

JAVAGURU INTRODUCTION TO

JAVA 1

ABOUT US

- ▶ Teaching more than **8 years**
- ▶ Over **1000 students** graduated
- ▶ Constantly **expanding list** of available courses
- ▶ **Assisting** students to get a job after graduation

HOMEWORK ASSIGNMENTS

- ▶ Required for course completion
 - ▶ Level 1 assignments
- ▶ Everything else
 - ▶ Optional, but highly recommended
- ▶ Upload to JavaGuru Moodle

MATERIALS AND RESOURCES

- ▶ Course materials
 - ▶ JavaGuru Moodle: <http://www.javaguru.lv/moodle/>
- ▶ Books
 - ▶ Head First Java (2nd edition) - Bert Bates, Kathy Sierra
 - ▶ Grokking Algorithms - Aditya Y. Bhargava
 - ▶ Thinking in Java (4th edition) - Bruce Eckel
- ▶ Documentation & help
 - ▶ Oracle's Java Tutorial: <https://docs.oracle.com/javase/tutorial/>
 - ▶ Q&A: <https://stackoverflow.com/questions/tagged/java>

GETTING STARTED

▶ Toolbox

- ▶ **JDK 8:** <https://adoptopenjdk.net/>
- ▶ **IntelliJ IDEA Community Edition:** <https://www.jetbrains.com/idea/download/>
- ▶ **Git:** <https://git-scm.com/downloads>

▶ Collaboration

- ▶ **GitHub:** <https://github.com/>

▶ Communication

- ▶ **Skype:** <https://www.skype.com/en/get-skype/>

JAVA OVERVIEW

BRIEF HISTORY

- ▶ **Green Team** (James Gosling, Mike Sheridan, Patrick Naughton)
- ▶ Initiated language project in June 1991
- ▶ Originally designed for **small embedded systems** in electronic appliances
- ▶ Initially called **Greentalk**, shortly after renamed to **Oak**
- ▶ A few years later renamed to **Java**

REASONS BEHIND NAMING

- ▶ Reflection of the essence of the technology
 - ▶ Revolutionary and dynamic
 - ▶ Easy to spell and fun to say
- ▶ Suggested names were Dynamic, Silk, Jolt, DNA
- ▶ Java is an island where first coffee was produced

PRINCIPLES

- ▶ Simple and robust
- ▶ Portable and platform independent
- ▶ High performant, multithreaded and secured
- ▶ Following object oriented language features

WHAT JAVA IS USED FOR

- ▶ Mobile phones
 - ▶ Google's Android OS
- ▶ Point of sale systems
 - ▶ McDonald's checkout computers
- ▶ Video games
 - ▶ Minecraft - one of the most popular games of all time
- ▶ Trading applications
 - ▶ Murex - application used for front to back connectivity is utilized by many banks
- ▶ Big data technologies
 - ▶ Elasticsearch - distributed search and analytics engine

JAVA COMPONENTS: JVM & JRE & JDK

- ▶ Java Virtual Machine (**JVM**) is an **abstract computing machine** that **enables** computer to run a Java program
- ▶ Java Runtime Environment (**JRE**) is a software package that **contains** what is required **to run** a Java program. It includes a Java Virtual Machine implementation together with an implementation of the Java Class Library
- ▶ Java Development Kit (**JDK**) is a **superset** of a JRE and **contains tools** for Java programmers, e.g. a java compiler

RELEASE TIME LAPSE

- ▶ JDK 1.1 Major Changes
 - ▶ Extensive retooling for AWT event model
 - ▶ Introduced inner classes
 - ▶ Addition of JDBC and JavaBeans
- ▶ J2SE 1.2 Major Changes
 - ▶ Rebranded as Java 2
- ▶ J2SE 1.3 Major Changes
 - ▶ Bundled with Hotspot JVM
 - ▶ JavaSound, Java Naming and Directory Interface
 - ▶ Java Platform Debugger Architecture



RELEASE TIME LAPSE

- ▶ JDK 1.4 Major Changes
 - ▶ First release developed under Java Community Process
 - ▶ Inclusion of regular expressions
- ▶ J2SE 5.0 Major Changes
 - ▶ For-each loop
 - ▶ Generics & Auto-boxing
 - ▶ Var-args
- ▶ Java SE 6 Major Changes
 - ▶ Bundled with database manager
 - ▶ Facilitates use of scripting languages with JVM



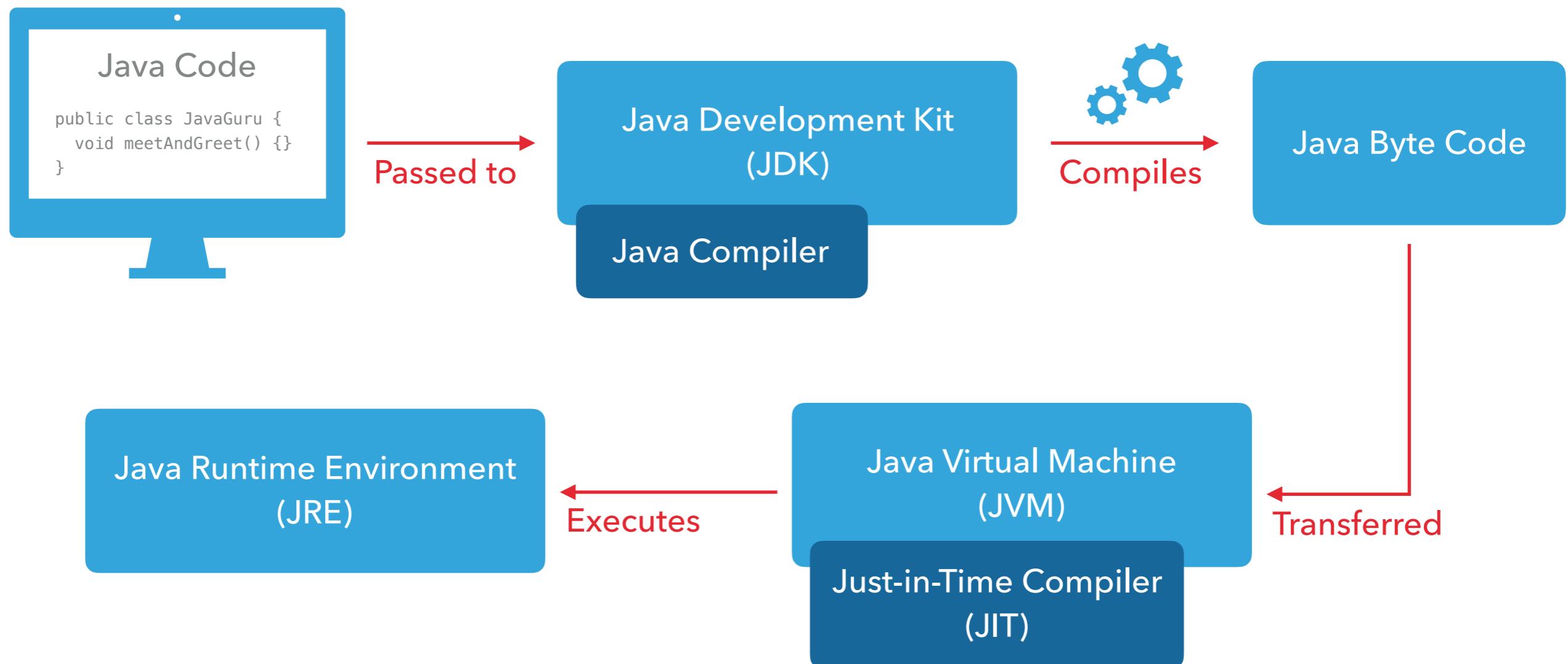
RELEASE TIME LAPSE

- ▶ Java SE 7 Major Changes
 - ▶ Strings in `switch`
 - ▶ JVM support for dynamic languages
- ▶ Java SE 8 Major Changes
 - ▶ Lambda expressions & Streams API
 - ▶ Default methods
 - ▶ Reworked dates API
- ▶ JDK 9 Major Changes
 - ▶ Module system
 - ▶ Extended Streams API



INTRODUCTION TO JAVA: LANGUAGE OVERVIEW

INTERNAL WORKFLOW



OBJECT-ORIENTED PRINCIPLES OVERVIEW

WHAT IS AN OBJECT?

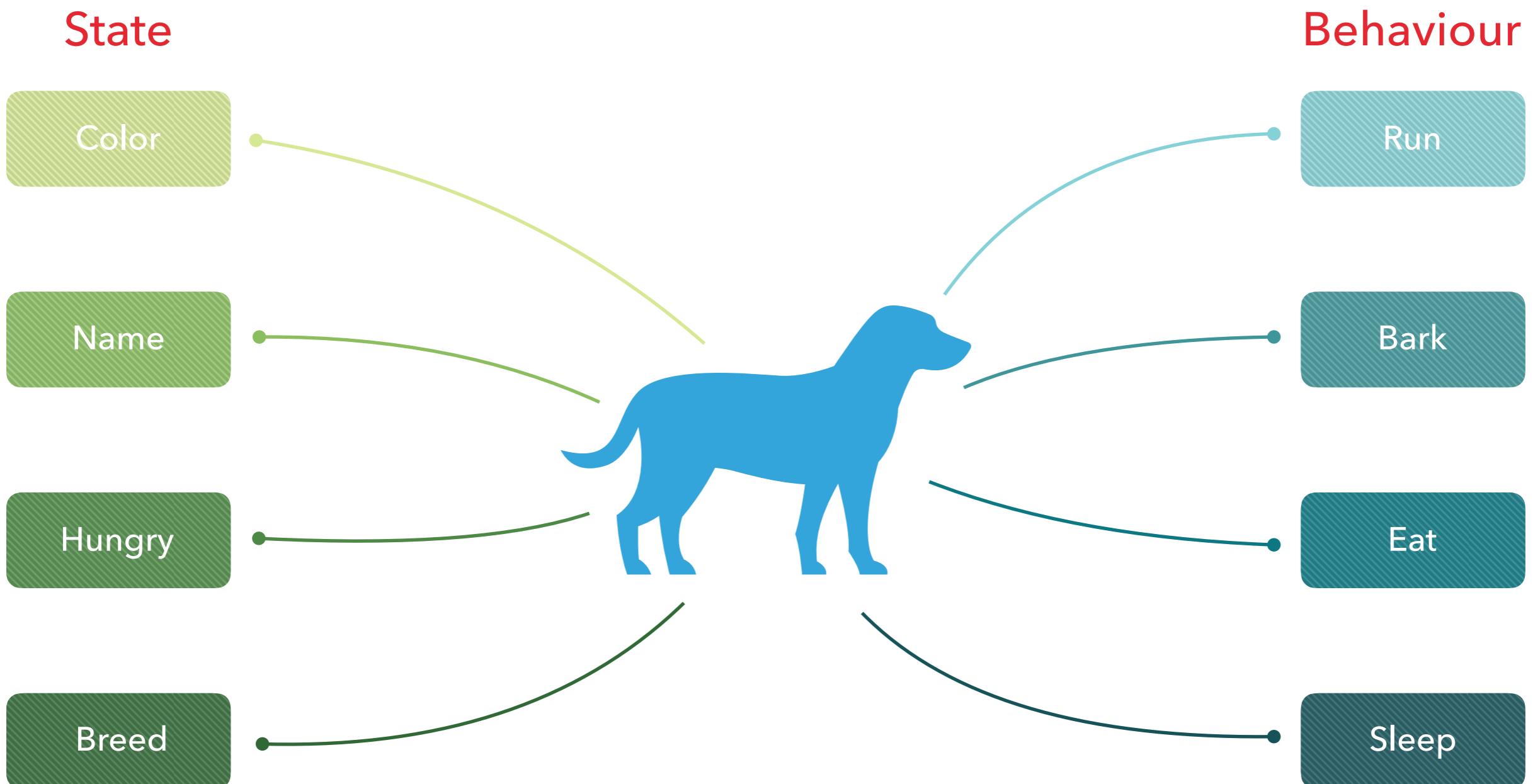
- ▶ Just look around... **Everything** is an object!



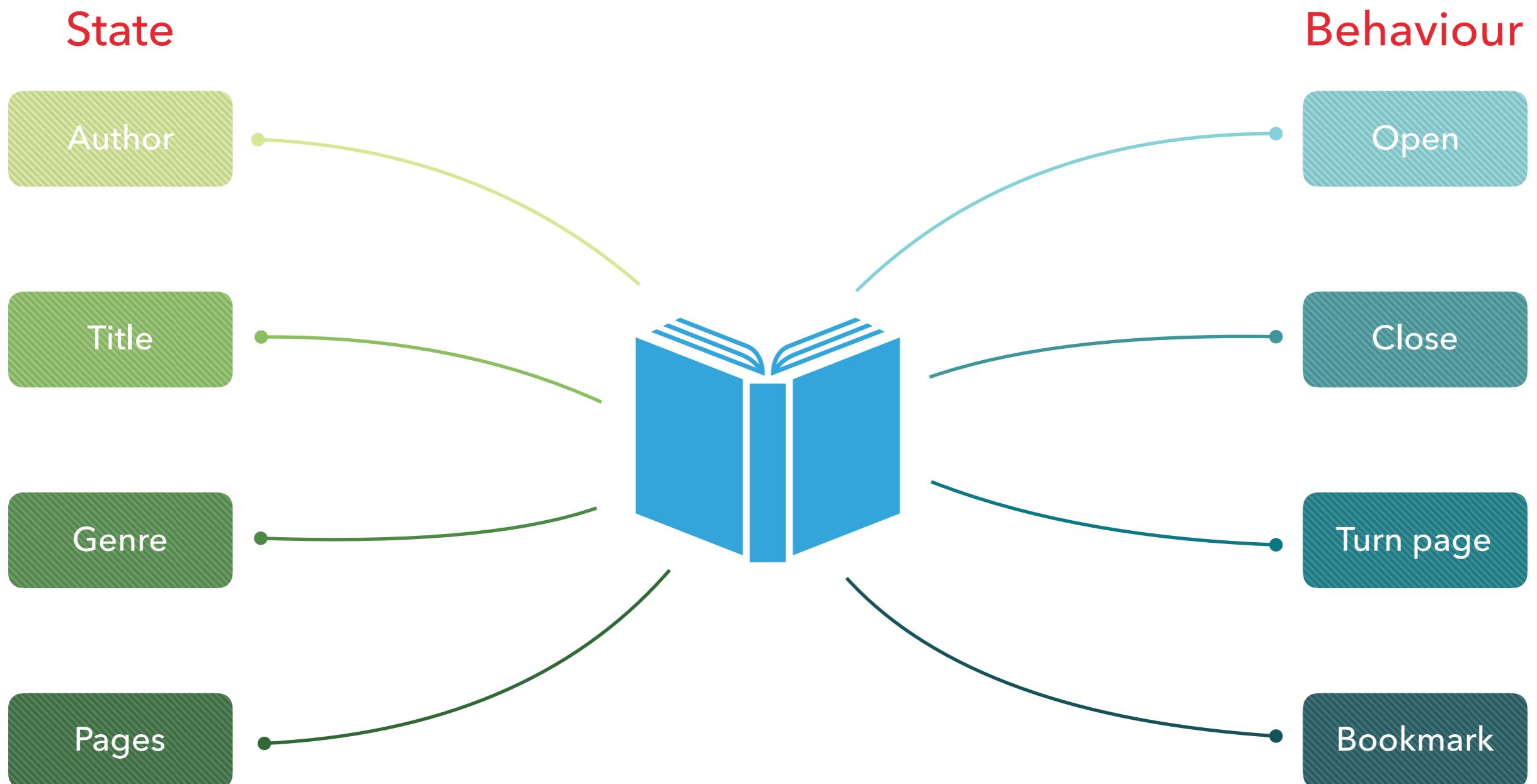
CHARACTERISTICS

- ▶ Every object share two characteristics:
 - ▶ Object has some sort of **state**
 - ▶ Object might have **behaviour**

OBJECT BREAKDOWN: DOG



OBJECT BREAKDOWN: BOOK



ALGORITHMS

DEFINITION OF AN ALGORITHM

- ▶ An algorithm is a procedure or formula for solving a problem, based on **conducting a sequence** of specified actions
- ▶ In mathematics and computer science, an algorithm usually means a small procedure that solves a **recurrent** problem
- ▶ A computer program can be viewed as an **elaborate** algorithm

ALGORITHM BREAKDOWN: TAXI RIDE

1. Contact with the taxi service
2. Provide pickup & destination addresses
3. Wait for the cab
4. Get in the car
5. Enjoy your ride
6. Pay for the service upon arrival

ALGORITHM BREAKDOWN: PLANT A PLANT

1. Dig a hole
2. Put roots into soil
3. Cover the hole
4. If soil is wet then end
5. Water the plant