UNIVERSITÄT
ZU KÖLN

Session 1: Welcome & Introduction

Softwaretechnologie: Java 1

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INSTITUT FÜR
DIGITAL HUMANITIES
UNIVERSITÄT ZU KÖLN

Section 1

Introduction

Contents of this Class

Introduction to object-oriented programming (with Java)

- Variables, operators, functions
- Comments, data types, casting
- Javadoc, conditionals
- Loops, arrays and Strings
- Objects and inheritance
- Interfaces, abstract classes, static variables
- Data streams
- Serialization, error handling with exceptions ...

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- Data streams
- Serialization, error handling with exceptions ...

Goal: Learn to program, using Java as an example

Softwaretechnologie: Java 1

- Teil des Basismoduls “Programmierung” für Informationsverarbeitung und Medieninformatik
- Erster Teil des Programmierkurses
- Begleitet von Übungen (“Programmierpraktikum”)
  - Anmeldung in Klips, finden zunächst per Zoom statt
- Studienleistung: Abgabe der Hausaufgaben via Ilias

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- Studienleistung: Abgabe der Hausaufgaben via Ilias
- Modulprüfung
  - Programmierprojekt (im Anschluss an das Sommersemester)

Kurswebseite:
`https://uni.koeln/ZWN85`

Programmierpraktikum (= begleitendes Tutorium)

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- Dienstag (10:00-11:30): Dennis Demmer
- Donnerstag (16:00-17:30): Vyshanta Simha
- Donnerstag (17:00-18:30, Zoom): Dennis Demmer

About Me

Figure: Nils (left)

Nils Reiter

- Master ("Diplom") in Computational Linguistics (Saarland University, 2007)
- PhD in Computational Linguistics (Heidelberg University, 2007-2013)
- Postdoc at the IMS (Stuttgart University, 2014-2021)
- Professor for Digital Humanities / Computational Linguistics (Cologne University, since 2021)

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  `nils.reiter@uni-koeln.de`

Learning Programming

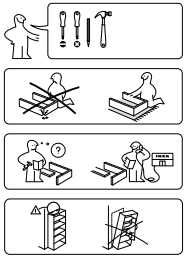
- Learning to program is hard and takes time
- It helps to
  - Regularly do it
  - Talk about it
  - Be stubborn and think formalistic
  - Be fearless and disrespectful
  - Read documentation
  - Understand your mistakes
- It's okay to make mistakes

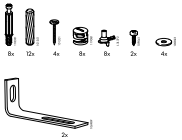
What is “programming” and what is a “program”?

- Eine Form der Informationsverarbeitung
- Programmieren → Programm
- Anweisungsreihung von Befehlen um Prozess zu produzieren

- Befehle ausführen


MARGARITA
Salted rim
Lime segment
2 crushed ice cubes
Lime juice 2 oz (60 ml)
Triple sec 1 oz (30 ml)
Tequila 2 oz (60 ml)





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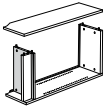

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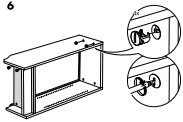

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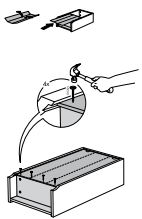

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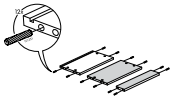

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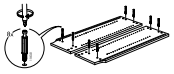

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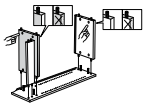

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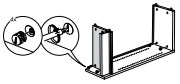


Sequence of Play

A game of The Crusader Kings boardgame *is broken up into Eras. Rounds, and Turns. Each game consists of three Eras, unless the scenario states otherwise. Each Era consists of three Rounds. Each Round consists of two Turns. A game progresses like this:*

ERA 1	ERA 2	ERA 3
ROUND TURN TURN	ROUND TURN TURN	ROUND TURN TURN
ROUND TURN TURN	ROUND TURN TURN	ROUND TURN TURN
ROUND TURN TURN	ROUND TURN TURN	ROUND TURN TURN

Player Order means that the player with the *First Player Token* goes first, followed by the rest of the players in clockwise order. Note that the First Player Token will change hands during the course of the game. When this happens, the current Turn is completed before the change in player order takes effect.

Summary

At the beginning of each Era, each player will draw eight Action Cards, of which six will be played during the Era. At the start of each Round, each player will pick two of these Action Cards to play in the two Turns of the Round, and decide which order to play them in. In each Turn, each player reveals one Action Card and performs one of the actions listed on the top of the card, and then resolves the event described at the bottom of the card.

The Era

Draw: In player order. The player first draws any bonus cards from Crusade Track modifiers or other modifiers.

The player then draws eight (8) Action Cards to form his Hand for the Era. These eight cards must consist of 1–2 Crusade cards, 0–3 of each of the Realm, Intrigue, and War cards, and 0–2 Tax cards. The player may look at his cards only after he is done drawing.

Rounds: Three Rounds (below) are played.

Clean Up: At the end of the first and the second Eras, perform these steps:

- All players discard all Action Cards that were not used during the Era, and place them face up on a shared discard pile next to the Game Board.
- Remove all spouse Character Cards in independent territories and place them face up on a shared discard pile next to the Game Board. Return their Trait Tokens to the General Trait Bag. Draw new spouse Character Cards for each independent territory, and a random Trait Token for each of them.
- Remove the three face up Development Cards on the Game Board, and place them face up on a shared discard pile. Draw three new Development Cards and place them face up on the indicated spaces.
- Then, a new Era starts with a draw phase.

At the end of the third Era, the game ends immediately. Go to End the Game and Scoring (page 17).

The Round

1. **Dynasty Phase:** Each player, in player order, may make one attempt to Marry his King, a sibling, or a child (see page 10), and may then grant and/or revoke any number of Duke and Duchess titles (see page 11).
2. **Plotting Phase:** Each player decides secretly which two Action Cards from his Hand to play this Round. These two cards are placed in front of the player, face down, with the card to be played first on top. If this is the third Round of the Era and a player has not yet played a Crusade card, he must do so now.
3. **Turns:** Play two Turns (below).
4. **Upkeep Phase:** Follow the three steps below.
   a. **Troop Costs:** All players pay 1 Gold for each territory under their control that is Mobilized (i.e. contains a Foot Soldier). If a player can't or won't pay for a territory, it is automatically demobilized. Remove the Foot Soldier and place an Unrest Token in the territory.
   b. **Demobilization:** Each player may now demobilize any number of Mobilized territories under his control. Simply remove the Foot Soldiers.
   c. **Age Tokens:** All players place one Age Token on their King's Character Card.
      - If this is the King's fourth Age Token, the player may remove one Trait Token of his choice from his Trait Bag. If it's a Random Trait Token, return it to the General Trait Bag.
      - If this would be the King's fifth Age Token, the King instead dies peacefully. Perform a Succession Ceremony according to the rules (page 21).

After the third Round, return to the Clean Up phase of the Era (above).

The Turn

Each player, in player order, reveals one of the two Action Cards chosen during Plotting (above). The top card must be played in the first Turn of the Round, and the bottom card in the second Turn.

The player first resolves one of the actions indicated at the top of the card.

Once the action is fully resolved, the player reads the event below the image on the Action Card and resolves its effects. The Action Card is then placed in the shared discard pile.

STRATEGY TIP:

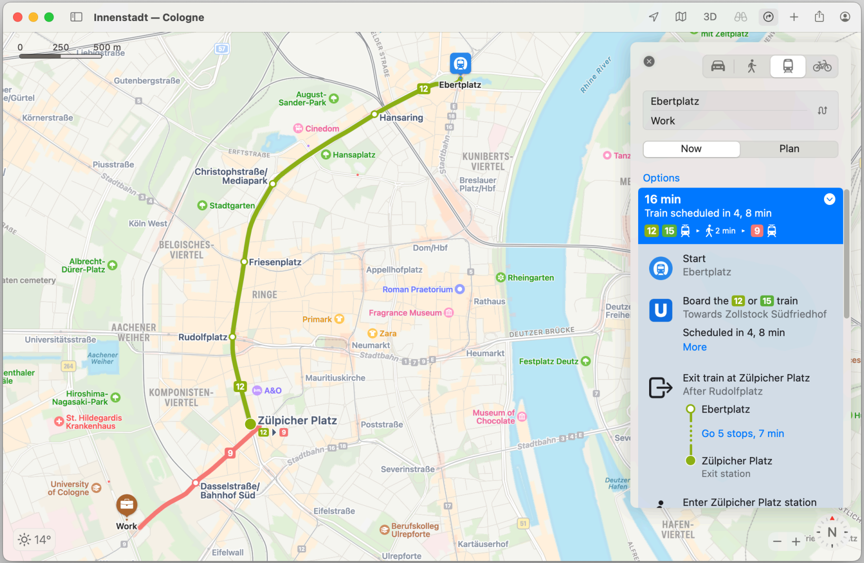
War Takes Planning

When choosing your Action Cards for the Era, remember that war takes careful planning. Before you can Invade an enemy, you need both a Casus Belli and to Mobilize your armies. That means that going to war is a process that takes three Turns to complete: First, you need to Plot to Manufacture Casus Belli (unless you already have it), second you need to Mobilize Foot Soldiers in adjacent provinces, and third, you can Invade.

STRATEGY TIP:

Don't Crusade Too Early

When picking your two Action Cards to play in a Round, be careful not to Crusade before you have an heir to your throne. Without an heir, you'll need to send your King on the Crusade, and if he dies, a Succession Crisis will be triggered. That's not a good way to start your game!


Innenstadt — Cologne
3D
0
250
500 m
Gutenbergstraße
Körnerstraße
Piusstraße
Köln West
BELGISCHES-VIERTEL
Albrecht-Dürer-Platz
AACHENER WEIHER
Universitätsstraße
Aachener Weiher
Hiroshima-Nagasaki-Park
St. Hildegardis Krankenhaus
University of Cologne
Work
14°
KOMPONISTEN-VIERTEL
August-Sander-Park
Cinedom
ERFTSTRASSE
Hansaplatz
Christophstraße/Mediapark
Stadtgarten
Friesenplatz
RINGE
Rudolfplatz
Primark
A&O
Zülpicher Platz
Dasselstraße/Bahnhof Süd
Eifelstraße
Eifelwall
Ebertplatz
Hansaring
KUNIBERTS-VIERTEL
Breslauer Platz/Hbf
Dom/Hbf
Appellhofplatz
Roman Praetorium
Rathaus
Fragrance Museum
Zara
Neumarkt
Heumarkt
Mauritiuskirche
Poststraße
Severinstraße
Berufskolleg Ulrepforte
Ulrepforte
Kartäuserhof
Museum of Chocolate
Rheingarten
Festplatz Deutz
DEUTZER BRÜCKE
Rhine River
HAFEN-VIERTEL
Ebertplatz
Work
Now
Plan
Options
16 min
Train scheduled in 4, 8 min
12 15 2 min 9
Start
Ebertplatz
Board the 12 or 15 train
Towards Zollstock Südfriedhof
Scheduled in 4, 8 min
More
Exit train at Zülpicher Platz
After Rudolfplatz
Ebertplatz
Go 5 stops, 7 min
Zülpicher Platz
Exit station
Enter Zülpicher Platz station

Programs and Programming

Program

A set of instructions from a fixed language to solve a problem

Programming

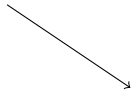
Writing a program: Coming up with a set of instructions to solve a problem

Programming Languages

- Inventory of instructions and how to formulate them
- Programming languages $\neq$ natural languages
  - E.g., programming languages don't have ambiguity
- Long history, highly active field of development
- More and more "powerful": More distant from the machine
  - You don't have to worry anymore about individual registers in the CPU

Programming Languages

List of programming languages in Wikipedia



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Paradigms/Types of Programming Languages

- Compiled – interpreted
  - Translation into machine code at run-time or at compile-time
- Imperative – Declarative
  - Declare the logic of your program vs. define the control flow in imperatives
- ...

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- Compiled – interpreted
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- Imperative – Declarative
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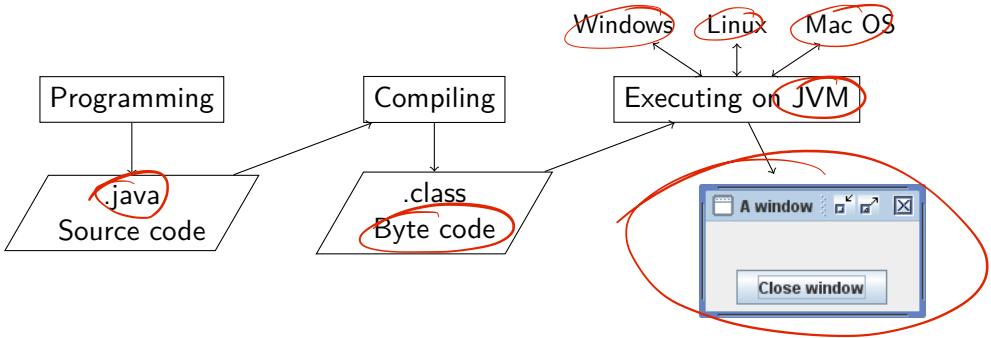
- ...
- Java: Object-oriented (i.e., imperative) and compiled
- Python: Object-oriented, functional and interpreted
- Many languages allow programming in different paradigms

Running a Java-Program



Java Virtual Machine

- Java programs are not executed directly on your CPU
- Java virtual machine (JVM) is a simulated computer
- The same byte code runs on all JVMs – independent of the underlying operating system
- As soon as there is a JVM for a platform, all Java programs can run there

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- The same byte code runs on all JVMs – independent of the underlying operating system
- As soon as there is a JVM for a platform, all Java programs can run there
- This comes at a price
  - Running the JVM consumes resources (memory, CPU cycles)
    - Ongoing debate on exact numbers
  - Platform-specific features cannot be used

demo

Integrated Development Environments (IDEs)

- Class of programs to support programming
- Make writing, compiling, refactoring and debugging a lot easier
- Different IDEs available – This class: Eclipse
  - Alternatives: Netbeans, IntelliJ, VSCode, ...
  - Bare bones: Text editor and terminal

demo

Section 2

Exercise