

*Einführung in die  
Informatik 2 für Ingenieure*  
**Zentralübung 1**

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# Agenda

1. Organisation
2. Umfrage
3. Java
4. UML
5. Übungsblatt 1

# Organisation

# Termine

- **Vorlesung** (Prof. Alfons Kemper)
  - Montag 10:00 - 11:30
- **Zentralübung** (Simon Ellmann, Christoph Anneser)
  - Montag 11:30 - 12:30
- **Fragestunde** (Sebastian Reichbauer)
  - Donnerstag 15:30 - 16:30

# Website

The screenshot shows a web browser window with the URL <https://db.in.tum.de/teaching/ss17/ei2/>. The browser's address bar shows the page is secure. The website header features the TUM logo and the text 'Technische Universität München' and 'Die unternehmerische Universität'. A navigation menu on the left includes 'Home', 'People', 'Research', 'Teaching', and 'Summer Term 2017'. The main content area is titled 'Einführung in die Informatik 2 für Ingenieure' and lists the following information:

- Prof. Alfons Kemper, Ph.D.**
- Alexander van Renen, M.Sc.**
- Organisation**
- Vorlesung**
  - Termin: Montag 10:00
  - Ort: BC2 0.01.17
- Zentralübung**
  - Termin: Montag 11:30
  - Ort: BC2 0.01.17
- Fragestunde**
  - Termin: Donnerstag 15:30
  - Ort: BC2 0.01.17
  - Tutor: Moritz Sichert [sichert@in.tum.de](mailto:sichert@in.tum.de)
- Material**

On the right side, the website identifies the 'Lehrstuhl III Datenbanksysteme' and lists 'Prof. Kemper', 'Prof. Neumann', and 'Prof. Günemann' as faculty members. The browser's address bar also shows the user's name 'Alexander'.

<http://db.in.tum.de/teaching/ss24/ei2/>

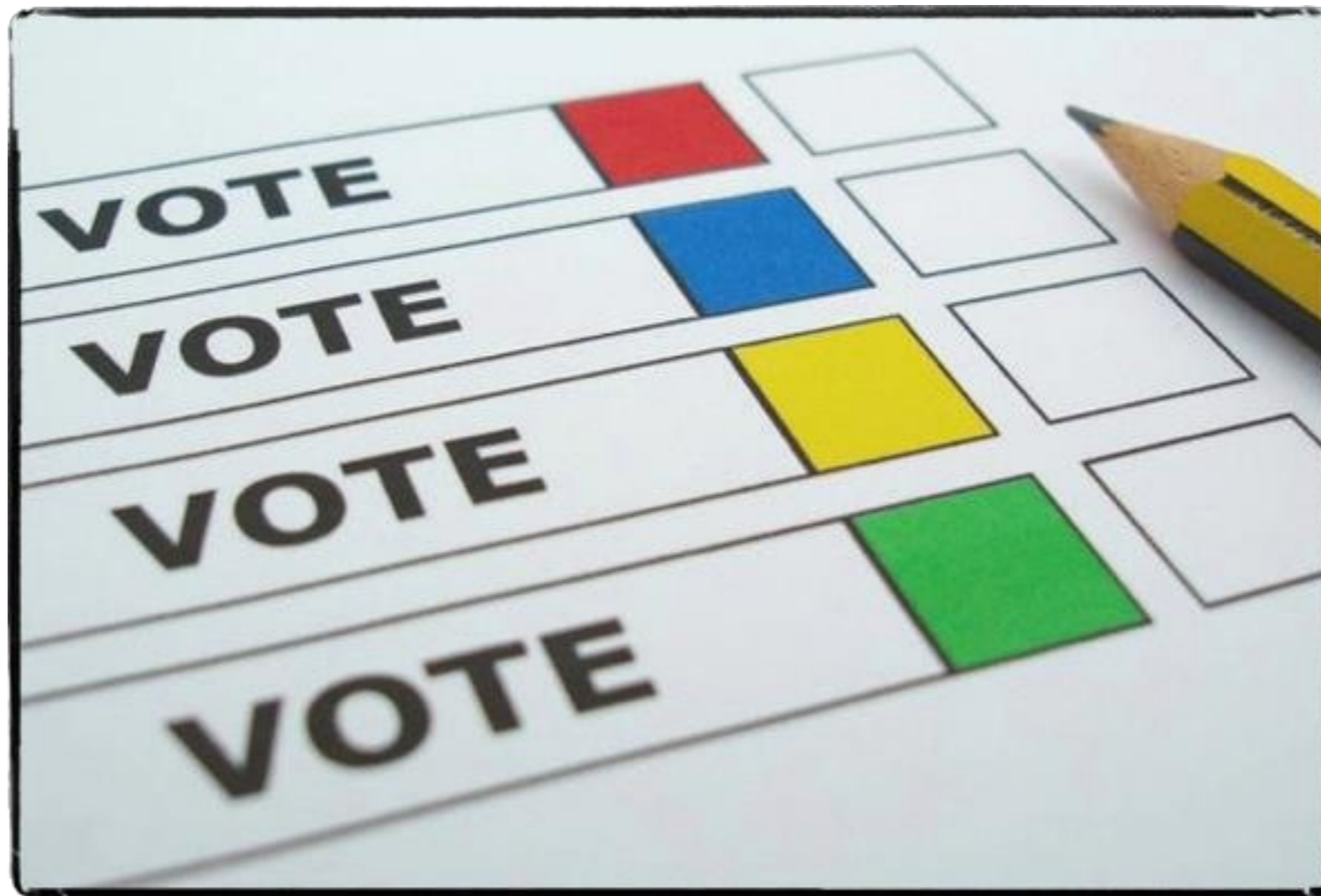
# Übungsblätter

- Erscheinen immer zu Beginn der Woche
- Keine Hausaufgaben
- Stattdessen:  
Ihr stellt eure Lösung vor
- Musterlösung danach auf der Webseite verfügbar

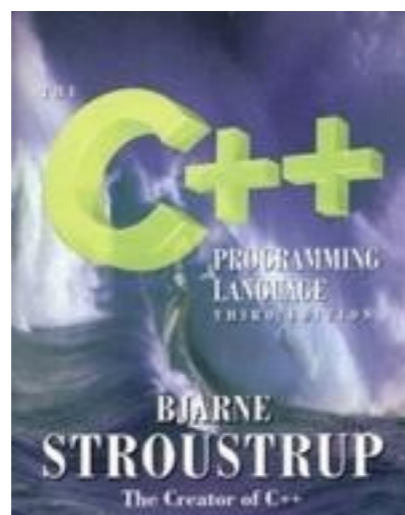


# Umfrage

<https://ars.particify.de/p/04470116>



# Programmiersprachen?

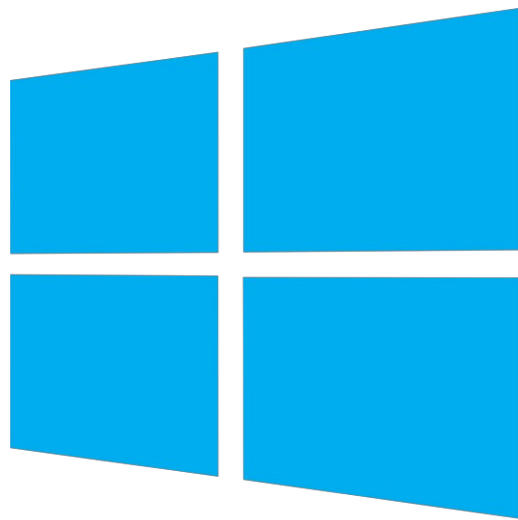


C#





# Betriebssysteme?



# Datenbanken?

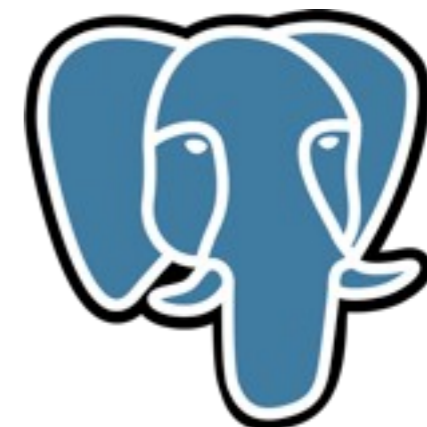
ORACLE®

IBM

Microsoft®  
SQL Server®

SQLite

MySQL®



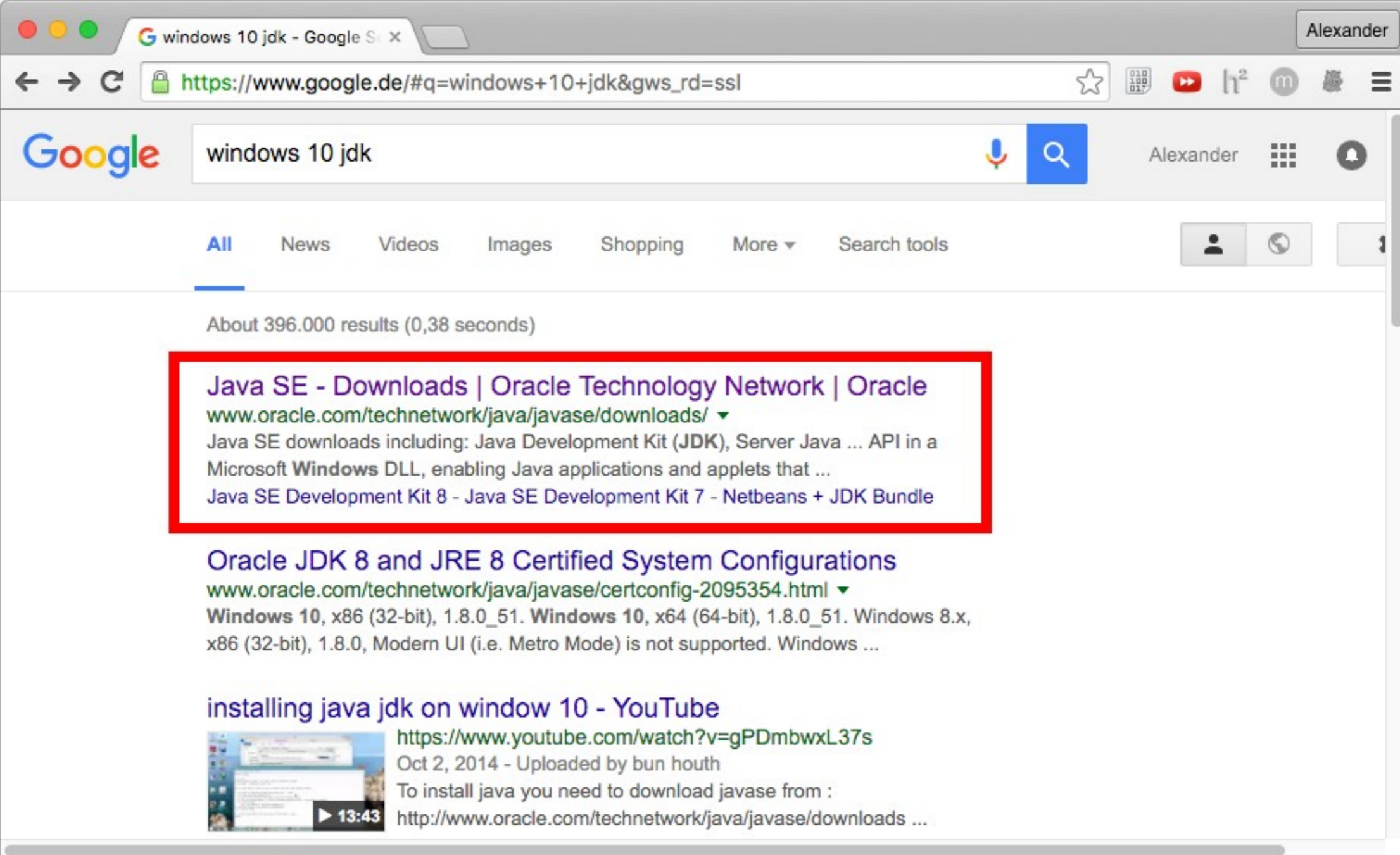
# Einführung in



# Java Setup

## 1. Java Development Kit (JDK)

# Java Setup (Windows)



A screenshot of a web browser window showing a Google search for "windows 10 jdk". The search results are displayed on the Google.de website. The first result is highlighted with a red box and is titled "Java SE - Downloads | Oracle Technology Network | Oracle". The URL is [www.oracle.com/technetwork/java/javase/downloads/](http://www.oracle.com/technetwork/java/javase/downloads/). The description of the result mentions "Java SE downloads including: Java Development Kit (JDK), Server Java ... API in a Microsoft Windows DLL, enabling Java applications and applets that ..." and lists "Java SE Development Kit 8 - Java SE Development Kit 7 - Netbeans + JDK Bundle". Below this, there are two other search results: "Oracle JDK 8 and JRE 8 Certified System Configurations" and a YouTube video titled "installing java jdk on window 10".

Windows 10 jdk - Google S x Alexander

[https://www.google.de/#q=windows+10+jdk&gws\\_rd=ssl](https://www.google.de/#q=windows+10+jdk&gws_rd=ssl)

Google windows 10 jdk Alexander

All News Videos Images Shopping More Search tools

About 396.000 results (0,38 seconds)

**Java SE - Downloads | Oracle Technology Network | Oracle**  
[www.oracle.com/technetwork/java/javase/downloads/](http://www.oracle.com/technetwork/java/javase/downloads/)  
Java SE downloads including: Java Development Kit (JDK), Server Java ... API in a Microsoft Windows DLL, enabling Java applications and applets that ...  
Java SE Development Kit 8 - Java SE Development Kit 7 - Netbeans + JDK Bundle

**Oracle JDK 8 and JRE 8 Certified System Configurations**  
[www.oracle.com/technetwork/java/javase/certconfig-2095354.html](http://www.oracle.com/technetwork/java/javase/certconfig-2095354.html)  
Windows 10, x86 (32-bit), 1.8.0\_51. Windows 10, x64 (64-bit), 1.8.0\_51. Windows 8.x, x86 (32-bit), 1.8.0, Modern UI (i.e. Metro Mode) is not supported. Windows ...

**installing java jdk on window 10 - YouTube**  
<https://www.youtube.com/watch?v=gPDmbwxL37s>  
Oct 2, 2014 - Uploaded by bun houth  
To install java you need to download javase from :  
<http://www.oracle.com/technetwork/java/javase/downloads> ...

# Java Setup (Windows)

The screenshot shows a web browser window displaying the Oracle Java SE Downloads page. The browser's address bar shows the URL `www.oracle.com/technetwork/java/javase/downloads/index.html`. The page features the Oracle logo on the left and a navigation menu with links for Products, Solutions, Downloads, Store, Support, Training, Partners, and About. A search bar is also present. The main content area is titled "Java SE Downloads" and includes tabs for Overview, Downloads, Documentation, Community, Technologies, and Training. Two download options are highlighted with red boxes: "Java Platform (JDK) 8u77" and "NetBeans with JDK 8". Below these, a section titled "Java Platform, Standard Edition" provides information about the Java SE 8u77 release, including a note that it includes important security fixes and a link to "Learn more". A sidebar on the right lists various Java SDKs and resources. The browser's status bar at the bottom indicates "Resolving host...".

Java SE - Downloads | Oracle

www.oracle.com/technetwork/java/javase/downloads/index.html

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Products Solutions Downloads Store Support Training Partners About

Oracle Technology Network > Java > Java SE > Downloads

Overview Downloads Documentation Community Technologies Training

**Java SE Downloads**

Java Platform (JDK) 8u77

NetBeans with JDK 8

**Java Platform, Standard Edition**

**Java SE 8u77**  
Java SE 8u77 includes important security fixes. Oracle strongly recommends that all Java SE 8 users upgrade to this release.  
[Learn more](#)

Java SDKs a

- Java SE
- Java EE and GL
- Java ME
- Java Card
- NetBeans IDE
- Java Mission C

Java Reso

- Java APIs
- Technical Article
- Demos and Vid
- Forums
- Java Magazine
- Java.net

Resolving host...

# Java Setup (Windows)

The screenshot shows the Oracle Java SE Development Kit 8u77 download page. The browser address bar shows the URL: [www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html](http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html). The page title is "Java SE Development Kit 8u77".

Below the title, there is a license agreement section with two radio buttons: "Accept License Agreement" (highlighted with a red box) and "Decline License Agreement".

Below the license agreement, there is a table of download links for various operating systems and architectures. The "Windows x64" row is highlighted with a red box.

Product / File Description	File Size	Download
Linux ARM 32 Soft Float ABI	77.7 MB	<a href="#">jdk-8u77-linux-arm32-vfp-hflt.tar.gz</a>
Linux ARM 64 Soft Float ABI	74.68 MB	<a href="#">jdk-8u77-linux-arm64-vfp-hflt.tar.gz</a>
Linux x86	154.74 MB	<a href="#">jdk-8u77-linux-i586.rpm</a>
Linux x86	174.92 MB	<a href="#">jdk-8u77-linux-i586.tar.gz</a>
Linux x64	152.76 MB	<a href="#">jdk-8u77-linux-x64.rpm</a>
Linux x64	172.96 MB	<a href="#">jdk-8u77-linux-x64.tar.gz</a>
Mac OS X	227.27 MB	<a href="#">jdk-8u77-macosx-x64.dmg</a>
Solaris SPARC 64-bit (SVR4 package)	139.77 MB	<a href="#">jdk-8u77-solaris-sparcv9.tar.Z</a>
Solaris SPARC 64-bit	99.06 MB	<a href="#">jdk-8u77-solaris-sparcv9.tar.gz</a>
Solaris x64 (SVR4 package)	140.01 MB	<a href="#">jdk-8u77-solaris-x64.tar.Z</a>
Solaris x64	96.18 MB	<a href="#">jdk-8u77-solaris-x64.tar.gz</a>
Windows x64	187.31 MB	<a href="#">jdk-8u77-windows-x64.exe</a>

Below the table, there is a section titled "Java SE Development Kit 8u77 Demos and Samples Downloads".

# Java Setup

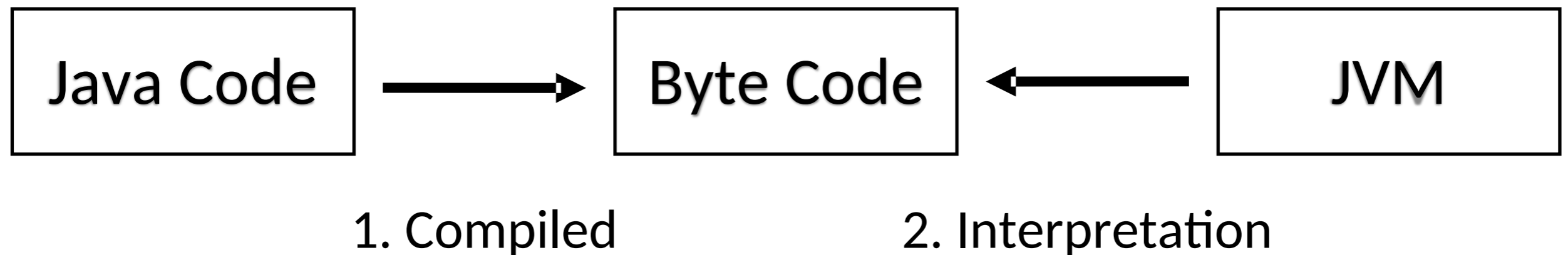
1. Java Development Kit (JDK) 
2. Code schreiben



# Hello World ...

```
public class Test {  
    public static void main(String[] args) {  
        System.out.println("hello my world !");  
    }  
}
```

# Hello World ...



1. Java Code wird vom java compiler (javac) in Java Byte Code übersetzt
2. Der Java Byte Code wird dann von der Java Virtual Machine (JVM) ausgeführt

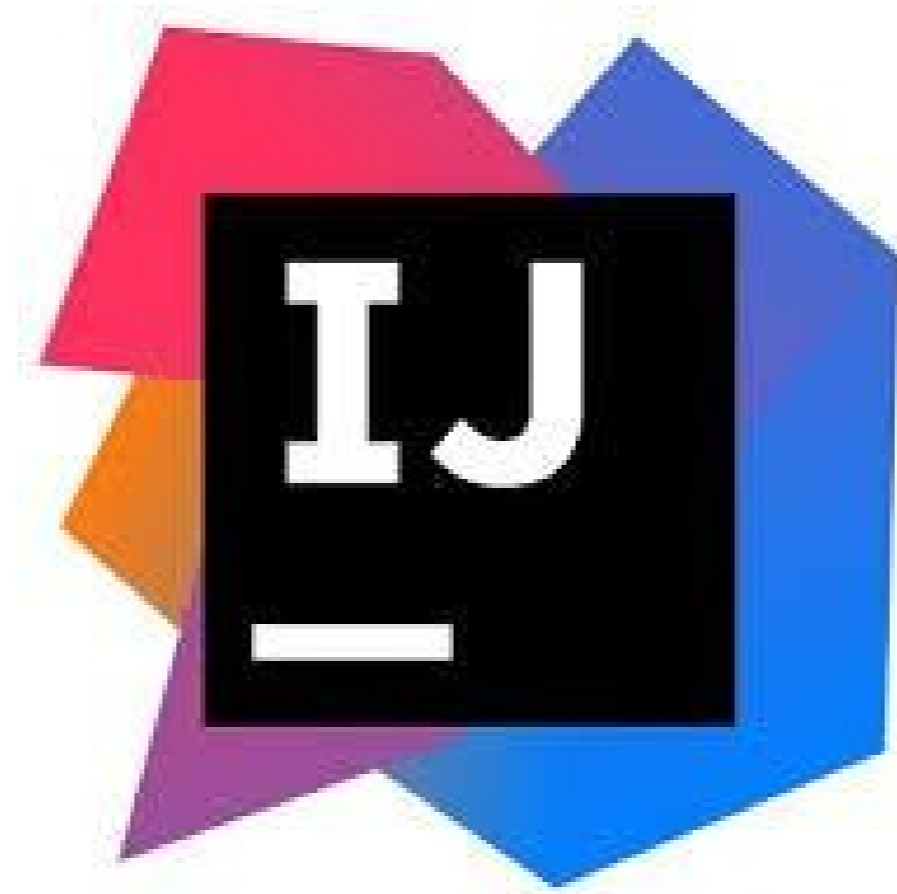
# Java Setup

1. Java Development Kit (JDK) ✓
2. Code schreiben ✓
3. Integrated Development Environment (IDE)

# IDE Overview

- IntelliJ IDEA CE
- Eclipse
- Netbeans

# IntelliJ IDEA



<https://www.jetbrains.com/idea/>

# Files & Packages

- Eine Klasse pro File
- Packages entsprechen der Ordner-Struktur

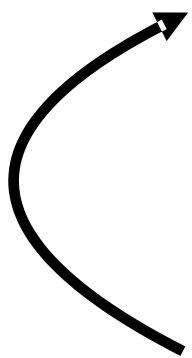
```
package source;
```

```
public class Blub {
```

```
    public static void main(String[] args) {  
        System.out.println("hello my world !");  
    }  
}
```

# Java Setup

1. Java Development Kit (JDK) ✓
2. Code schreiben ✓
3. IntelliJ IDEA installieren ✓
4. Code schreiben
5. Debuggen
6. Goto 4



# Ein paar Links

- IDE: IntelliJ IDEA:  
<https://www.jetbrains.com/idea/>
- Online IDE:  
[http://www.tutorialspoint.com/compile\\_java\\_online.php](http://www.tutorialspoint.com/compile_java_online.php)
- Zusätzliche Übungsaufgaben:  
<https://www.hackerrank.com/>
- Java Reference:  
<https://docs.oracle.com/javase/8/docs/api/overview-summary.html>



# Java Objekte



# Klassen & Objekte

- Eine Klasse ... z. B.: Punkt
  - ... beschreibt einen Daten-Typen.
  - ... ist sowas wie ein 'struct' in C.
- Ein Objekt ... zB: (1, 3)
  - ... ist eine Ausprägung eines Daten-Typen.
  - ... ist sowas wie eine Instanz von einer 'struct' in C.

# Klassen & Objekte

- Objekt Attribute/Methoden gehören zu einem Objekt.

```
public class Point {  
    float x; // Objekt Attribut  
    float y; // Objekt Attribut  
    float length() { /* .. */ } // Objekt Methode  
}
```

# Objekt Methoden

- Nachgebaut in C

```
struct Point {  
    float x;  
    float y;  
};  
float pointGetLength(Point* this) { /* .. */ }
```

- Java

```
public class Point {  
    float x;  
    float y;  
    float length() { /* .. */ }  
}
```

# Copy-by-reference vs -by-value

- C: By-value

```
// The pointer itself by value  
Point* a = malloc(sizeof(Point));  
Point* b = a;
```

```
// By value  
Point a;  
Point b = a;
```

- Java: Objects by-reference, primitive Typen by-value

```
// By reference  
Point a = new Point();  
Point b = a;
```

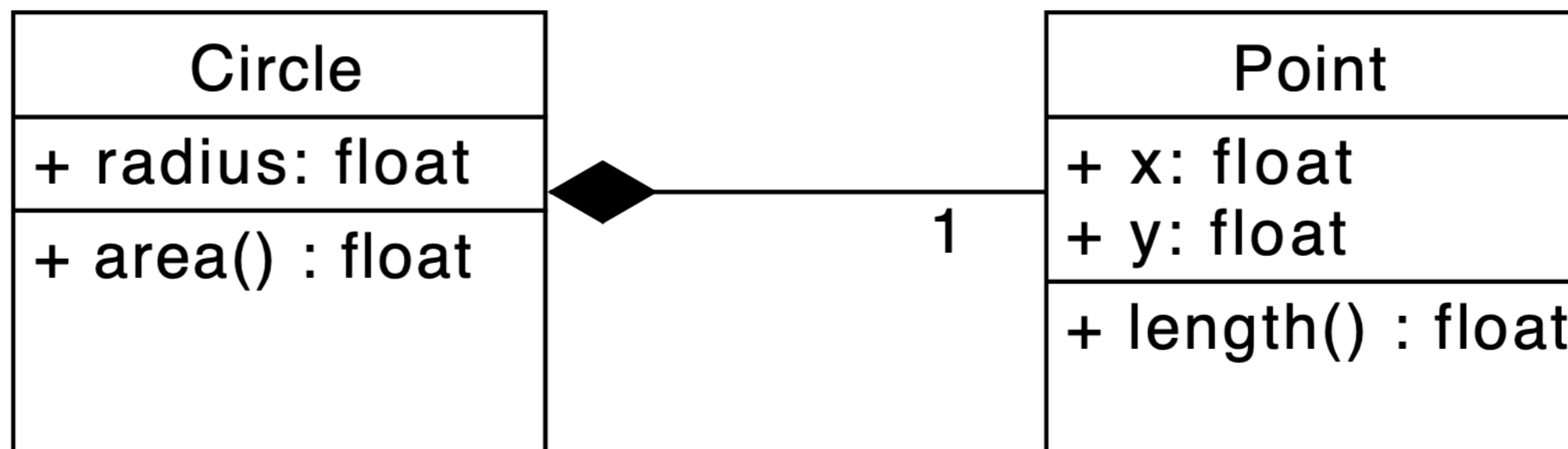
```
// By value  
int a = 3;  
int b = a;
```

# Modellierungsbeispiel



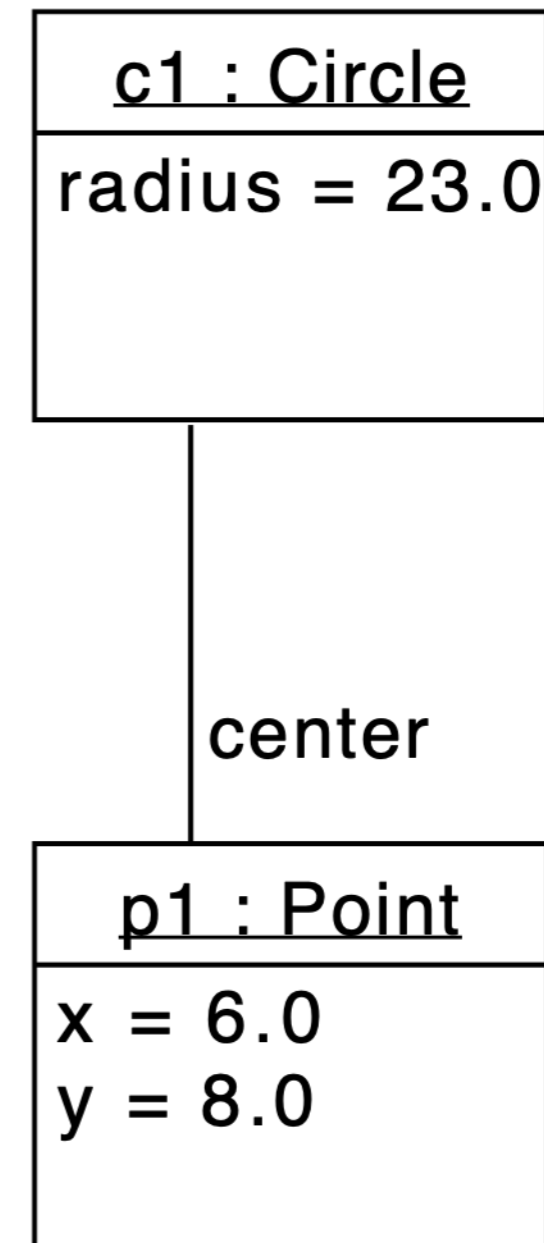
# Klassendiagramm

- Zeigt die Struktur des modellierten Systems
- Beschreibt Klassen mit Attributen und Operationen
- Zeigt Beziehungen zwischen Klassen



# Objektdiagramm

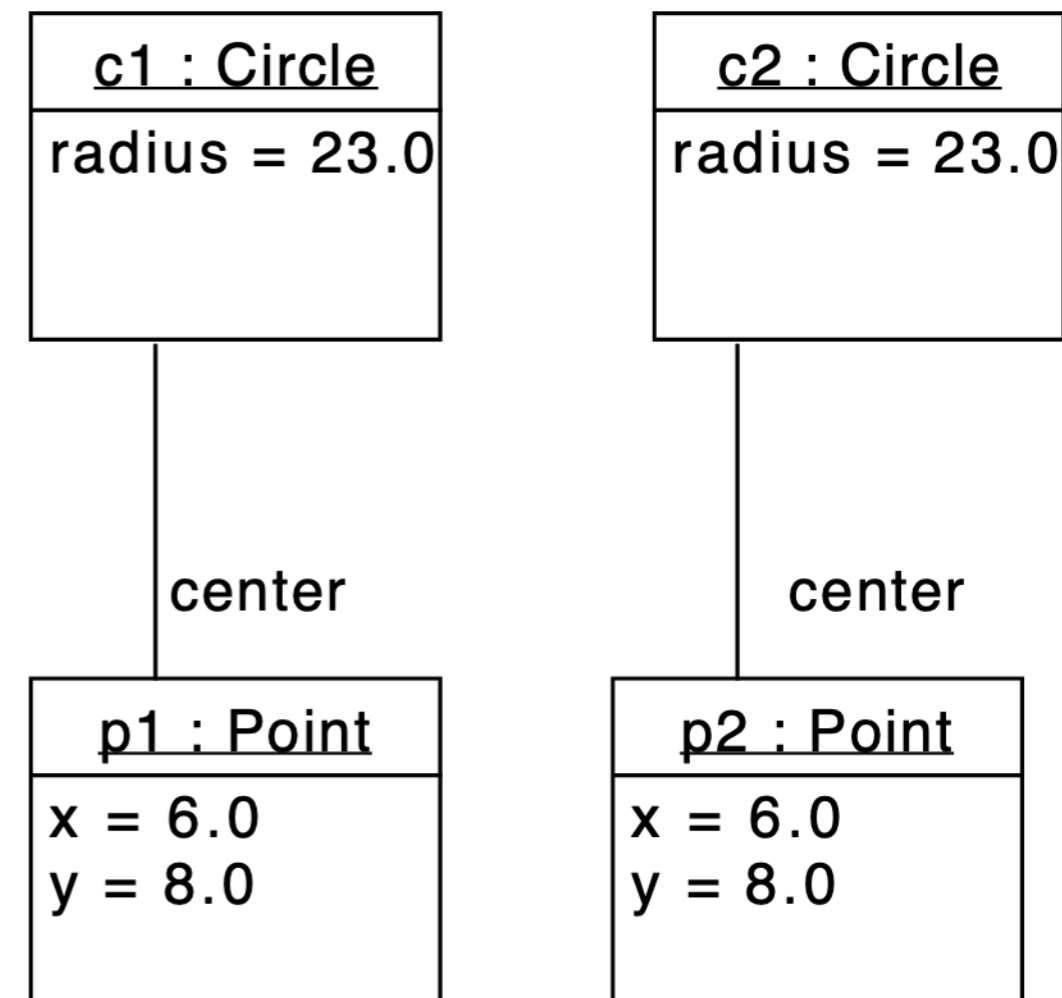
- Zeigt das modellierte System zu einem Zeitpunkt
- Enthält Instanzen von Klassen und Assoziationen





# Objektdiagramm

- Zeigt das modellierte System zu einem Zeitpunkt
- Enthält Instanzen von Klassen und Assoziationen

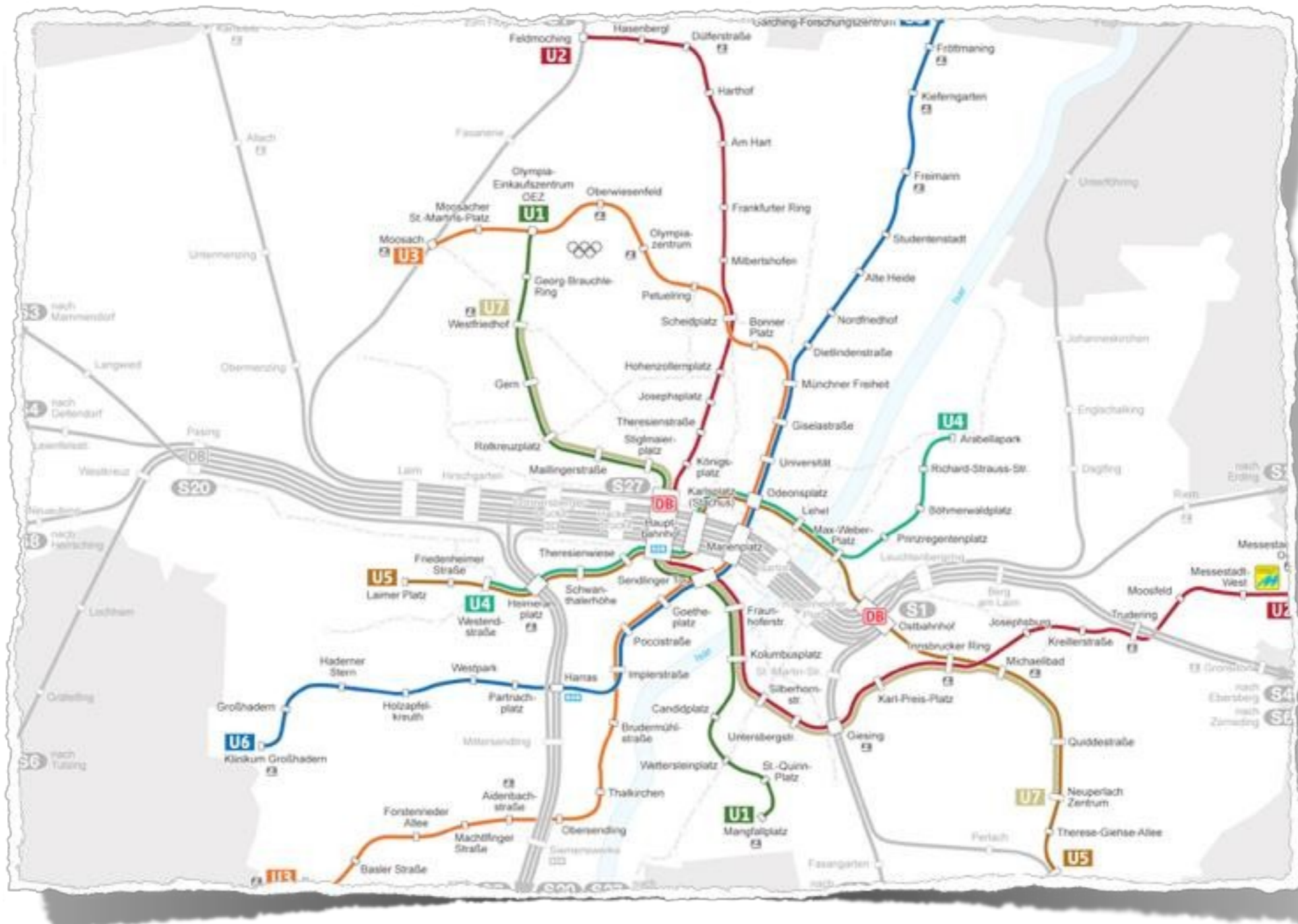


# Übungsblatt 1

- Verfügbar auf der Webseite
- Benötigt Java Compiler und Laufzeitumgebung



# Aufgabe 1



# Aufgabe 2

