Welcome.TU.code

OOP, Visibility

Recap

- What is a variable scope?
- What is a class?
- What is an object?
- Why do we need objects?
- What is a method?
- What is an attribute?

Class Example

```java
public class Rectangle{
    int width;
    int height;

    int area(){
        return width*height;
    }
    void rotate(){ … }
    String toString(){ … }
}
```

Attributes
(=Data)

Methods
(=Operations)

Object Example

```java
public static void main(String[] args){
    Rectangle r1 = new Rectangle();
    r1.width = 2;
    r1.height = 5;
    System.out.println(r1.area());
  Rectangle r2 = new Rectangle();
    r2.width = 3;
    r2.height = 4;
    System.out.println(r2.area());
}
```

Constructor

helps to initialize attributes of an object from start

```java
public class Rectangle{
    int width;
    int height;

    Rectangle(int w; int h){
        width = w;
        height = h;
    }
    ...
}
```

Constructor Example

```java
public static void main(String[] args){
    Rectangle r1 = new Rectangle(2,5);
    System.out.println(r1.area());

    Rectangle r2 = new Rectangle();
    r2.width = 3;
    r2.height = 4;
    System.out.println(r2.area());
}
```

Keyword this

```java
public class Rectangle{
    int width;
    int height;


    Rectangle(int width, int height){
        this.width = width;
        this.height = height;
    }
    ...
}
```
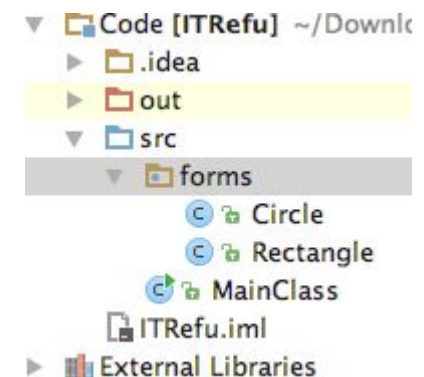
=this.width

=this.height

Packages

help to structure the files
need actual folders in file system
need a definition on top of the file:

```java
package forms;


public class Rectangle{
    ..
}
```

Visibility

Modifier	same Class	same Package	everywhere
`private`	yes	no	no
default	yes	no	no
`package`	yes	yes	no
`public`	yes	yes	yes

Setter and Getter

```java
public class Rectangle{

    private int width;
    private int height;

    public void setWidth(int width){
        this.width = width;
    }
    public int getWidth(){
        return this.width;
    }
    ...
}
```

Setter and Getter

Rule of thumb:

1) Make all attributes private
2) force access via public setter and getter to control access

to reduce complexity & increase security

Exercise

Implement Task 1: Person