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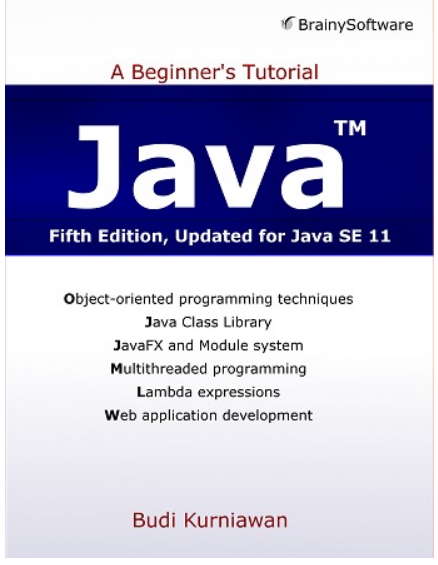
- **Lectures + Exercises:**
  8 x 45 minutes = 6 hours

How much time to invest?

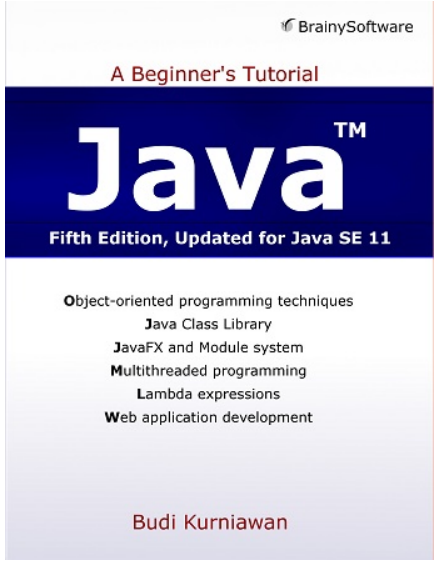
Mean weekly effort:

- **40 hours (60 mins) workload / week**
- **30 ECTS for all current lectures**
- **40h * 8 / 30 ⇒ 10 hours 40 minutes**
- **Lectures + Exercises:**
  8 x 45 minutes = 6 hours
- **Supplementary weekly effort:**
  4 hours and 40 minutes

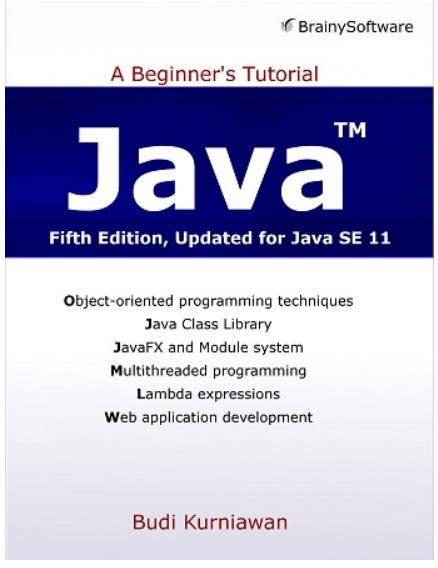
Recommended reading resources I



Recommended reading resources I



Recommended reading resources I



Recommended reading resources II

Primary	• Java: A Beginner's Tutorial (6th Edition)
Secondary	• Java ist auch eine Insel of 15-th edition book 2020 including Java™ 14.
	• Grundkurs programmieren in Java

Your biggest enemies

Your biggest enemies

Your biggest enemies

Discussion boards

Your biggest enemies

Discussion boards

Push news

Your biggest enemies

Discussion boards

Push news

Entertainment

Your biggest enemies

Discussion boards

Push news

Entertainment

Messenger(s)

Your biggest enemies

Discussion boards

Push news

Entertainment

Messenger(s)

»Social« networks

Your biggest enemies

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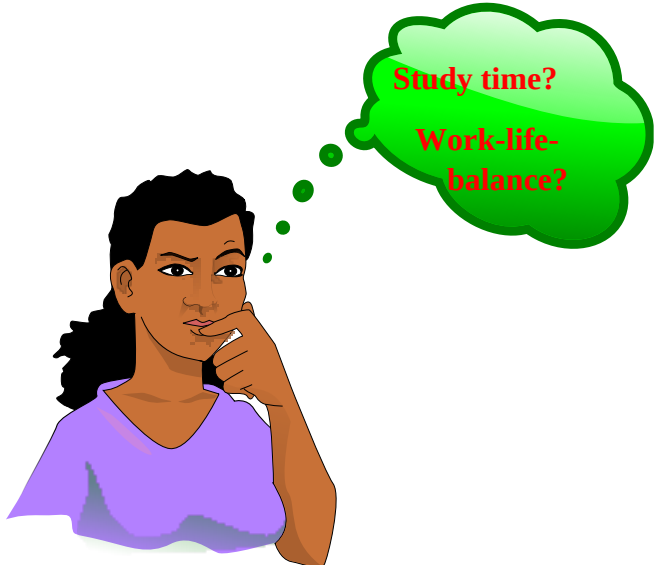


German humour

Aus „Der Postillion“ :

Mann, der am Handy

nur mal eben die Uhrzeit nachschauen wollte,

chattet acht Minuten auf WhatsApp,

schaut drei YouTube-Videos

und liest einen Artikel über Peru,

weiß aber am Ende immer noch nicht, wie spät es ist

4 most imperative study objectives

1. MANAGE YOUR TIME!
2. MANAGE YOUR TIME!
3. MANAGE YOUR TIME!
4. MANAGE YOUR TIME!

Online tutorials

Bradley Kjell: Introduction to Computer Science using Java	• German translation by Heinrich Gailer
Udemy: Java Tutorial for Complete Beginners	Video tutorials and related source code examples. Registration required.

Unix and the terminal

- The Unix Shell / Software-carpentry, nice video collection. Each section is also available in PDF and PowerPoint™ format.
- UNIX Tutorial for Beginners, text oriented.
- Introduction to Unix commands

Online programming, automated feedback

http://codingbat.com	No registration required.
https://www.programmr.com/zone/java	• Hunt for “Challenges” within page. • Registration required.
https://www.codewars.com	• Registration or github.com login required.

Online programming I

`codeabbey.com`	Problem list.
`rosettacode.org`	Programming tasks (including solutions for multiple languages).
reddit.com	Daily Programmer.

Online programming II

Project Euler	Registration required for keeping track of your exercises' status. The following exercises in particular are considered to be useful with respect to this lecture: 1, 2, 4, 5, 8, 9, 11.
Java Programming Tutorial	Basic and more difficult exercises
Java Programming Exercises	Start from the easier exercises.

Java Visualizer

Java Visualizer

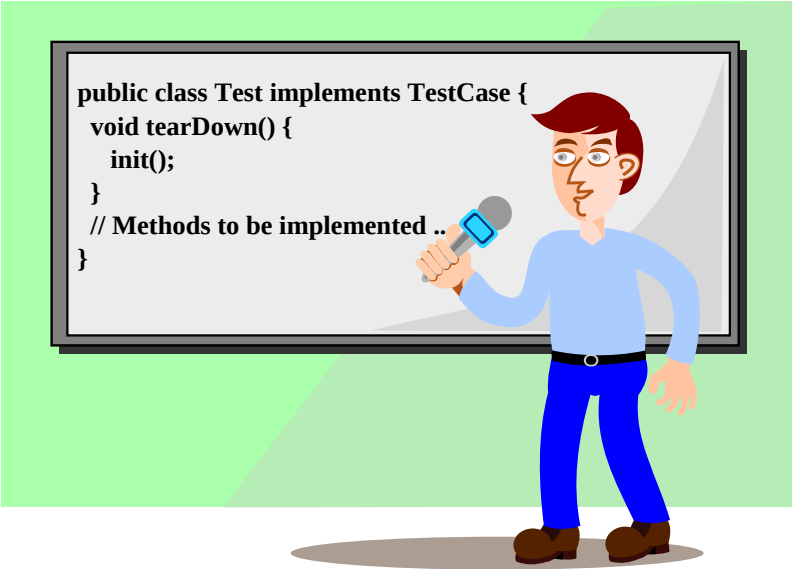
(beta: report a bug)

Write your Java code here:

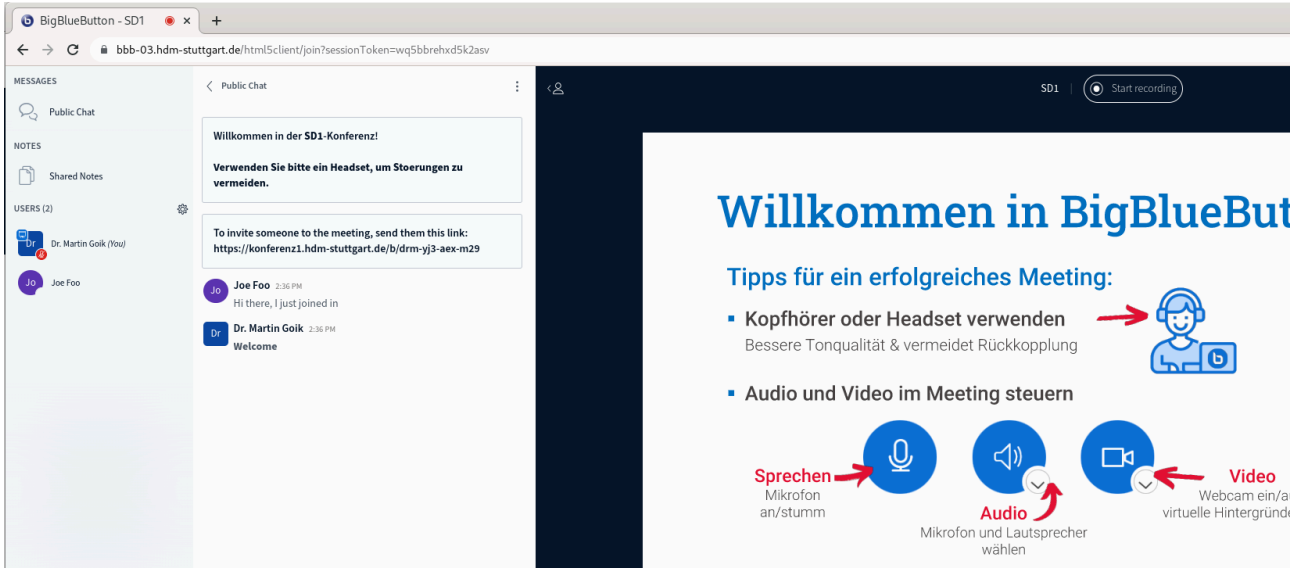
```
public class ClassNameHere {
    public static void main(String[] args) {

    }
}
```

Live lecture additions



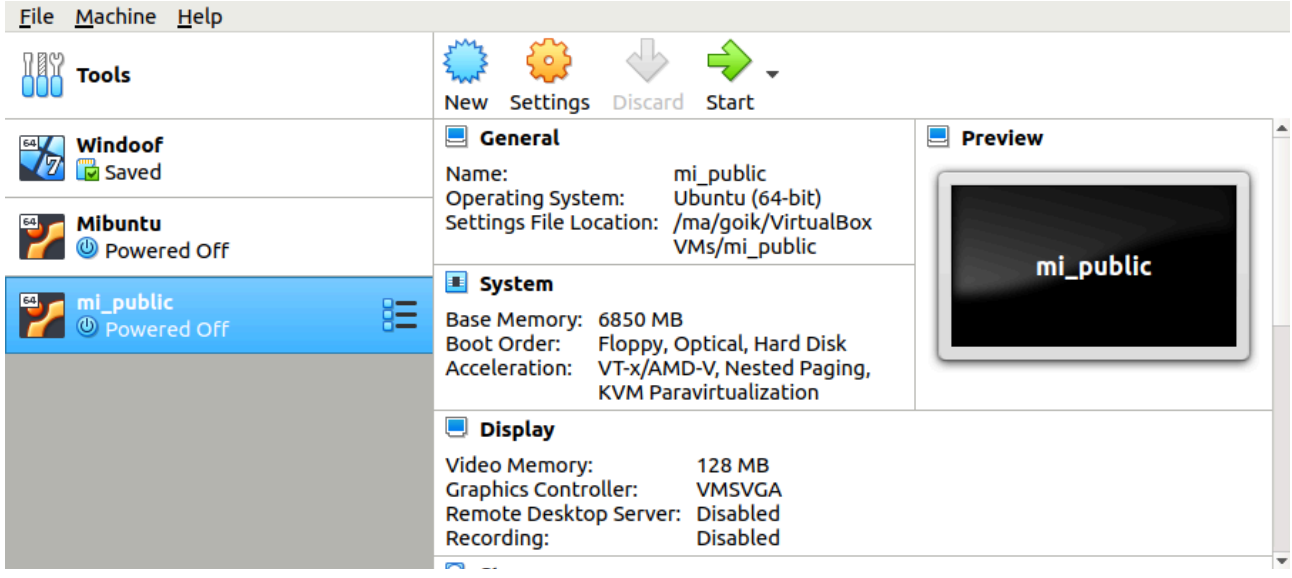
Remote lecture participation



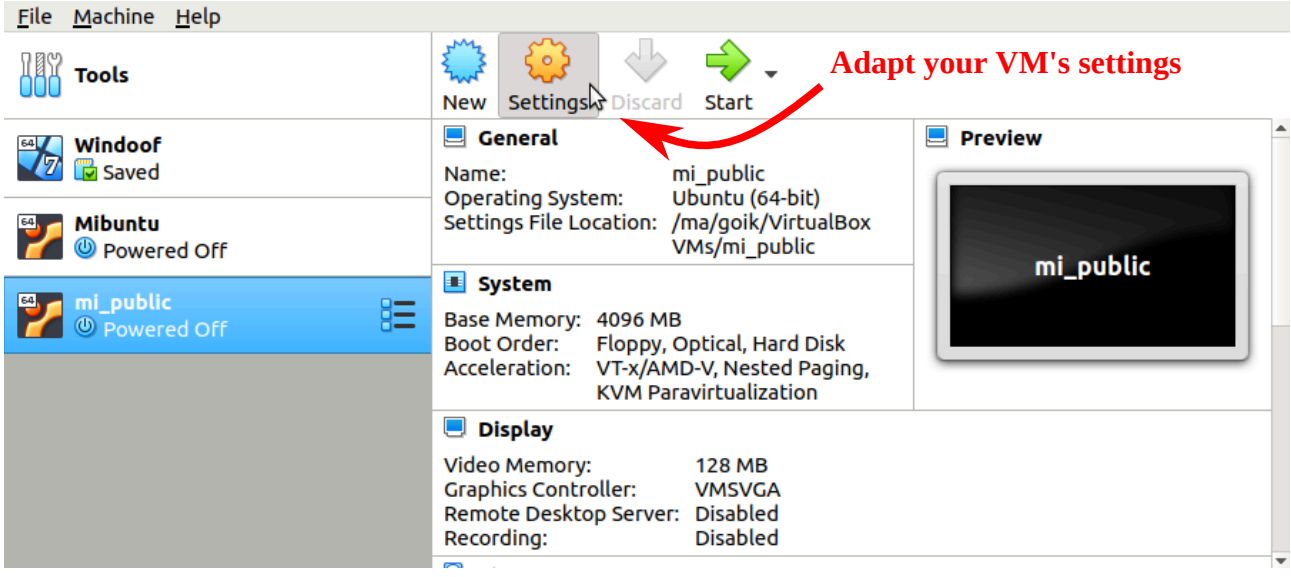
Virtualbox / VMware player based virtualized Linux image

- Contain all MI pool workstation Linux software.
- Available for free VMware Workstation Player as compressed image. Apple users: Consider buying VMWare Fusion.
- Available for free VirtualBox desktop virtualization as compressed image.
- The beasts are quite big (~20 GB on disk, ~ 5GB compressed download)! **You may prefer a wired connection in favour of WiFi !**
- Alternative: Native or dual boot Ubuntu “Desktop” installation.

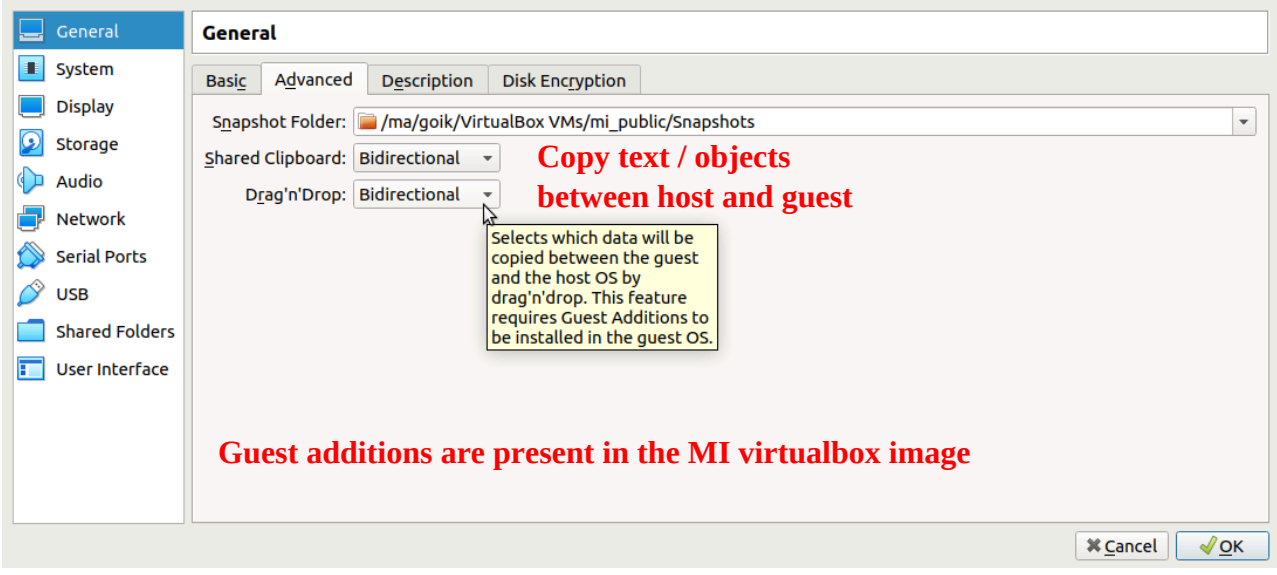
Virtualbox™ settings



Virtualbox™ settings



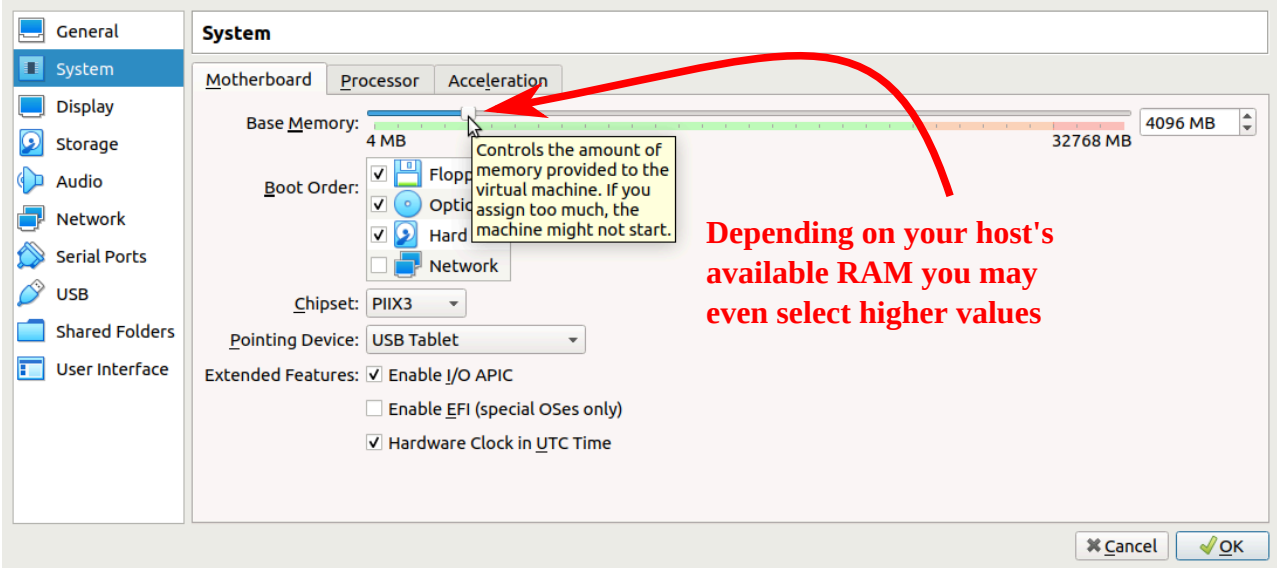
Virtualbox™ settings



Copy text / objects between host and guest

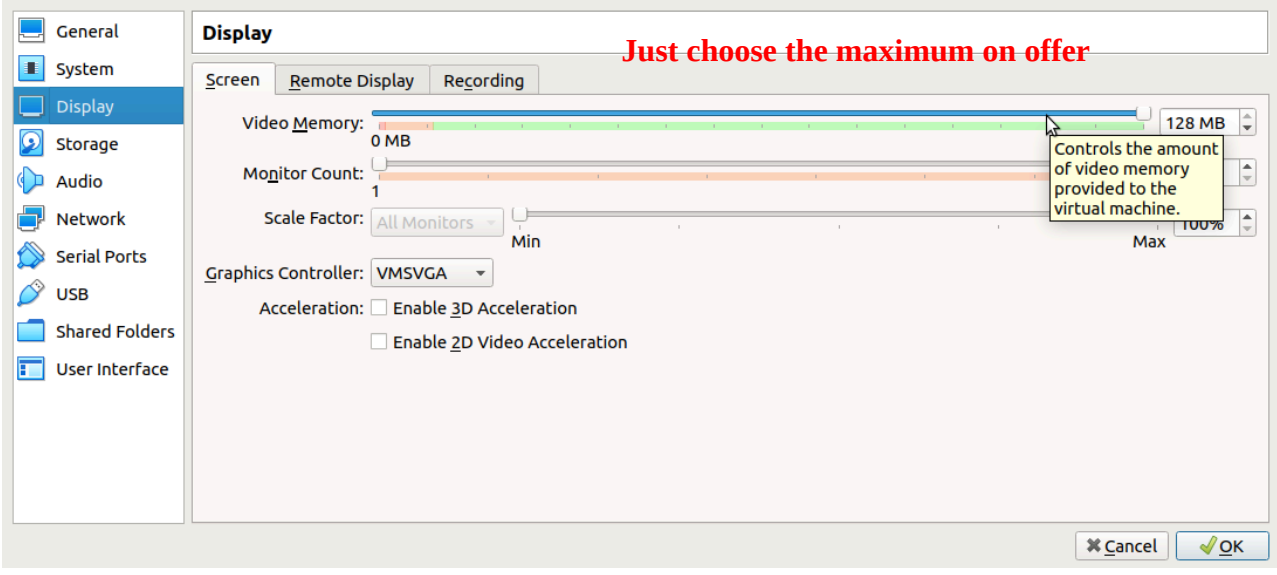
Guest additions are present in the MI virtualbox image

Virtualbox™ settings



Depending on your host's available RAM you may even select higher values

Virtualbox™ settings



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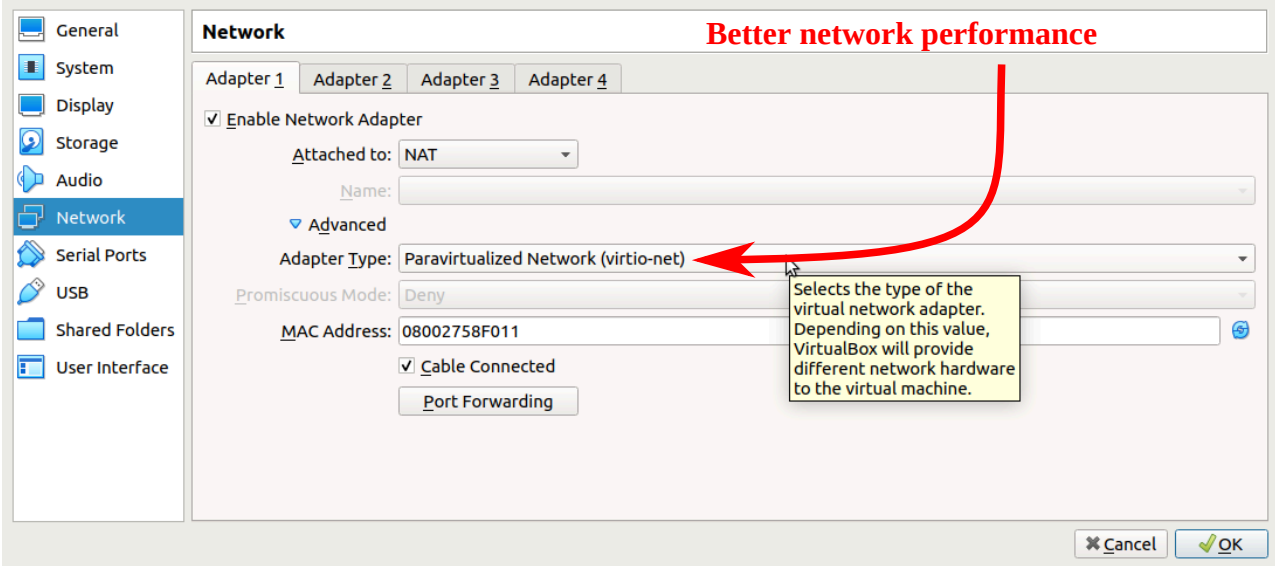

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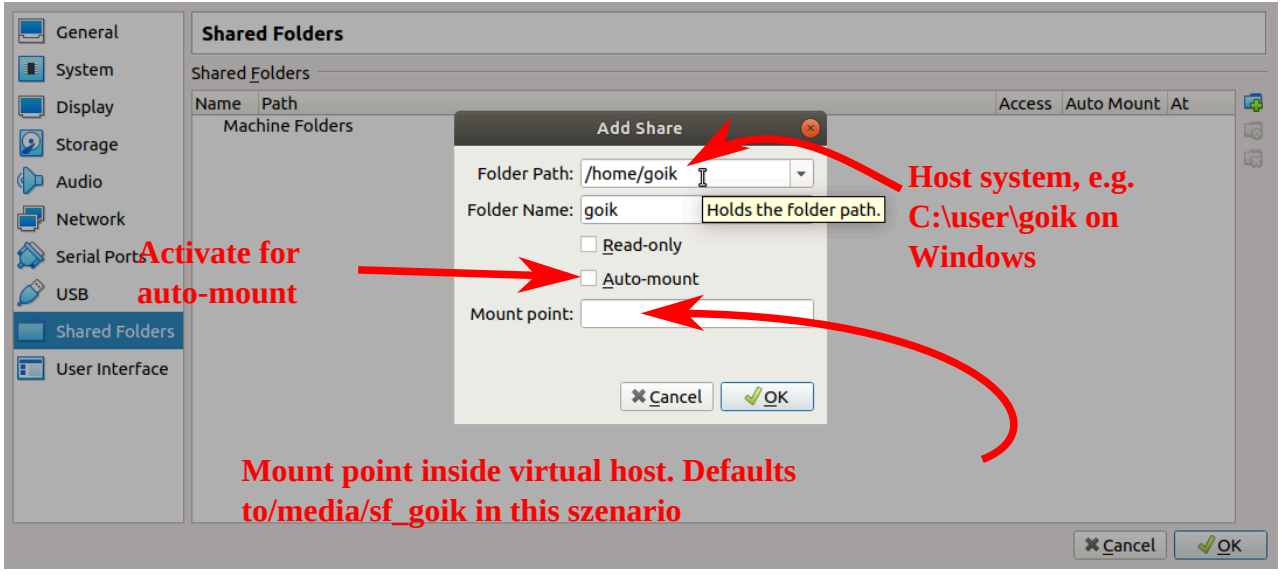
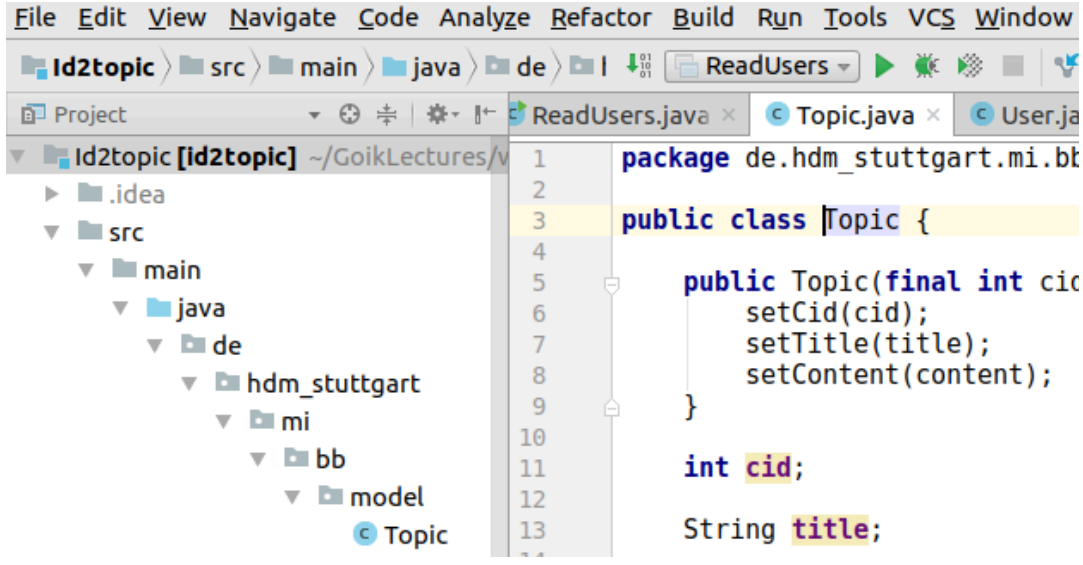


Intellij IDEA IDE



Embedded exercises

- Tight relationship to the E-examination.
- Complete list of exercises on offer.

Using the exercises

Hotel key cards

❶ **Q:** A hotel supplies the following type of cards for opening room doors:

A customer is worried concerning the impact of loosing his card. For security eventually run short on available combinations.

Discuss this argument by estimating the number of distinct patterns.

❷ **A:** +

open solution (Did you try hard enough yourself?)

❸ Create comment

HdM mail server

Either of:

- Read your mails at https://ox.hdm-stuttgart.de regularly.

  or

- Activate mail forwarding from https://ox.hdm-stuttgart.de to your “real” email account.

Configure MI VPN client access

- External MI E-examination system access requires VPN:
  - Past years' E-examinations.
  - Your personal exam results.
- OpenVPN wiki installation page (Login required).
- `HdM_MI_stud.ovpn` allows for using a maximum of MI services.

MI Cloud server

- https://cloud.mi.hdm-stuttgart.de.
- 25 GB free disk space.
- Desktop and mobile clients.

NSA free (Maybe)

MI File server

- Accessing your computer pool home directory.
- Windows share \\mi-ad1.srv.mi.hdm-stuttgart.de\xy123 or \\192.168.111.15\xy123.
- Requires Mi VPN.

MI Git versioning server

- https://gitlab.mi.hdm-stuttgart.de.
- Collaborative software development.

Coached exercises

- Tuesday and Wednesday 17:45-19:15.
- Alternating seminar and software exercises: E.g. seminar on Tuesdays, exercises on Wednesdays.
- Seminar groups of ~12 participants assigned to a tutor.

Bonus points

- Precondition: You must pass the examination based on its own score excluding bonus points.
- Examination: E.g. 90 points / 100% resulting in “1,0”, 45 points / 50% resulting in “4.0”.
- 0-10 bonus points on top of examination score in case of reaching at least 50% examination points.
- Examples:
  - 40 examination points: “Failed” regardless of any number of bonus points
  - 45 Examination points, 10 bonus points. Result: 55 points resulting in a 3.0 mark rather than 4.0.

Seminar rules and bonus points

- Join exactly one group at the MI E-learning system.
- Bonus point requirements:
  1. 80% participation rate of all weekly appointments
  2. Presenting **at least three exercise** solutions of `https://freedocs.mi.hdm-stuttgart.de/apb.html`.

Presenting exercise solutions

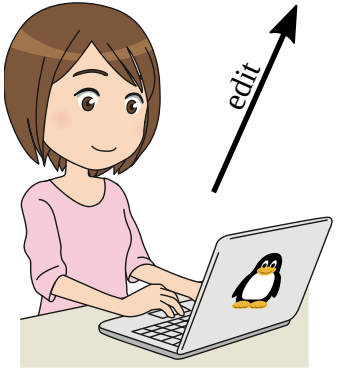
- Give a brief account of the exercise in question.
- Explain your solution's concept and present your code.
- Explain possible problems / pitfalls.
- Ask your tutor for exercises to avoid thematic clashes

Edit - compile - execute

Edit - compile - execute

Source code: **HelloWorld.java**

```
public class HelloWorld {
  public static void main(String[] args){
    System.out.println("Hello, world");
  }
}
```



Edit - compile - execute

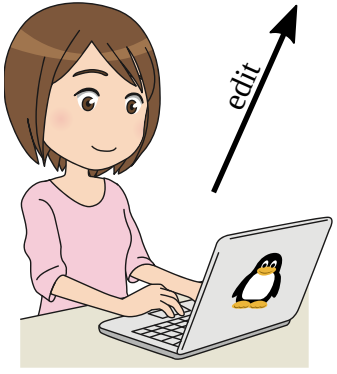
Source code: **HelloWorld.java**

```
public class HelloWorld {
  public static void main(String[] args){
    System.out.println("Hello, world");
  }
}
```

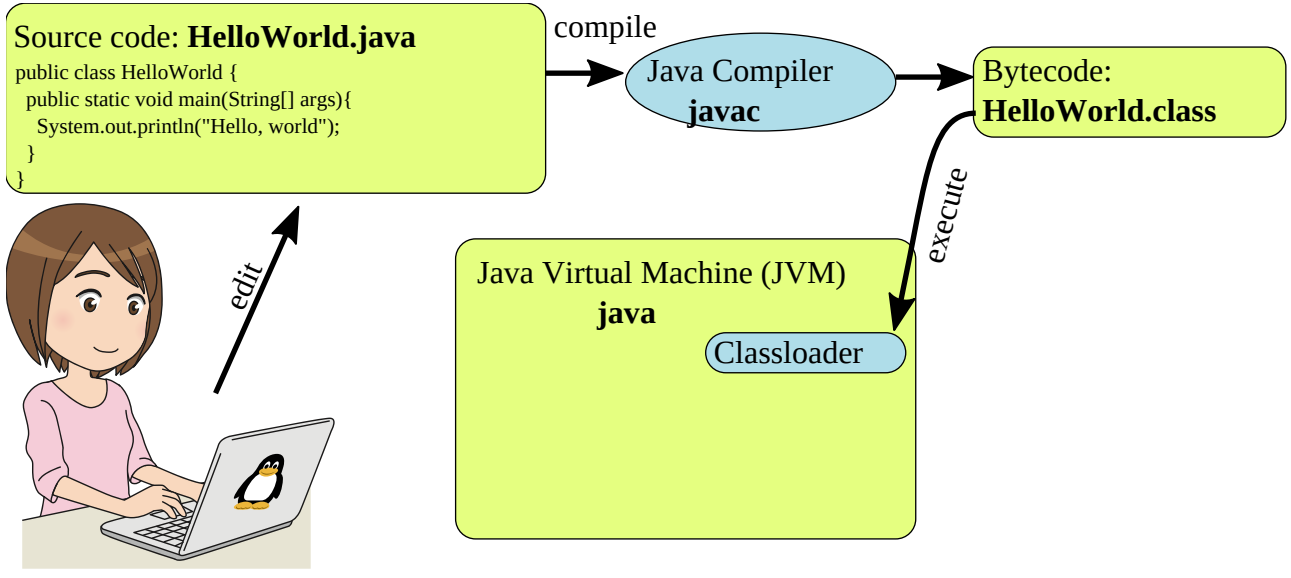
compile

Java Compiler
javac

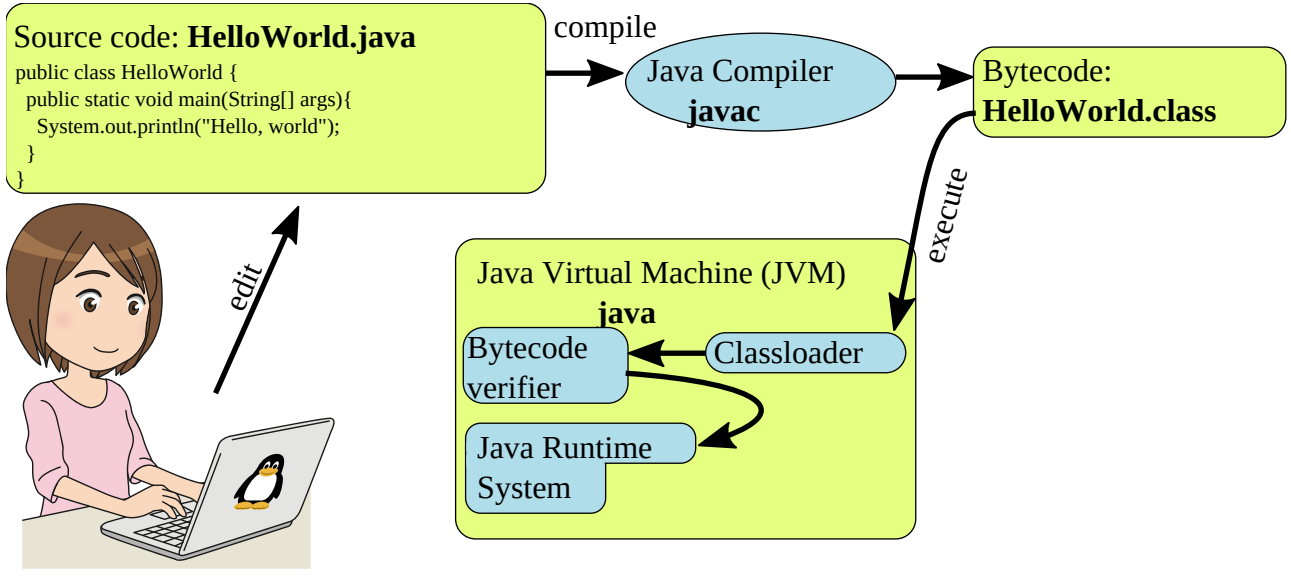
Bytecode:
HelloWorld.class



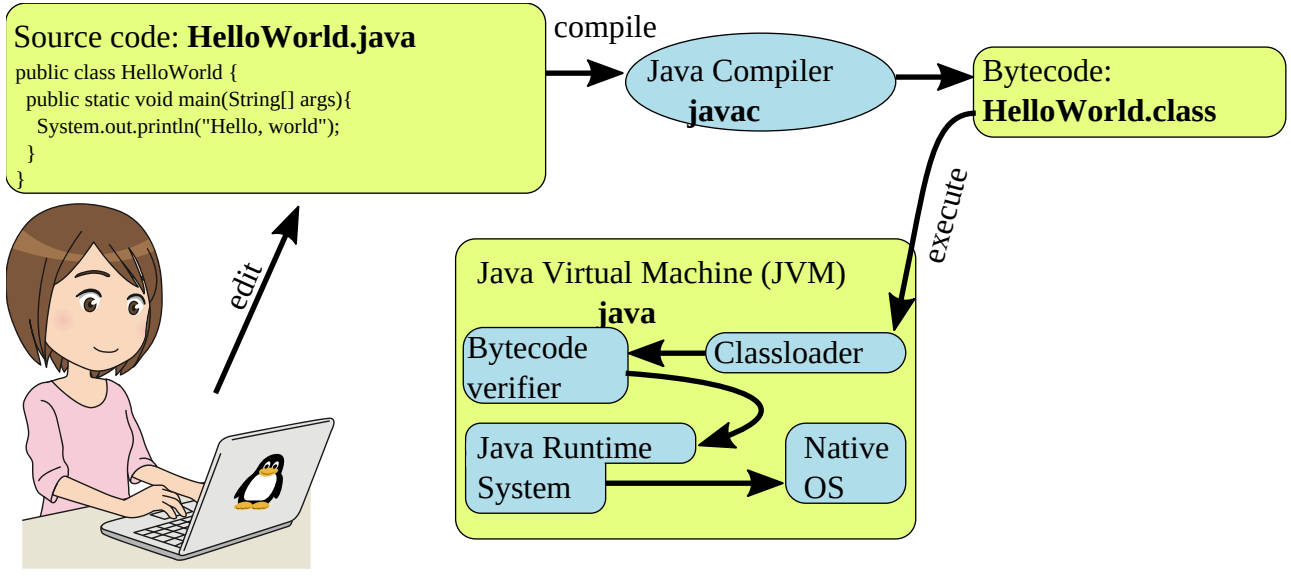
Edit - compile - execute



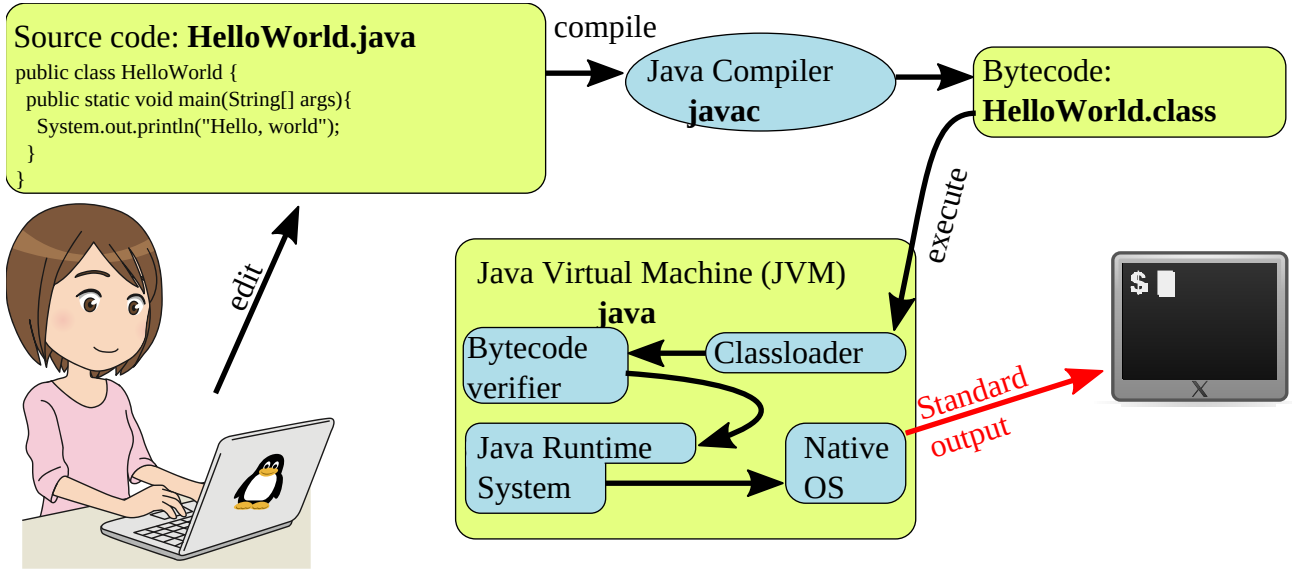
Edit - compile - execute



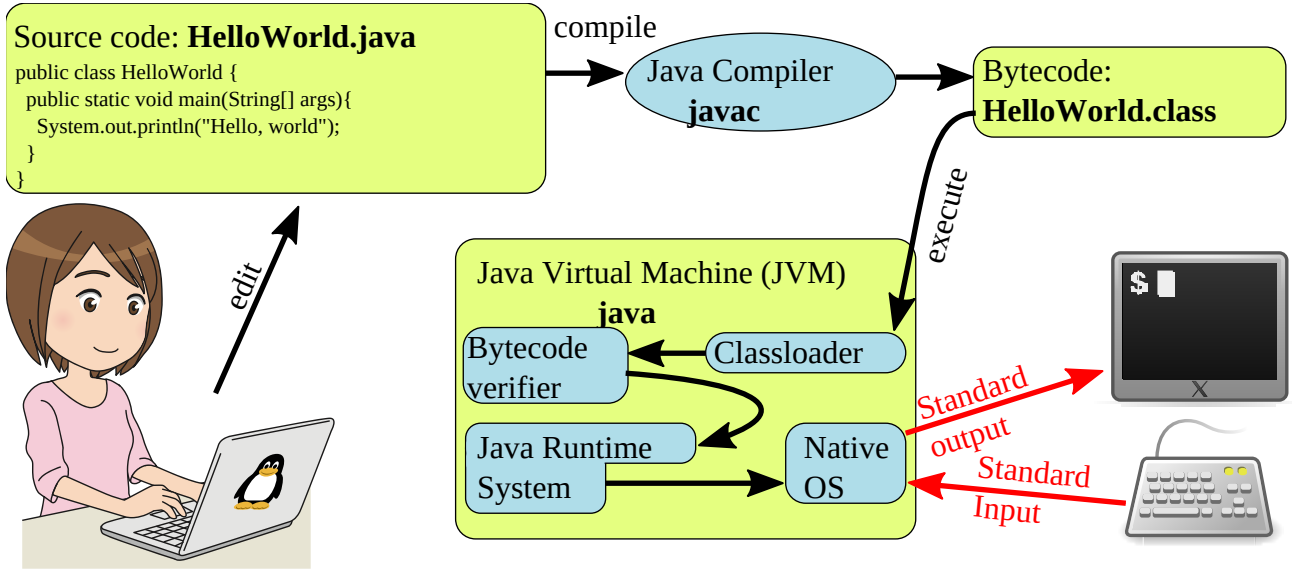
Edit - compile - execute



Edit - compile - execute



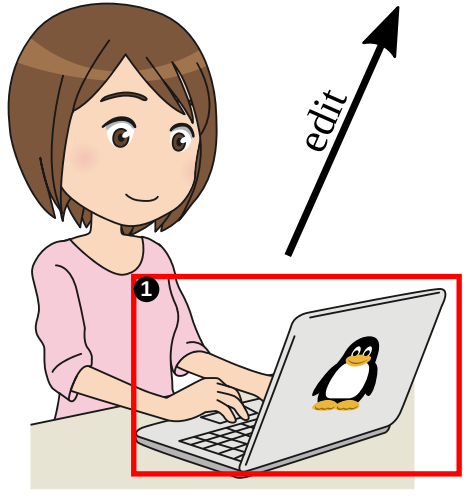
Edit - compile - execute



Editing Java™ files

❷ Source code: **HelloWorld.java**

```
public class HelloWorld {
  public static void main(String[] args){
    System.out.println("Hello, world");
  }
}
```



Defining class `HelloWorld`

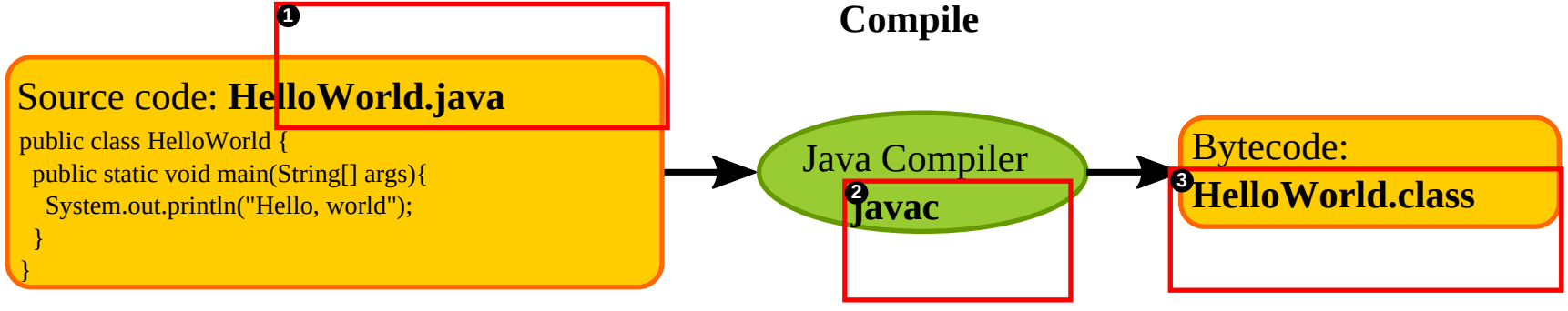
```java
// Filename HelloWorld.java ❶

public class HelloWorld ❷ {

  public static void main(String[] args) ❸ {
    System.out.println("Hello, world"); ❹
  }

}
```

Compiling Java™ file



Command line Java™ file compilation

```
~/tmp$ ls -al HelloWorld.class
ls: cannot access 'HelloWorld.class': No such file or directory

~/tmp$ javac HelloWorld.java

~/tmp$ ls -al HelloWorld.class
-rw-r--r-- 1 goik fb1prof 419 Sep 23 15:44 HelloWorld.class
```

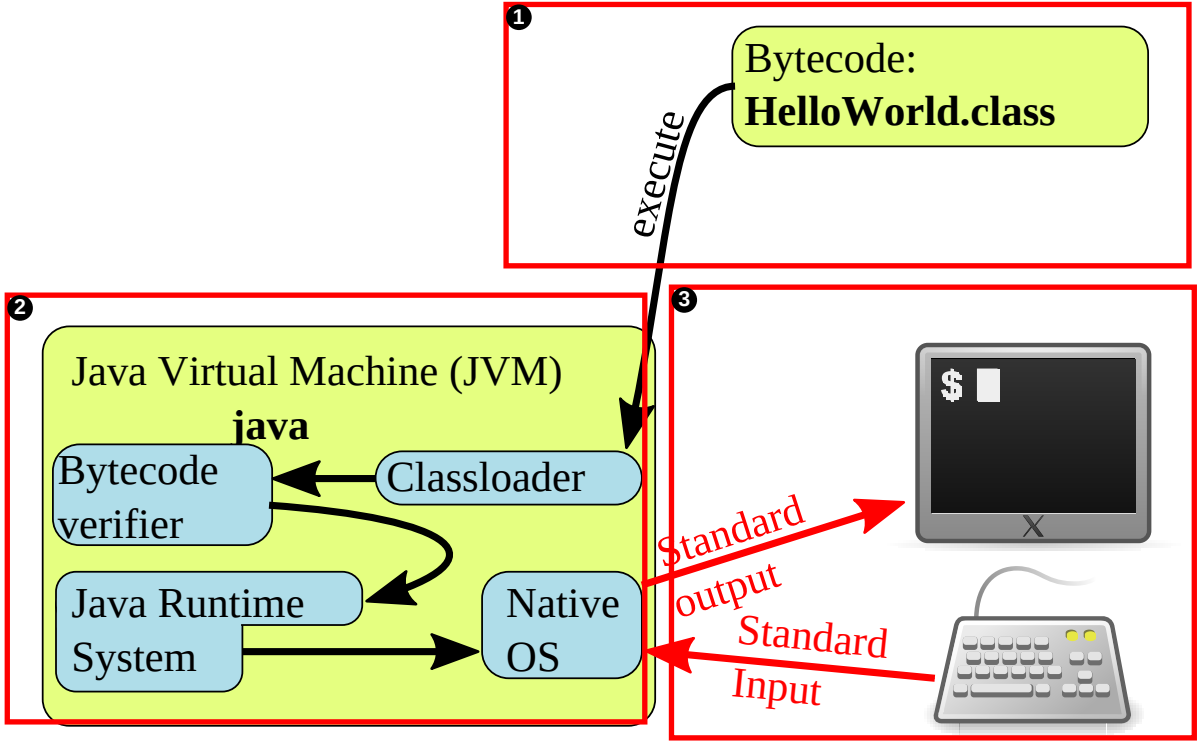
Java byte code file `HelloWorld.class`

```
Êþº¾^@^@^@6^@^]
^@^F^@^O        ^@^P^@^Q^H^@^R
^@^S^@^T^G^@^U^G^@^V^A^@^F<init>^A^@^C()V^A^@^DCode^A^@^OLineNumberTable^A^@^Dmain^A^@^V(\
  [Ljava/lang/String;)V^A^@
SourceFile^A^@^OHelloWorld.java^L^@^G^@^H^G^@^W^L^@^X^@^Y^A^@^LHello, world^G^@^Z^L^@^[^@\
  ^\^A^@
HelloWorld^A^@^Pjava/lang/Object^A^@^Pjava/lang/System^A^@^Cout^A^@^ULjava/io/PrintStream;\
  ^A^@^Sjava/io/PrintStream^A^@^Gprintln^A^@^U(Ljava/lang/String;)V^@!^@^E^@^F^@^@^@^@^@^\
  B^@^A^@^G^@^H^@^A^@    ^@^@^@^]^@^A^@^A^@^@^@^E*·^@^A±^@^@^@^A^@
^@^@^@^F^@^A^@^@^@^B^@  ^@^K^@^L^@^A^@  ^@^@^@%^@^B^@^A^@^@^@   ²^@^B^R^C¶^@^D±^@^@^@^A^@
^@^@^@
^@^B^@^@^@^D^@^H^@^E^@^A^@^M^@^@^@^B^@^N
```

Source code vs. bytecode

`HelloWorld.java`	`HelloWorld.class`
• Human readable (kind of #). • High abstraction level. • Text file	• Machine readable instructions. • Non-editable (usually). • Binary file.

Executing byte code file `HelloWorld.class`



Command line byte code file `HelloWorld.class` execution

```
> java HelloWorld
Hello, world
```

Remark: This executes `HelloWorld.class` rather than `HelloWorld.java`.

JDK™ installation options

- Manual installation.
- Linux Debian / Ubuntu 22.04:

```
apt install openjdk-17-jdk
```

Getting first Java™ impressions

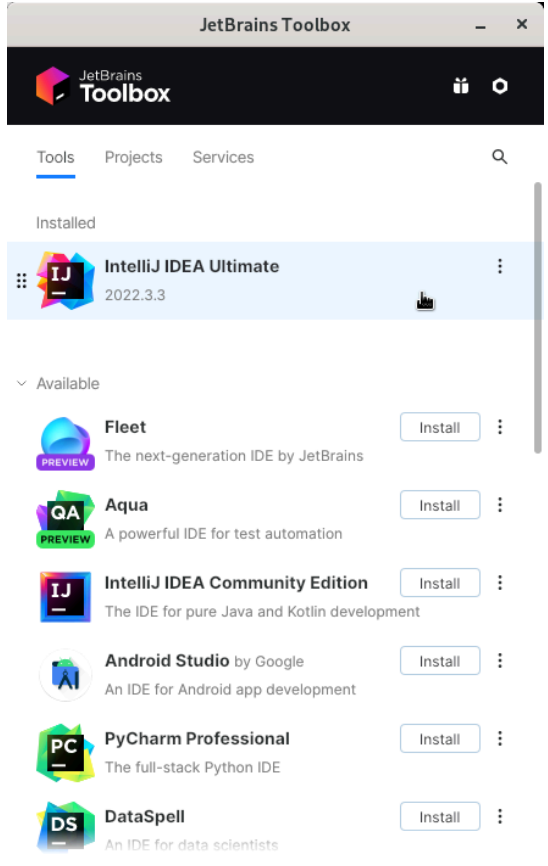
- Copy code you probably do not (yet) understand
- Try to guess whats going on
- Execute an watch the outcome
- Optional: Add minor modifications thereby altering the results.
- Don't worry: You'll get a full understanding later. (Promised! #)

Related exercises

Exercise 1: Extending class `HelloWorld`
Exercise 2: Renaming a class file
Exercise 3: Editing and compilation
Exercise 4: Editing bytecode
Exercise 5: Working with variables
Exercise 6: Code equivalence
Exercise 7: Different byte code, same execution results
Exercise 8: A conditional
Exercise 9: A loop

Intellij IDEA installation

- IntelliJ IDEA Toolbox based installation
- Choose “Ultimate”.



Idea »Ultimate« license types

- Activation code for offline usage, apply at:

  `www.jetbrains.com/shop/eform/students`

- Using HdM/MI license server:

  `http://jetbrains.mi.hdm-stuttgart.de:11111`

  See MI wiki for further details.

Alternative: Using the HdM license server

Insert address:

`http://jetbrains.mi.hdm-stuttgart.de:11111`

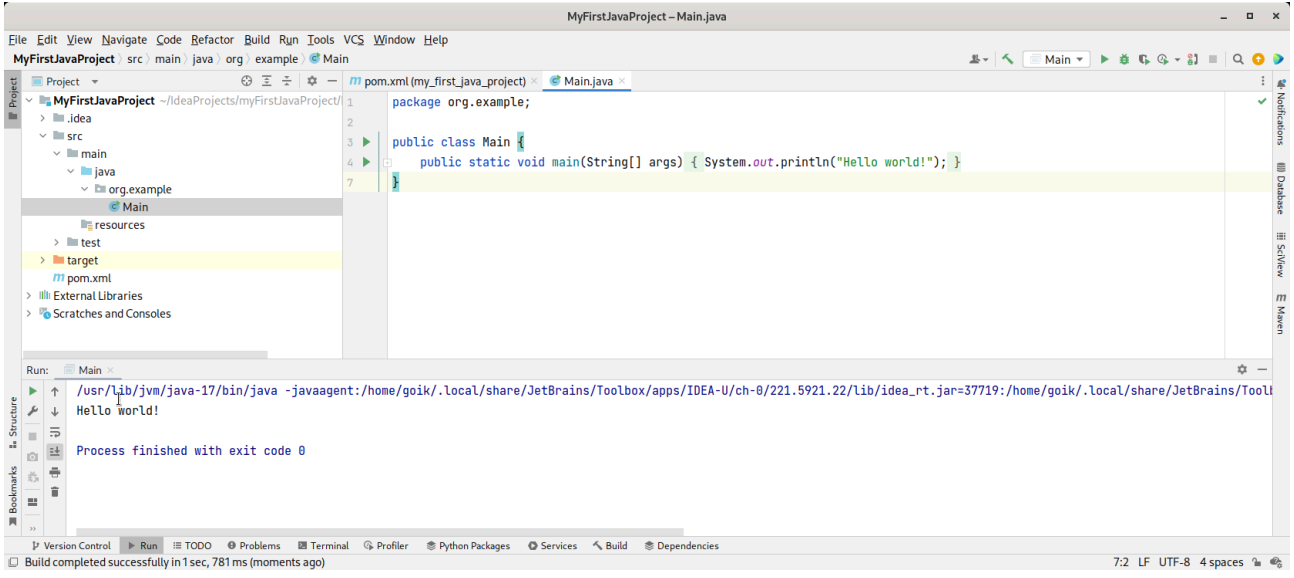
External usage requires VPN !

Creating a new Java project

Creating a new Java project

Creating a new Java project

Creating a new Java project



Related exercises

Exercise 10: Getting used to Intellij IDEA