

How much time to invest?

Mean **weekly** effort:



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•40 hours (60 mins) workload / week



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- 30 ECTS for all current lectures

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- $40h * 8 / 30 \Rightarrow$ **10 hours 40 minutes**

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- $40h * 8 / 30 \Rightarrow$ **10 hours 40 minutes**
- 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
- $40h * 8 / 30 \Rightarrow$ **10 hours 40 minutes**
- Lectures + Exercises:
8 x 45 minutes = 6 hours
- Supplementary weekly effort:
4 hours and 40 minutes

Recommended reading resources I

BrainySoftware

A Beginner's Tutorial

Java™

Fifth Edition, Updated for Java SE 11

Object-oriented programming techniques

Java Class Library

JavaFX and Module system

Multithreaded programming

Lambda expressions

Web application development

Budi Kurniawan

Recommended reading resources I



Recommended reading resources I



Recommended reading resources II

- | | |
|-----------|---|
| Primary | <ul style="list-style-type: none">• Java: A Beginner's Tutorial (6th Edition) |
| Secondary | <ul style="list-style-type: none">• 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

Discussion boards

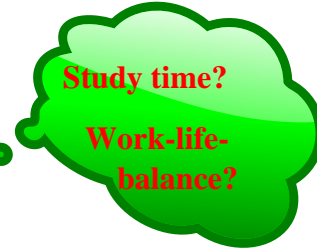


Push news

Entertainment

Messenger(s)

»Social« networks



Study time?

**Work-life-
balance?**

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](https://www.programmr.com/zone/java)

- Hunt for “Challenges” within page.
- Registration required.

[https://
www.codewars.com](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

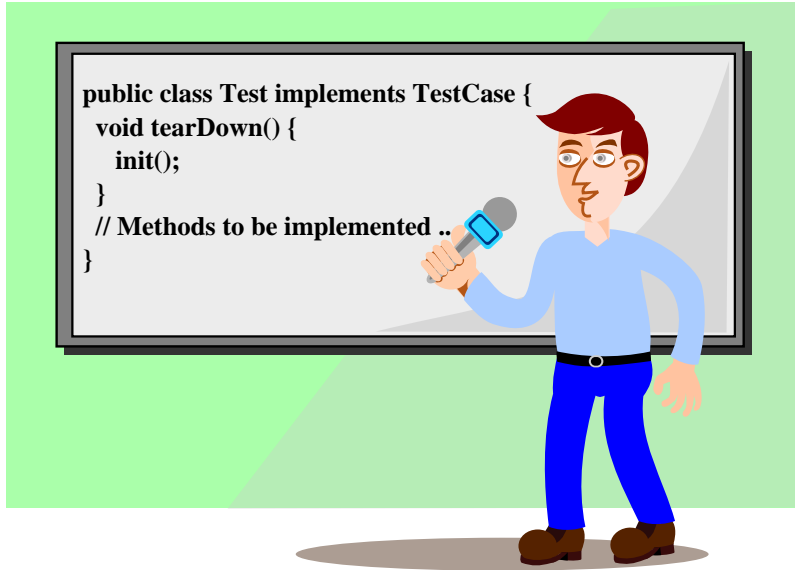
(beta: [report a bug](#))



Write your Java code here:

```
1 public class ClassNameHere {  
2     public static void main(String[] args) {  
3  
4     }  
5 }
```

Live lecture additions



Remote lecture participation

BigBlueButton - SD1

bbb-03.hdm-stuttgart.de/html5client/join?sessionToken=wq5bbrehxd5k2asv

MESSAGES

Public Chat

NOTES

Shared Notes

USERS (2)

Dr. Martin Galk (You)

Joe Foo

Public Chat

Willkommen in der SD1-Konferenz!

Verwenden Sie bitte ein Headset, um Störungen zu vermeiden.

To invite someone to the meeting, send them this link:
<https://konferenz1.hdm-stuttgart.de/b/drm-yj3-aex-m29>

Joe Foo 2:36 PM

Hi there, I just joined in

Dr. Martin Galk 2:36 PM

Welcome

SD1

Start recording

Willkommen in BigBlueBut

Tipps für ein erfolgreiches Meeting:

- Kopfhörer oder Headset verwenden
Bessere Tonqualität & vermeidet Rückkopplung
- Audio und Video im Meeting steuern

Sprechen
Mikrofon
an/stumm

Audio
Mikrofon und Lautsprecher
wählen

Video
Webcam ein/a
virtuelle Hintergründe

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

FileMachineHelp

Tools

Windoof

Saved

Mibuntu

Powered Off

mi_public

Powered Off

NewSettingsDiscardStart

General

Name:mi_public

Operating System:Ubuntu (64-bit)

Settings File Location:/ma/goik/VirtualBox VMs/mi_public

System

Base Memory:6850 MB

Boot Order:Floppy, Optical, Hard Disk

Acceleration:VT-x/AMD-V, Nested Paging, KVM Paravirtualization

Display

Video Memory:128 MB

Graphics Controller:VMSVGA

Remote Desktop Server:Disabled

Recording:Disabled

Preview

mi_public

Virtualbox™ settings

FileMachineHelp

Tools

Windoof

Mibuntu

mi_public

NewSettingsDiscardStart

General

Name:mi_public
Operating System:Ubuntu (64-bit)
Settings File Location:/ma/goik/VirtualBox
VMs/mi_public

System

Base Memory:4096 MB
Boot Order:Floppy, Optical, Hard Disk
Acceleration:VT-x/AMD-V, Nested Paging,
KVM Paravirtualization

Display

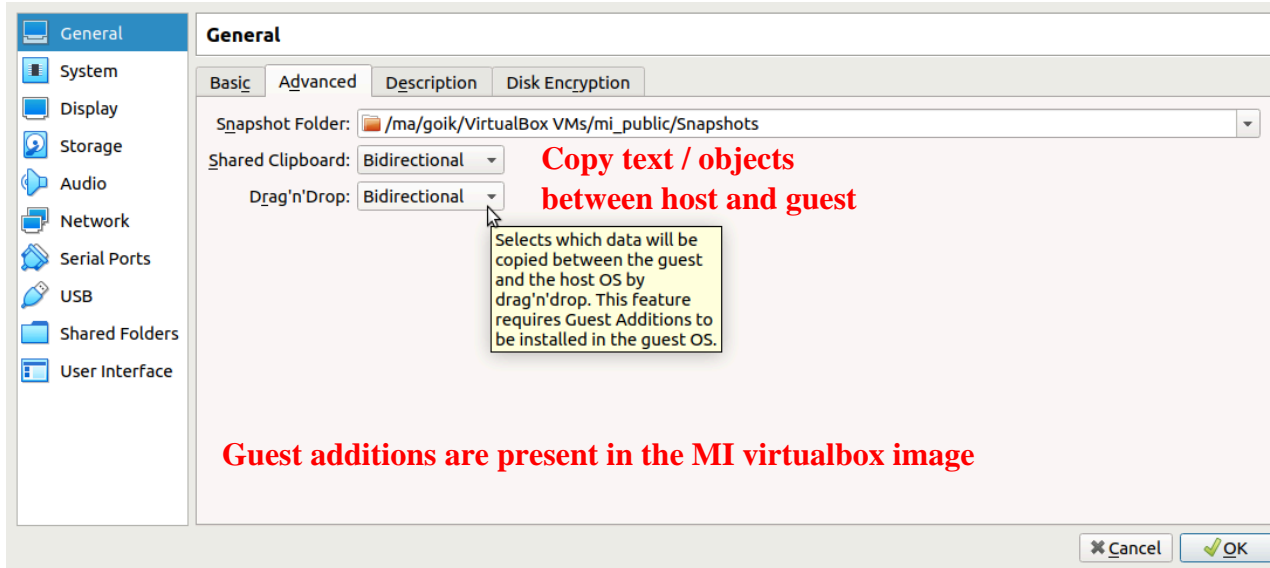
Video Memory:128 MB
Graphics Controller:VMSVGA
Remote Desktop Server:Disabled
Recording:Disabled

Preview

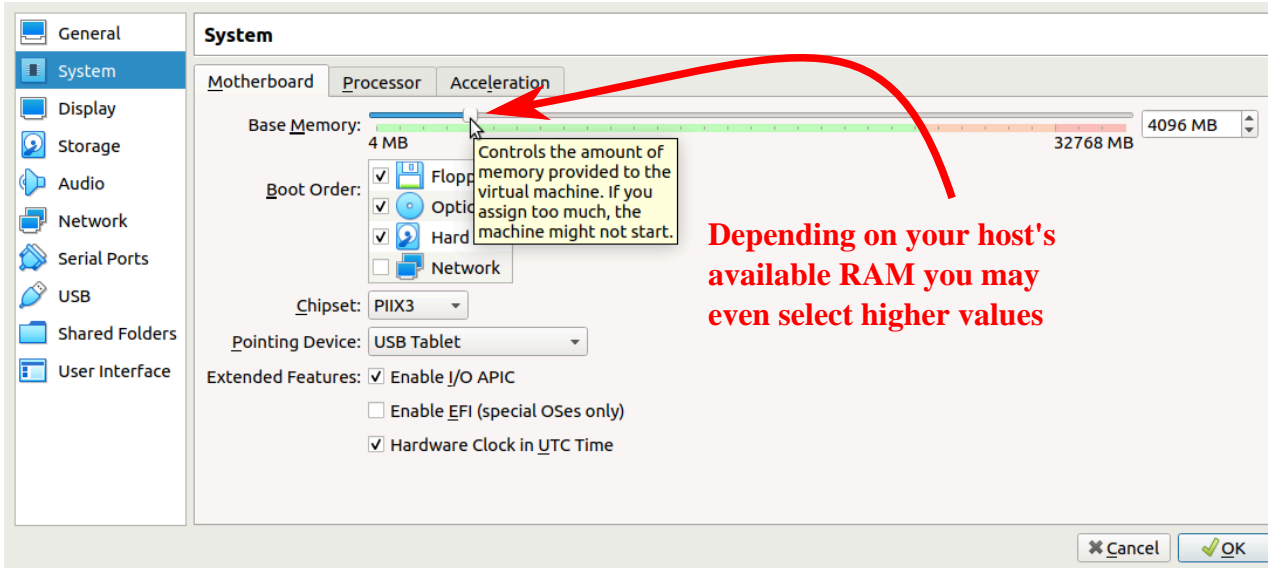
mi_public

Adapt your VM's settings

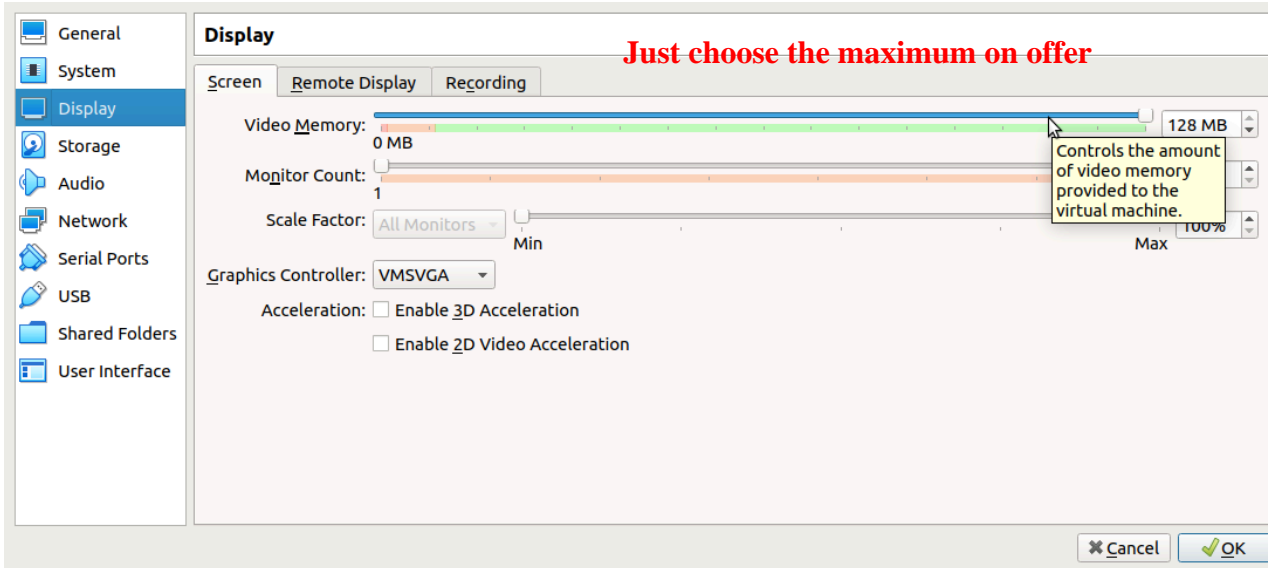
Virtualbox™ settings



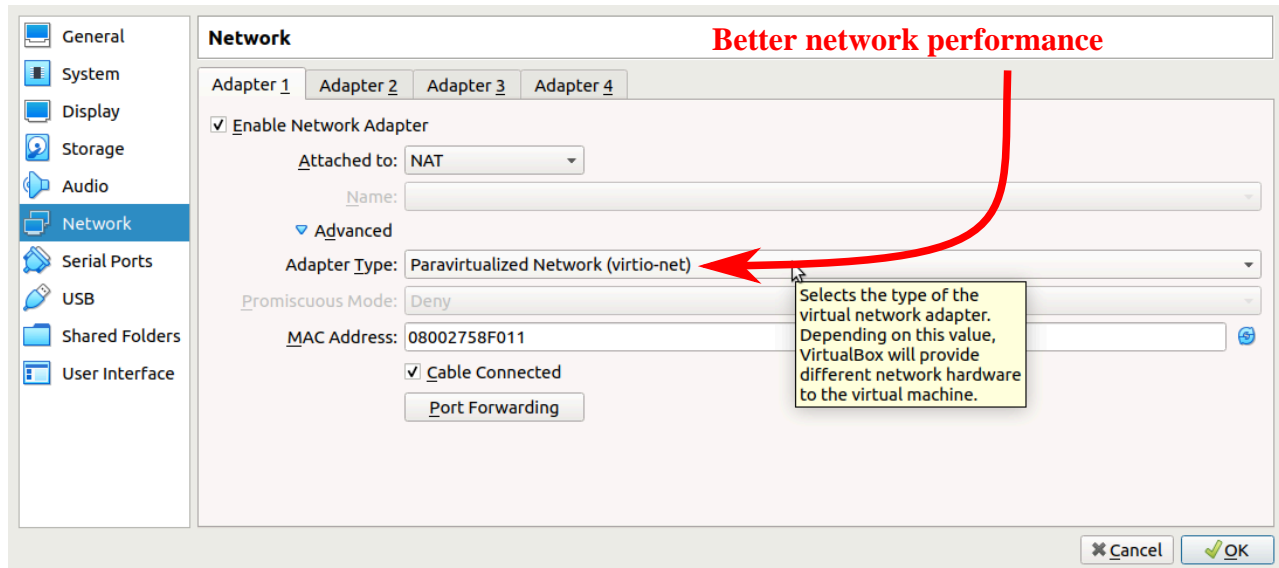
Virtualbox™ settings



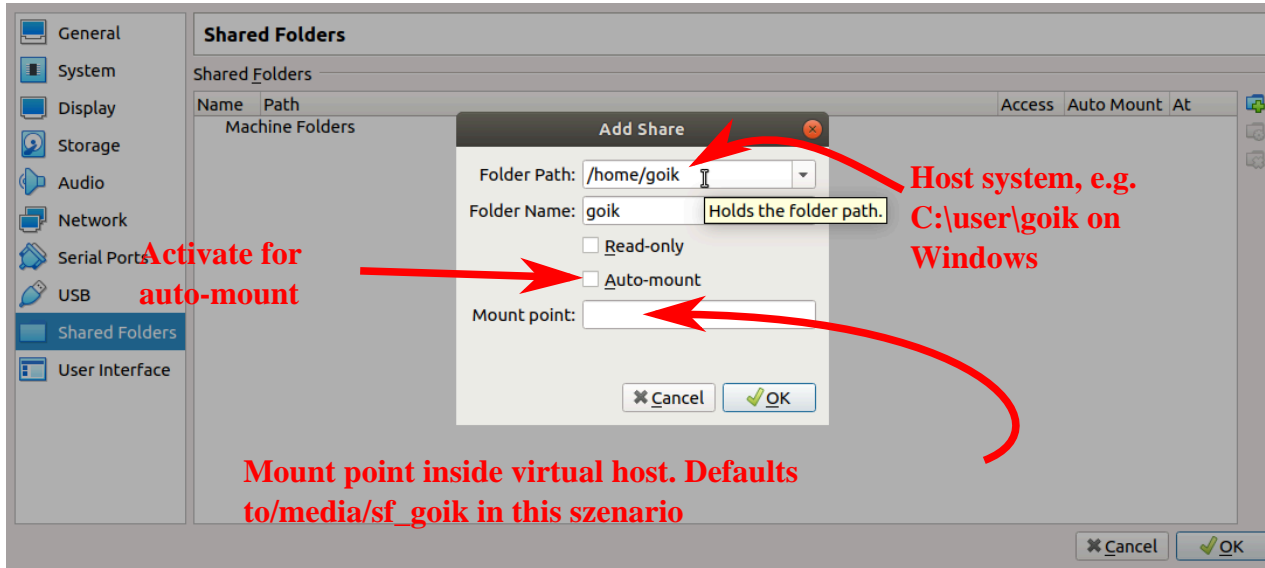
Virtualbox™ settings



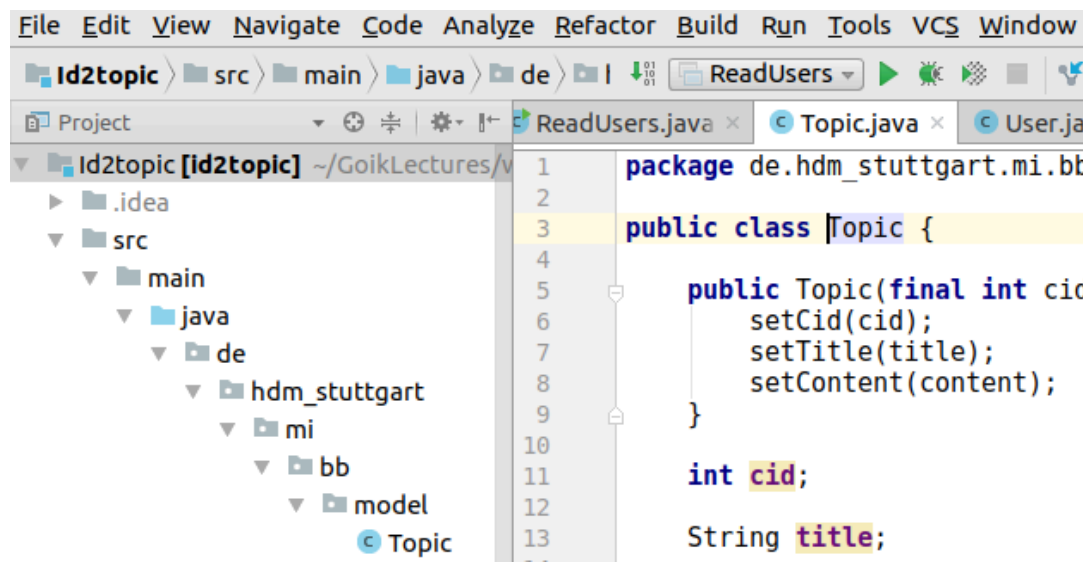
Virtualbox™ settings



Virtualbox™ settings



IntelliJ IDEA IDE



Embedded exercises

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

Using the exercises


Hotel key cards

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



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

Discuss this argument by estimating the number of distinct patterns.

2 A:  open solution (Did you try hard enough yourself?)

3  [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

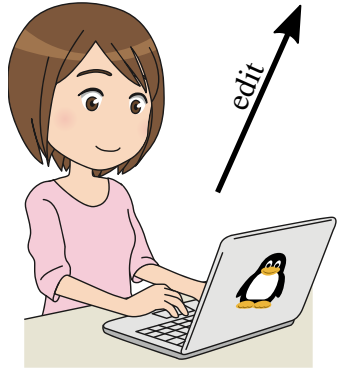
Edit - compile - execute



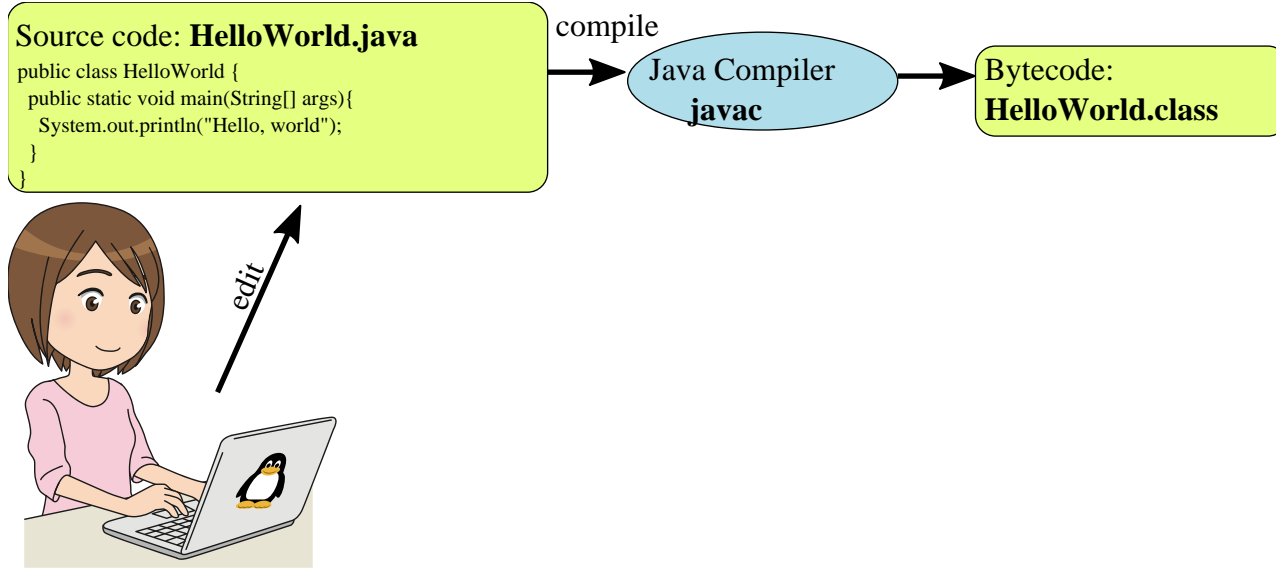
Edit - compile - execute

Source code: **HelloWorld.java**

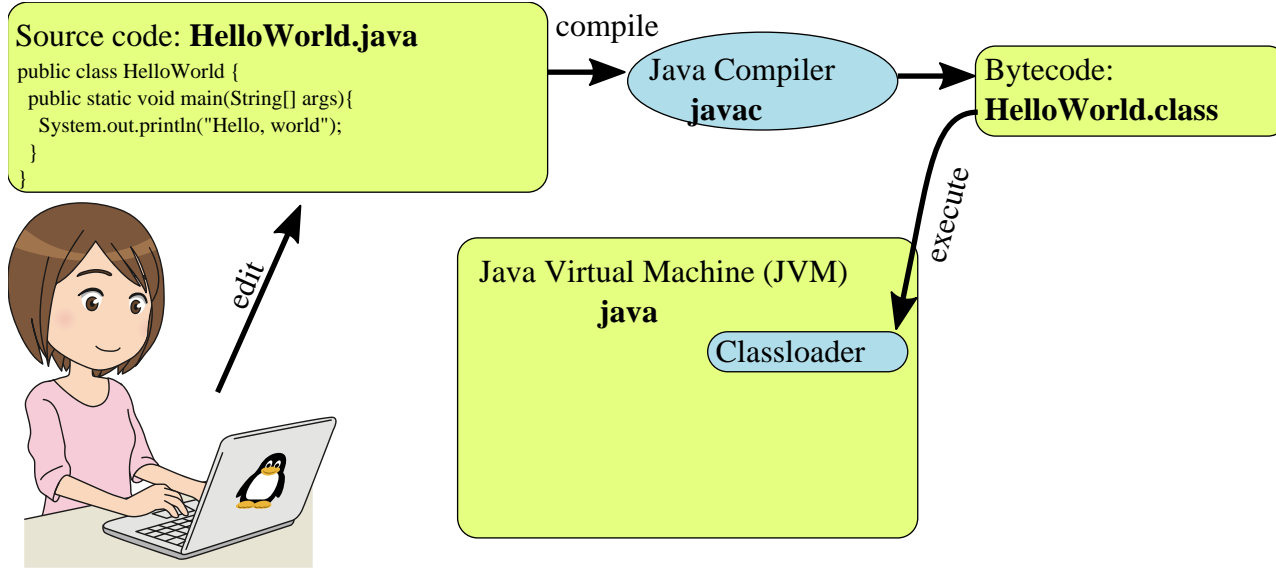
```
public class HelloWorld {  
    public static void main(String[] args){  
        System.out.println("Hello, world");  
    }  
}
```



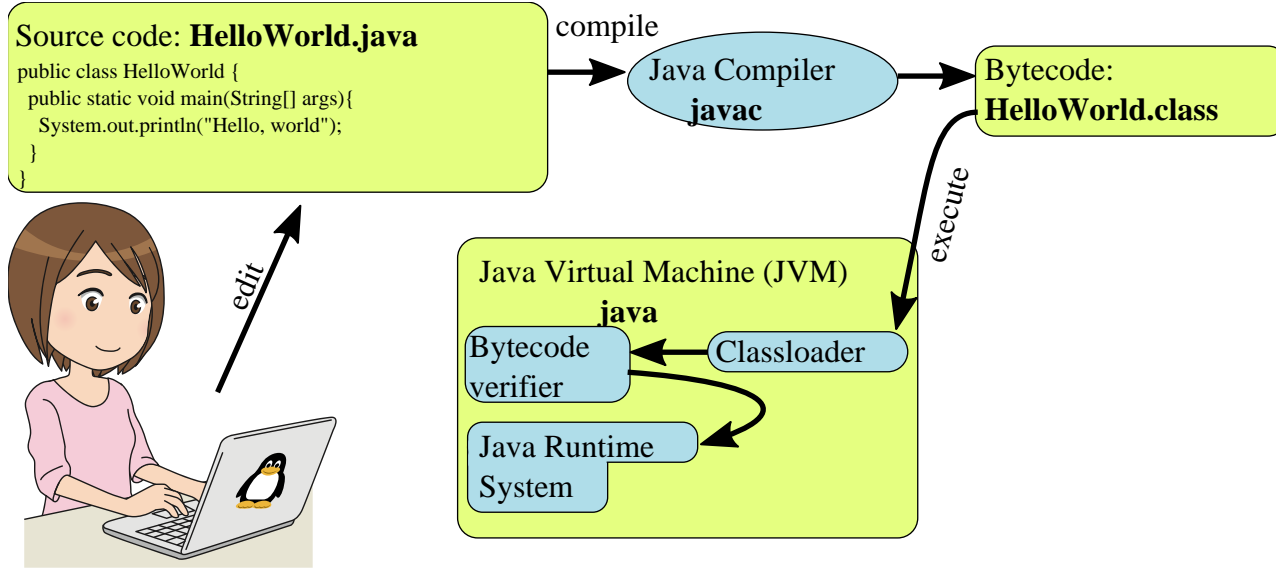
Edit - compile - execute



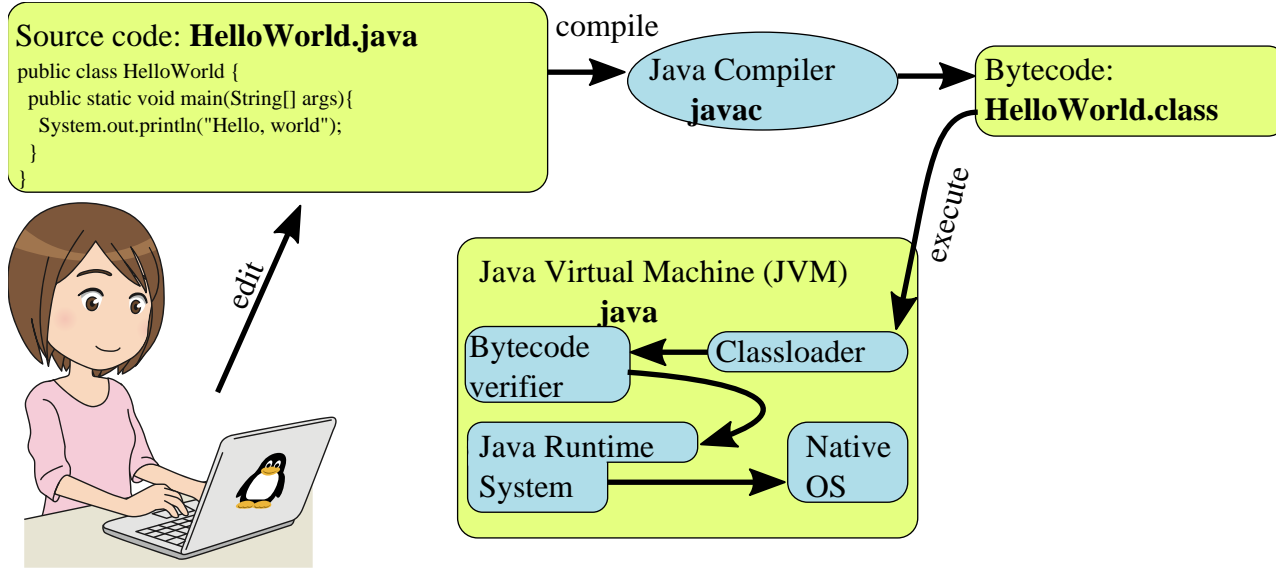
Edit - compile - execute



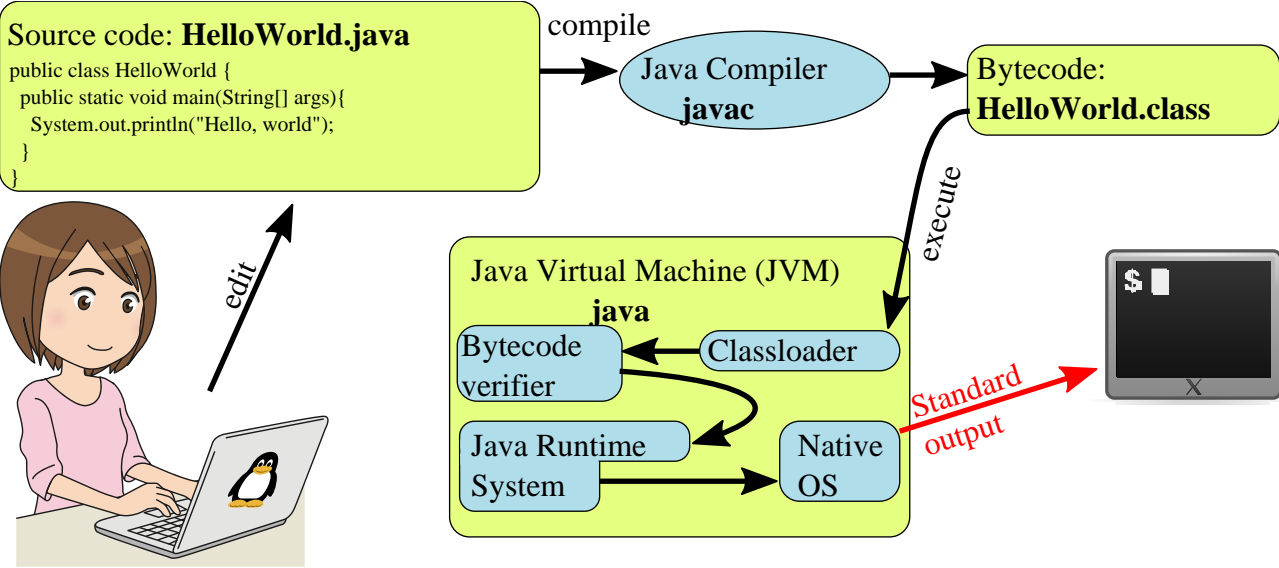
Edit - compile - execute



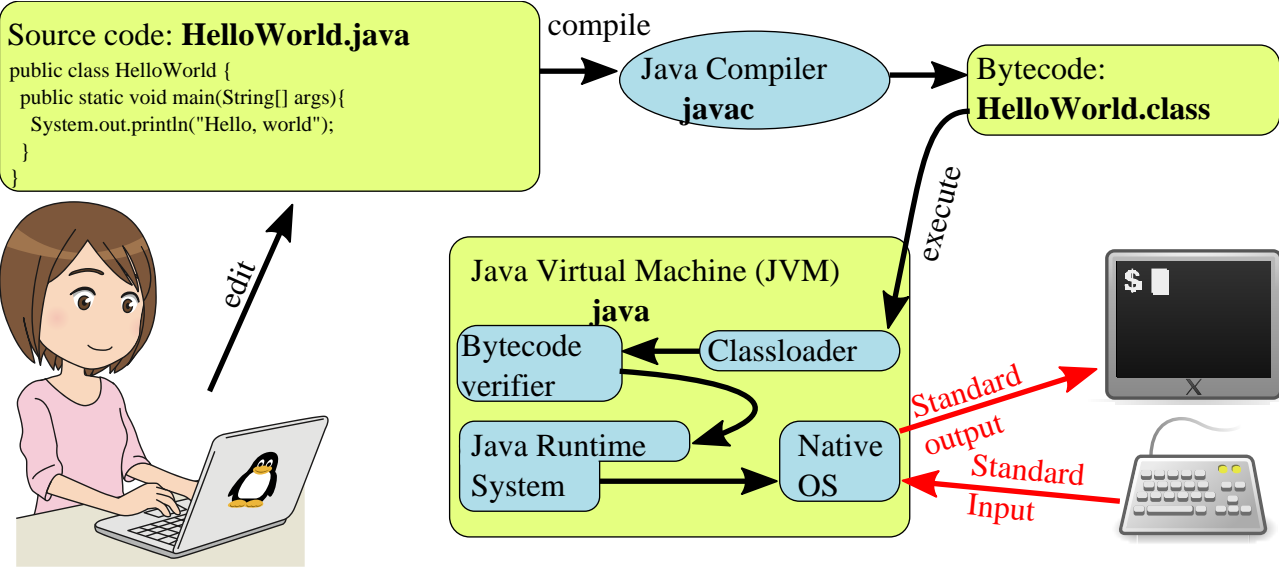
Edit - compile - execute



Edit - compile - execute



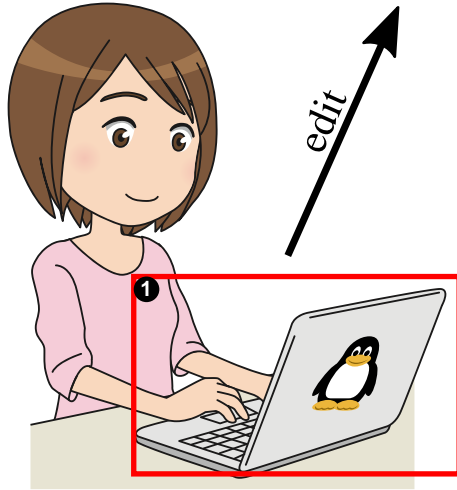
Edit - compile - execute



Editing Java™ files

2 Source code: **HelloWorld.java**

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

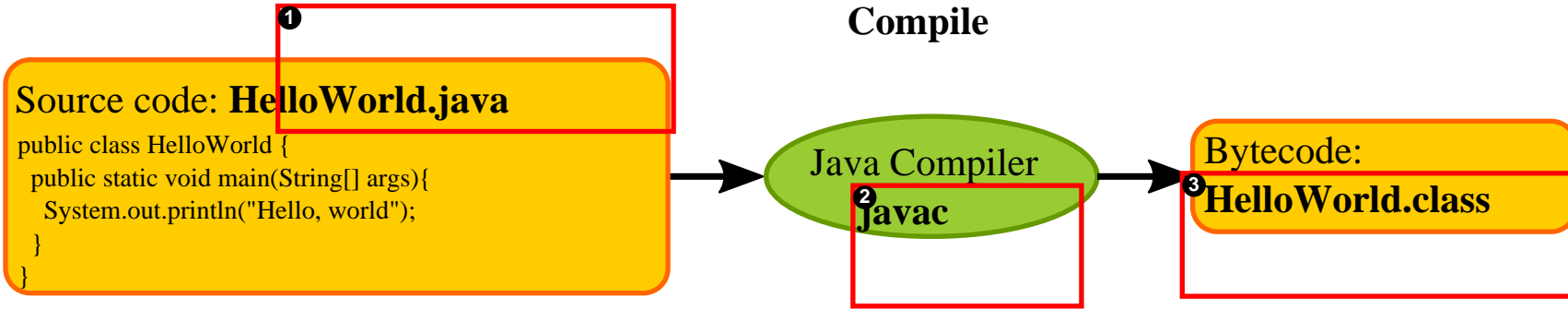


Defining class HelloWorld

```
// 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
```

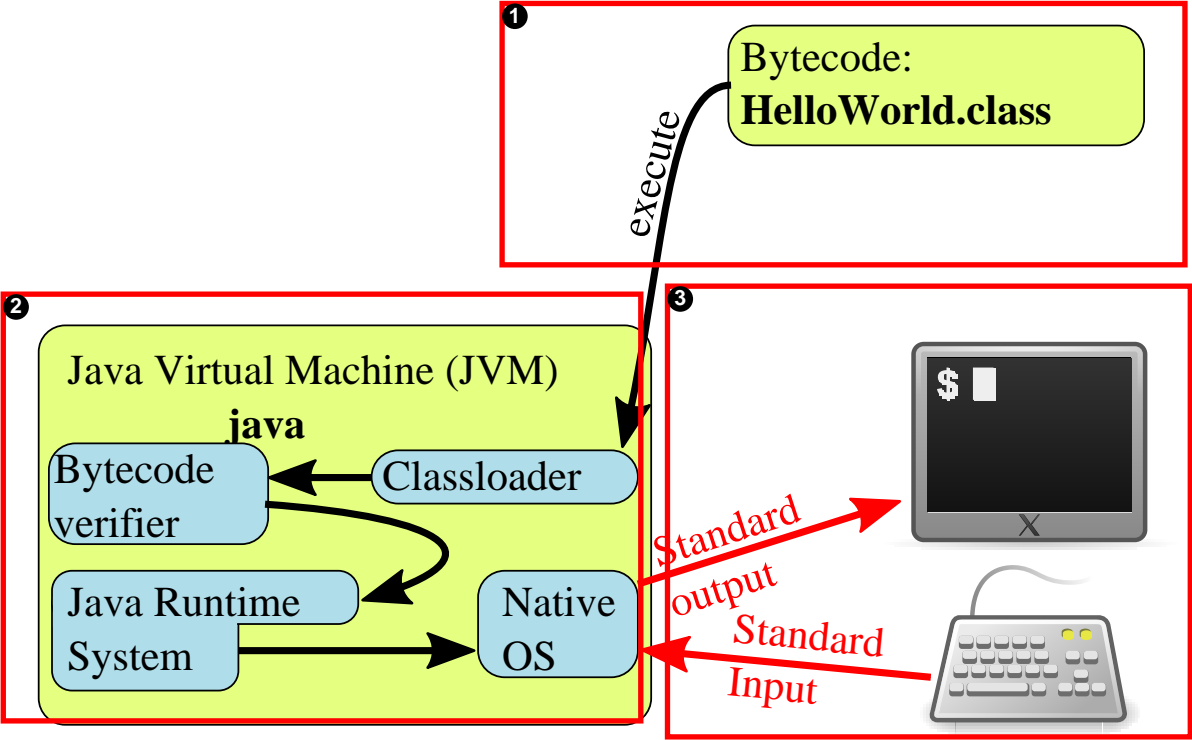
Java byte code file HelloWorld.class

Ëp¼^@^@6^@]
^@^F^@^0 ^@^P^@^Q^H^@^R
^@^S^@^T^G^@^U^G^@^V^A^@^F<init>^A^@^C()V^A^@^DCode^A^@^0LineNumberTable^A^@^Dmain^A^@^V(\n[Ljava/lang/String;)V^A^@
SourceFile^A^@^0**HelloWorld.java**^L^@^G^@^H^G^@^W^L^@^X^@^Y^A^@^L**Hello, world**^G^@^Z^L^@^[^@\
^\\^A^@
HelloWorld^A^@^Pjava/lang/Object^A^@^Pjava/lang/System^A^@^Cout^A^@^ULjava/io/PrintStream;\n^A^@^Sjava/io/PrintStream^A^@^G**println**^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
<ul style="list-style-type: none">• Human readable (kind of #).• High abstraction level.• Text file	<ul style="list-style-type: none">• 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

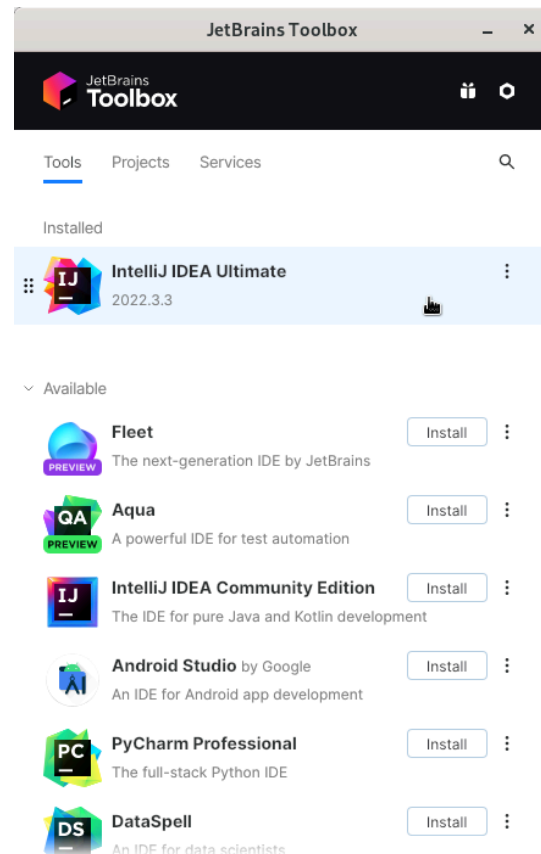
Exercise 7: Different byte code, same execution results

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:

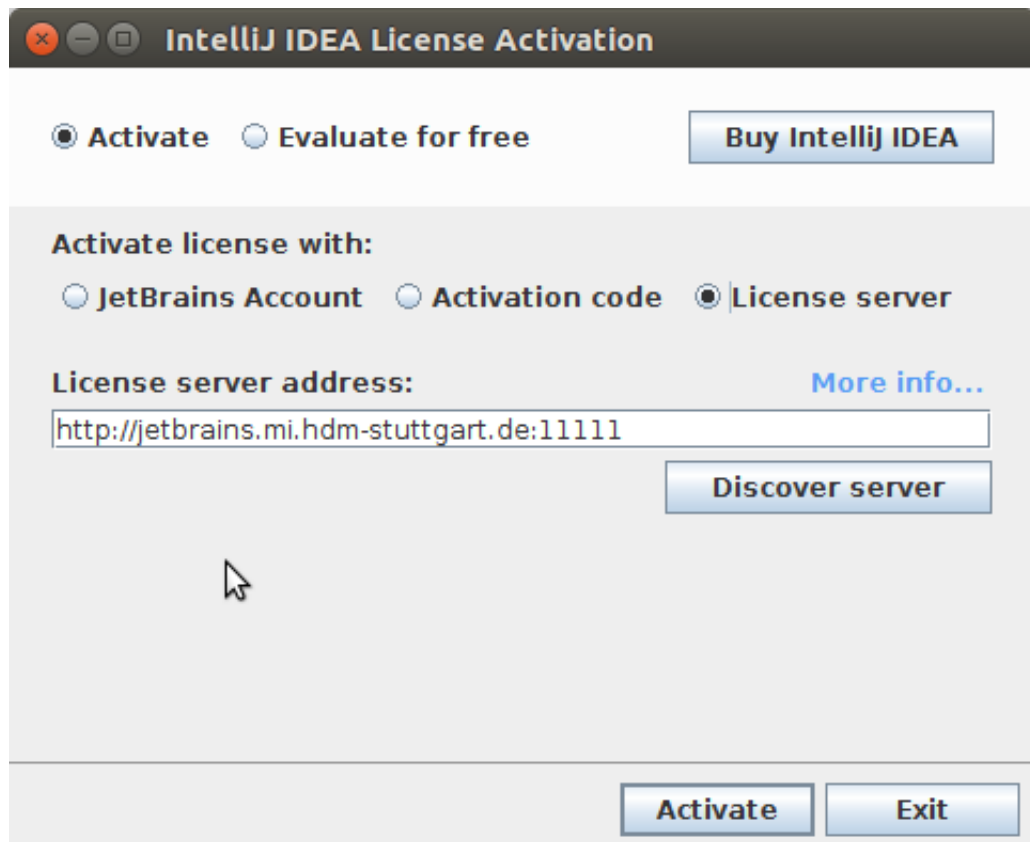
`www.jetbrains.com/shop/eform/students`

- Using HdM/MI license server:

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

See MI wiki for further details.

Alternative: Using the HdM license server



The image shows the IntelliJ IDEA License Activation dialog box. At the top, there are three window control buttons (close, minimize, maximize) and the title "IntelliJ IDEA License Activation". Below the title bar, there are three radio buttons: "Activate" (selected), "Evaluate for free", and "Buy IntelliJ IDEA" (a button). Underneath, there is a section titled "Activate license with:" with three radio buttons: "JetBrains Account", "Activation code", and "License server" (selected). Below this, there is a label "License server address:" followed by a text input field containing the URL "http://jetbrains.mi.hdm-stuttgart.de:11111". To the right of the input field is a blue link "More info...". Below the input field is a button labeled "Discover server". At the bottom of the dialog, there are two buttons: "Activate" and "Exit".

IntelliJ IDEA License Activation

☒ Activate ☐ Evaluate for free [Buy IntelliJ IDEA](#)

Activate license with:

☐ JetBrains Account ☐ Activation code ☒ License server

License server address: [More info...](#)

[Discover server](#)

[Activate](#) [Exit](#)

Insert address:

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

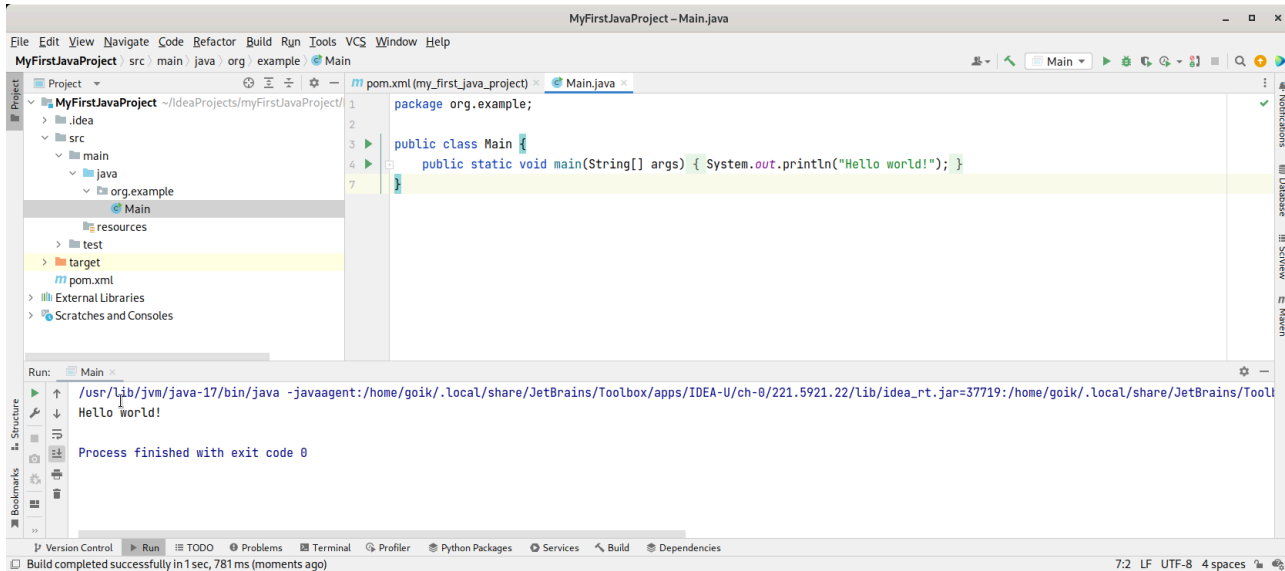
External usage requires VPN !

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