EABSS Workshop 2023

Co-Creation of Agent-Based Social Simulation Models

Introduction to AnyLogic and Java

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

Content

- AnyLogic
- Objects and Java in 10 Minutes ;-)
- Live Implementation Demo

AnyLogic

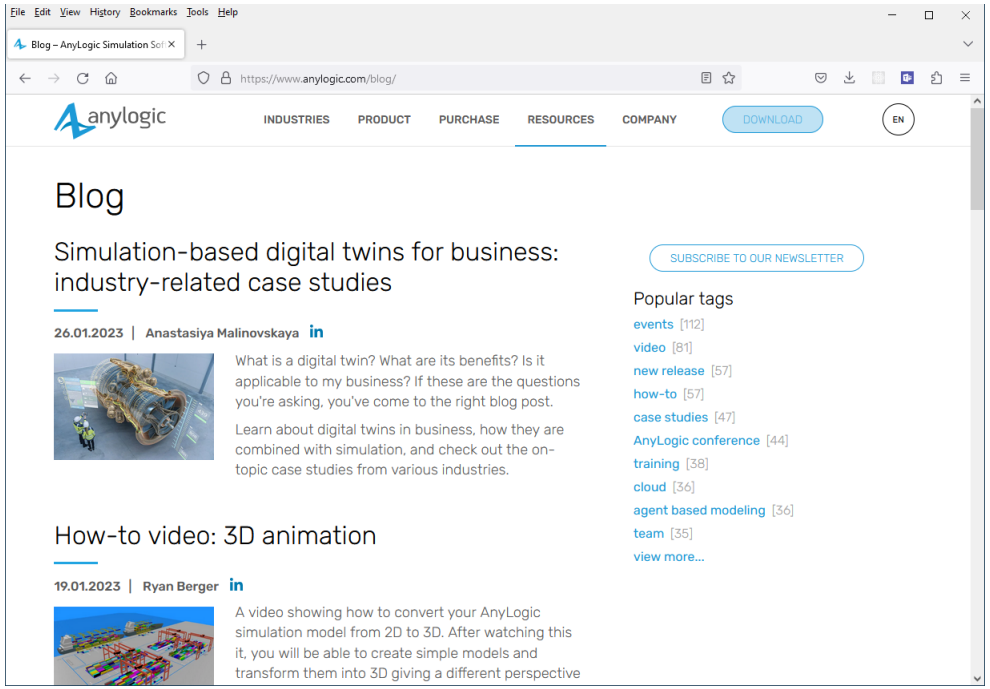
AnyLogic

- The latest version available for download is AnyLogic 8.8.1 PLE
  - Win: https://files.anylogic.com/anylogic-ple-8.8.1.x86_64.exe
  - Mac: https://files.anylogic.com/anylogic-ple-8.8.1.dmg
  - Linux: https://files.anylogic.com/anylogic-ple-8.8.1.linux.x86_64.tgz.bin

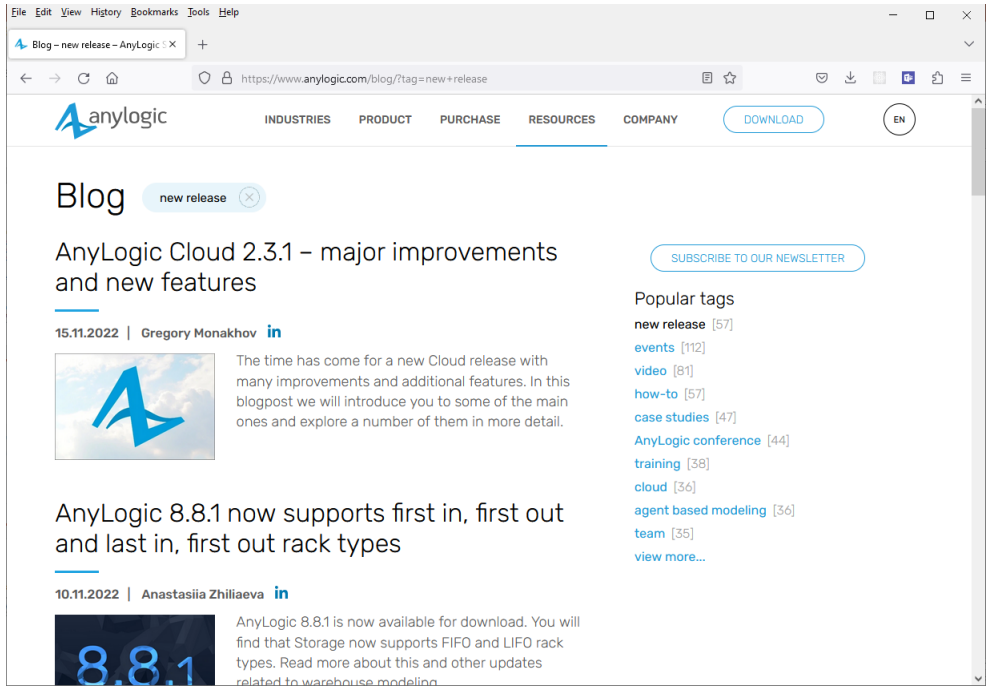
- In AnyLogic you are not writing the full code of Java classes from the beginning to the end; instead you are entering pieces of code and expressions in numerous small edit boxes in the properties of various model elements

AnyLogic

- AnyLogic Blog
  - https://www.anylogic.com/blog/

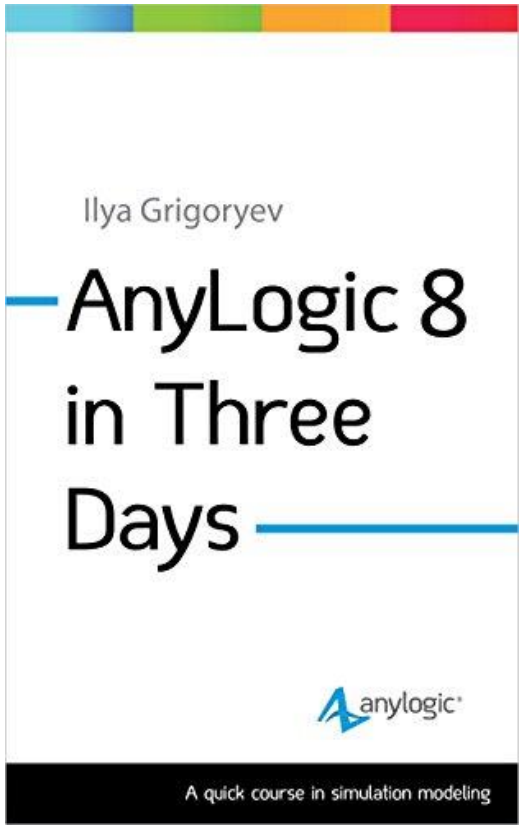


- AnyLogic Blog (new releases)
  - https://www.anylogic.com/blog/?tag=new+release



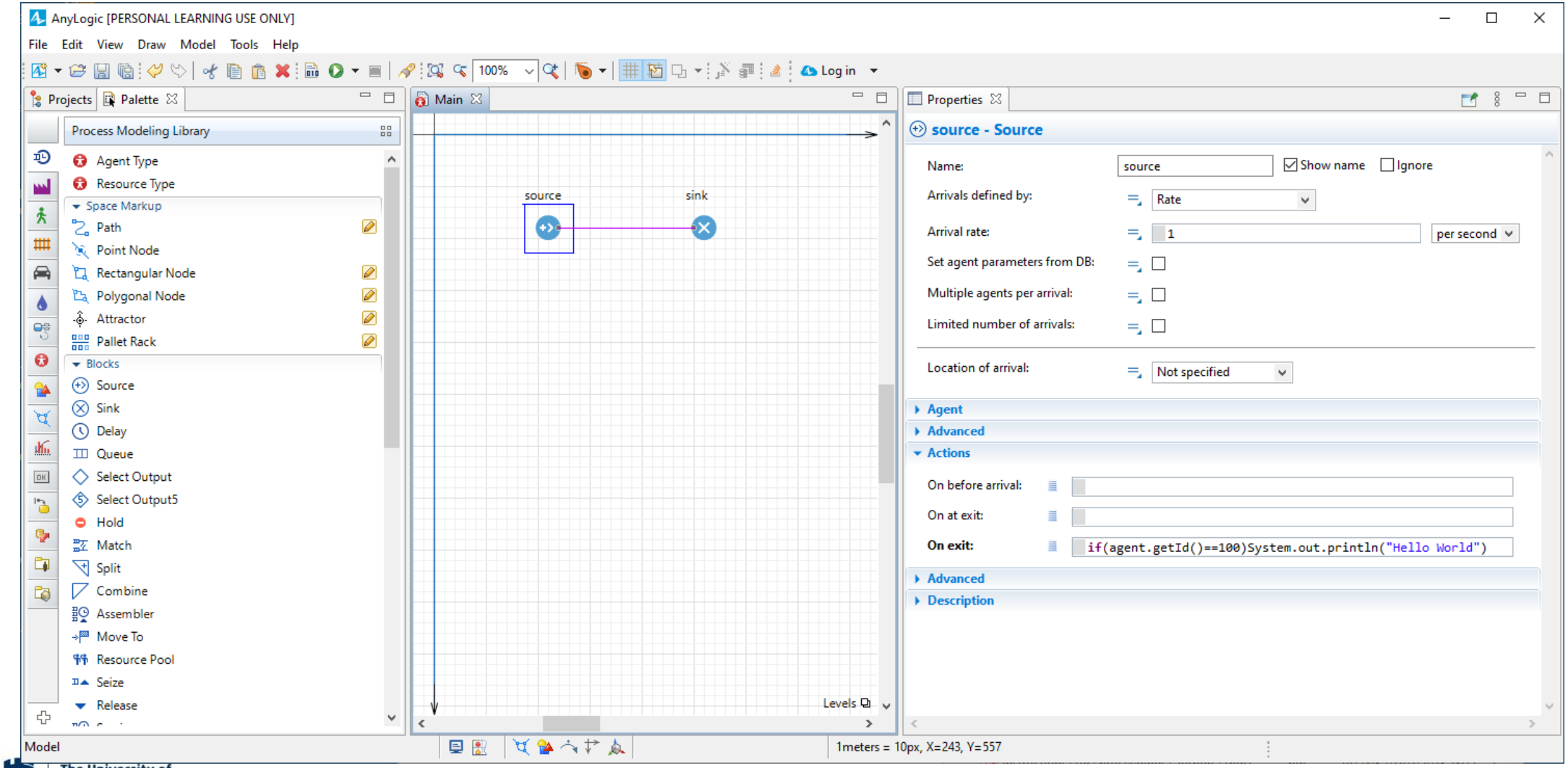
AnyLogic

- Free tutorial book

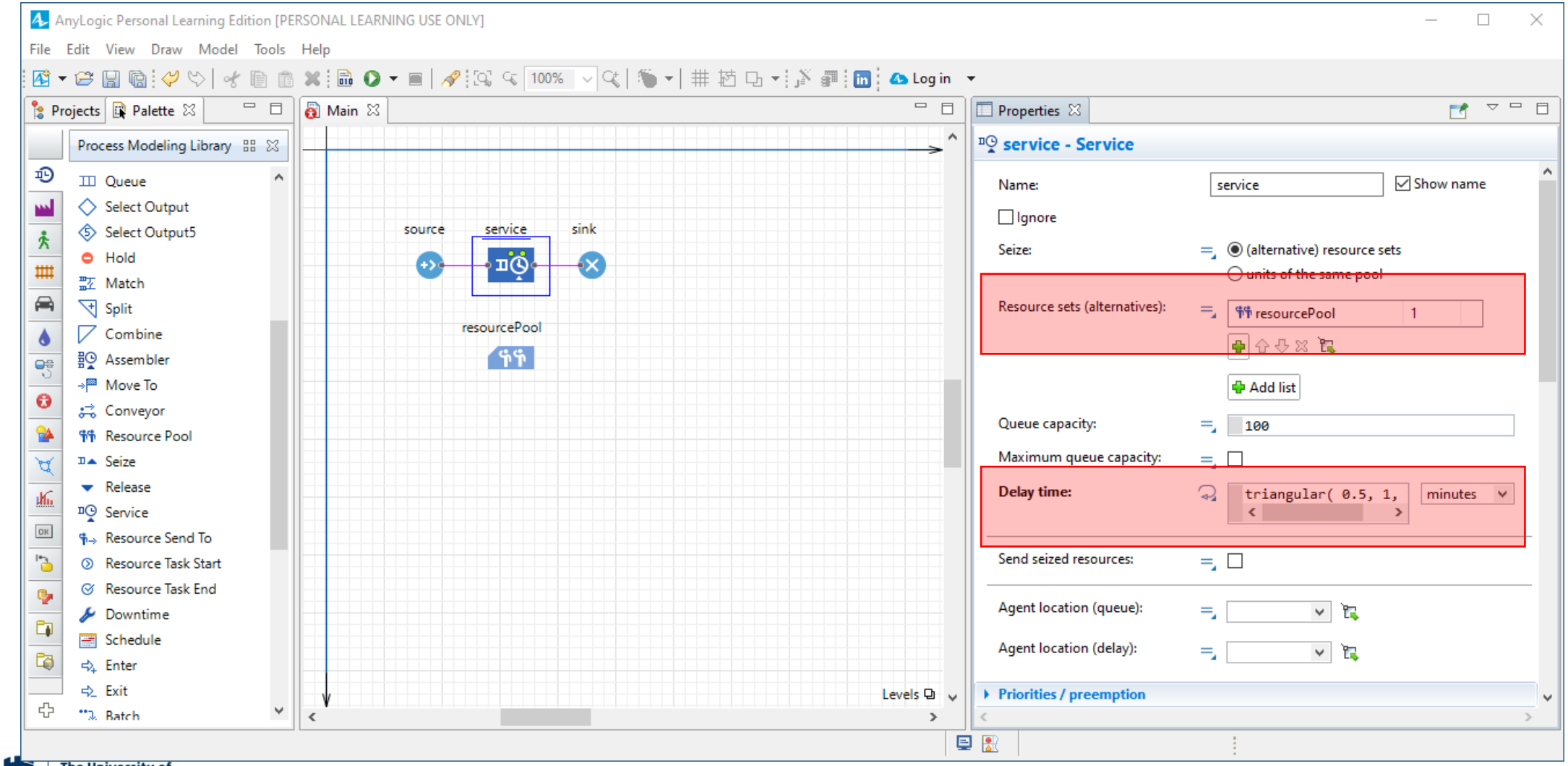


https://www.anylogic.com/upload/book.php?lang=English

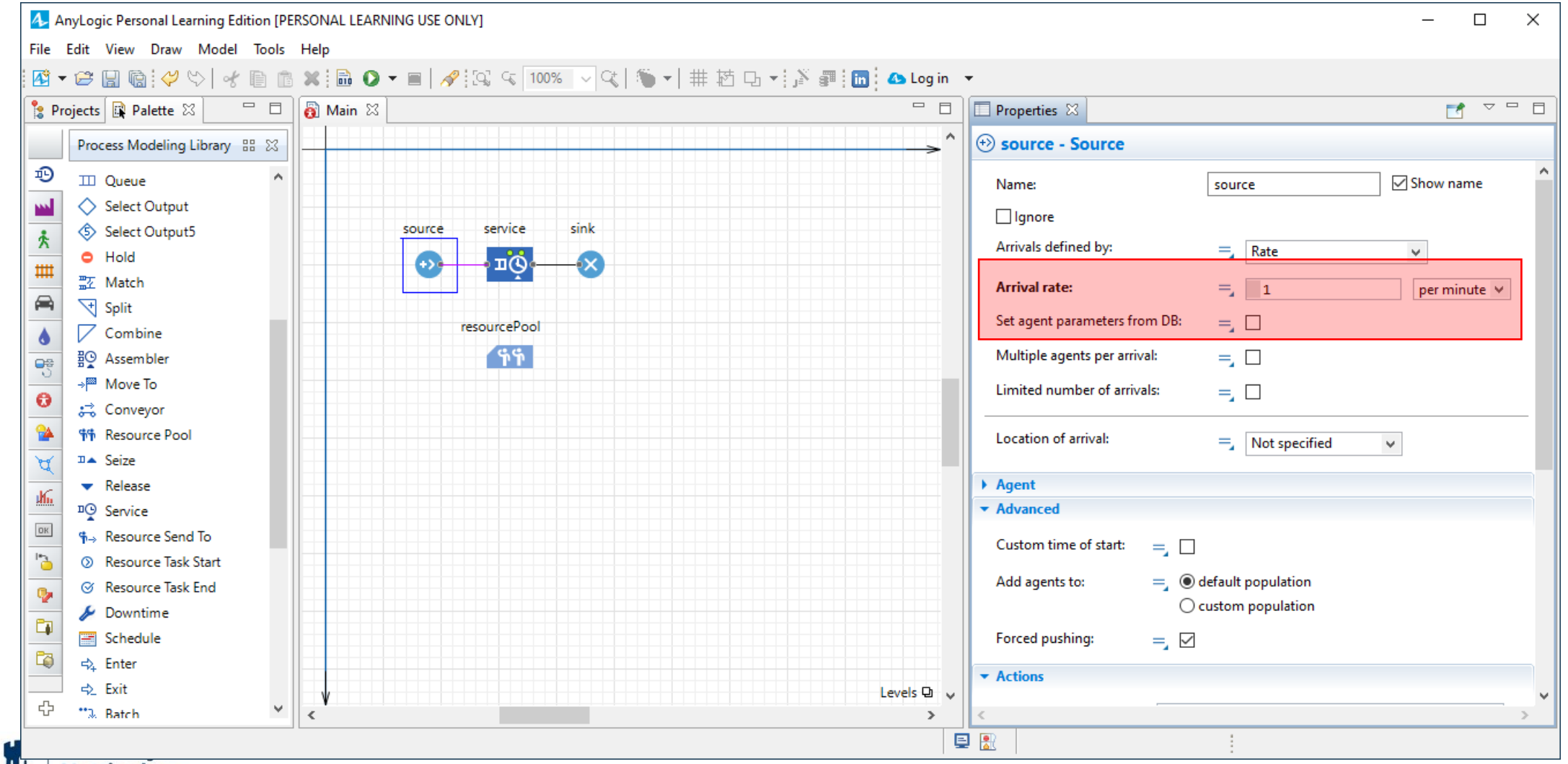
AnyLogic "Hello World!"



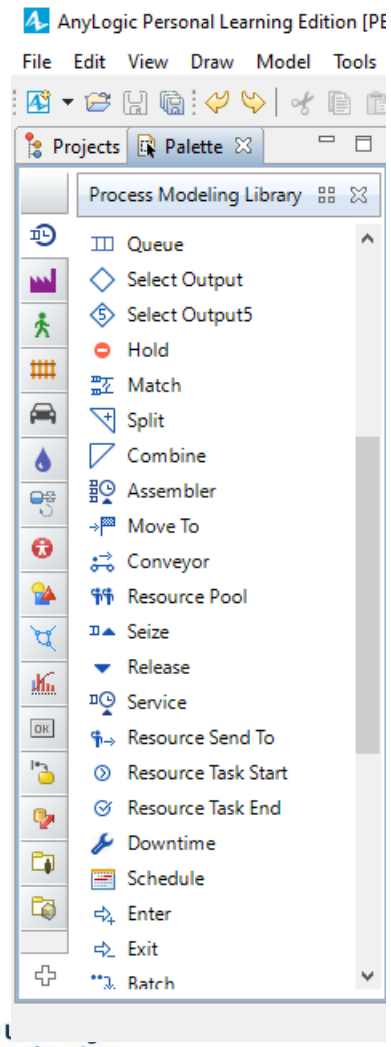
AnyLogic Process Modelling

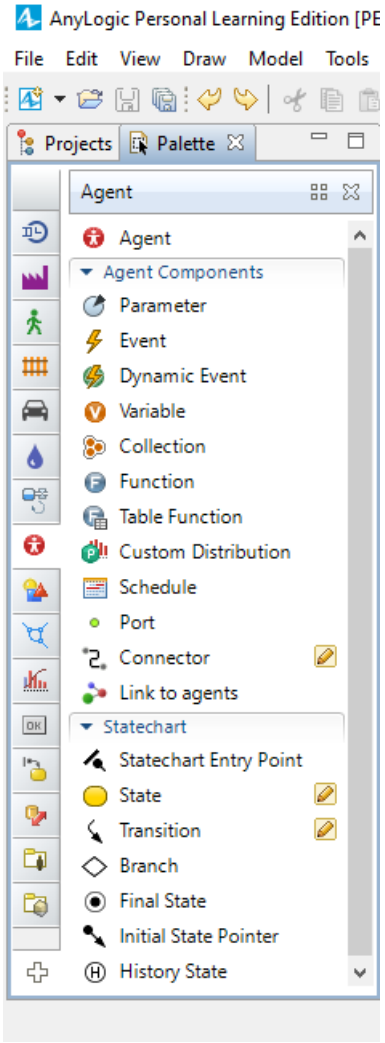


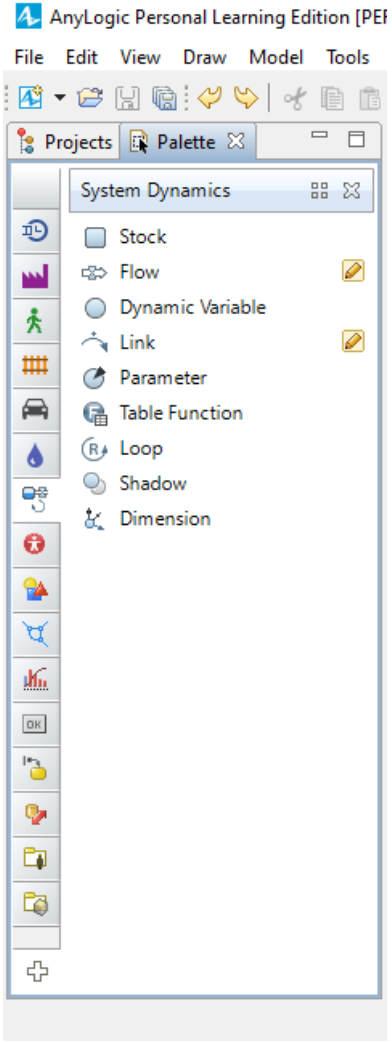
AnyLogic Process Modelling

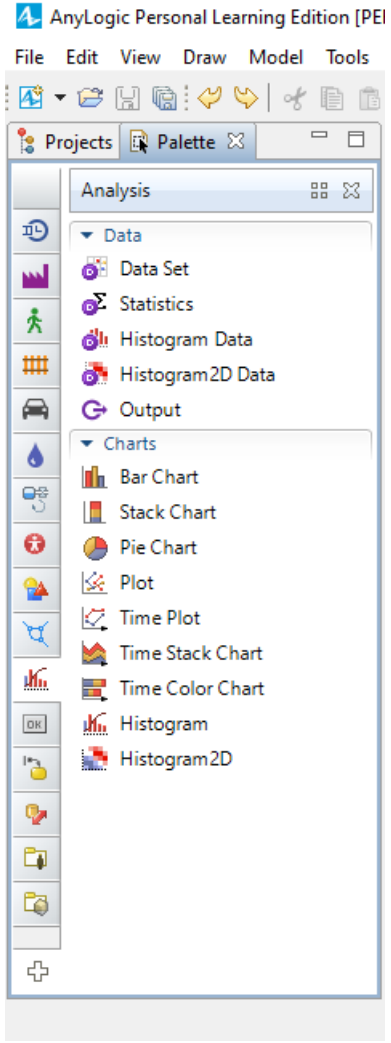


AnyLogic IDE



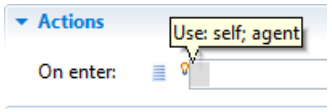


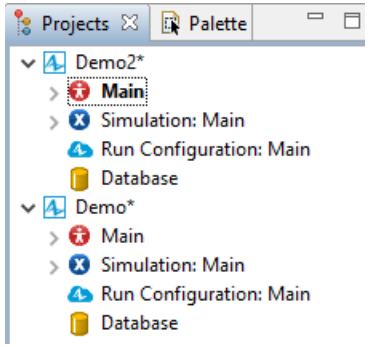




Things to Remember

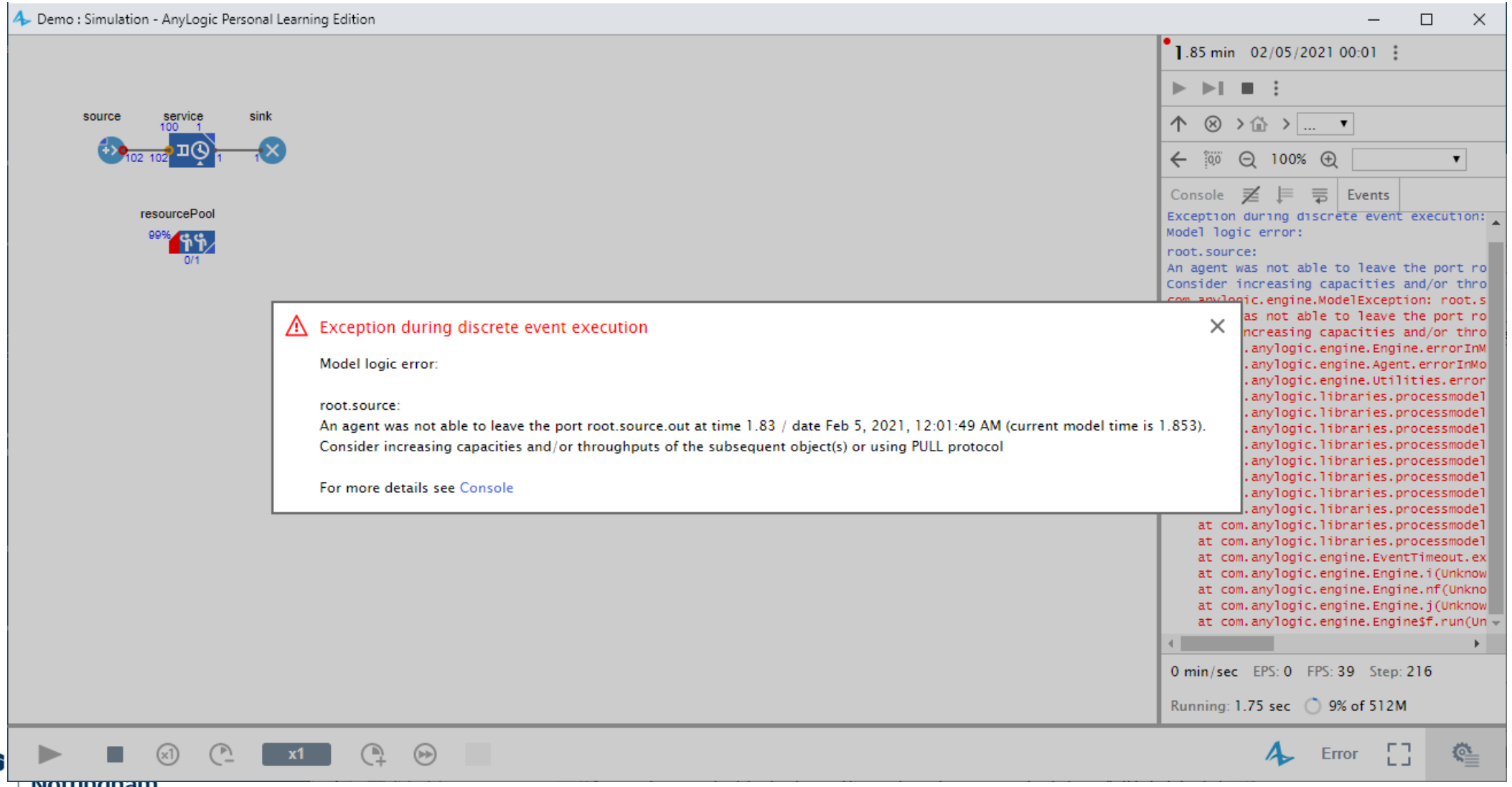
- Important things
  - F1: Help
  - Ctrl-Space: Code completion support
  - Ctrl-Enter: Perform refactoring (replace name occurrences)
  - Make sure you select the correct model when pressing "Run"
  - Make sure you set up model time units correctly in the "Model"
  - Use the "magic lightbulb" ...



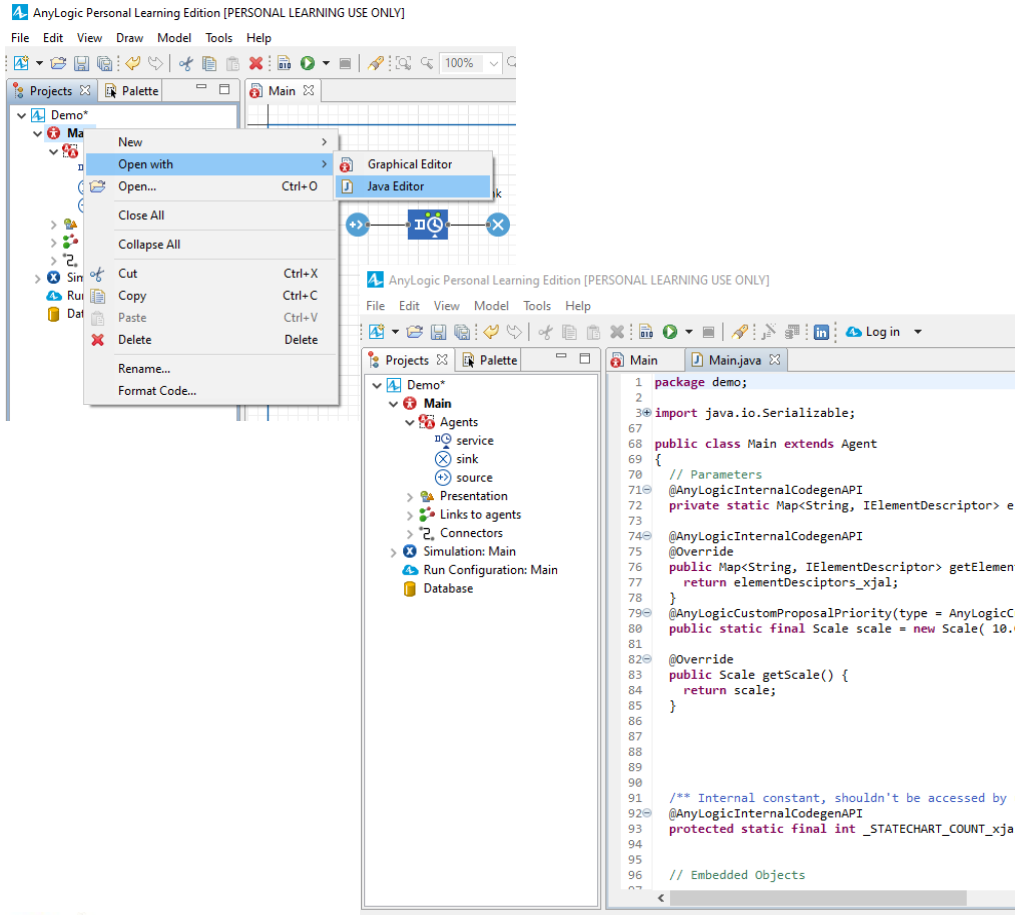


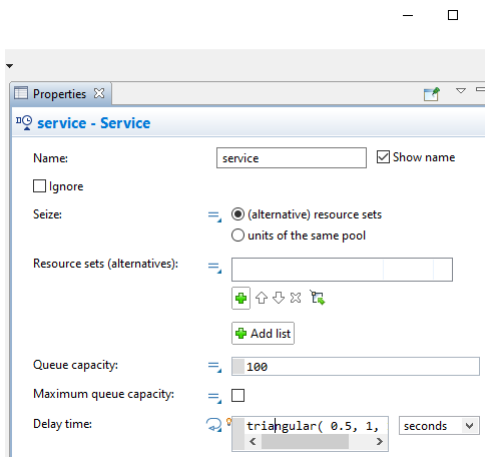
- Since AnyLogic v7
  - Everything is called "Agent" (entities; resources; agents; …)
  - PLE version limits number of agents per simulation run to 50000 (**but you can reuse them**)

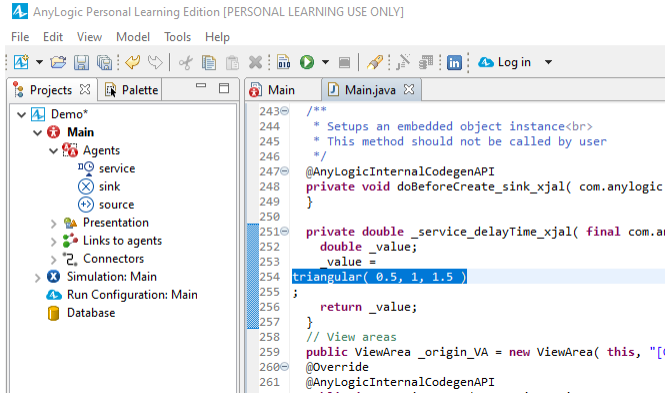
Running AnyLogic



AnyLogic IDE

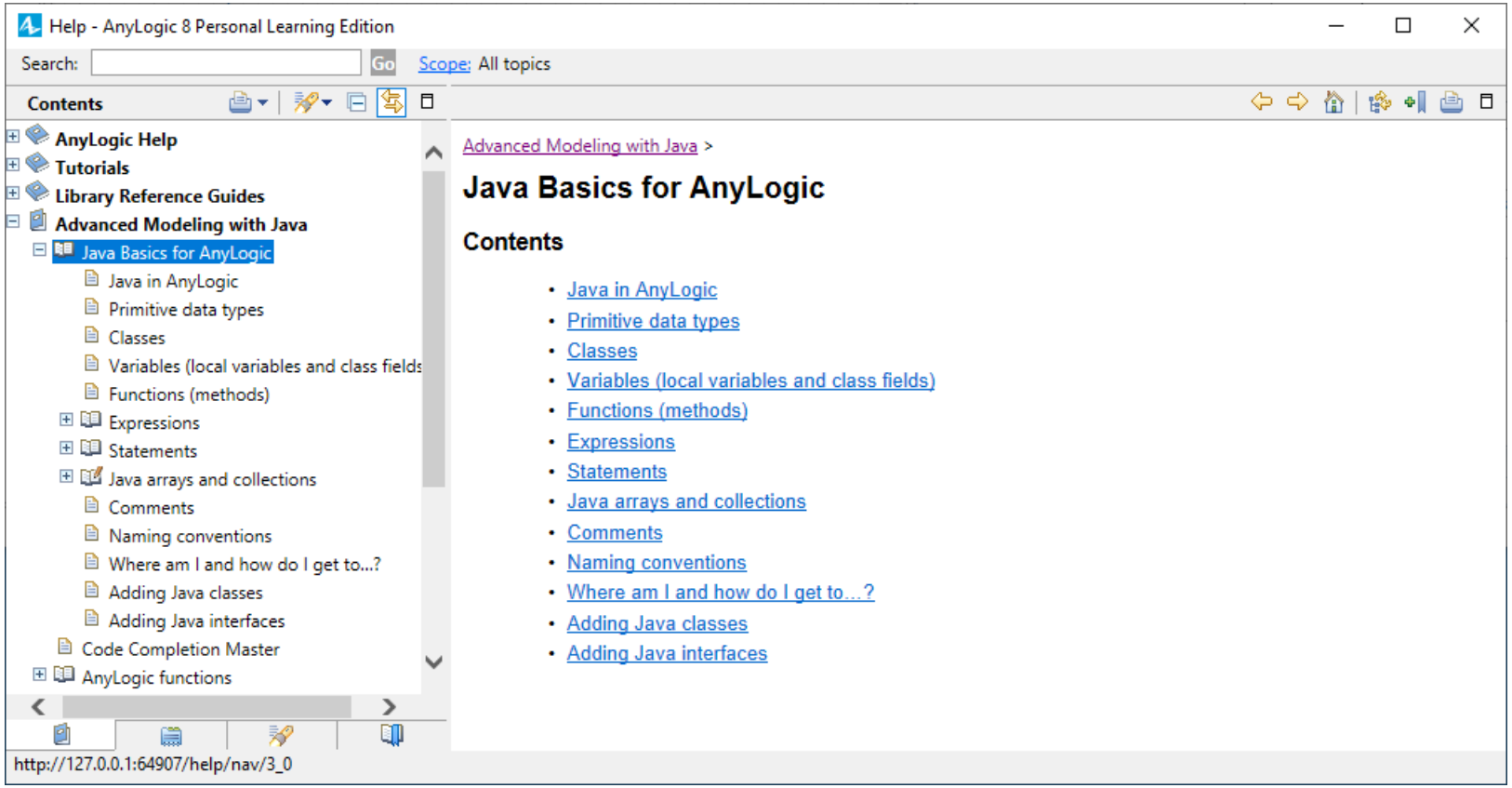




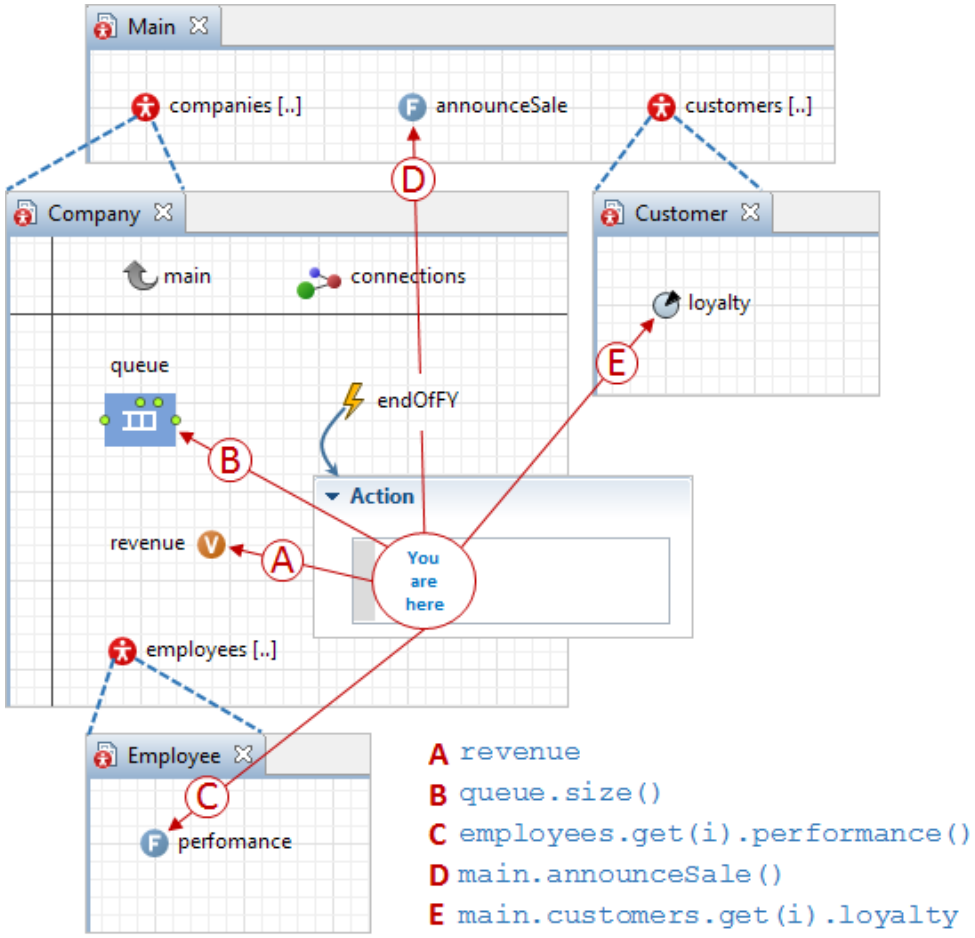


Press {Ctrl+J} to go to the point in the Java code that is associated with the current code snippet highlighted in the Properties window

AnyLogic Help

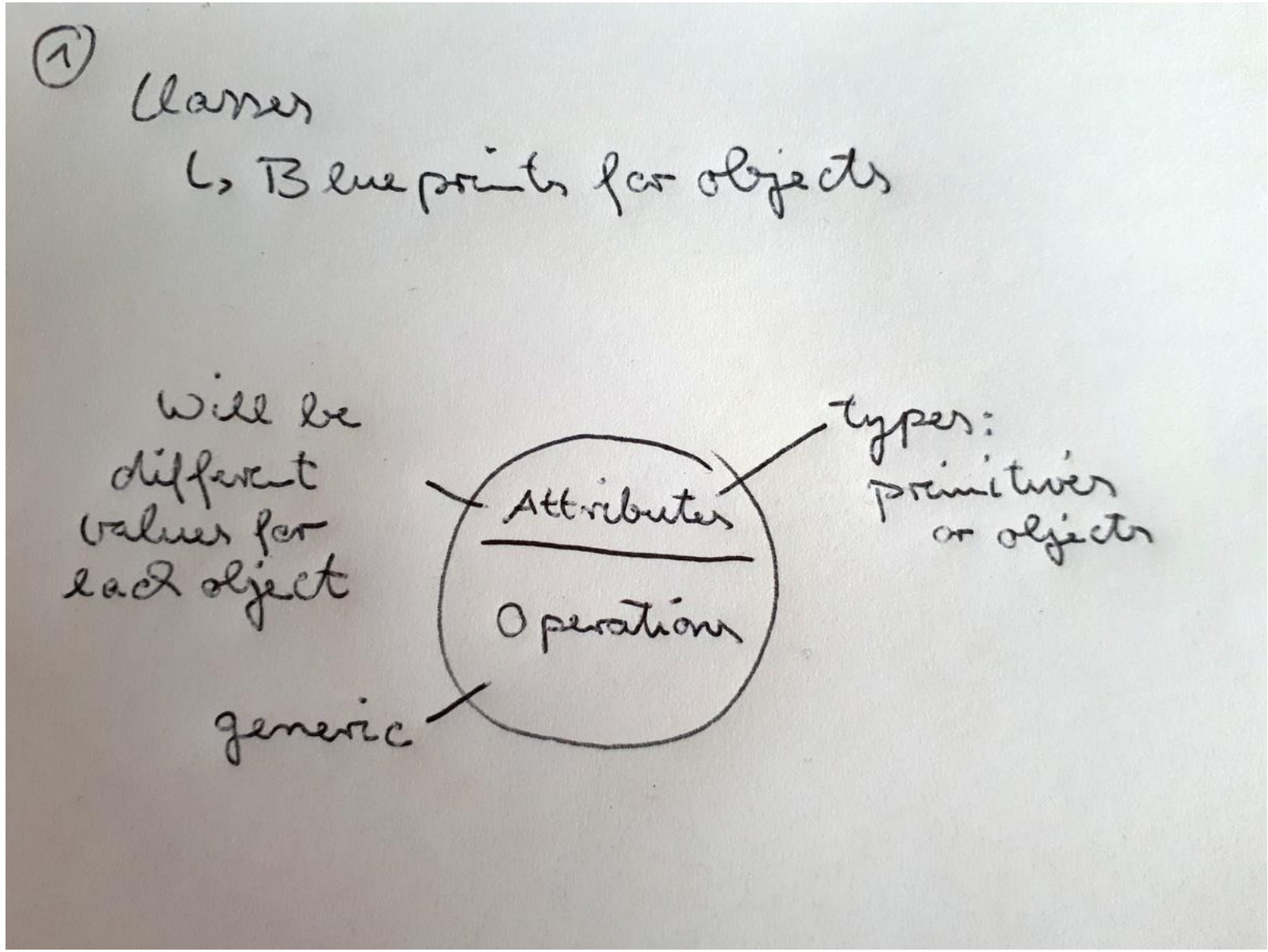


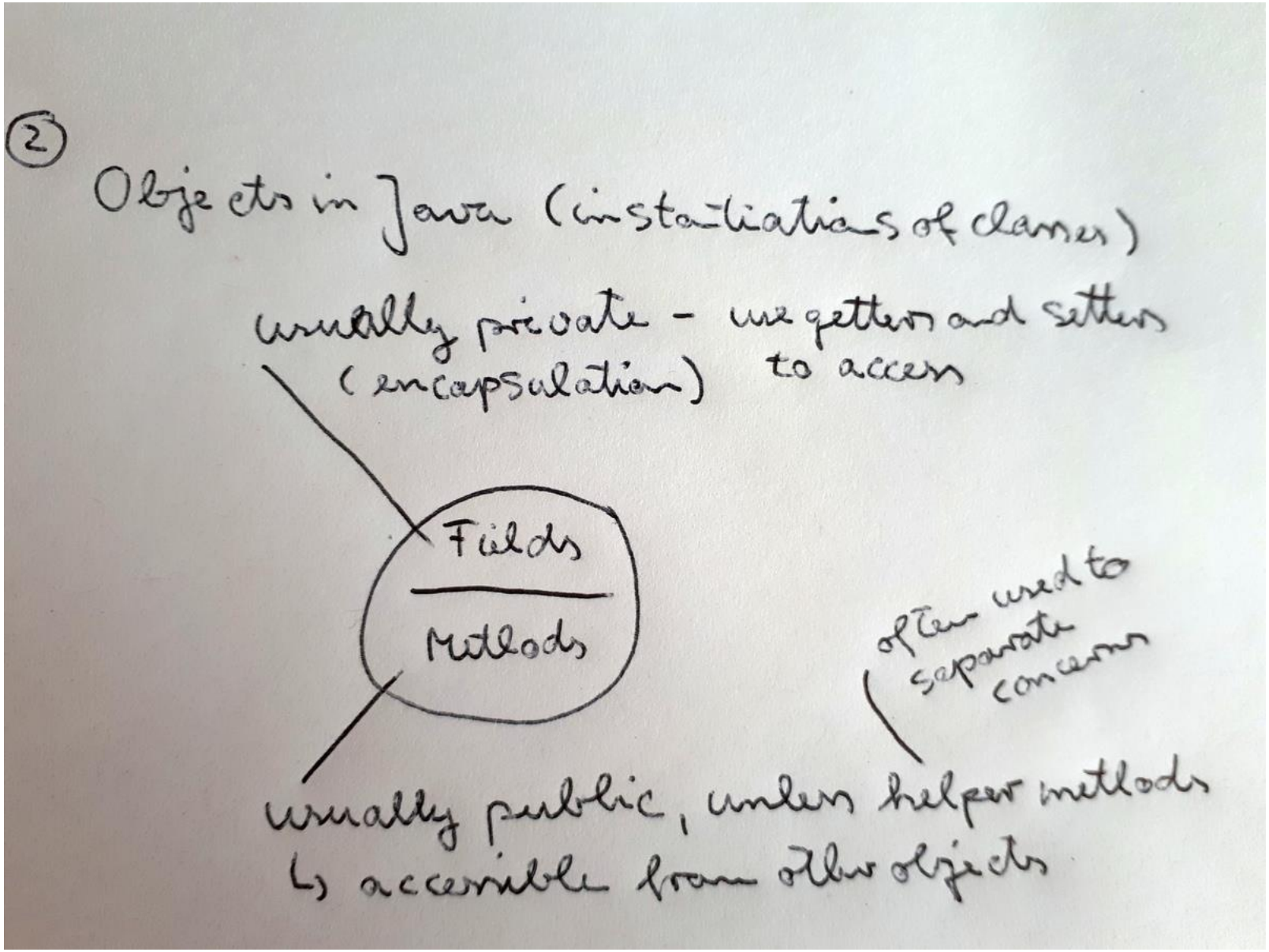
Where am I and how do I get to…?

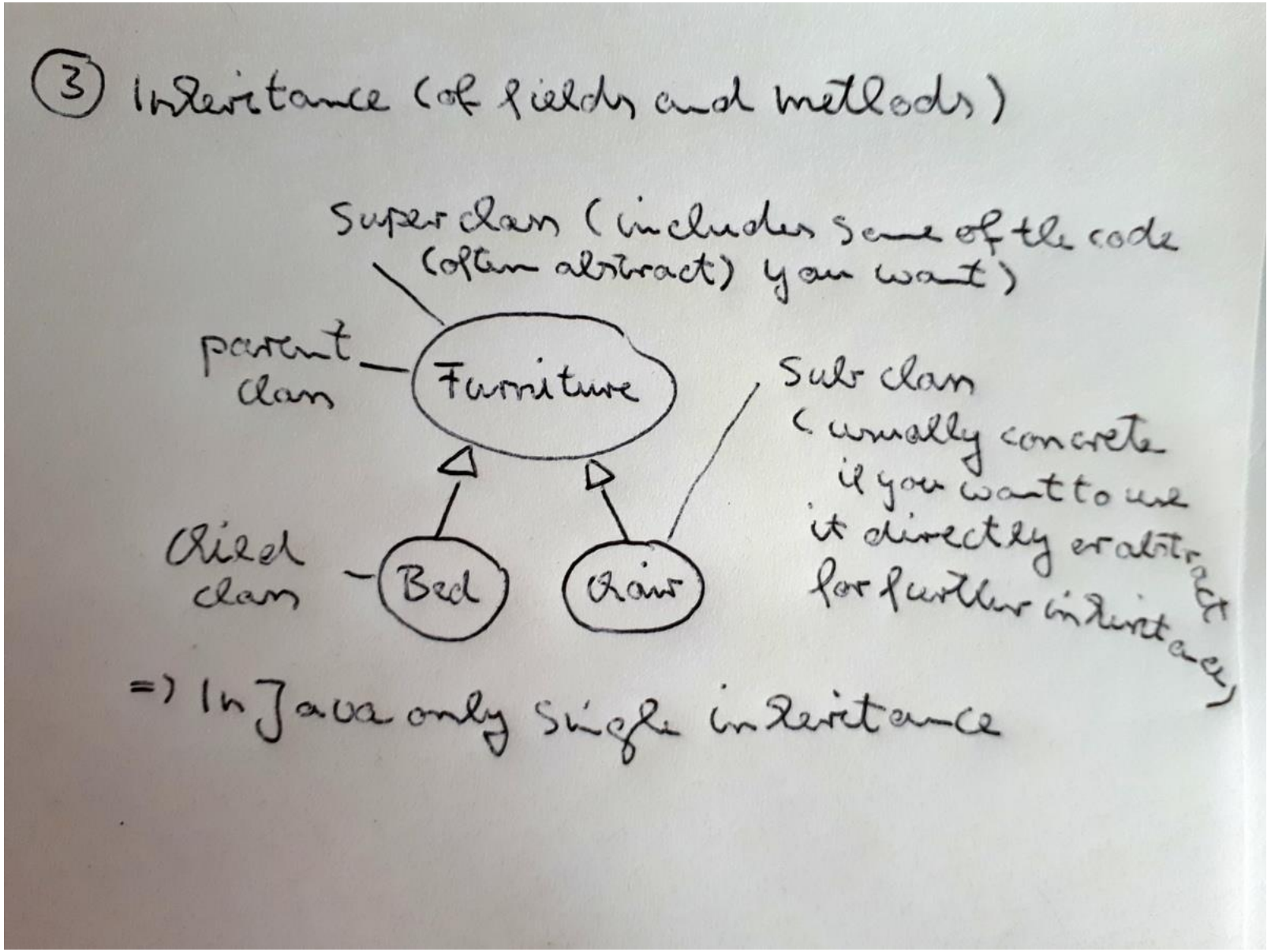


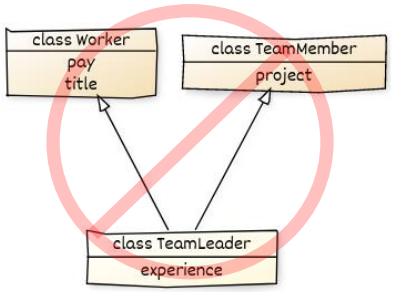
A `revenue`
B `queue.size()`
C `employees.get(i).performance()`
D `main.announceSale()`
E `main.customers.get(i).loyalty`

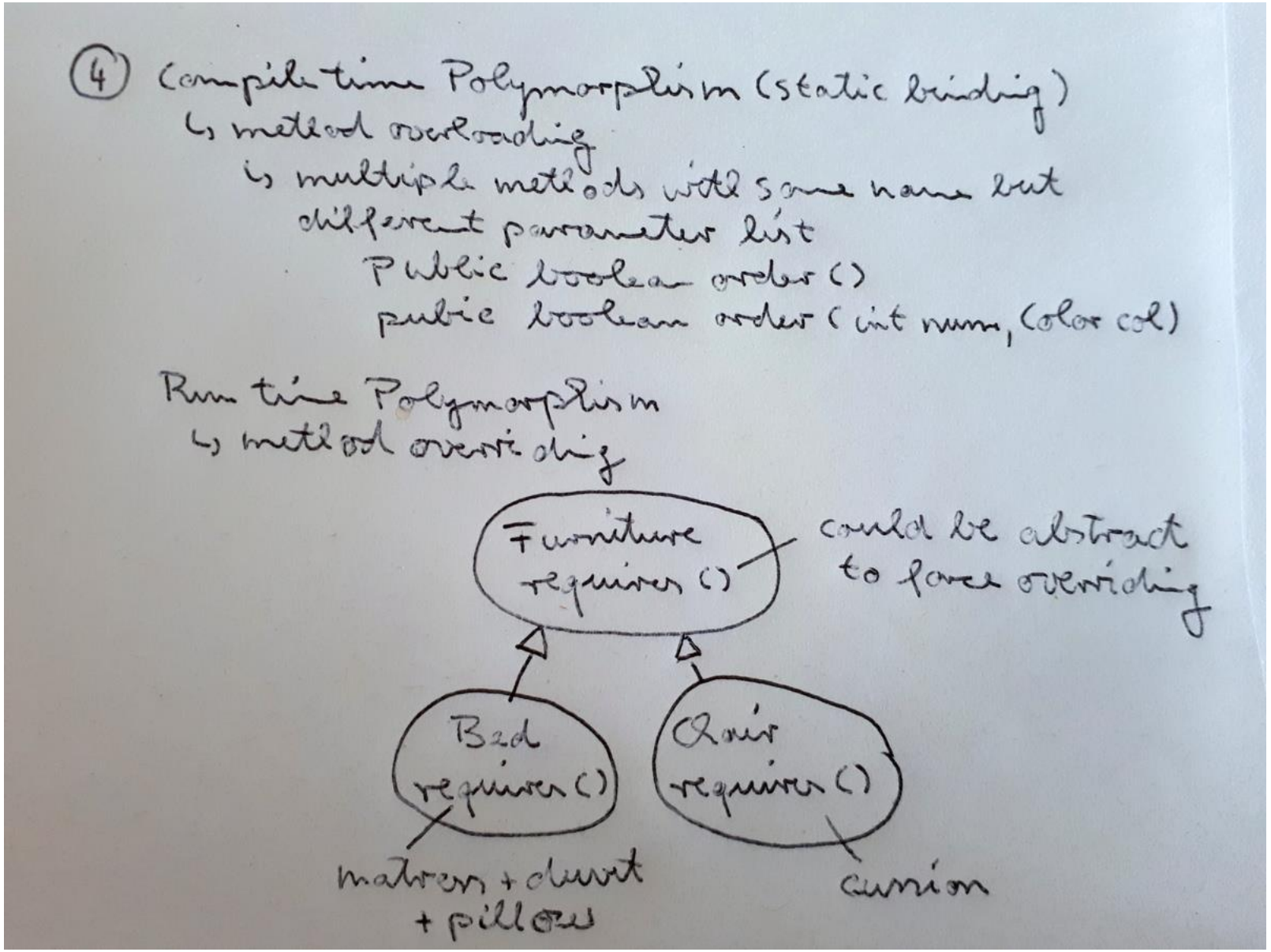
Objects and Java in 10 Minutes ;-)


1
Classes
↳ Blueprints for objects
Will be different values for each object
Attributes
Operations
generic
types: primitives or objects


2
Objects in Java (instantiations of classes)
usually private - use getters and setters to access
(encapsulation)
Fields
Methods
often used to separate concerns
usually public, unless helper methods
↳ accessible from other objects


(3) Inheritance (of fields and methods)
Super class (includes some of the code (often abstract) you want)
parent class
Furniture
Sub class (usually concrete if you want to use it directly or abstract for further inheritance)
Child class
Bed
Chair
=) In Java only single inheritance


class Worker
pay
title
class TeamMember
project
class TeamLeader
experience



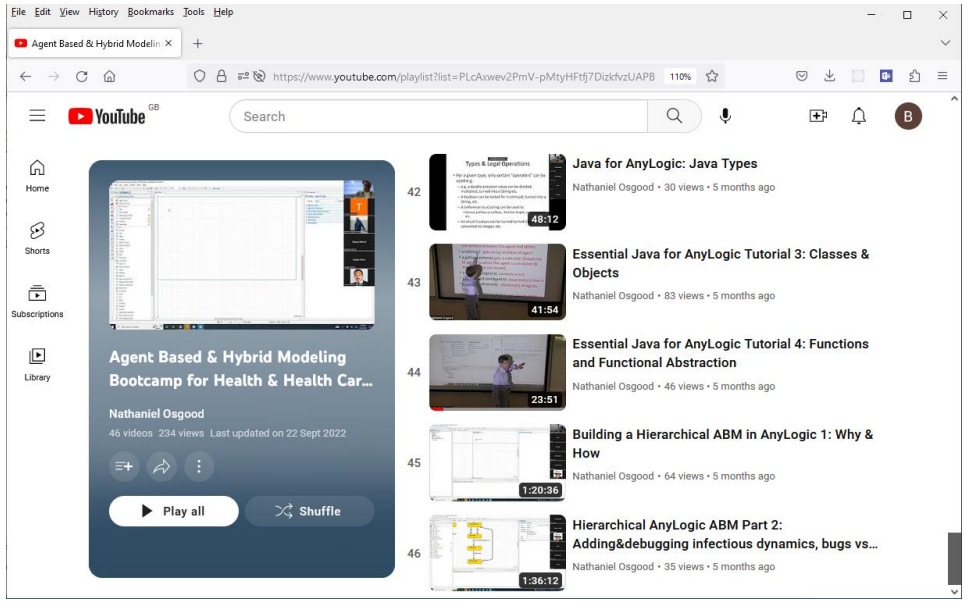
Polymorphism (many forms) in Java is a concept by which we can perform a single action in different ways

Free Java Course

- Amigoscode: Java Full Course - Java Tutorial for Beginners
  - https://www.youtube.com/watch?v=j9VNCI9Xo80

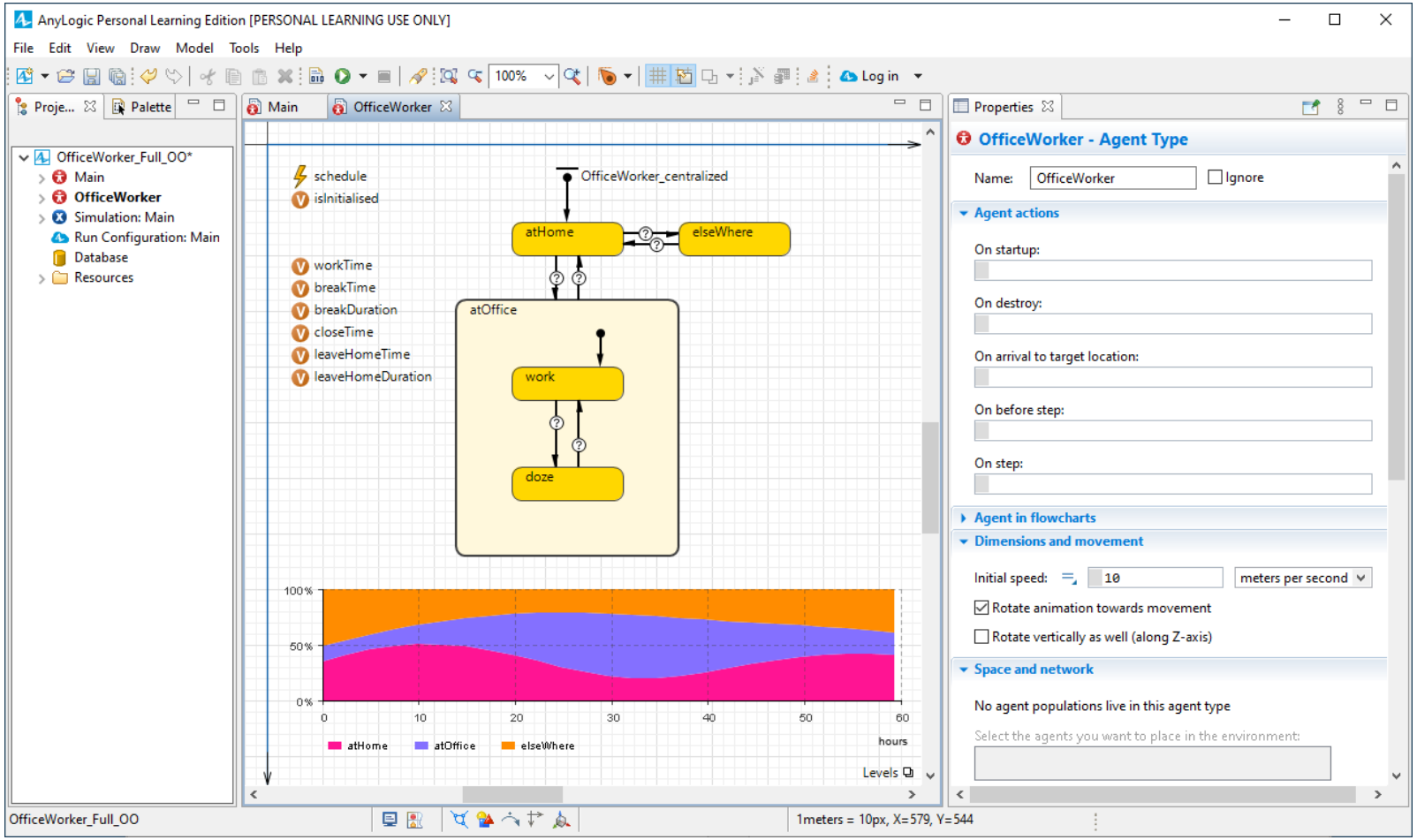
Java Basics for AnyLogic

- For useful advice see Nathaniel Osgood's YouTube videos
  - Check "Agent Based & Hybrid Modeling Bootcamp for Health & Health Care" playlist
    - https://www.youtube.com/playlist?list=PLcAxwev2PmV-pMtyHFtfj7DizkfvzUAPB
    - Towards the bottom of the playlist (video 42 to 46) you find "Java for AnyLogic" tutorials



Live Implementation Demo

Implementing the Office Scenario



Any Questions?