TECHNISCHE
UNIVERSITÄT
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Welcome.TU.code

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Object-oriented programming

Recap

What do we need Arrays for?

How to use two dimensional arrays?

Recap

What do we need Arrays for?

How to use two dimensional arrays?

Why is this

```
int[] coins = new int[3];
```

better than this

```
int coin1;
int coin2;
int coin3;
```

Recap - Example

Write the function `int[][] printSquare(int n)` which returns an two dimensional array so that:

n = 1

```
0
```

n = 3

```
0  1  2
1  2  3
2  3  4
```

n = 7

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

Scope

The scope defines the „time“ a variable exists

Valid inside the { } brackets

Variables from „outside“ are valid too

Global variables vs. local variables

Examples follow

Scope - Examples

```
public static void main(String args[]){
   int a;
   for(int i = 0; i < 5; i++){
      a = a + i;
   }
}
```

Scope - Examples

```
public static void main(String args[]){
  for(int i = 0; i < 5; i++){
     int a = i;
  }
  a = 7;
}
```

Scope - Examples

```
public static int addOne(int b){
   return b + 1;
}
public static void main(String args[]){
   int c = 4;
   addOne(c);
   b = b + 3;
}
```

Scope - Examples

```
public class MainClass{
   static int amount;
   public static void main(String args[]){
       amount = 3;
       int c = 3;
   }
}
```

Scope - Examples

```
public static void main(String args[]){
   int c = 4;
   printC(c);
}
public static void printC(int x){
   System.out.println(c);
}
```

Object-oriented programming

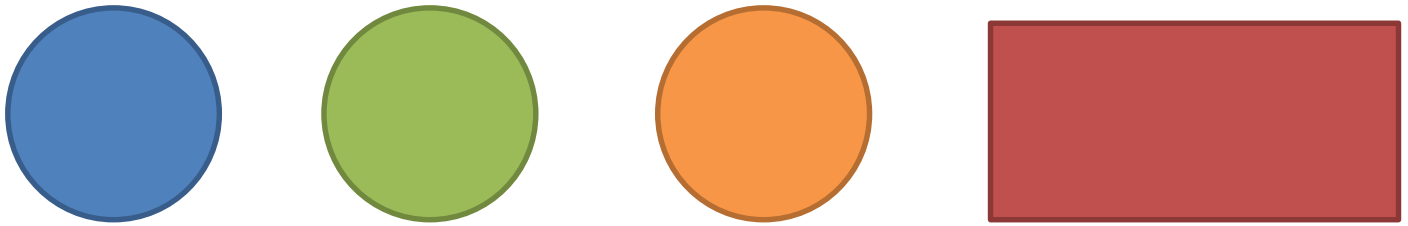
Java is object oriented

Everything is an object

Objects represent things

They have attributes and methods

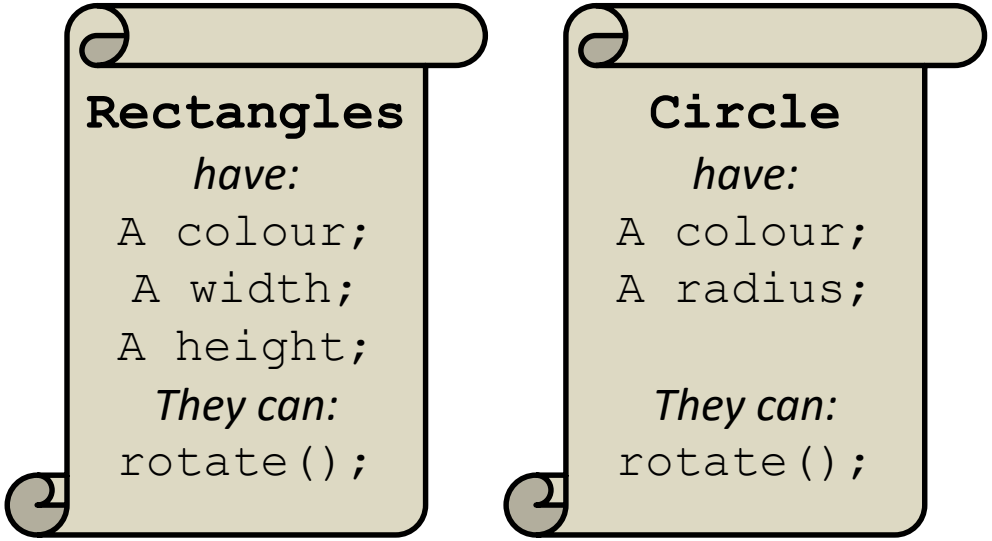
Circle (blue) Circle (green) Circle (orange) Rectangle (red, 2 x 1)



Object-oriented programming
Classes

„Construcion plan“ for objects

They define the objects‘ attributes and methods



Live example

Creating the class `Circle`

See git for the code (after this lecture)

OOP Example

Let‘s program the Rectangle class and instanciate some rectangles in an array.

Rectangles

have:

```
A colour;
A width;
A height;
```

They can:

```
rotate();
```

Rectangle (red, 2 x 1)

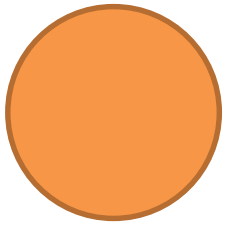
toString() method

A method to print information about an object

Should be implemented by the programmer

Should contain important information

Example:



„An orange cirle“

Homework

- Finish the rectangle class
- Write toString() for rectangle
- Write a method to change the colour of a rectangle
- Write a method to change the colour of a circle