {
        System.out.println("superclass class-method");
    }
}
```

```
class MountainBike extends Bicycle {
    public static void myClassMethod(int someInt) {
        System.out.println("subclass class-method");
    }
}
```

```
Bicycle.myClassMethod(10);        // "superclass class-method"
MountainBike.myClassMethod(10);   // "subclass class-method"
```

Interfaces <---> Polymorphie : Beispiel

```
interface ICanSting {
      public void sting();
}
```

```
class LittleBee implements ICanSting {
      public void sting() {
            System.out.println("*pieks*");
      }
}
```

```
class AngryHornet implements ICanSting {
      public void sting() {
            System.out.println("*MEGAPIEKS*");
      }
}
```

```
LittleBee maja = new LittleBee();
AngryHornet horst = new AngryHornet();
ICanSting someStinger;
someStinger = maja;
someStinger.sting();          // *pieks*
someStinger = horst;
someStinger.sting();          // *MEGAPIEKS*
```


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Aufgabe

Gegeben ist folgende **fehlerhafte Java Methode** expo zur näherungsweisen Berechnung der Funktion $f(x) = e^x \approx \sum_{i=0}^{30} \frac{x^i}{i!}$

```
double void expo(double x){
      double result  = 1.0;
      double help = 1.0;
      double help2 = 1.0;
      for (int i=1; i<30; i++){
            help = help * x;
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            result = result + expo(help / help2);
      }
      return result;
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Umranden bzw. markieren Sie die **drei Fehler** im Code und **verbessen Sie sie!**

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Welche **Ausgabe** produziert NotoriousRomanticsDemo?

Welche der drei Konzepte **Overloading**, **Overriding**, **Polymorphie** werden im obigen Code benutzt, welche nicht?
BEGRÜNDEN Sie jeweils kurz!

Gegeben sei folgender **Java Code**:

```
public class NotoriousRomanticsDemo {
      public static void main(String[] args) {
            Person manOnTrain = new Person();
            manOnTrain.isInNiceMood = true;
            LovingPerson womanOnTrain = new LovingPerson();
            womanOnTrain.isInNiceMood = true;
            womanOnTrain.sayLovePoem("aehm...");
            manOnTrain.commentOnLovePoem("that's so beautiful!");
            Person person = womanOnTrain;
            person.commentOnLovePoem("you like it! :-)");
            Person someBystander = new Person();
            someBystander.commentOnLovePoem(" how cute!");
      }
      }

public class LovingPerson extends Person implements Romantic{
      public void sayLovePoem(String what){
            System.out.println(what + "ene mene muh: I'm in love with you!");
      }

      public void commentOnLovePoem(String what){
            System.out.print("no matter what: ");
            this.commentOnLovePoem();
      }

      public void commentOnLovePoem(){
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      }
}

public class Person {
      public boolean isInNiceMood = false;
      public void commentOnLovePoem(String what){
            if(isInNiceMood)
            System.out.println("oiii :-) " + what);
      else
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public interface Romantic {
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aehm...ene mene muh: I'm in love with you!

oiii :-) that's so beautiful!

no matter what: I am in love

oerks! :-(

Overloading:
ja, denn es gibt die Methode commentOnLovePoem in der Klasse LovingPerson zwei mal, jeweils mit verschiedenen Signaturen.

Overriding:
ja, denn die Methode
public void commentOnLovePoem(String what)
der Klasse Person wird in der Klasse LovingPerson überschrieben.

Polymorphie
ja, denn das Objekt womanOnTrain wird einmal als Person und ein anderes Mal als LovingPerson angesprochen. Beim Aufruf person.commentOnLovePoem(…) wird die speziellere Methode der Unterklasse LovingPerson ausgeführt.

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		GovernmentMember merkel = new GovernmentMember();
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public class MinisterOfFinance extends GovernmentMember implements
StateRepresentant{
	public void commentOnCrisis(){
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Welche Ausgabe produziert FinancialCrisisDemo?

Welche der drei Konzepte **Overloading**, **Overriding**, **Polymorphie** werden im obigen Code benutzt, welche nicht? **BEGRÜNDEN** Sie jeweils kurz!

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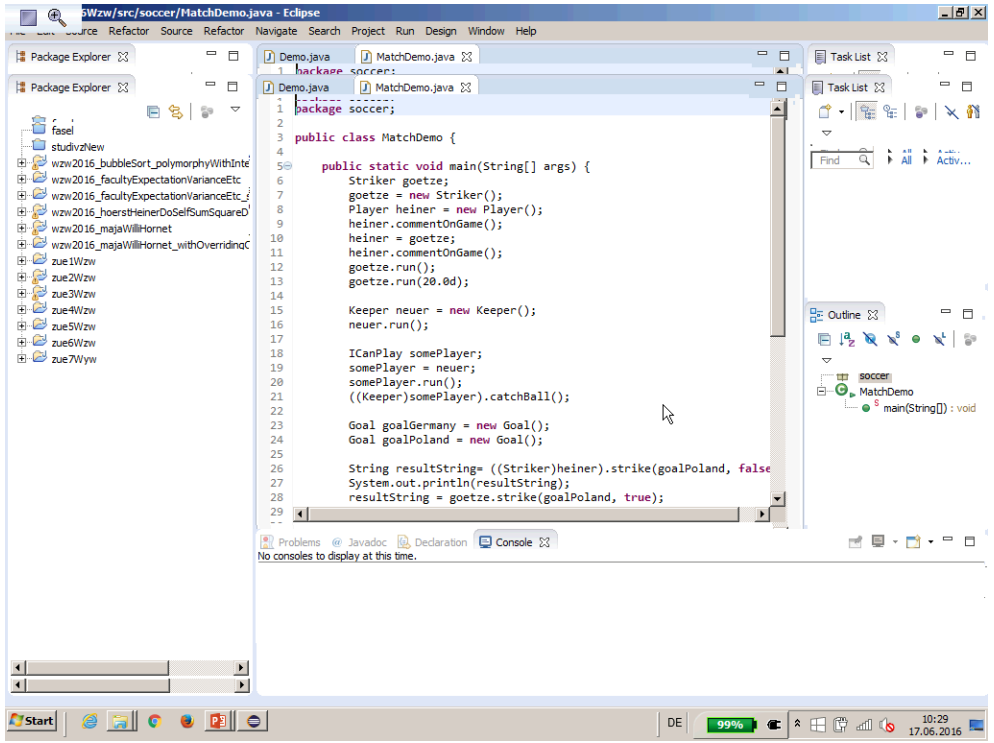

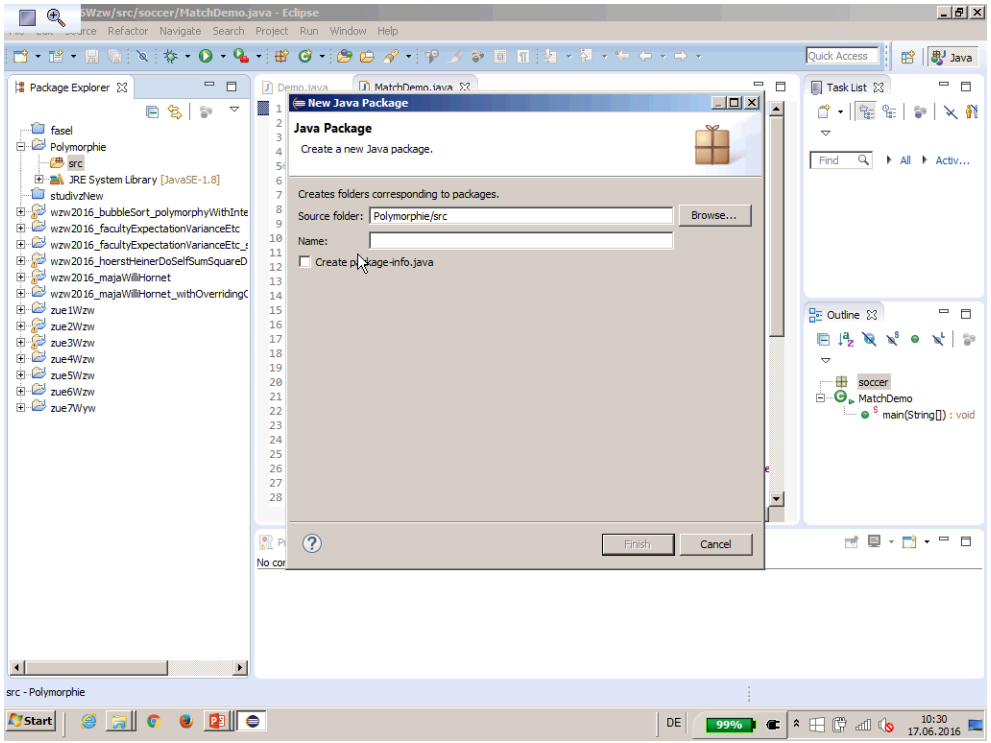

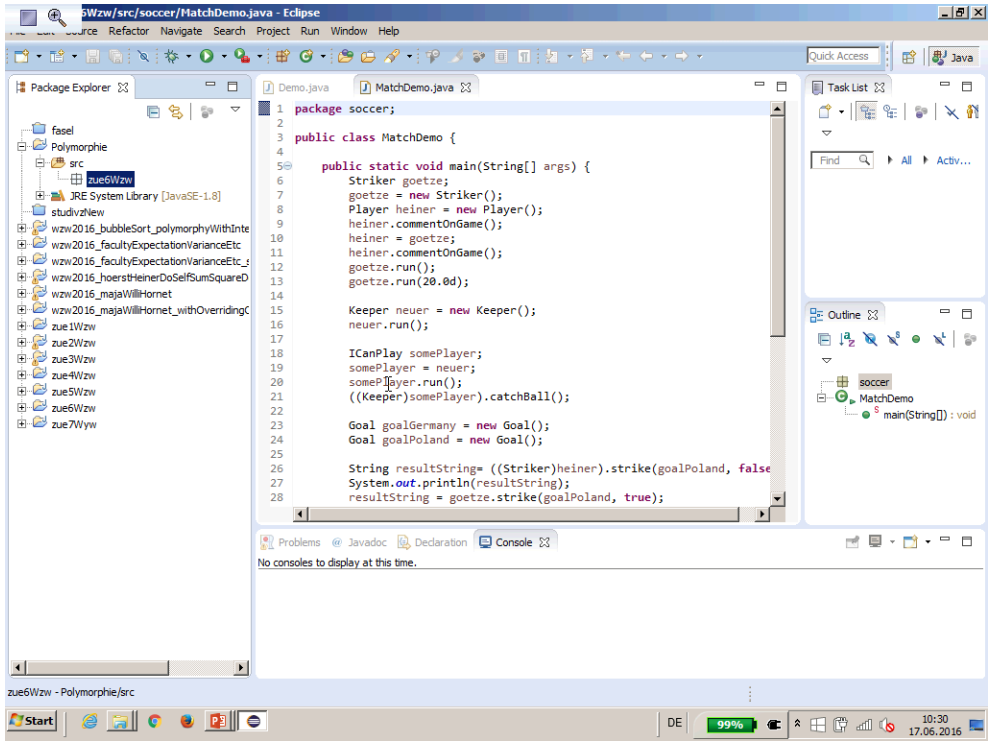

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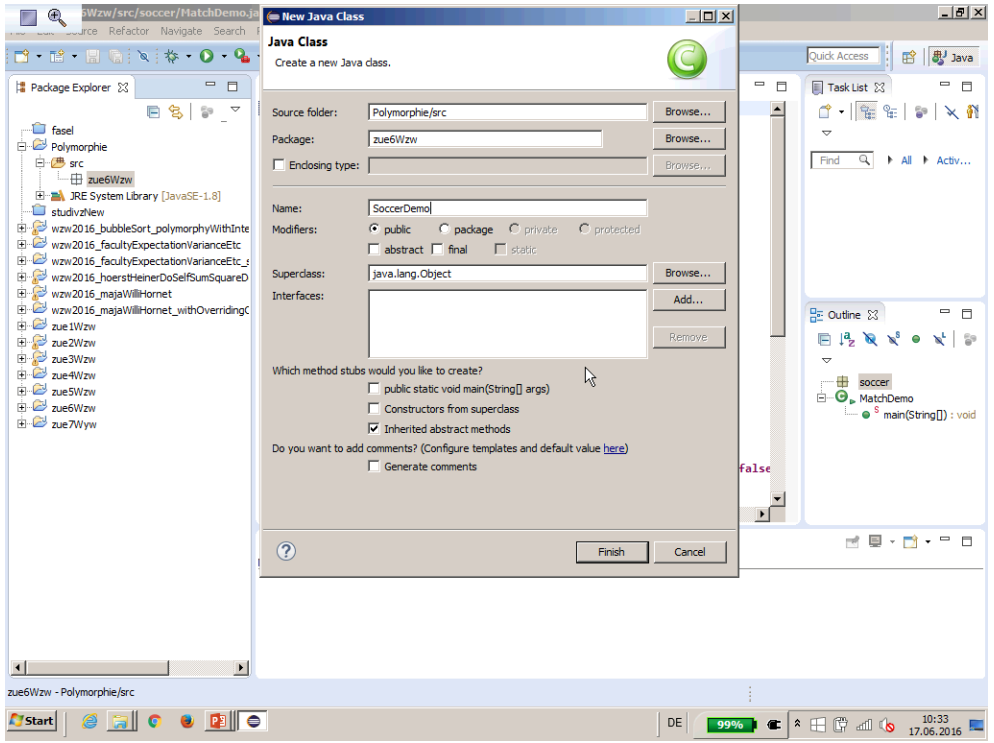

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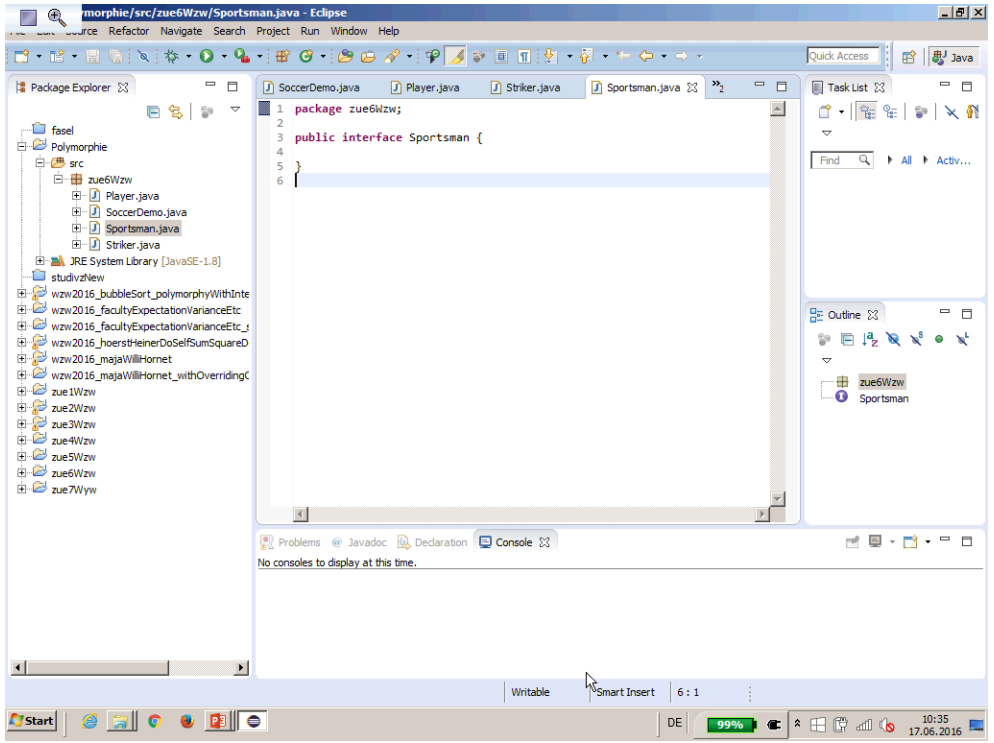

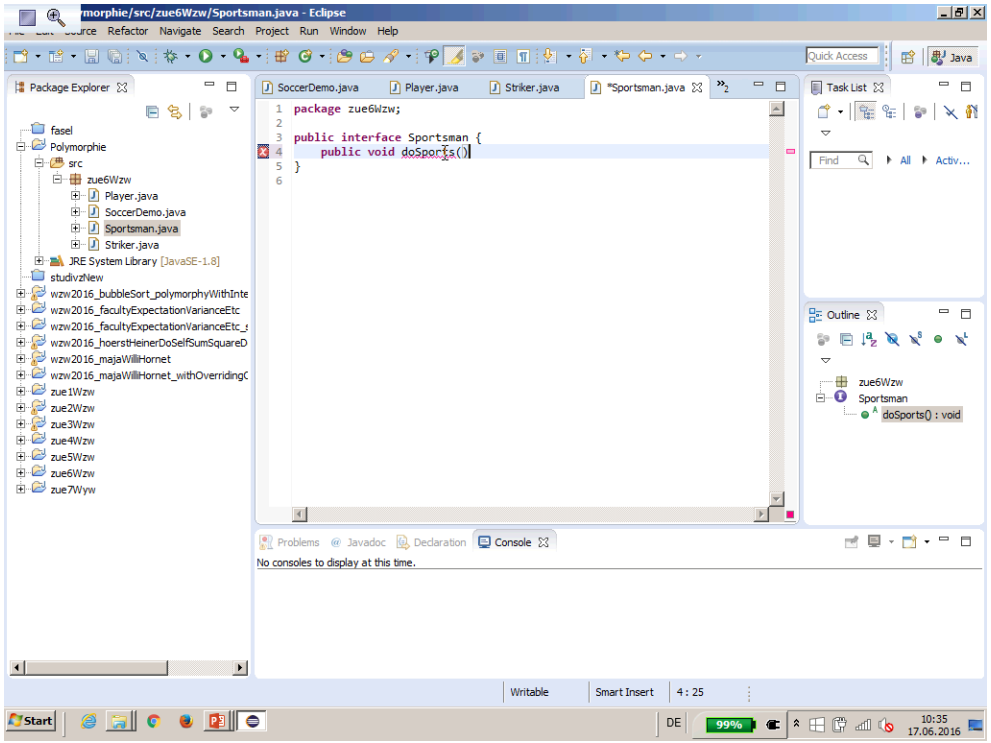
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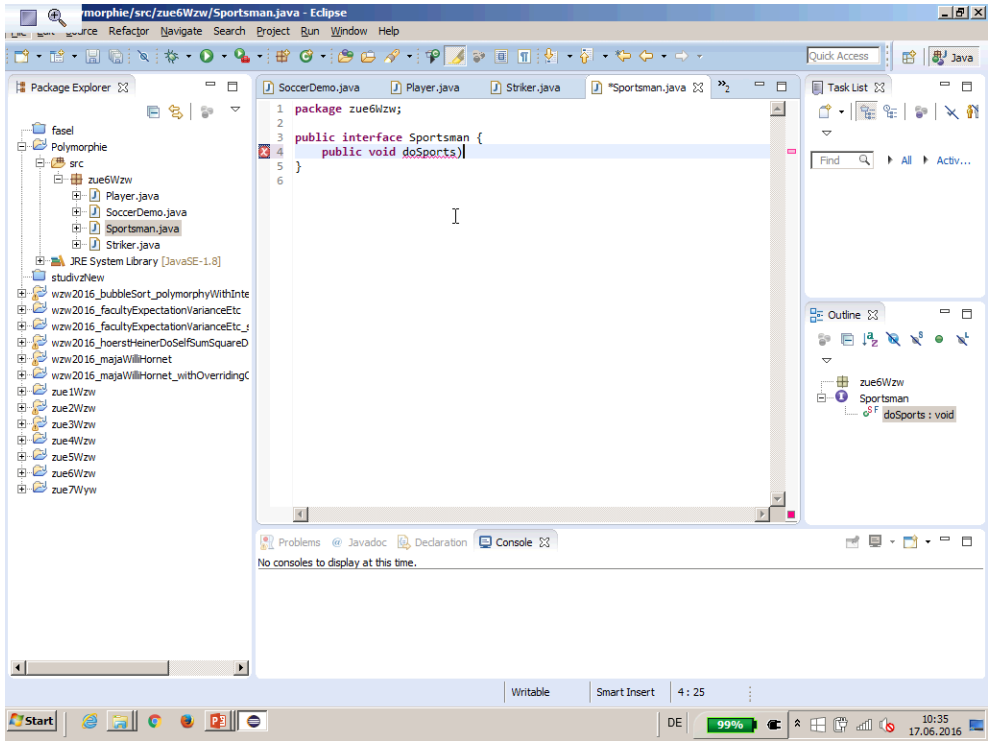
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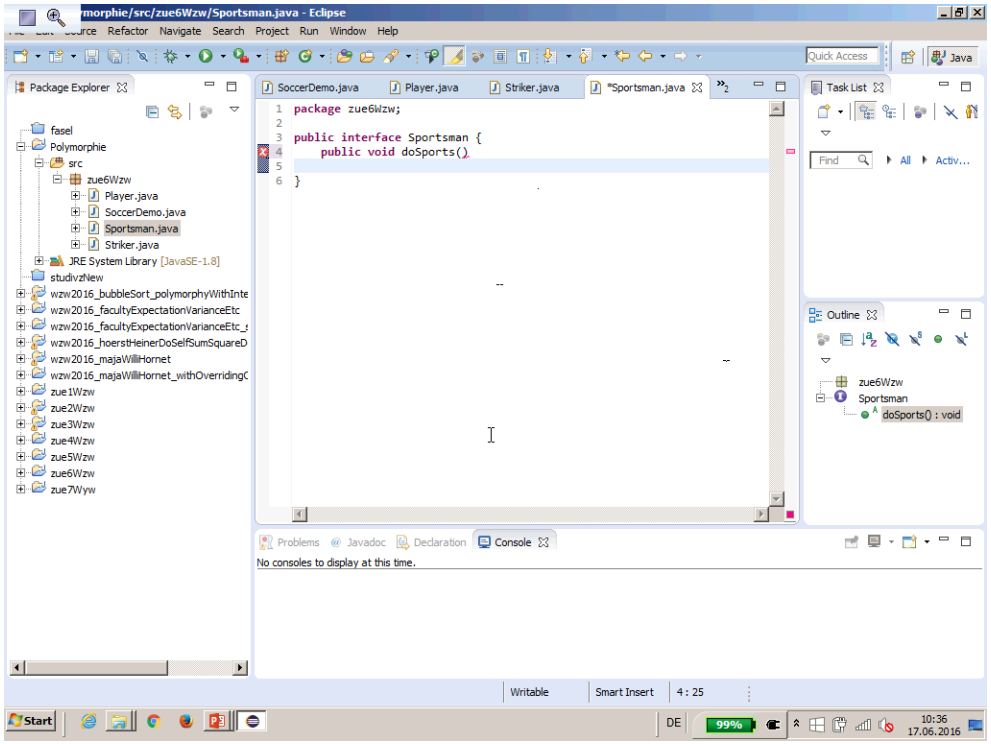
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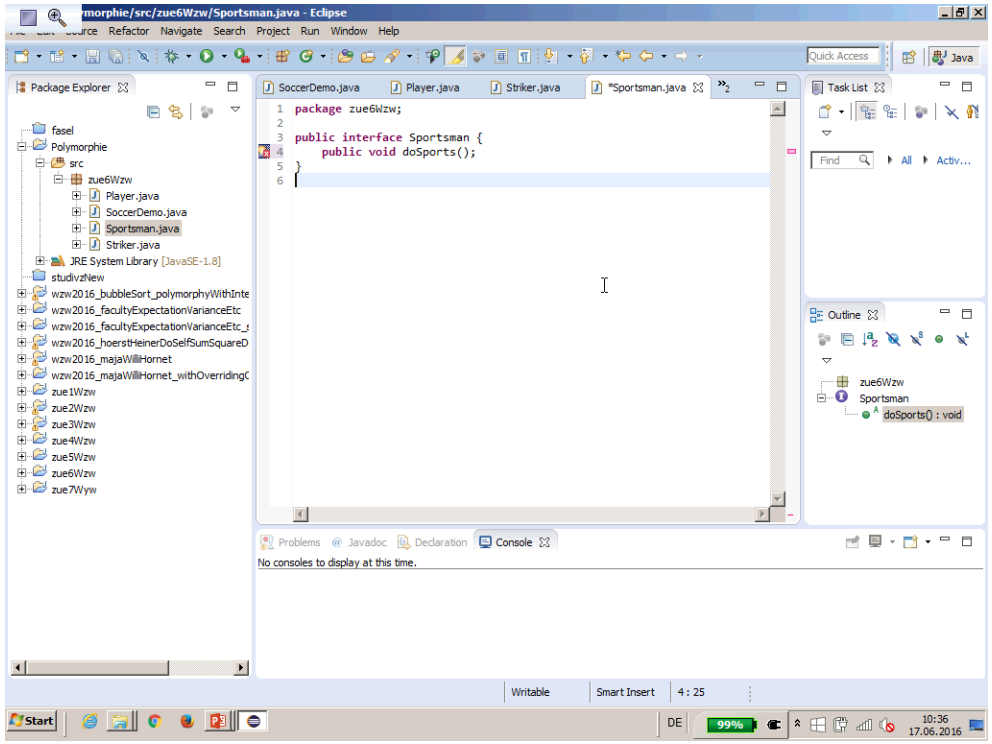
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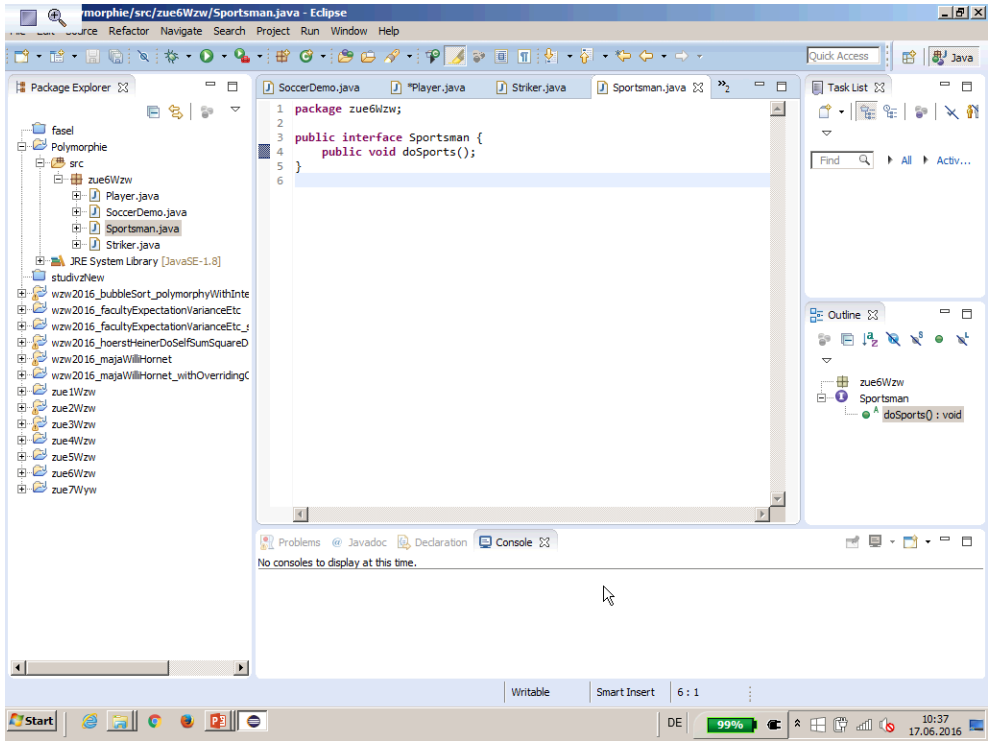

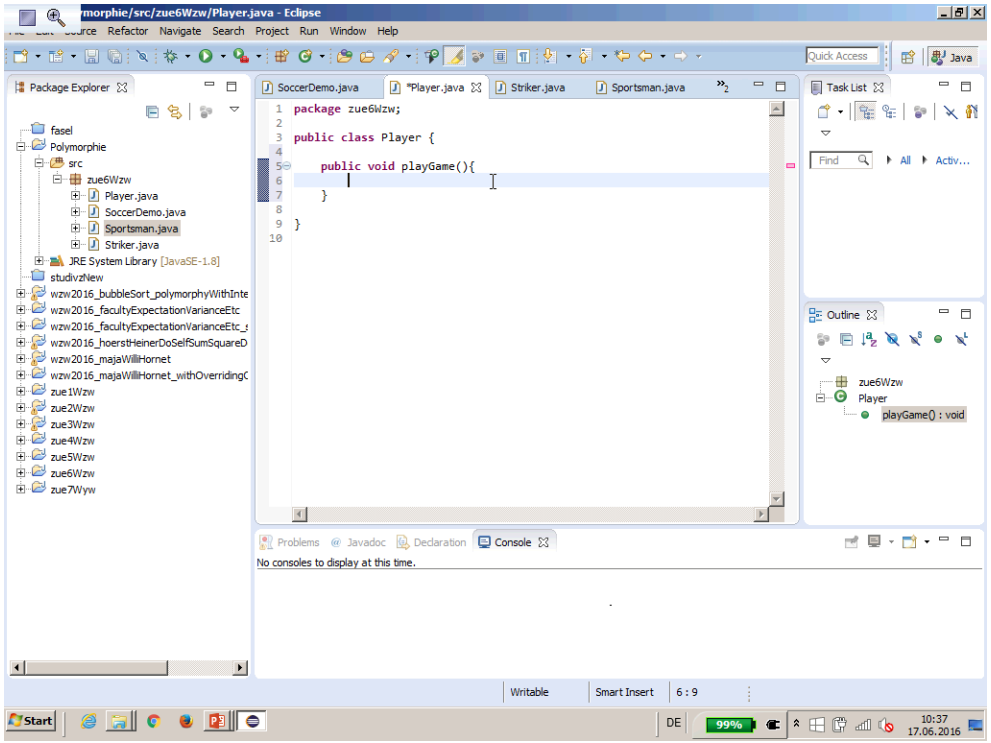

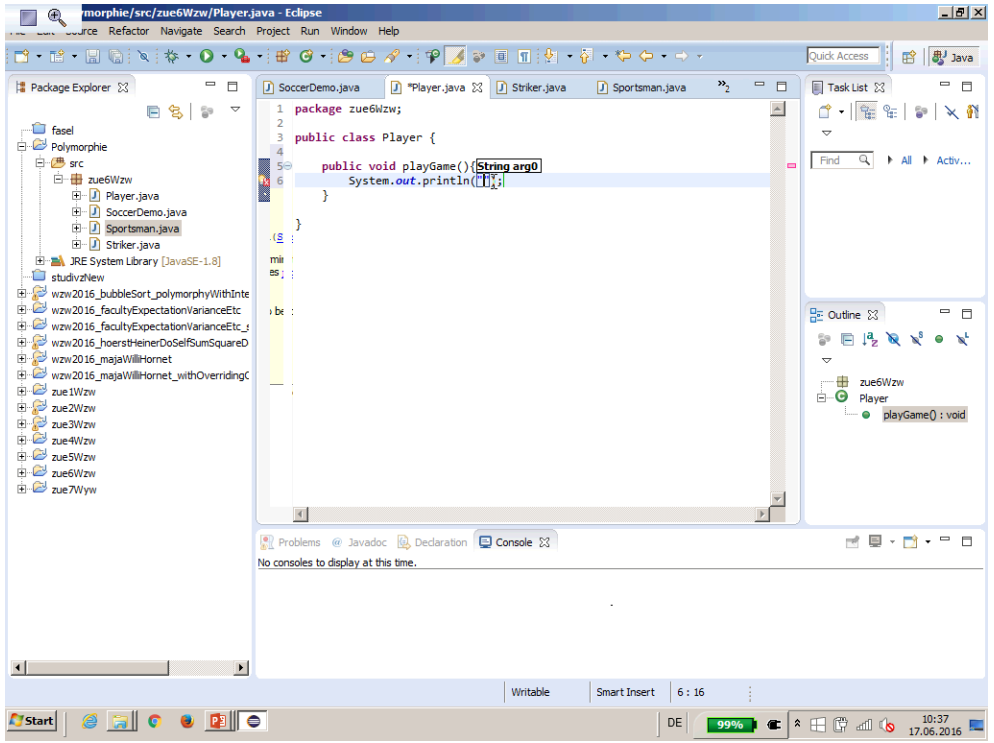

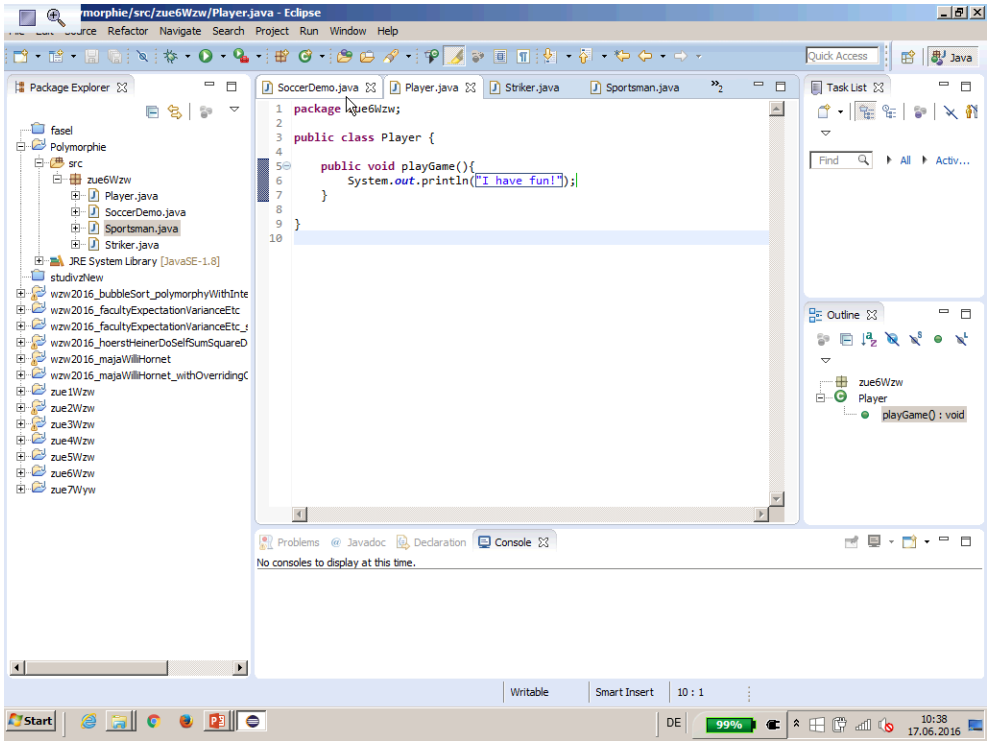

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		MinisterOfFinance schaeuble = new MinisterOfFinance();
		MinisterOfFinance varoufakis = new MinisterOfFinance();
		schaeuble.commentOnCrisis();
		GovernmentMember merkel = new GovernmentMember();
		merkel.commentOnCrisis(" aehhh...");
		GovernmentMember someOtherMember = schaeuble;
		someOtherMember.commentOnCrisis(" aehhh...");
		varoufakis.commentOnCrisis("whatever....i need more money!");
	}
}

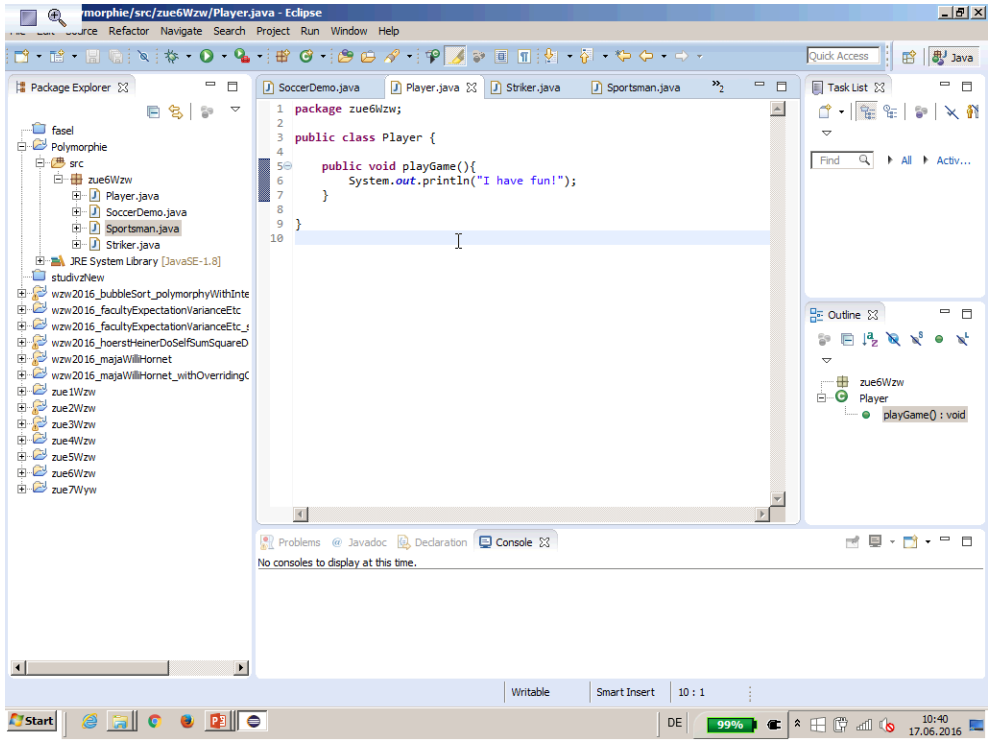
public class MinisterOfFinance extends GovernmentMember implements
StateRepresentant{
	public void commentOnCrisis(){
		System.out.println("no comment at the moment");
	}

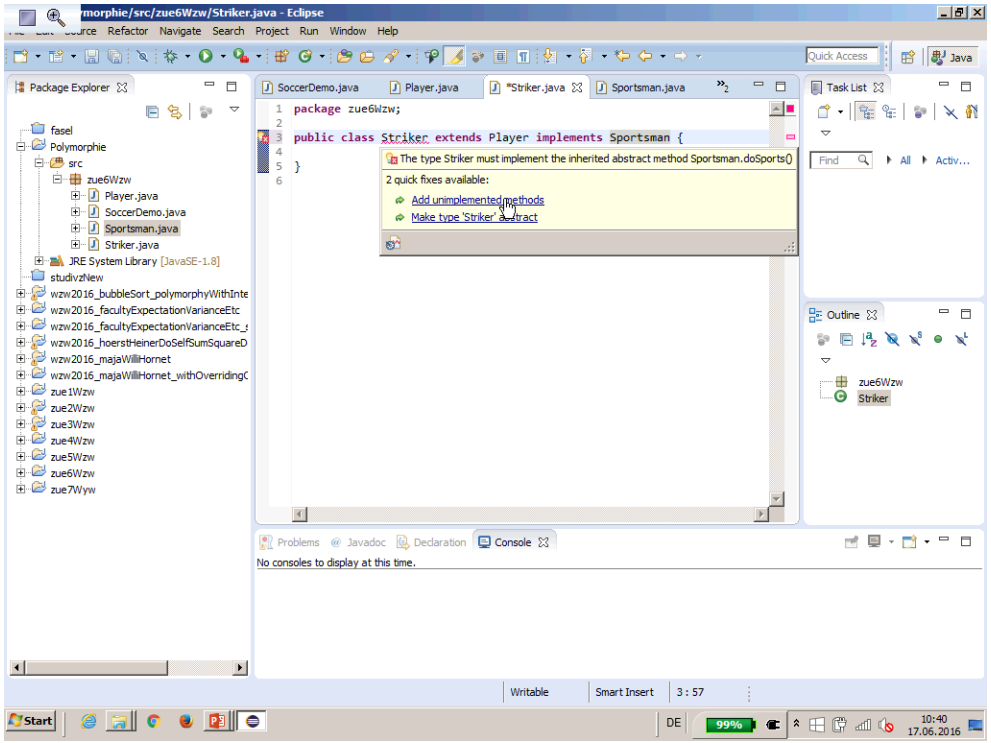
	public void commentOnCrisis(String what){
		System.out.println(what);
	}
}

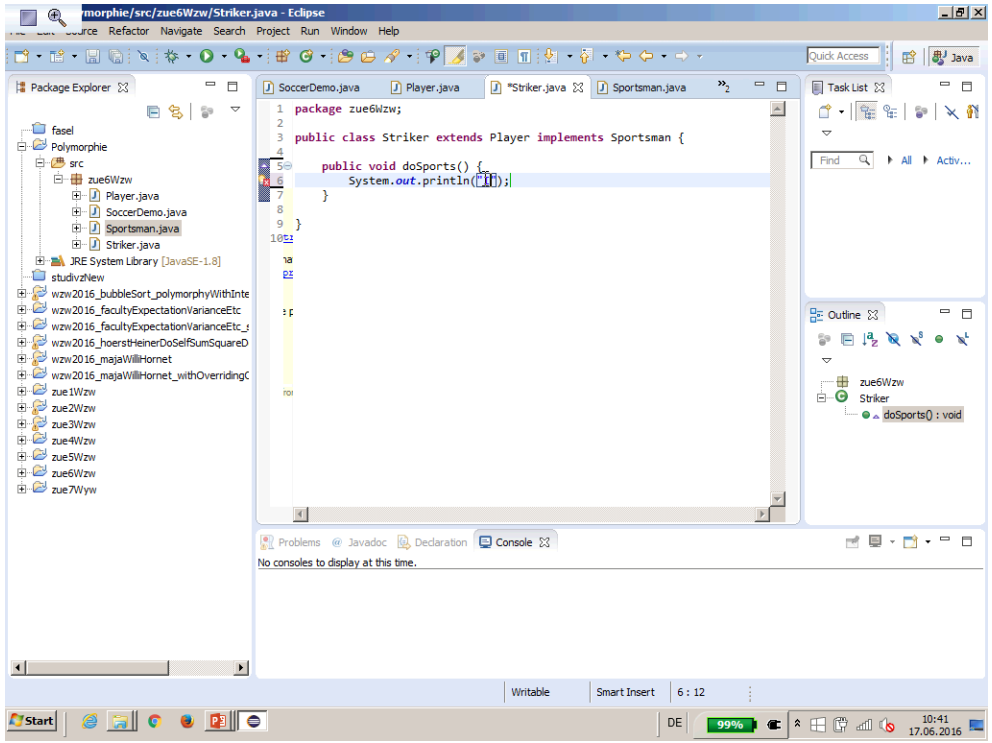
public class GovernmentMember {
	public void commentOnCrisis(String what){
		System.out.println("i must say that " + what);
	}
}

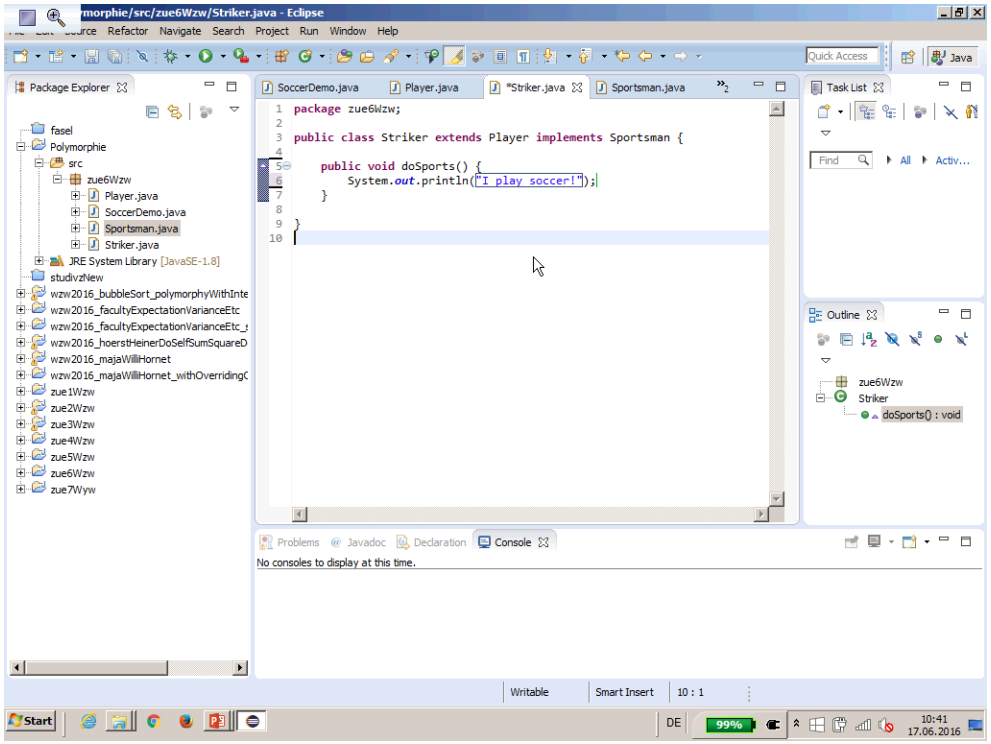

public interface StateRepresentant {
	public void commentOnCrisis();
}
```

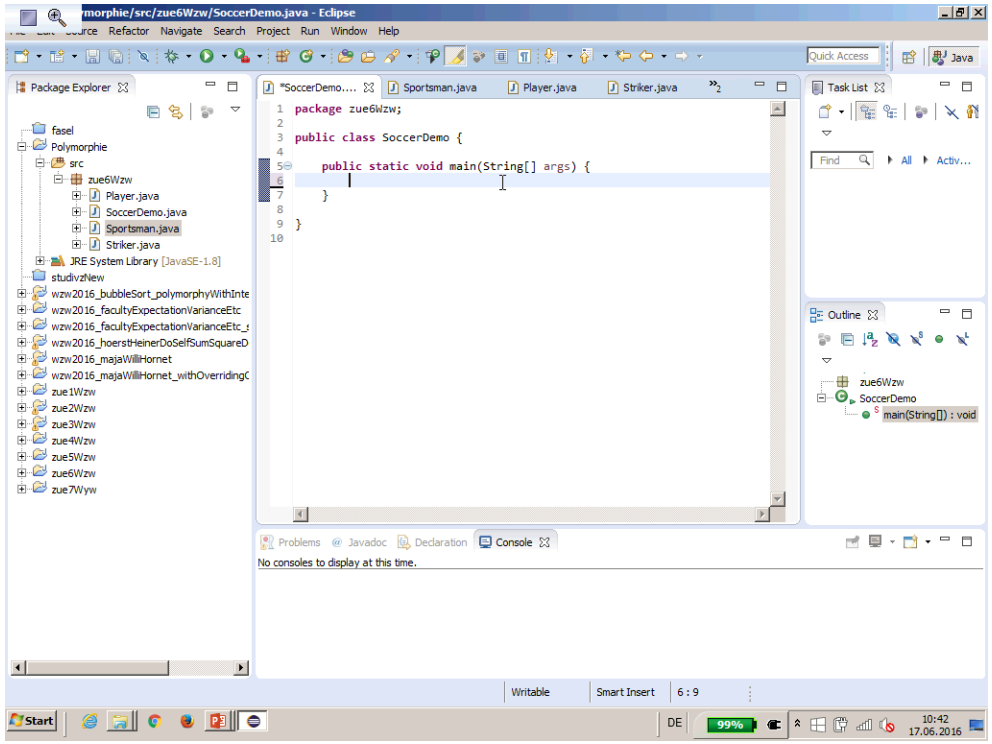
155

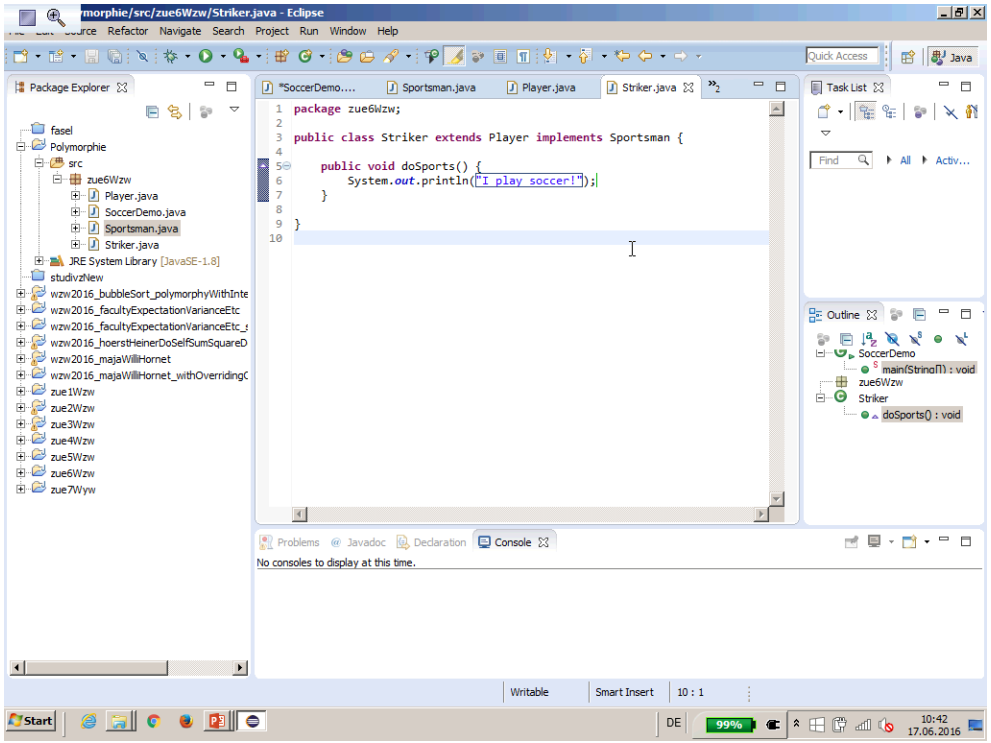


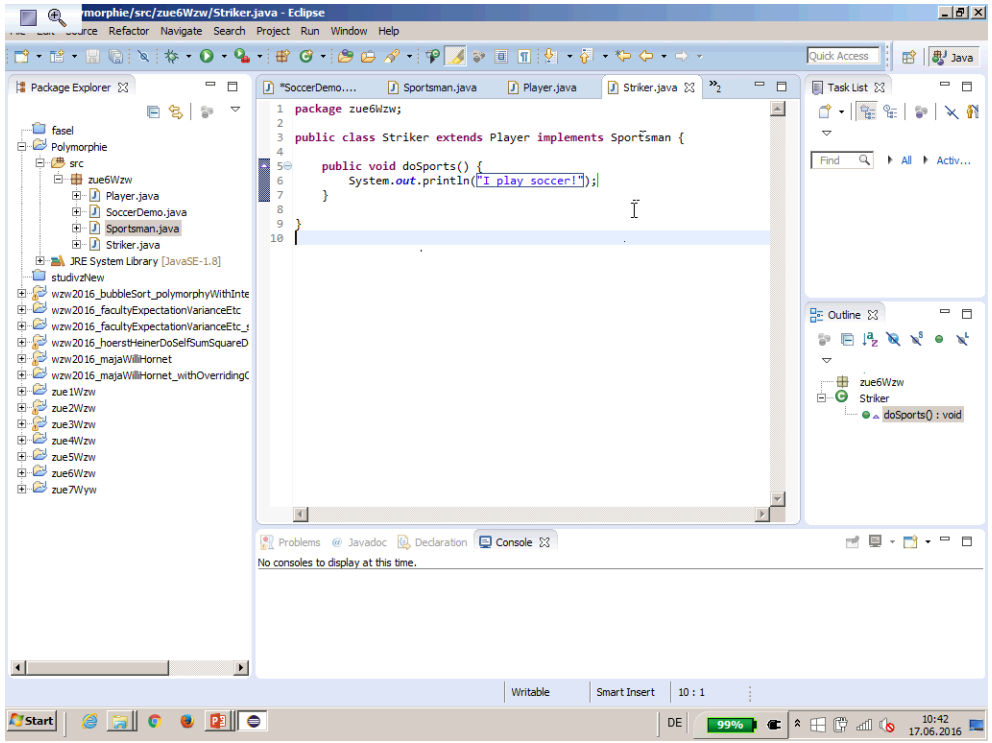

morphie/src/zue6Wzw/Striker.java - Eclipse
package zue6Wzw;
public class Striker extends Player implements Sportsman {
}
The type Striker must implement the inherited abstract method Sportsman.doSports()
2 quick fixes available:
Add unimplemented methods
Make type 'Striker' abstract
Writable
Smart Insert
3 : 57


morphie/src/zue6Wzw/Striker.java - Eclipse
package zue6Wzw;
public class Striker extends Player implements Sportsman {
public void doSports() {
System.out.println();
}
}
Writable
Smart Insert
6 : 12


morphie/src/zue6Wzw/Striker.java - Eclipse
package zue6Wzw;
public class Striker extends Player implements Sportsman {
public void doSports() {
System.out.println("I play soccer!");
}
}
Writable
Smart Insert
10 : 1


morphie/src/zue6Wzw/SoccerDemo.java - Eclipse
package zue6Wzw;
public class SoccerDemo {
public static void main(String[] args) {
}
}
Writable
Smart Insert
6 : 9


morphie/src/zue6Wzw/Striker.java - Eclipse
Refactor Navigate Search Project Run Window Help
Package Explorer
*SoccerDemo.... Sportsman.java Player.java Striker.java
Task List
Outline
1 package zue6Wzw;
2
3 public class Striker extends Player implements Sportsman {
4
5 public void doSports() {
6 System.out.println("I play soccer!");
7 }
8
9 }
10
Problems Javadoc Declaration Console
No consoles to display at this time.
Writable Smart Insert 10 : 1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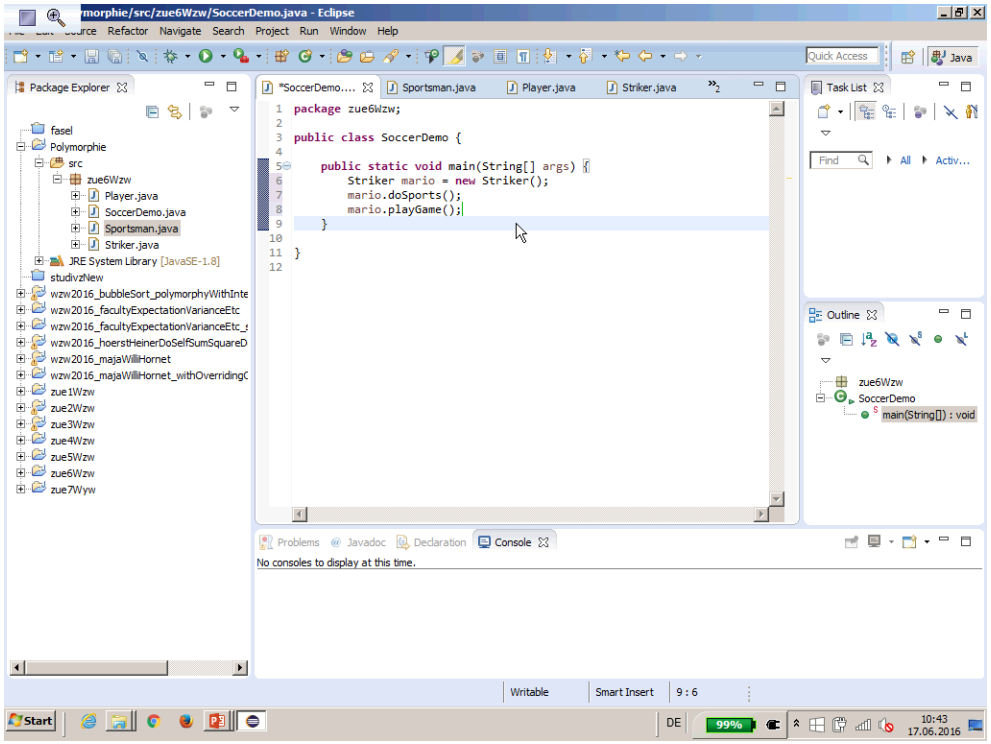
5 public void doSports() {
6 System.out.println("I play soccer!");
7 }
8
9 }
10
Problems Javadoc Declaration Console
No consoles to display at this time.
Writable Smart Insert 10 : 1


morphie/src/zue6Wzw/SoccerDemo.java - Eclipse
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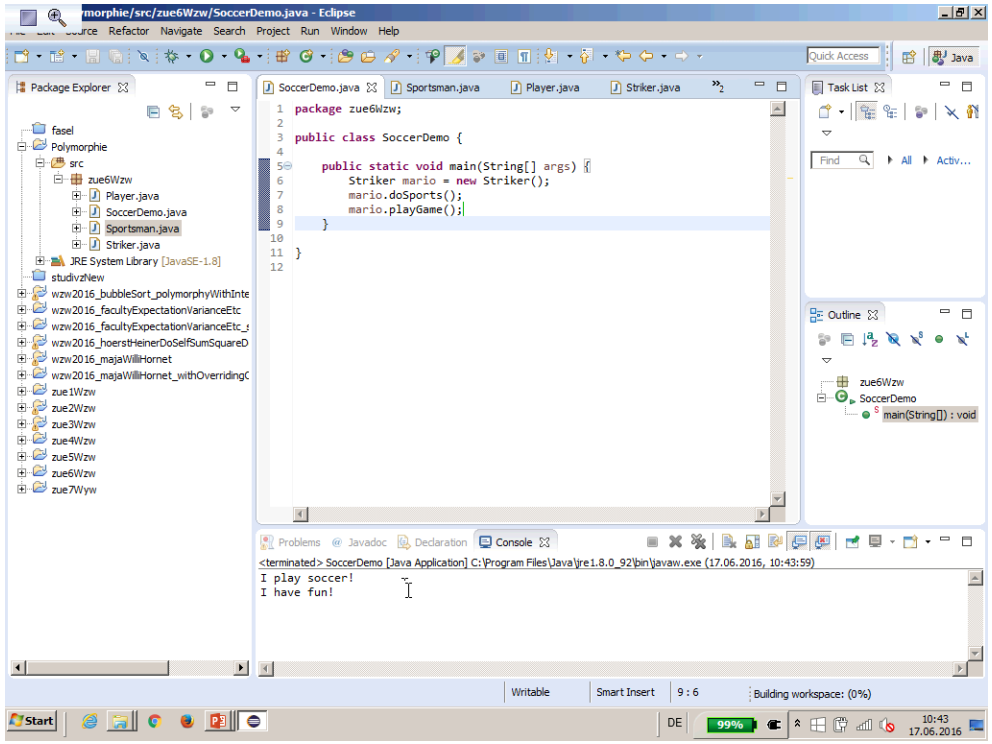
Package Explorer
*SoccerDemo.... Sportsman.java Player.java Striker.java
Task List
Outline
1 package zue6Wzw;
2
3 public class SoccerDemo {
4
5 public static void main(String[] args) {
6 Striker mario = new Striker();
7 mario.doSports();
8 mario.playGame();
9 }
10
11 }
12
Problems Javadoc Declaration Console
No consoles to display at this time.
Writable Smart Insert 9 : 6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Refactor Navigate Search Project Run Window Help
Package Explorer
SoccerDemo.java Sportsman.java Player.java Striker.java
Task List
Outline
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2
3 public class SoccerDemo {
4
5 public static void main(String[] args) {
6 Striker mario = new Striker();
7 mario.doSports();
8 mario.playGame();
9 }
10
11 }
12
Problems Javadoc Declaration Console
<terminated> SoccerDemo [Java Application] C:\Program Files\Java\jre1.8.0_92\bin\javaw.exe (17.06.2016, 10:43:59)
I play soccer!
I have fun!
Writable Smart Insert 9 : 6
Building workspace: (0%)