

# Groovy

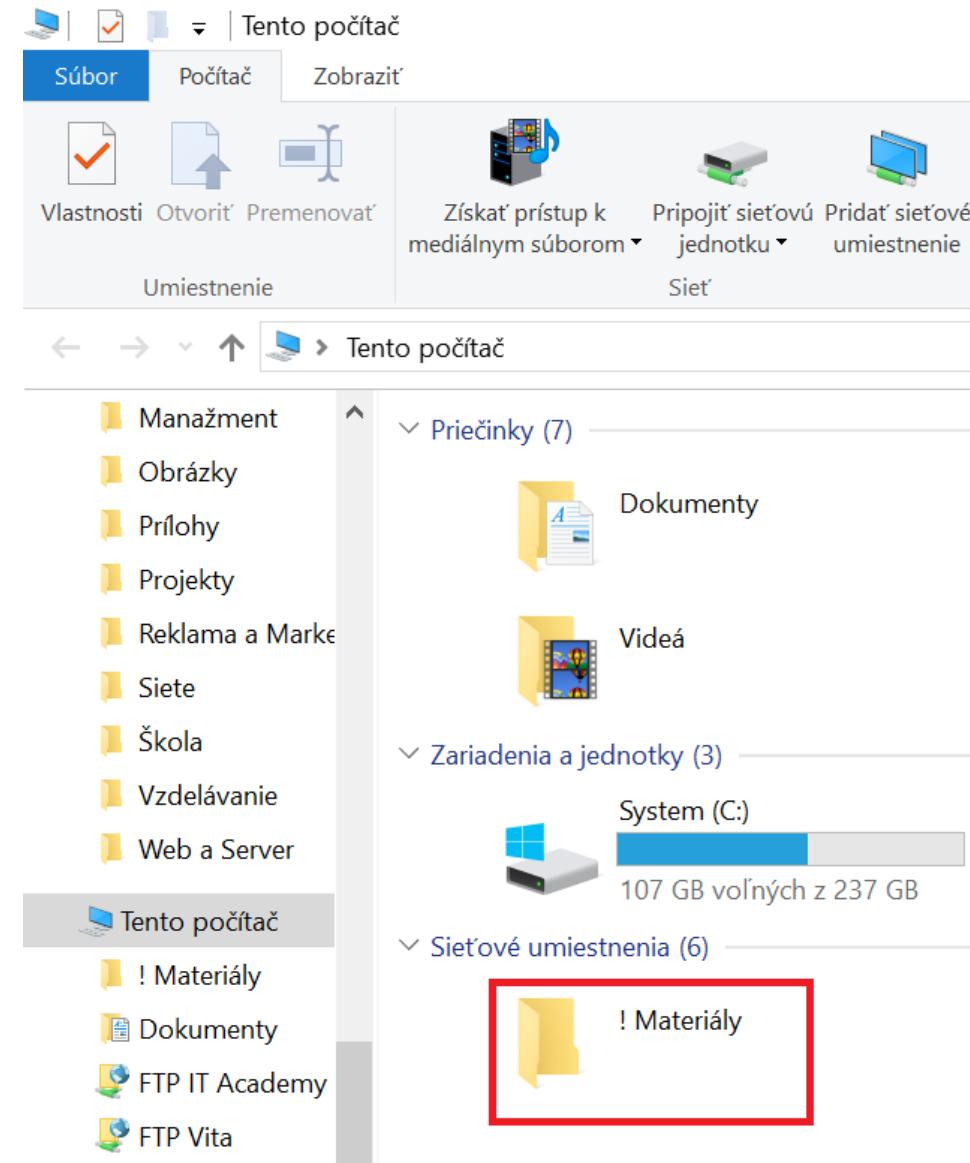
## I. Začiatočník



Lektor: PhDr. Ing. Mgr. Miroslav Reiter, DiS., DBA, MPA  
Kontakt: [miroslav.reiter@it-academy.sk](mailto:miroslav.reiter@it-academy.sk)

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– [www.linkedin.com/in/miroslav-reiter](http://www.linkedin.com/in/miroslav-reiter)
3. Majte otvorený GitHub repozitár Groovy  
– <https://github.com/miroslav-reiter/>





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## ★ Materiály ku kurzu Groovy (GroovyScript)

[Kurz Groovy](#) je pre vás ideálnym štartom, ak sa chcete vyznať v objektovo orientovanom programovacom jazyku Groovy. Oboznámime vás so základmi jazyka Groovy, prejdeme si inštaláciu vývojových prostredí a dokumentáciou. Ukážeme si, ako využívať Groovy knižnicu a rôzne dátové typy. Ako absolvent kurzu Groovy zvládnete základy práce s Groovy, porozumiete jeho ekosystému a budete schopný vykonávať základné testovanie.

### ❓ Čo je Groovy (GroovyScript)

Groovy je objektovo orientovaný programovací jazyk pre platformu Java. Ide o alternatívu k programovaciemu jazyku Java. Možno naň pozerat ako na skriptovací jazyk pre javovskú platformu. Inšpiráciu čerpal z jazykov Python, Ruby, Perl a Smalltalk. Využíva výhody objektového programovania, ale zároveň poskytuje zjednodušenú "skriptovaciu" syntax, ktorá vie "zabalíť a rozbalíť" často opakované časti kódu. Jedným z jeho cieľov je redukovať "povinný" kód a zjednodušiť tak tvorbu webových, databázových či desktopových aplikácií. Kompilácia je vykonávaná priamo do bajtkódu, takže ho môžeme použiť všade tam, kde funguje Java.

### About

★ Materiály, Cvičné Súbory, Prezentácia ku kurzu Groovy (GroovyScript)

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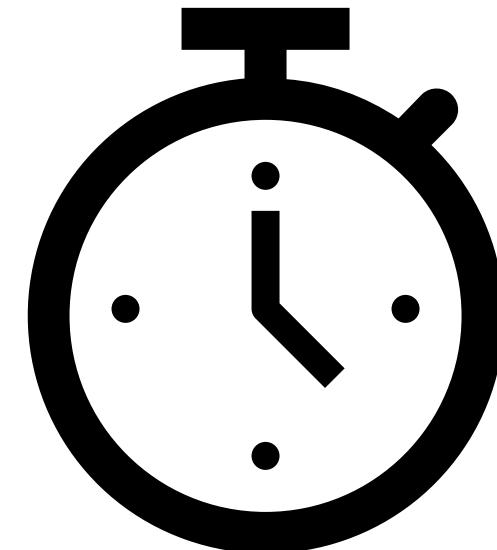
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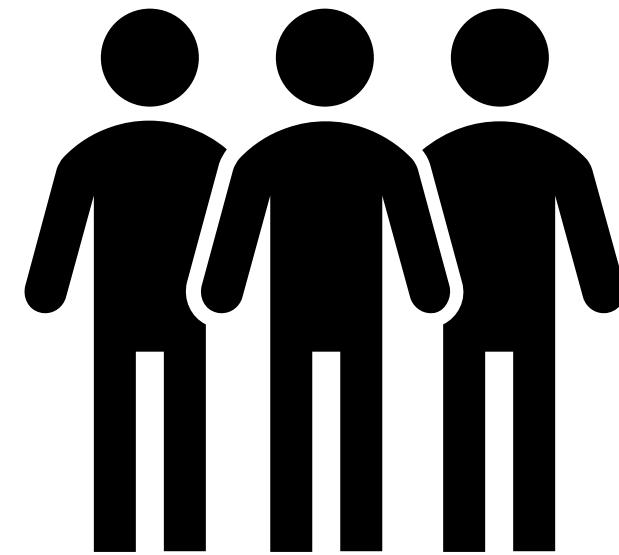
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Skúsenosti v IT a s programovaním

Skúsenosti so Groovy

Vaše hobby



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Foto: Jakub Kovalík pre FMK UCM | Miroslav Reiter na prednáške Grow with Google na FMK UCM.

**Nikola Kotláriková**

19. júl 2022 · 8 min. čítania



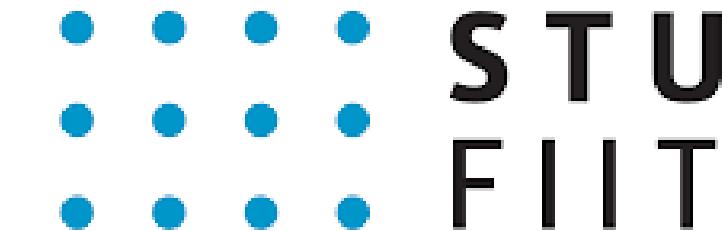


# Miroslav Reiter

1. PhDr. VŠM (Podnikovný manažment)
2. Ing. STU FEI (**Aplikovaná informatika**)
3. Mgr. UK FM (**Strategický manažment a marketing**)
4. Mgr. VŠM (**Manažérstvo kvality**)
5. Mgr. VŠEMVŠ (Verejná správa)
6. Mgr. DTI (Učiteľstvo ekonomických predmetov)
7. DiS. AMOS (Cestovný ruch)
8. MBA LIGS (Executive management)
9. DBA Humanum (**IT manažment**)
10. MPA IES (Verejná správa a samospráva krajov)
11. MSc. Humanum (**Bezpečnosť informačných systémov**)
12. Ing. Paed. IGIP
13. Mgr. PEVŠ (**Bezpečnosť informačných systémov**)



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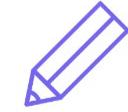
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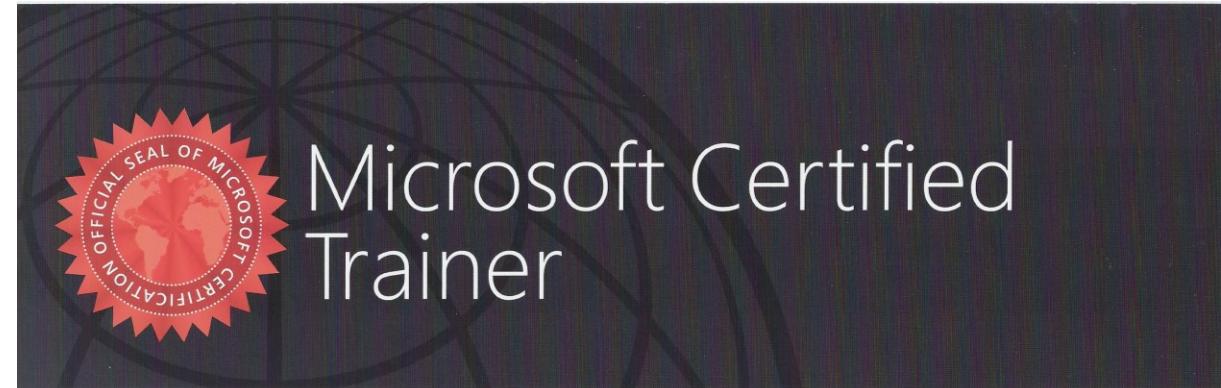
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získava status  
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Automation

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Has successfully completed the requirements to be recognized as a Microsoft Certified Trainer

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## Miroslav Reiter

Slovakia

Bratislava

⭐ Certified Trainer (Microsoft, Google, ISTQB) 📱 Hard worker (I do business + 5 jobs) 🎓 Lecturer (I have graduated from 13 different Universities, currently studying 4 other)

### Biography

I'm a hard worker, intellectual and joker. I love learning and teaching as well. My main objective is to teach people and improve their IT knowledge. To create truly practical knowledge necessary for life and present it in an interesting way. I don't like snake charmers and people who cannot explain things simply.

I lead people to constantly work on themselves and learn. Do you want to be successful in life?  
OK, so start working on yourself and educate yourself.

👤 I am a Google Certified Trainer, Microsoft Certified Trainer, ISTQB/GASQB Trainer, PRINCE2/ITIL4/ArchiMate/TOGAF/UML/BPMN/Scrum Trainer

💻 My preferred programming languages are Java 🍞, C#, Python 🐍, JavaScript (Google Apps Script), VBA and R

💻 I teach programming and how to use IT technologies effectively at VITA and IT Academy. My online courses can be bought directly at [VITA.sk](http://VITA.sk). I recommend buying an annual subscription with all courses

📢 I frequently speak at conferences and workshops. Mostly about IT (programming, automation, certification, testing, enterprise architecture and modeling), management (Project management, PRINCE2, ITIL4), education and online marketing with ads (Google Ads, Google Analytics, Copywriting, Social media, YouTube)



Luigi, Mário  
a Yoshi



# Vaše Ciele a Očakávania

Chcem sa certifikovať/získať certifikát

Chcem sa naučiť Groovy

Chcem sa naučiť konkrétny...

Chcem sa uliať/vypadnúť z práce

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# Čo nás čaká a nemenie...

1. deň

Základy Groovy

Inštalácia a Konfig.

Dátové Typy

Metódy, Logika

2. deň

Riadiace Štruktúry

OOP (Triedy a Obj)

Knižnice

Ekosystém

# Čo je Apache Groovy?

Objektovo orientovaný Programovací Jazyk



Platforma Java a alternatíva k Jave



## A multi-faceted language for the Java platform

[Apache](#) Groovy is a powerful, optionally typed and dynamic language, with static-typing and static compilation capabilities, for the Java platform aimed at improving developer productivity thanks to a concise, familiar and easy to learn syntax. It integrates smoothly with any Java program, and immediately delivers to your application powerful features, including scripting capabilities, Domain-Specific Language authoring, runtime and compile-time meta-programming and functional programming.



### Flat learning curve

Concise, readable and expressive syntax, easy to learn for Java developers



### Powerful features

Closures, builders, runtime & compile-time meta-programming, functional programming, type inference, and static compilation

## Documentation

# Getting started

# Language Specification

# Tools

# Groovy module guides

# API documentation

# Documentation for other versions

FAQ

# 🏛 Documentation

Improve this doc

The documentation is available as a [single-page document](#), or feel free to pick at a direct section below.

You can also browse [documentation for other versions](#).

## 🎓 Getting started

- [Download Groovy](#)
- [Install Groovy](#)
- [Differences with Java](#)
- [The Groovy Development Kit](#)
- [Runtime and compile-time metaprogramming](#)
- [The Grape dependency manager](#)
- [Testing.guide](#)
- [Domain-Specific Languages](#)
- [Integrating Groovy into applications](#)
- [Security](#)
- [Design patterns in Groovy](#)
- [Style guide](#)

## 📦 Groovy module guides

- [Parsing and producing JSON](#)
- [Working with a relational database](#)
- [Processing XML](#)

## 🎓 Language Specification

- [Syntax](#)
- [Operators](#)
- [Program structure](#)
- [Object orientation](#)
- [Closures](#)
- [Semantics](#)

## ⚙️ Tools

- [groovyc - the Groovy compiler](#)
- [groovysh - the Groovy repl-like shell](#)
- [groovyConsole - the Groovy Swing console](#)
- [IDE integration](#)

## </> API documentation

- [GroovyDoc documentation of the Groovy APIs](#)
- [The Groovy Development Kit enhancements](#)

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- 1. Default imports
- 2. Multi-methods
- 3. Array initializers
- 4. Package scope visibility
- 5. ARM blocks
- 6. Inner classes
  - 6.1. Static inner classes
  - 6.2. Anonymous Inner Classes
  - 6.3. Creating Instances of Non-Static Inner Classes
- 7. Lambda expressions and the method reference operator
- 8. GStrings
- 9. String and Character literals
- 10. Behaviour of `==`
- 11. Primitives and wrappers
  - 11.1. Numeric Primitive Optimization with

# Differences with Java

Groovy tries to be as natural as possible for Java developers. We've tried to follow the principle of least surprise when designing Groovy, particularly for developers learning Groovy who've come from a Java background.

Here we list all the major differences between Java and Groovy.

## 1. Default imports

All these packages and classes are imported by default, i.e. you do not have to use an explicit `import` statement to use them:

- `java.io.*`
- `java.lang.*`
- `java.math.BigDecimal`
- `java.math.BigInteger`
- `java.net.*`
- `java.util.*`
- `groovy.lang.*`
- `groovy.util.*`

## 2. Multi-methods

## Table of contents

- 1. Comments
  - 1.1. Single-line comment
  - 1.2. Multiline comment
  - 1.3. Groovydoc comment
  - 1.4. Shebang line
- 2. Keywords
- 3. Identifiers
  - 3.1. Normal identifiers
  - 3.2. Quoted identifiers
- 4. Strings
  - 4.1. Single-quoted string
  - 4.2. String concatenation
  - 4.3. Triple-single-quoted string
    - 4.3.1. Escaping special characters
    - 4.3.2. Unicode escape sequence

# Syntax

This chapter covers the syntax of the Groovy programming language. The grammar of the language derives from the Java grammar, but enhances it with specific constructs for Groovy, and allows certain simplifications.

## 1. Comments

### 1.1. Single-line comment

Single-line comments start with `//` and can be found at any position in the line. The characters following `//`, until the end of the line, are considered part of the comment.

```
// a standalone single line comment
println "hello" // a comment till the end of the line
```

### 1.2. Multiline comment

A multiline comment starts with `/*` and can be found at any position in the line. The characters following `/*` will be considered part of the comment, including new line characters, up to the first `*/` closing the comment. Multiline comments can thus be put at the end of a statement, or even inside a statement.

```
/* a standalone multiline comment
   spanning two lines */
println "hello" /* a multiline comment starting
                  at the end of a statement */
println 1 /* one */ + 2 /* two */
```

### 1.3. Groovydoc comment

Similarly to multiline comments, Groovydoc comments are multiline, but start with `/**` and end with `**/`. Lines

# Vlastnosti Groovy



## Flat learning curve

Concise, readable and expressive syntax, easy to learn for Java developers



## Smooth Java integration

Seamlessly and transparently integrates and interoperates with Java and any third-party libraries



## Vibrant and rich ecosystem

Web development, reactive applications, concurrency / asynchronous / parallelism library, test frameworks, build tools, code analysis, GUI building



## Powerful features

Closures, builders, runtime & compile-time meta-programming, functional programming, type inference, and static compilation



## Domain-Specific Languages

Flexible & malleable syntax, advanced integration & customization mechanisms, to integrate readable business rules in your applications



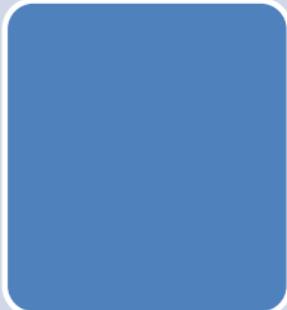
## Scripting and testing glue

Great for writing concise and maintainable tests, and for all your build and automation tasks

# Vlastnosti Skriptovacích Jazykov

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Časté veci  
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knižnice!

spracovanie  
textu

práca so  
zoznamami

ľahké IO

XML

Účel svätí  
prostriedky

procedurálne

funkcionálne

objektové

Kompilácia  
nie je  
nutná

skript sa  
interpretuje  
dokola

Dátové  
typy  
zdržujú

typy sa určia  
za behu

alebo vôbec  
neexistujú



Groovy Logo

Paradigm

Multi-paradigm: object-oriented, imperative, functional, aspect-oriented, scripting

Designed by

James Strachan

Developer

Guillaume Laforge (PMC Chair)  
Jochen Theodorou (Tech Lead)  
Paul King  
Cedric Champeau

First appeared

2003; 20 years ago

Stable release

4.0.5 (September 6, 2022; 8 months ago<sup>[1]</sup>) <sup>[±]</sup>

Preview release

4.0.0-beta-1 / September 6, 2021; 20 months ago<sup>[1]</sup>

Typing discipline

Dynamic, static, strong, duck

Platform

Java SE

License

Apache License 2.0

Filename extensions

.groovy, .gvy, .gy, .gsh <sup>[2]</sup>

Website

groovy-lang.org

Major implementations

Gradle, Grails

Influenced by

Java, Python, Ruby, Smalltalk

Influenced

Kotlin

# Verzie a Používanie Groovy

- 2003: Začal a prvý príspevok na blogu s podrobnosťami
- 2004-2007: Bolo vydaných niekoľko beta verzií
- 2007: Groovy 1.5 vydané ako prvé „final“ realease
- 2007: 1. cena: Cena za inováciu JAX
- 2008: Akvizácia spoločnosťou SpringSource
- 2012: **Groovy 2.0** so statickou kompliaciou a kontrolou statického typu
- 2014: **Groovy 3.0** s podporou protokolu Meta Object Protocol
- 2022: **Groovy 4.0.5**
- 2013: **Groovy 4.0.12**

1802 firiem po celom svete

# They all use Apache Groovy!

NETFLIX amadeus



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## Who uses Apache Groovy?

Some of the companies that use Apache Groovy include:

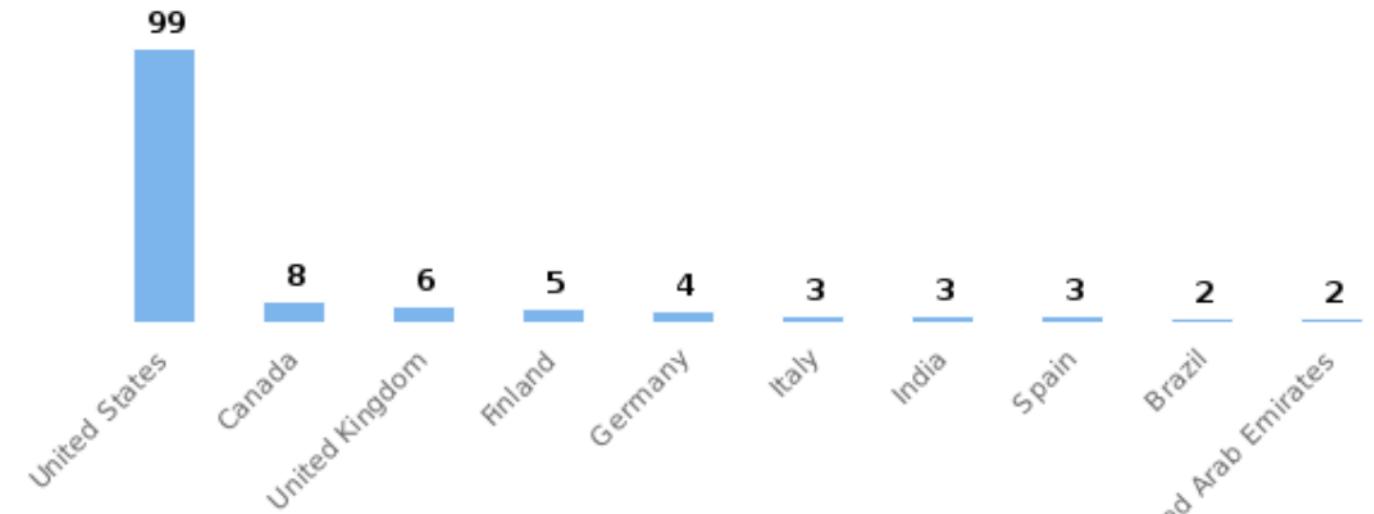
Company	Website	Country	Revenue	Company Size
<a href="#">eBay Inc.</a>	ebay.com	United States	>1000M	>10000
<a href="#">Southwest Airlines Co</a>	southwest.com	United States	>1000M	>10000
<a href="#">Blackfriars Group</a>	blackfriarsgroup.com	United Kingdom	1M-10M	>10000

## Top Countries that use Apache Groovy

Top Countries that use Apache Groovy

67% of Apache Groovy customers are in United States.

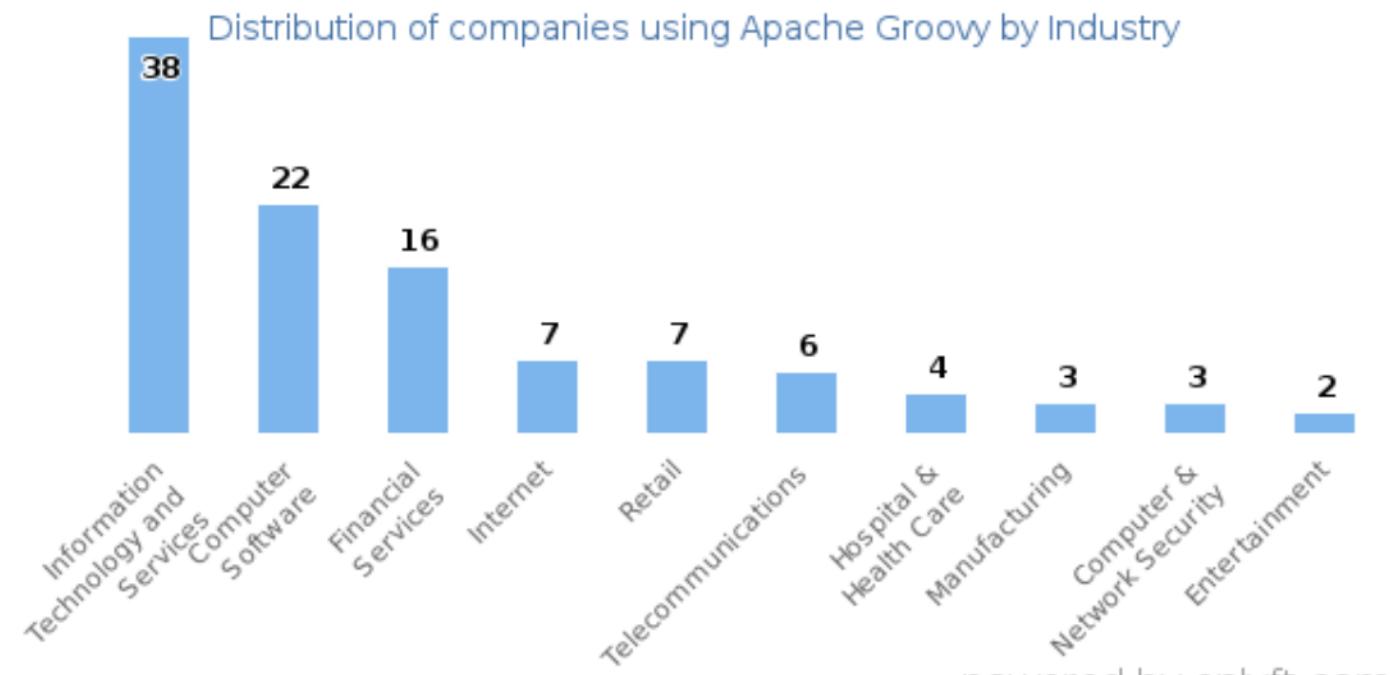
Distribution of companies using Apache Groovy by Country



## Top Industries that use Apache Groovy

Looking at Apache Groovy customers by industry, we find that Information Technology and Services (25%), Computer Software (14%) and Financial Services (10%) are the largest segments.

Top Industries that use Apache Groovy

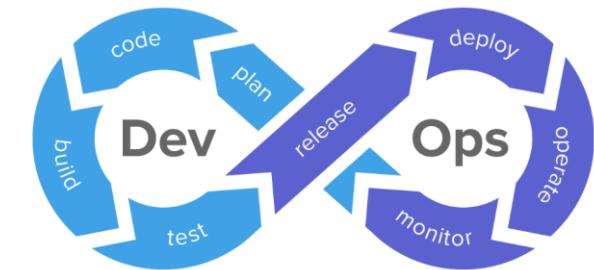


Jun 2023	Jun 2022	Change	Programming Language	Ratings	Change
1	1		 Python	12.46%	+0.26%
2	2		 C	12.37%	+0.46%
3	4		 C++	11.36%	+1.73%
4	3		 Java	11.28%	+0.81%
5	5		 C#	6.71%	+0.59%
6	6		 Visual Basic	3.34%	-2.08%
7	7		 JavaScript	2.82%	+0.73%
8	13		 PHP	1.74%	+0.49%
9	8		 SQL	1.47%	-0.47%
10	9		 Assembly language	1.29%	-0.56%
11	12		 Delphi/Object Pascal	1.26%	-0.07%
12	24		 MATLAB	1.11%	+0.48%
13	25		 Scratch	1.02%	+0.43%
14	15		 Go	1.00%	0.00%

Sep 2018	Sep 2017	Change	Programming Language	Ratings	Change
1	1		Java	17.436%	+4.75%
2	2		C	15.447%	+8.06%
3	5	▲	Python	7.653%	+4.67%
4	3	▼	C++	7.394%	+1.83%
5	8	▲	Visual Basic .NET	5.308%	+3.33%
6	4	▼	C#	3.295%	-1.48%
7	6	▼	PHP	2.775%	+0.57%
8	7	▼	JavaScript	2.131%	+0.11%
9	-	▲	SQL	2.062%	+2.06%
10	18	▲	Objective-C	1.509%	+0.00%

# Kde Využijem Groovy?

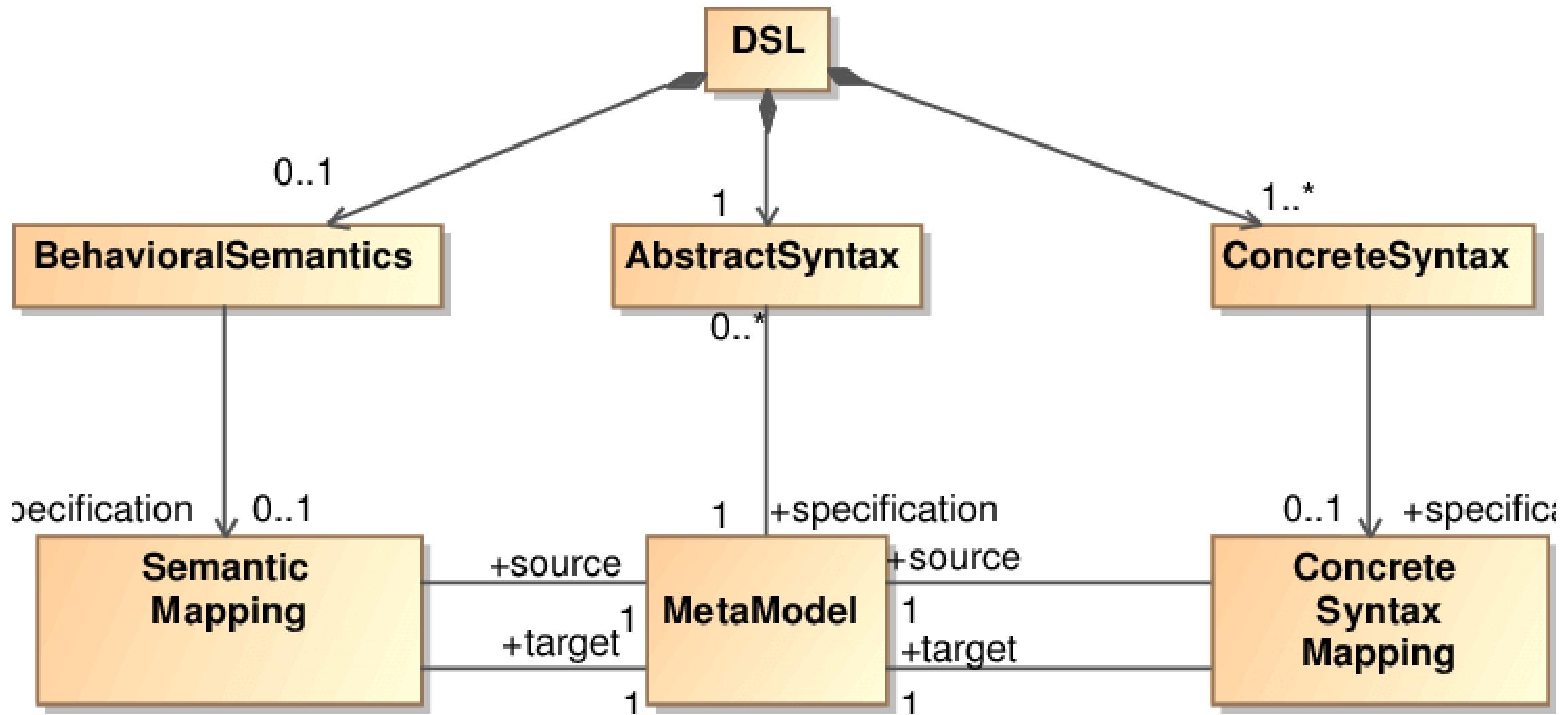
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**DOMAIN  
SPECIFIC  
LANGUAGES**



# Čo je DSL (Domain Specific Language)?



# Porovnanie Jazykov

## Groovy

- Voliteľne typovaný dynamický jazyk
- Testovanie a DevOps
- Priama podpora OOP
- Integrácia s Javou, beží nad **JVM**
- Agilný jazyk pre platformu Java
- Domain-Specific Language authoring
- \*.groovy

## Java

- Kompilovaný silno typový OOP jazyk
- Stabilný jazyk na vývoj veľkých systémov
- Multiplatformnosť (Windows, Linux, Mac)
- Mobilné zariadenia (Android)
- Množstvo knižníc
- Pridáva neustále nové technológie
- \*.java

Groovy = Java++ | Dynamická Java | Python + Java

# Začiatky v Groovy...

```
println "Hello World"
```

HelloWorld.groovy

```
c:\java\groovy\bin> groovy HelloWorld.groovy
```

skript bude  
interpretovaný!

# Základné koncepty

## GroovyBeans je verzia programu JavaBeans

- Implicitne generuje prístupové a mutovateľné metódy

## Podpora pre Metaprogramovanie

- Každá vyvolaná metóda prechádza registrom meta tried
- Umožňuje preťažovať metódy

## Podpora Lazy vyhodnocovanie

- Preskočí priradenie premenných, kým nie sú potrebné

Multiplaformnosť + Knižnice + Jednoduchosť skriptovania

# Základné koncepty

- Používa abstraktnú syntaxu stromových transformácií (AST)
- Schopnosť vývojárov modifikovať zdrojový kód pred jeho vykonaním na bajtkód
- Druhy transformácií AST
  - Singletonova transformácia
  - Typy AST Transformácií
  - Immutable AST makro
  - Newify transformácia

Abstract Syntax Tree (AST)

```
1  /* Example code for Groovy Presentation
2   By: Chad Gallati, Melissa Plakyda, Jenny Wilkes
3 */
4 */
5 //obligatory Hello World!
6 println "Hello world!"
7
8
9 /*
10  This shows how Groovy's syntax allows omitting parentheses
11  and dots sometimes. This allows some code to be written to
12  look like plain english.
13 */
14 show = { println it }
15 square_root = { Math.sqrt(it) }
16
17 /*
18  [the: { what ->
19  [of: { n -> action(what(n)) }]
20  }]
21 }
22
23 // equivalent to: please(show).the(square_root).of(100)
24 please show the square_root of 100
25 // ==> 10.0
26
27
28
29 /*
30  This is an example of a GroovyBean that shows off Groovy's
31  automatic generator of accessor and mutator methods.
32 */
33 class AGroovyBean {
34     String color
35 }
36
37 def myGroovyBean = new AGroovyBean()
38
39 myGroovyBean.setColor('baby blue')
40 if(myGroovyBean.getColor() == 'baby blue'){
41     println "Your bean is now baby blue"
42 }
43
44 myGroovyBean.color = 'pewter'
45 if(myGroovyBean.color == 'pewter'){
46     println "Your bean is now pewter"
47 }
```

# Základné koncepty

- **Traits** - štrukturálna konštrukcia jazyka, ktorá umožňuje:
  - Kompozíciu správania
  - Implementácia rozhraní za behu
  - Usporiadanie správania
  - Kompatibilita so statickou kontrolou/kompiláciou
- Potom ho možno použiť ako normálne rozhranie pomocou kľúčového slova „**implements**“

# Začiatky v Groovy...

Problémy pri interpretovaní

Syntaktické chyby

Sémantické chyby

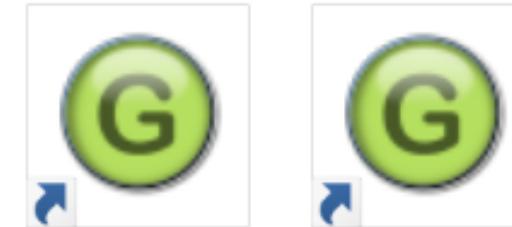
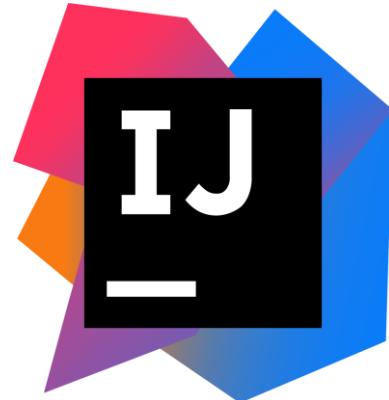
Problémy pri spúšťaní

Chybové hlásenia



groovy: Command not found

# Aké IDE mám použiť?



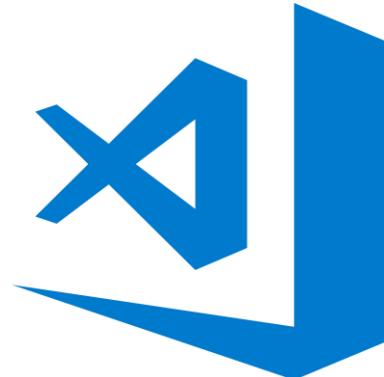
Groovy  
Console

Groovy  
Shell

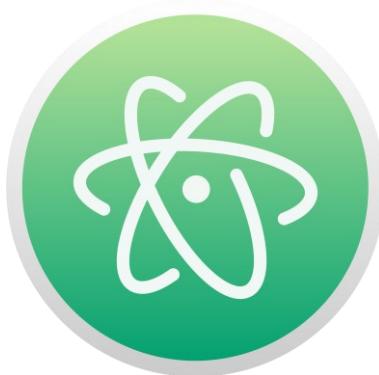


Integrated development environment

# Aký Editor mám použiť?



```
iLE88Dj. :jD88888Dj:  
.LGitE888D.f8GjjjL8888E;  
iE :8888Et. .G8888.  
;i E888, ,8888,  
D888, :8888:  
D888, :8888:  
D888, :8888:  
888W, :8888:  
W88W, :8888:  
W88W: :8888:  
DGDD: :8888:  
:8888:  
:W888: :8888:  
:8888:  
E888i :8888:  
tW88D
```



IDE ≠ editor

# Inštalácia Groovy



**NetBeans**



Groovy  
Console



Groovy  
Shell



## Java SE 17 Archive Downloads

Go to the [Oracle Java Archive](#) page.

The JDK is a development environment for building applications using the Java programming language.

The JDK includes tools useful for developing and testing programs written in the Java programming language and running on the Java™ platform.

**WARNING:** These older versions of the JDK are provided to help developers debug issues in older systems. **They are not updated with the latest security patches and are not recommended for use in production.**

For production use Oracle recommends downloading the latest JDK version.

Only developers and enterprise administrators should download these releases.

For current Java releases, please visit [Oracle Java SE Downloads](#).

## Java SE Development Kit 17.0.7

This software is licensed under the [Oracle No-Fee Terms and Conditions License](#).

Product / File Description	File Size	Download
Linux Arm 64 Compressed Archive	172.12 MB	<a href="https://download.oracle.com/java/17/archive/jdk-17.0.7_linux-aarch64_bin.tar.gz">https://download.oracle.com/java/17/archive/jdk-17.0.7_linux-aarch64_bin.tar.gz</a> (sha256 )
Linux Arm 64 RPM Package	171.87 MB	<a href="https://download.oracle.com/java/17/archive/jdk-17.0.7_linux-aarch64_bin.rpm">https://download.oracle.com/java/17/archive/jdk-17.0.7_linux-aarch64_bin.rpm</a> (sha256 )

# Java a Groovy Skratky

Platforma Java zahrnuje 2 komponenty:

- Virtuálny stroj jazyka java (**JVM** – Java Virtual Machine)
  - Prostredie, ktoré umožňuje beh programu
- Aplikačné programové rozhranie (**API** – Application Programming Interface)
  - Softvérové komponenty

JVM (Java Virtual Machine)

Java SE (Java Standard Edition)

Java EE (Java Enterprise Edition)

Java Card

Java DB

JDK (Java Development Kit)

JRE (Java Runtime Environment)

API (Application Programming Interface)

# Java Updaty a Aktualizácie



jdk1.6.0\_21



jdk1.6.0\_29



jre6



jdk1.6.0\_26



jdk1.7.0\_21



jre7





## ★ Groovy 5.0

[Groovy 5.0](#) is the next major [version](#) of Groovy. We expect to have alpha releases soon.

## ★ Groovy 4.0

[Groovy 4.0](#) is the latest stable [version](#) of Groovy designed for JDK8+ with much improved JPMS support.

### 4.0.12 distributions



[binary \(mirror\)](#)

DIST: [asc sha256](#)

PERM: [asc sha256](#)



[source](#)

[asc sha256](#)



[documentation \(mirror\)](#)

DIST: [asc sha256](#)

PERM: [asc sha256](#)



[SDK bundle \(mirror\)](#)

DIST: [asc sha256](#)

PERM: [asc sha256](#)



[Windows installer](#)

(community artifact)

Please consult the [change log](#) for details.

## ★ Groovy 3.0

[Groovy 3.0](#) is the previous stable [version](#) of Groovy designed for JDK8+ with a new more flexible parser (aka Parrot parser).

### 3.0.17 distributions



[binary \(mirror\)](#)

DIST: [asc sha256](#)

PERM: [asc sha256](#)



[source](#)

[asc sha256](#)



[documentation \(mirror\)](#)

DIST: [asc sha256](#)

PERM: [asc sha256](#)



[SDK bundle \(mirror\)](#)

DIST: [asc sha256](#)

PERM: [asc sha256](#)



[Windows installer](#)

(community artifact)



1

## About GroovyConsole

X

Welcome to the Groovy Console for evaluating Groovy scripts

Groovy version: 4.0.12

Java version: 17.0.5+9-LTS-191 (Oracle Corporation)

OS version: 10.0 (Windows 10)

OK



Groovy  
Console



Groovy  
Shell

```
WARNING: A terminally deprecated method in java.lang.System has been called
WARNING: System::setSecurityManager has been called by org.codehaus.groovy.vmplugin.v8.IndyInterface$$InjectedInvoker@0x0000000800cbb000 (file:/C:/Program%20Files%20(x86)/Groovy/lib/groovy-4.0.12.jar)
WARNING: Please consider reporting this to the maintainers of org.codehaus.groovy.vmplugin.v8.IndyInterface$$InjectedInvoker@0x0000000800cbb000
WARNING: System::setSecurityManager will be removed in a future release
Groovy Shell (4.0.12, JVM: 17.0.5)
Type ':help' or ':h' for help.

-----
```

groovy:000> -

C:\Windows\system32>groovysh  
Groovy Shell (2.5.8, JVM: 1.8.0\_201)  
Type ':help' or ':h' for help.

-----  
groovy:000>  
groovy:000> :help

For information about Groovy, visit:  
<http://groovy-lang.org>

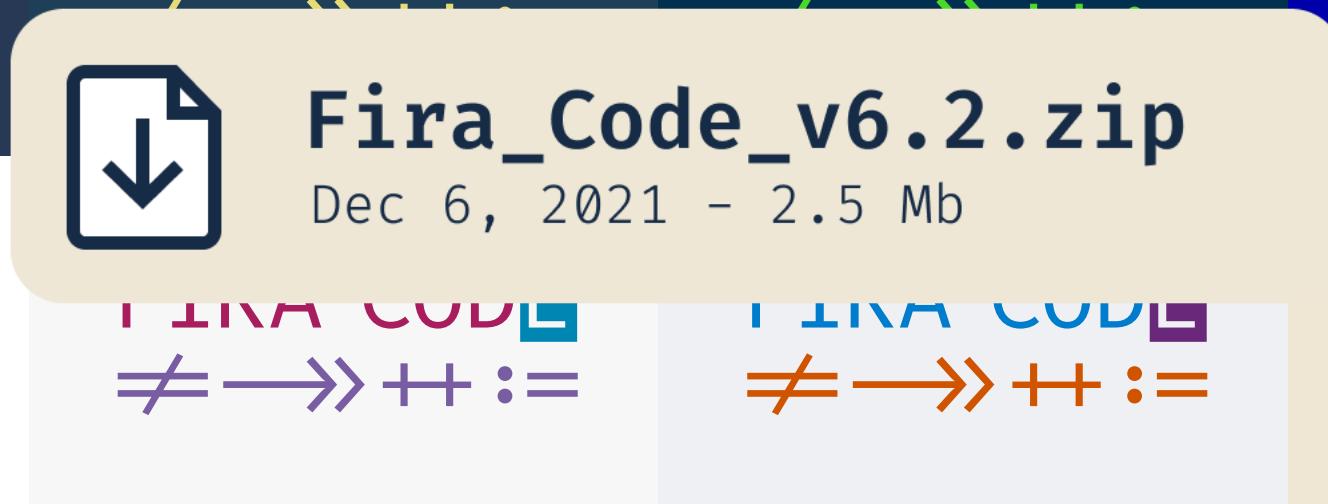
Available commands:

:help	(:h )	Display this help message
?	(:?)	Alias to: :help
:exit	(:x )	Exit the shell
:quit	(:q )	Alias to: :exit
import	(:i )	Import a class into the namespace
:display	(:d )	Display the current buffer
:clear	(:c )	Clear the buffer and reset the prompt counter
:show	(:S )	Show variables, classes or imports
:inspect	(:n )	Inspect a variable or the last result with the GUI object browser
:purge	(:p )	Purge variables, classes, imports or preferences
:edit	(:e )	Edit the current buffer
:load	(:l )	Load a file or URL into the buffer
.	(:. )	Alias to: :load
:save	(:s )	Save the current buffer to a file
:record	(:r )	Record the current session to a file
:history	(:H )	Display, manage and recall edit-line history

```
[Chads-MacBook-Pro:Desktop Quentin$ groovy test.groovy
Hello world!
10.0
Your bean is now baby blue
Your bean is now pewter
Chads-MacBook-Pro:Desktop Quentin$ ]
```



FIRA CODE  
≠→→++:=



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- XSLT IDE Online Pro monthly  [Buy](#)

You can cancel your subscription anytime on [Stripe Portal](#)

**Product Downloads**

Product	OS	Arch	
cpi-explorer-portable	Windows	x86_64	<a href="#">Download</a>
groovyide	Mac	aarch64	<a href="#">Download</a>
groovyide	Mac	x86_64	<a href="#">Download</a>
groovyide	Windows	x86_64	<a href="#">Download</a>
groovyide-portable	Windows	x86_64	<a href="#">Download</a>



```
1 println "hello world!"  
2
```

Press Alt+Enter to run Groovy Code [Click to Run](#)

1 Console Output

Open Dir

Refresh

## Input

1

## Headers

add header

## Properties

add property

## Script

Copy Share URL

```
1 import com.sap.gateway.ip.core.customdev.util.Message;
2
3 def Message processData(Message message) {
4
5     def messageLog = messageLogFactory.getMessageLog(message)
6     if(messageLog != null){
7
8         def po_number = message.getHeaders().get("po_number")
9         if(po_number!=null){
10             messageLog.addCustomHeaderProperty("po_number", p
11         }
12     }
13     return message;
14 }
```

## Output

1

## Headers

empty

## Properties

empty

## Message Processing Logs

## Log Properties

empty

## Custom Header Properties

empty

## Attachments

empty

Script Function: processData

Click to Execute Script (Alt+Enter)

## Console

1

# Online Groovy IDE

```
1 def x = 10
2 def y = 25
3
4 print 'Sum of x + y = ' + (x + y)
```

## Execute Mode, Version, Inputs & Arguments

3.0.9 JVM: 17.0.1

 Interactive

Stdin Inputs

CommandLine Arguments

 Execute

...



## Result

```
|
```

Note: Please check [our documentation](#), or [Youtube channel](#). for more details

## Know Your JDoodle

- JDoodle supports 76+ languages with multiple versions - [see all](#).
- With [JDoodle APIs](#), you can execute programs just by making a REST call.
- With [JDoodle Plugins](#), you can embed an IDE to your website with just 3 lines of code.

## JDoodle For Your Organisation

- Do you have any specific compiler requirements?
- Do you want to integrate compilers with your website, webapp, mobile app, courses?
- Are you looking more features in [JDoodle Plugin](#) and [JDoodle API](#) ?

# Groovy web console

```
1  
2 print "Ahoj svet"  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16
```



**Actions** ► Execute script | New script | Publish script | View recent scripts



[Subscribe  
to this  
site](#)

**Result** **Output** Stacktrace

Ahoj svet

## Console tips

- You can hit Alt-Meta-R to execute the current script without using the execute button.
- You can resize the script view by sliding down the bottom of the line number gutter.

**GROOVY DEVELOPERS NEVER RIP,  
THEY JUST GET GARBAGE COLLECTED.**

- I LIKE. NITTY-WITTY.COM

# Rozbehanie Groovy

1. Pridať **GROOVY\_HOME** premennú na adresár, v ktorom je uložená distribúcia
2. Do **PATH** premennej pridať cestu do adresára **GROOVY\_HOME / bin**
3. A nastaviť **JAVA\_HOME** premennú na adresár, v ktorom je **JDK**
4. Následne je možné spustiť **groovy shell**  
príkazom groovy/groovysh alebo GUI konzolu  
príkazom groovyConsole

## Vlastnosti systému

Názov počítača Hardvér Spresnenie Ochrana systému Vzdialé použitie

Na vykonanie väčšiny z týchto zmien treba byť prihlásený ako správca.

## Výkon

Vizuálne efekty, plánovanie procesora, používanie pamäte a virtuálna pamäť

Nastavenie...

## Používateľské profily

Nastavenie pracovnej plochy súvisiace s prihlásením

Nastavenie...

## Spúšťanie a obnovovanie

Spúšťanie systému, zlyhanie systému a informácie pre ladenie

Nastavenie...

Premenné prostredia...

OK

Zrušiť

Použiť

## Premenné prostredia

## Používateľské premenné pre používateľa Administrator

Premenná	Hodnota
MOZ_PLUGIN_PATH	C:\Program Files (x86)\Foxit Software\Foxit Reader\plugins\
OneDrive	D:\OneDrive - IT Academy s.r.o
OneDriveCommercial	D:\OneDrive - IT Academy s.r.o
OneDriveConsumer	D:\OneDrive
Path	C:\Users\Administrator\AppData\Local\Microsoft\WindowsApps...
PGDATABASE	postgres
PyCharm	C:\Program Files\JetBrains\PyCharm 2022.3\bin;
PvCharm Community Edition	C:\Program Files\JetBrains\PvCharm Community Edition with Ana...

Nové...

Upraviť...

Odstrániť

## Systémové premenné

Premenná	Hodnota
CATALINA_HOME	C:\Program Files\Apache Software Foundation\Apache Tomcat 8...
ComSpec	C:\WINDOWS\system32\cmd.exe
DriverData	C:\Windows\System32\Drivers\DriverData
ESET_OPTIONS	...
GDAL_DATA	C:\Program Files\PostgreSQL\11\gdal-data
GROOVY_HOME	C:\Program Files (x86)\Groovy\
INTEL_DEV_REDIST	C:\Program Files (x86)\Common Files\Intel\Shared Libraries\
IWRPath	C:\Program Files (x86)\SAP\FrontEnd\iwb

Nové...

Upraviť...

Odstrániť

OK

Zrušiť

# Environ GROOVY HOME

Upraviť premennú prostredia



C:\Program Files\Microsoft SQL Server\120\Tools\Binn\  
C:\Program Files\PowerShell\7\  
C:\Program Files\nodejs\  
C:\Program Files\dotnet\  
C:\Program Files\Git\cmd  
C:\Program Files (x86)\Intel\Intel(R) Management Engine Compo...  
C:\Program Files\Intel\Intel(R) Management Engine Components...  
C:\Program Files (x86)\Intel\Intel(R) Management Engine Compo...  
C:\Program Files\Intel\Intel(R) Management Engine Components...  
C:\Program Files\Microsoft SQL Server\150\Tools\Binn\  
C:\Program Files\Microsoft SQL Server\150\DTS\Binn\  
C:\Users\Administrator\AppData\Roaming\npm\node\_modules...  
C:\Program Files\NVIDIA Corporation\NVIDIA NvDLISR  
C:\Program Files (x86)\Microsoft SQL Server\150\Tools\Binn\  
C:\Program Files (x86)\Microsoft SQL Server\150\DTS\Binn\  
C:\Program Files\Microsoft SQL Server\Client SDK\ODBC\170\To...  
C:\Program Files (x86)\dotnet\  
C:\Program Files\Microsoft SQL Server\130\Tools\Binn\  
C:\Program Files (x86)\NVIDIA Corporation\PhysX\Common  
C:\Python32\  
C:\Program Files (x86)\eID\_klient\  
%GROOVY\_HOME%bin

Nové

Upraviť

Prehľadávať...

Odstrániť

Posunúť nahor

Posunúť nadol

Upraviť text...

OK

Zrušiť

```
WARNING: A terminally deprecated method in java.lang.System has been called
WARNING: System::setSecurityManager has been called by org.codehaus.groovy.vmplugin.v8.IndyInterface$$InjectedInvoker@0x0000000800cbb000 (file:/C:/Program%20Files%20(x86)/Groovy/lib/groovy-4.0.12.jar)
WARNING: Please consider reporting this to the maintainers of org.codehaus.groovy.vmplugin.v8.IndyInterface$$InjectedInvoker@0x0000000800cbb000
WARNING: System::setSecurityManager will be removed in a future release
Groovy Shell (4.0.12, JVM: 17.0.5)
Type ':help' or ':h' for help.

-----
```

groovy:000> -

CMD -> groovysh

```
WARNING: A terminally deprecated method in java.lang.System has been called
WARNING: System::setSecurityManager has been called by org.codehaus.groovy.vmp plugin.v8.IndyInterface$$InjectedInvoker@0x0000000800cbb000 (file:/C:/Program%20Files%20(x86)/Groovy/lib/groovy-4.0.12.jar)
WARNING: Please consider reporting this to the maintainers of org.codehaus.groovy.vmp plugin.v8.IndyInterface$$InjectedInvoker@0x0000000800cbb000
WARNING: System::setSecurityManager will be removed in a future release
Groovy Shell (4.0.12, JVM: 17.0.5)
Type ':help' or ':h' for help.
```

```
-----  
groovy:000> :h
```

```
For information about Groovy, visit:  
http://groovy-lang.org
```

```
Available commands:
```

:help	(:h )	Display this help message
?	(:?)	Alias to: :help
:exit	(:x )	Exit the shell
:quit	(:q )	Alias to: :exit
:import	(:i )	Import a class into the namespace
:display	(:d )	Display the current buffer
:clear	(:c )	Clear the buffer and reset the prompt counter
:show	(:s )	Show variables, classes or imports
:inspect	(:n )	Inspect a variable or the last result with the GUI object browser
:purge	(:p )	Purge variables, classes, imports or preferences
:edit	(:e )	Edit the current buffer
:load	(:l )	Load a file or URL into the buffer
.	(..)	Alias to: :load
:save	(:s )	Save the current buffer to a file
:record	(:r )	Record the current session to a file
:history	(:H )	Display, manage and recall edit-line history
:alias	(:a )	Create an alias
:set	(:= )	Set (or list) preferences
:grab	(:g )	Add a dependency to the shell environment
:register	(:rc)	Register a new command with the shell
:doc	(:D )	Open a browser window displaying the doc for the argument

```
For help on a specific command type:  
:help command
```

```
groovy:000>
```

**:h alebo :help**

```
groovy:001> :inspect  
groovy:001>
```

## Groovy Object Browser



Path Help

Class Info

```
module java.base
package java.lang
public final class Integer
implements Comparable, Constable, ConstantDesc
extends Number
(is Primitive: false, is Array: false, is Groovy: false)
```

Properties (includes public fields)

(Meta) Methods

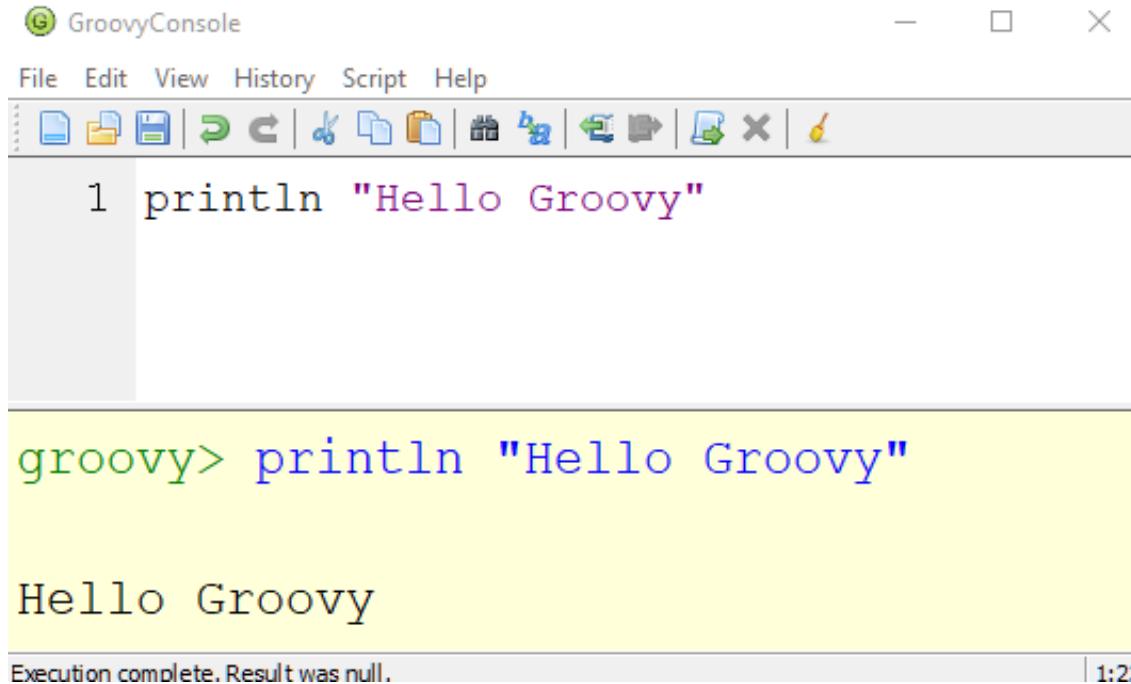
Name	Value	Type	Origin	Modifier	Declarer
BYTES	4	int	GROOVY	public	n/a
MAX_VALUE	2147483647	int	GROOVY	public	n/a
MIN_VALUE	-2147483648	int	GROOVY	public	n/a
SIZE	32	int	GROOVY	public	n/a
TYPE	int	Class	GROOVY	public	n/a
class	class java.lang.Integer	Class	GROOVY	public	n/a

◀ Path: java.lang.Integer instance ▶

Groovy Object Browser													
Path		Help											
Class Info													
<pre>module java.base package java.lang public final class Integer implements Comparable, Constable, ConstantDesc extends Number (is Primitive: false, is Array: false, is Groovy: false)</pre>													
Properties (includes public fields) <span>(Meta) Methods</span>													
Name	Params	Type	Origin	Modifier	Declarer	Exceptions							
bitCount	int	int	JAVA	public static	Integer								
byteValue		byte	JAVA	public	Integer								
compare	int, int	int	JAVA	public static	Integer								
compareTo	Integer	int	JAVA	public	Integer								
compareTo	Object	int	JAVA	public volatile	Integer								
compareUnsigned	int, int	int	JAVA	public static	Integer								
decode	String	Integer	JAVA	public static	Integer								
describeConstable		Optional	JAVA	public	Integer								
divideUnsigned	int, int	int	JAVA	public static	Integer								
doubleValue		double	JAVA	public	Integer								
equals	Object	boolean	JAVA	public	Integer								
floatValue		float	JAVA	public	Integer								
getClass		Class	JAVA	public final native	Object								
getInteger	String	Integer	JAVA	public static	Integer								
getInteger	String, Integer	Integer	JAVA	public static	Integer								
getInteger	String, int	Integer	JAVA	public static	Integer								
hashCode		int	JAVA	public	Integer								
hashCode		int	JAVA	public static	Integer								
highestOneBit	int	int	JAVA	public static	Integer								
intValue		int	JAVA	public	Integer								
java.lang.Integer	String	Integer	JAVA	public	Integer								
java.lang.Integer	int	Integer	JAVA	public	Integer								
longValue		long	JAVA	public	Integer								
lowestOneBit	int	int	JAVA	public static	Integer								
max	int, int	int	JAVA	public static	Integer								
min	int, int	int	JAVA	public static	Integer								
notify		void	JAVA	public final native	Object								
notifyAll		void	JAVA	public final native	Object								
numberOfLeadingZeros	int	int	JAVA	public static	Integer								
numberOfTrailingZeros	int	int	JAVA	public static	Integer								
parseInt	CharSequence, int, int, int	int	JAVA	public static	Integer								
parseInt	String	int	JAVA	public static	Integer								
parseInt	String, int	int	JAVA	public static	Integer								
parseUnsignedInt	CharSequence, int, int, int	int	JAVA	public static	Integer								
parseUnsignedInt	String	int	JAVA	public static	Integer								
parseUnsignedInt	String, int	int	JAVA	public static	Integer								
remainderUnsigned	int, int	int	JAVA	public static	Integer								
resolveConstantDesc	MethodHandles\$Lookup	Integer	JAVA	public	Integer								
resolveConstantDesc	MethodHandles\$Lookup	Object	JAVA	public volatile	Integer								
reverse	int	int	JAVA	public static	Integer								
reverseBytes	int	int	JAVA	public static	Integer								
rotateLeft	int, int	int	JAVA	public static	Integer								
Path:		java.lang.Integer instance											

# Náš prvý program Ahoj, Svet!

AhojSvet.groovy

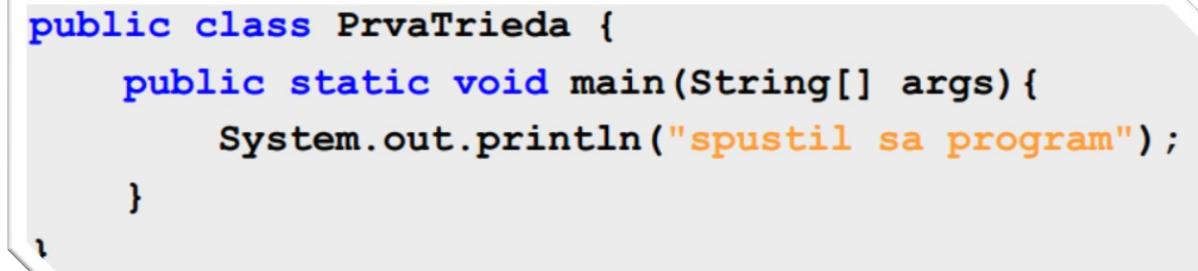


The screenshot shows the GroovyConsole interface. The title bar says "GroovyConsole". The menu bar includes File, Edit, View, History, Script, Help. The toolbar has various icons for file operations. The code area contains the following Groovy script:

```
1 println "Hello Groovy"
```

In the interactive console below, the command `groovy> println "Hello Groovy"` is entered, followed by the output `Hello Groovy`. The status bar at the bottom indicates "Execution complete. Result was null." and shows the time "1:23".

AhojSvet.java



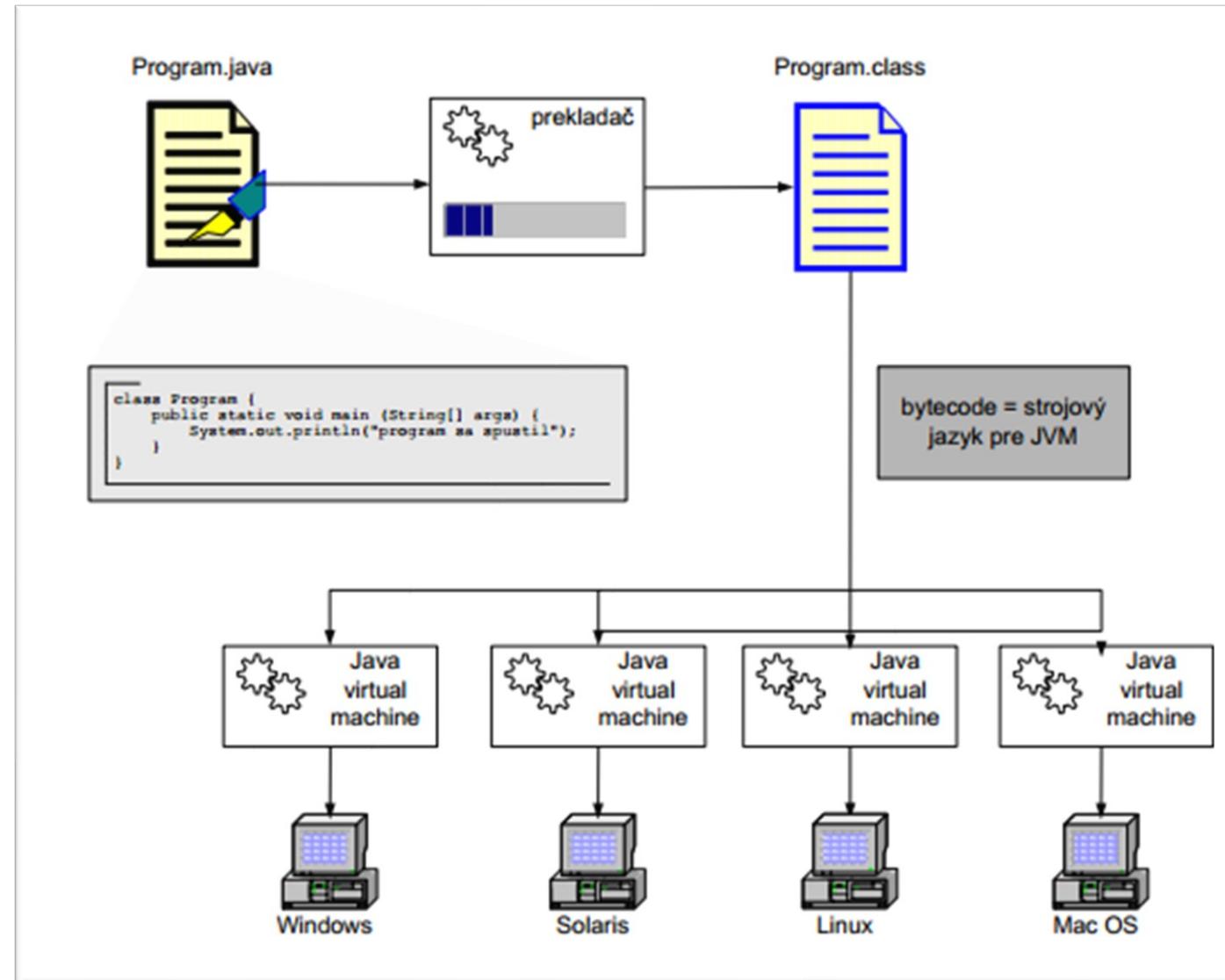
```
public class PrvaTrieda {
    public static void main(String[] args) {
        System.out.println("spustil sa program");
    }
}
```

# Základné konzolové príkazy

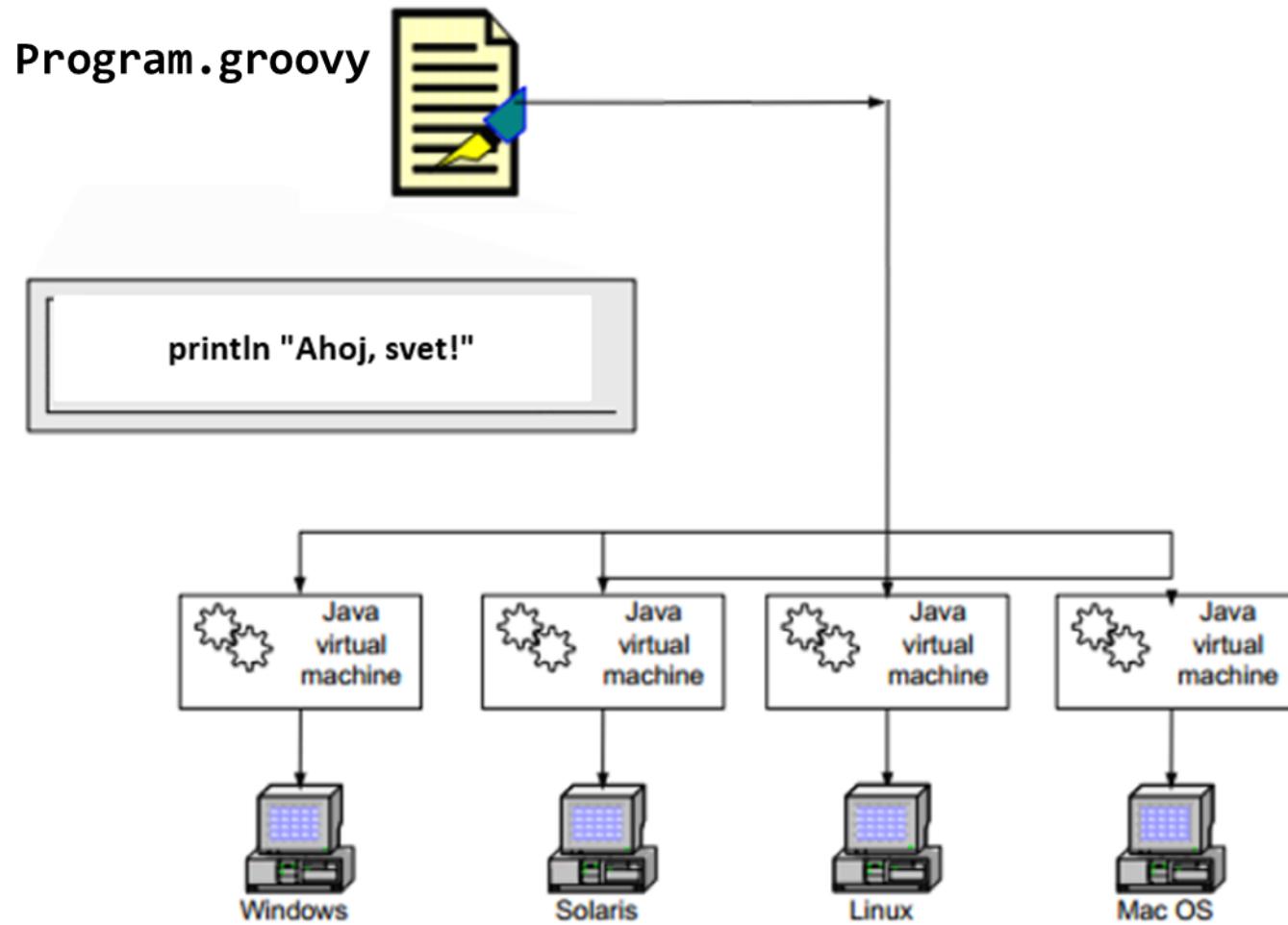
- **Groovyc** – Groovy compliter
- **Groovy**
  - **groovy AhojSvet.groovy**
- **:help** (:h) Display this help message
- **:**? (:?) Alias to: :help
- **:exit** (:x) Exit the shell
- **:quit** (:q) Alias to: :exit
- **:show** (:S) Show var, classes or imp
- **:inspect** (:n) Inspect a variable or the last result with the GUI object browser
- **:history** (:H) Display, manage and recall edit-line history

- **javac** – Java compiler
  - javac PrvaTrieda.java
- **java** – spustenie preloženého programu
  - java PrvaTrieda
  - java -jar PrvyProgram.jar
- **jar** – práca so súbormi jar
  - jar cfe PrvyProgram.jar PrvaTrieda PrvaTrieda.class
  - jar cfm PrvyProgram.java Manifest.txt PrvaTrieda.class
- **javadoc** – vytvorenie dokumentácie zo zdrojových súborov

# Java platforma pre Javu



# Java platform pre Groovy



Java Language		Java Language								
Tools & Tool APIs	java	javac	javadoc	jar	javap	JPDA				
	JConsole	Java VisualVM	Java DB	Security	Int'l	RMI				
	IDL	Deploy	Monitoring	Troubleshoot	Scripting	JVM TI	Web Services			
Deployment	Java Web Start			Applet / Java Plug-in						
	JavaFX									
	Swing		Java 2D		AWT	Accessibility				
User Interface Toolkits	Drag and Drop		Input Methods		Image I/O	Print Service	Sound			
	IDL	JDBC	JNDI	RMI	RMI-IIOP		Scripting			
	Beans	Int'l Support		Input/Output		JMX				
JRE	JNI		Math		Networking		Override Mechanism			
	Security	Serialization		Extension Mechanism		XML JAXP				
	lang and util		Collections		Concurrency Utilities		JAR			
lang and util Base Libraries	Logging	Management		Preferences API		Ref Objects				
	Reflection	Regular Expressions		Versioning		Zip	Instrumentation			
	Java Virtual Machine									
Java HotSpot Client and Server VM										

Java SE  
API

# Premenné a Typy

**1. sprava = "Ahoj svet!"**

**2. println sprava**

- Dátové typy (String, int, double) nemusíme uvádzat
- Bodkočiarky ; nemusíme písat
- Dátový typ pre sprava sa určí automaticky
- Println je funkcia
  - Zátvorky () netreba písat

# Premenné a typy

1. **Def** sprava = "Ahoj svet!"
2. println sprava
  
3. **String** sprava2 = "Ahoj svet!"
4. println sprava2

- Dátový typ sa určí podľa priradzovanej hodnoty
- V situácii **keď nepoznáme dátový typ**, tak **použijeme def**
- V skriptoch **môžeme def vyniechať**
- Premenná sa **stane globálnou**

# Groovy web console

```
1  
2 print "Ahoj svet"  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16
```



**Actions ►** Execute script | New script | Publish script | View recent scripts



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**Result** **Output** Stacktrace

Ahoj svet

## Console tips

- You can hit Alt-Meta-R to execute the current script without using the execute button.
- You can resize the script view by sliding down the bottom of the line number gutter.

# Kolekcie (Zoznamy a Mapy)

## Groovy

- Zoznam (List):  
`mena = ["Adam", "Karol", "Fero"]`
- Mapa (Map):  
`zamestnanec = [  
 meno: "Adam",  
 priezvisko: "Šangala"  
]`

## Java

- Zápis pre inicializáciu kolekcií
- `List<String> mena = Arrays.asList("Adam", "Karol", "Fero");`
- `Map map = new HashMap();  
map.put(1, "Adam");`

## Table of contents

1. No semicolons
2. Return keyword optional
3. Def and type
4. Public by default
5. Omitting parentheses
6. Classes as first-class citizens
7. Getters and Setters
8. Initializing beans with named parameters and the default constructor
9. Using `with()` and `tap()` for repeated operations on the same bean
10. Equals and `==`
11. GStrings (interpolation, multiline)
12. Native syntax for data

# Style guide

A Java developer embarking on a Groovy adventure will always have Java in mind, and will progressively learn Groovy, one feature at a time, becoming more productive and writing more idiomatic Groovy code. This document's purpose is to guide such a developer along the way, teaching some common Groovy syntax style, new operators, and new features like closures, etc. This guide is not complete and only serves as a quick intro and a base for further guideline sections should you feel like contributing to the document and enhancing it.

## 1. No semicolons

When coming from a C / C++ / C# / Java background, we're so used to semicolons, that we put them everywhere. Even worse, Groovy supports 99% of Java's syntax, and sometimes, it's so easy to paste some Java code into your Groovy programs, that you end up with tons of semicolons everywhere. But... semicolons are optional in Groovy, you can omit them, and it's more idiomatic to remove them.

## 2. Return keyword optional

In Groovy, the last expression evaluated in the body of a method can be returned without necessitating the `return` keyword. Especially for short methods and for closures, it's nicer to omit it for brevity:

```
String toString() { return "a server" }
String toString() { "a server" }
```

But sometimes, this doesn't look too good when you're using a variable, and see it visually twice on two rows:

```
def props() {
```

## GROOVY CODING STYLE

---

I've been using Groovy for about 4 years. The code that I used to write 3 years ago looks very different from the 1 year old code and from the code I am writing these days. Why is that?

Sure, one part of it is that I've been becoming more and more familiar with Groovy over the years and Groovy has been becoming more powerful; such features as `@Delegate` and especially `@Mixin` change the way I write code.

However, the main reasons are different. When I begin using Groovy I was a Java developer. And that is why during the first few month my code looked more like Java with closures and fancy collections literals; I believe, this is the case for many Groovy developers.

Then I was doing a lot of Ruby development and it had changed my habits and my style of coding. Just a few examples: there are no interfaces in Ruby. They just don't make any sense in Ruby world. You don't specify a type when you define a variable in Ruby. We specify `def` in groovy if we don't want to specify the exact type of the variable.

Compare these two chunks of code:

# Google Java Style Guide

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- [7.3 Where Javadoc is used](#)

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Revised April 20, 1999

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# Čo sa Oplatí Prečítať?

## Slovensko a česko

- Albatrosmedia
- Kopp
- Grada
- Wolters Kluwer
- BEN
- Veda

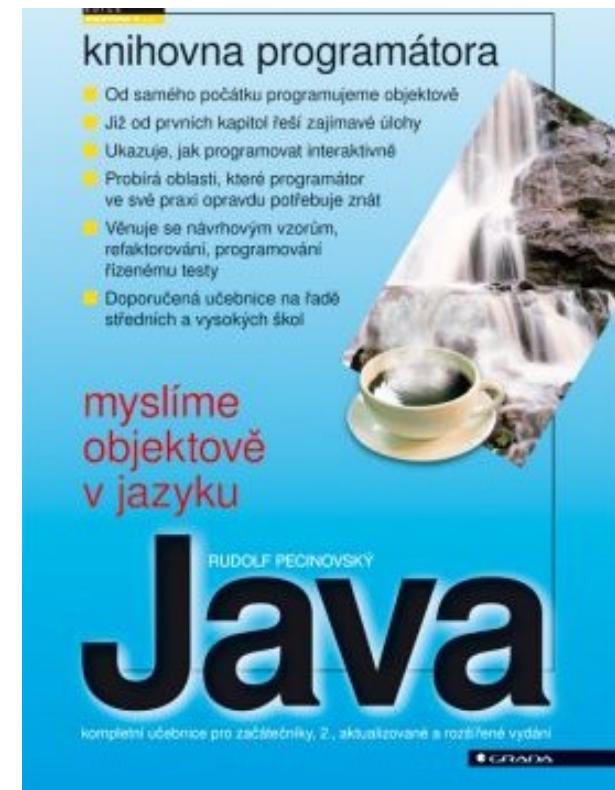
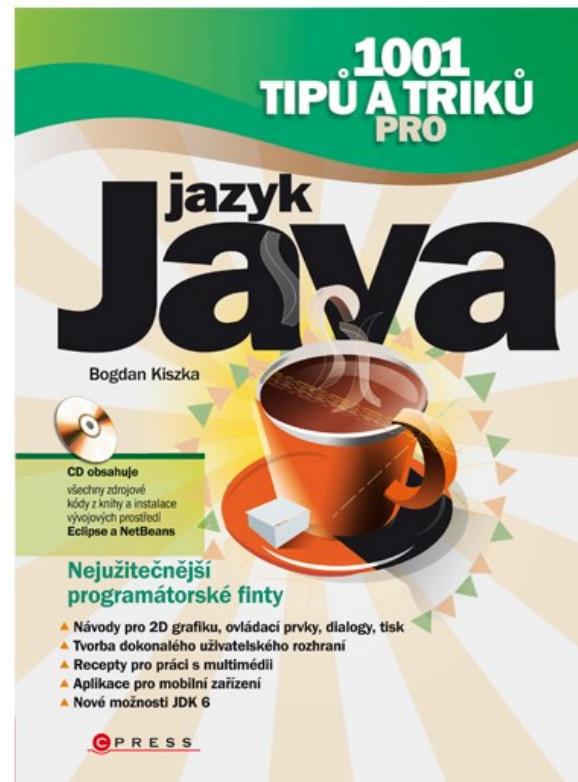
## Zahraničie

- O'Reilly
- Manning
- Packt
- Apress
- Wiley
- No Starch Press

## YouTube Tutoriály

- [IT Academy](#)

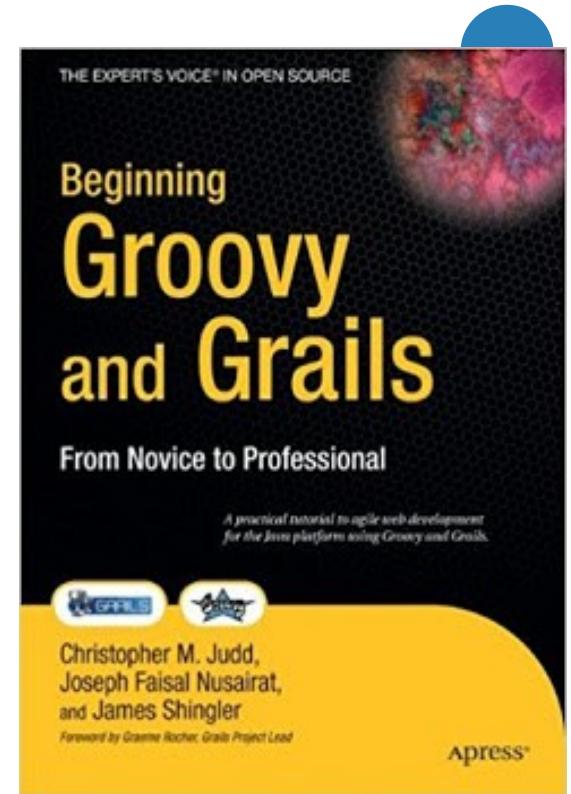
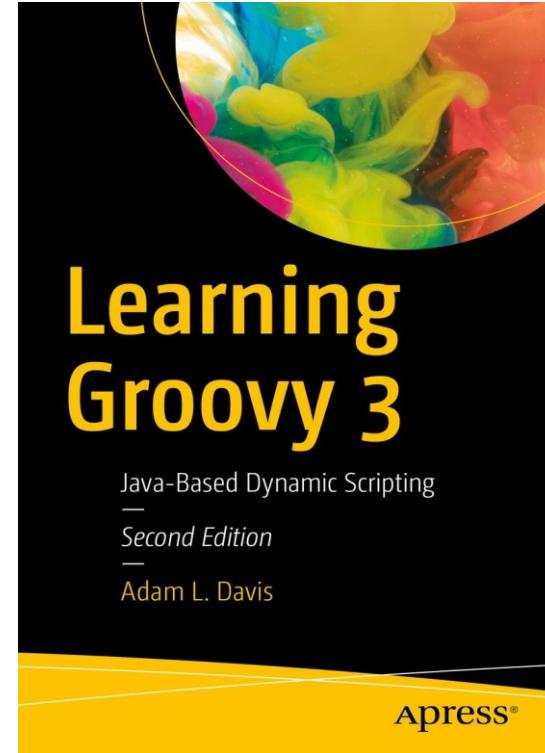
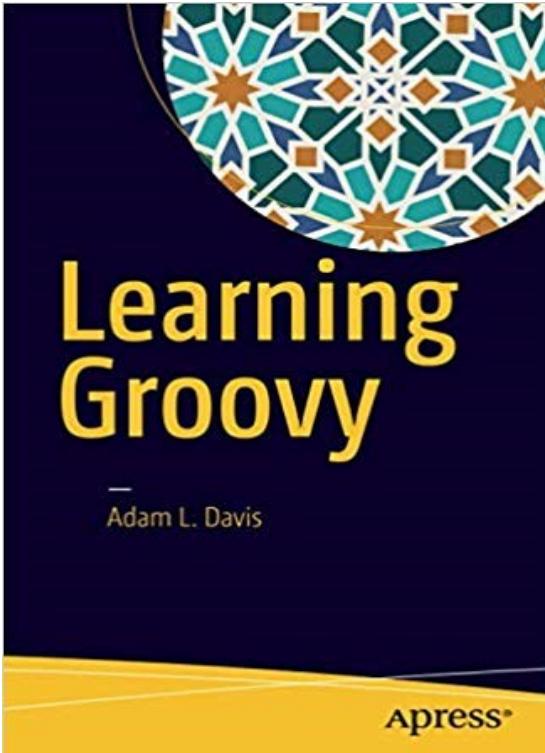
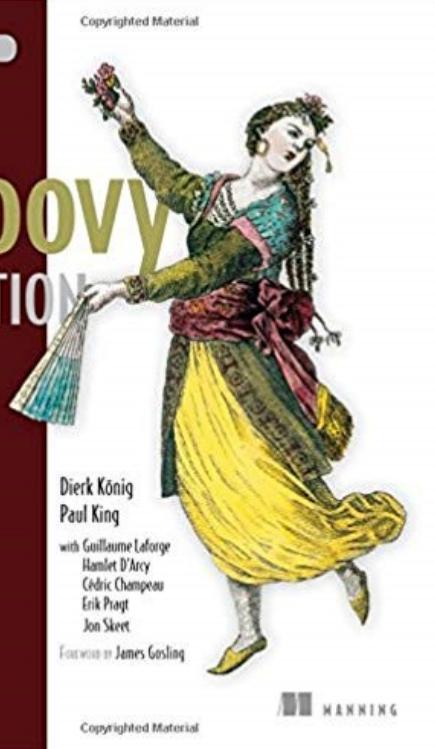
# Čo sa oplatí/neoplatí prečítať SK/CZ?



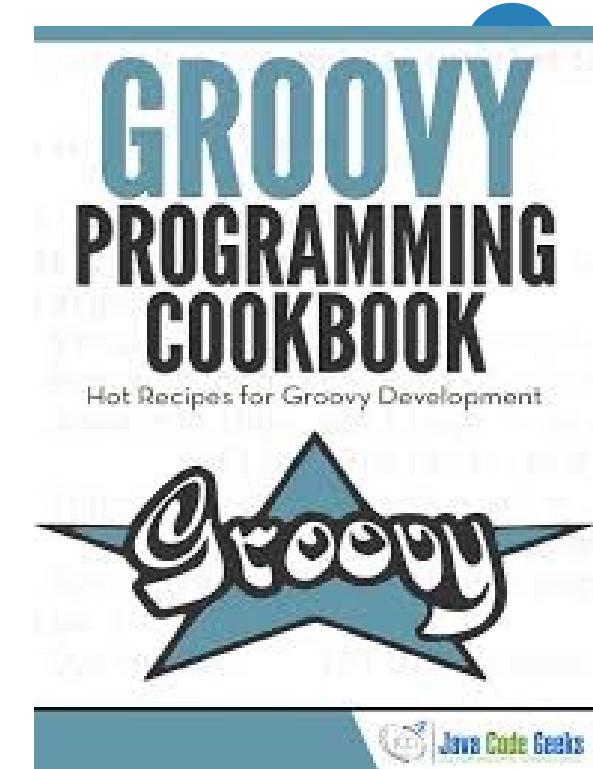
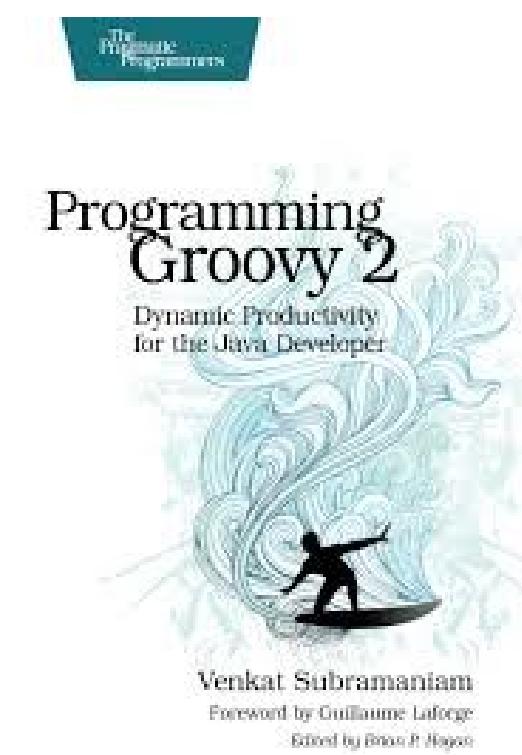
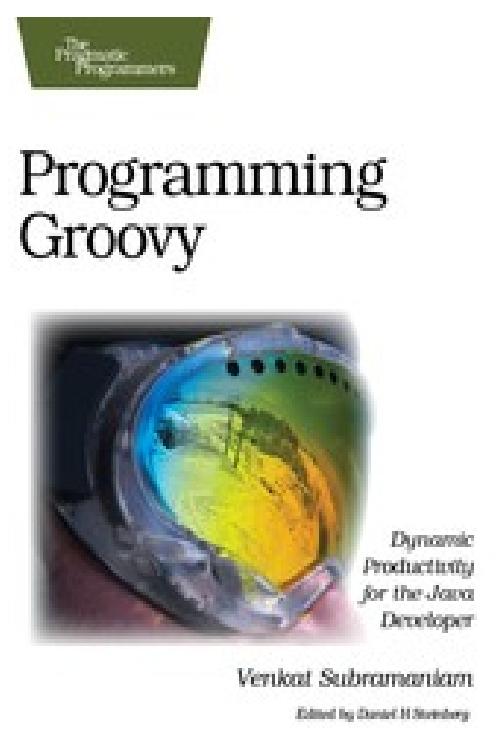
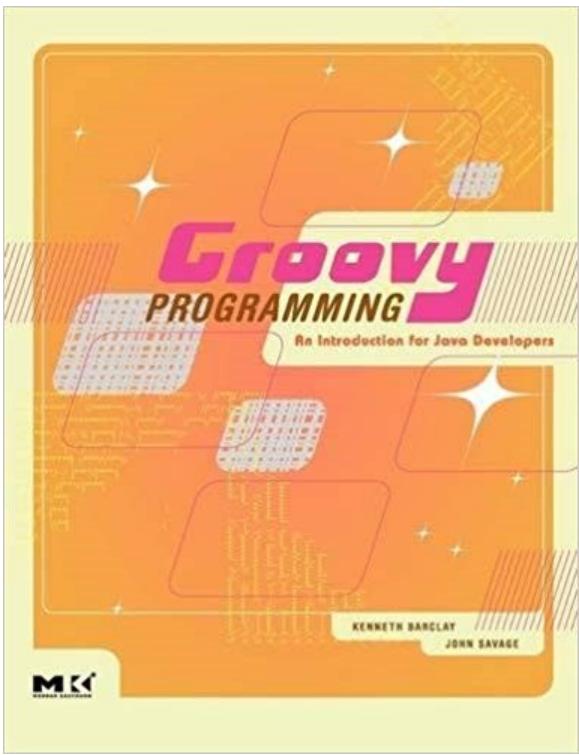
SECOND EDITION

# Groovy IN ACTION

Covers Groovy 2.4



# Čo sa oplatí/neoplatí prečítať EN



# Čo sa oplatí/neoplatí prečítať EN

# Najdôležitejšie Klávesové Skratky

## Práca s Zdrojovým Kódom

- Spustí aplikáciu F6
- Preruší aplikáciu CTRL + BREAK
- Immediate window CTRL + G
- Object browser F2
- Project browser CTRL + R
- Properties window F4
- Zobrazí kód (pri formulári) F7
- Zobrazí vizuálnu časť form. SHIFT + F7
- Aktuálny pomocník F1

## Ladenie/Debug

- Stop into F8
- Step over SHIFT + F8
- Step out CTRL + SHIFT + F8
- Run to cursor CTRL + F8
- Edit watch CTRL + W
- Quick watch SHIFT + F9
- Toggle breakpoint F9
- Clear all breakpoints CTRL + SHIFT + F9
- Bring to front (objekt dopredu) CTRL + J

**ALT + Ins** Code Generator

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# Tags

A tag is a keyword or label that categorizes your question with other, similar questions. Using the right tags makes it easier for others to find and answer your question.

 groovy

Popular	Name	New
---------	------	-----

**groovy** × 24114

an object-oriented programming language for the Java platform. It is a dynamic language with features similar to those of Python,

7 asked today, 45 this week

**jenkins-groovy** × 772

Question regarding using groovy code in Jenkins, specifically in Jenkinsfile and groovy plugins

14 asked this week, 64 this month

**groovyshell** × 181

The term groovyshell refers to both: 1. A command line interactive groovy shell, usually invoked as "groovysh" 2. One of the

21 asked this year

**groovy-console** × 112

a Java Swing based graphical user interface that is packaged with the Groovy distribution. It provides a simple but elegant way of

18 asked this year

**logback-groovy** × 39

A Groovy DSL that provides an alternative to XML for configuring Logback.

2 asked this year

**groovyclassloader** × 35

a ClassLoader for loading Groovy classes.

4 asked this year

**groovyws** × 34

GroovyWS was a library for creating and consuming WS-I compliant web services.

**urlmappings.groovy** × 33

The URLMappings plugin configures Grails' URL Mapping infrastructure.

1 asked this year

**groovy-eclipse** × 33

the set of Eclipse plugins that provide Eclipse support for Groovy projects.

2 asked this year

**groovydoc** × 29

Groovy's equivalent for JavaDoc

**groovyscriptengine** × 27

11 asked this year

**groovy-sql** × 23

an API for the Groovy programming language

**groovy++** × 18

statically typed extension of Groovy programming language.

3 asked this year

**groovydsl** × 18

an IntelliJ framework to define the behaviour of end-user DSLs as script files which are executed by the IDE.

4 asked this year

**groovyfx** × 16

a Groovy binding for JavaFX 2.0.

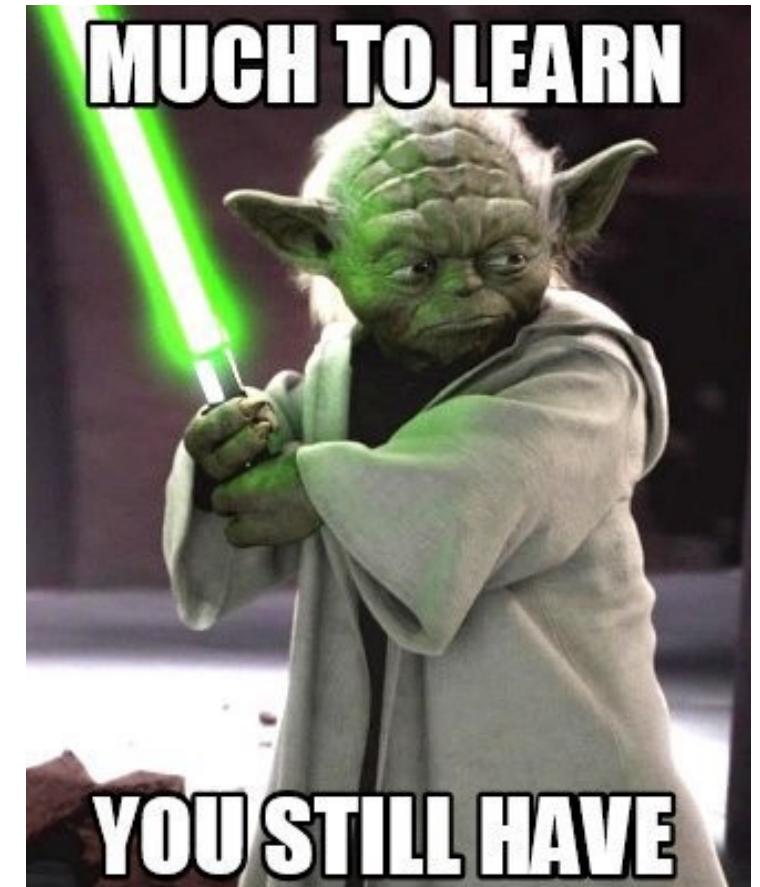
1 asked this year

**groovysh** × 11

a command-line application which allows easy access to evaluate Groovy expressions, define classes and run simple

# Čo ti Odporúčam si Pozriet?

1. <http://groovy-lang.org/>
2. <https://groovy-lang.org/style-guide.html>
3. <https://docs.oracle.com/en/cloud/paas/app-builder-cloud/visual-builder-groovy/best-practices-for-groovy-performance.html>
4. <https://www.guru99.com/groovy-tutorial.html>
5. <https://www.tutorialspoint.com/groovy/index.htm>
6. <https://www.javatpoint.com/groovy>
7. <https://www.root.cz/clanky/groovy-v-prikladech-uvod-do-jazyka/>
8. <https://www.root.cz/serialy/groovy-v-prikladech/>





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### Informácie

Skupina softvérových vývojárov. Táto skupina by mala byť miestom, kde sa môžu českoslovenkí vývojári vzájomne spoznať, vyžiadať si konštrukívnu... [Zobraziť viac](#)

#### Verejná

Členov skupiny a ich príspevky bude vidieť ktokoľvek.

#### Viditeľná

Túto skupinu nájde ktokoľvek

#### Slovensko

Martin Majling

1 d. ·



# Ako sa s nami spojiť?



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Budova KOLOSEO prízemie  
Tomášikova 50/A  
831 04 Bratislava



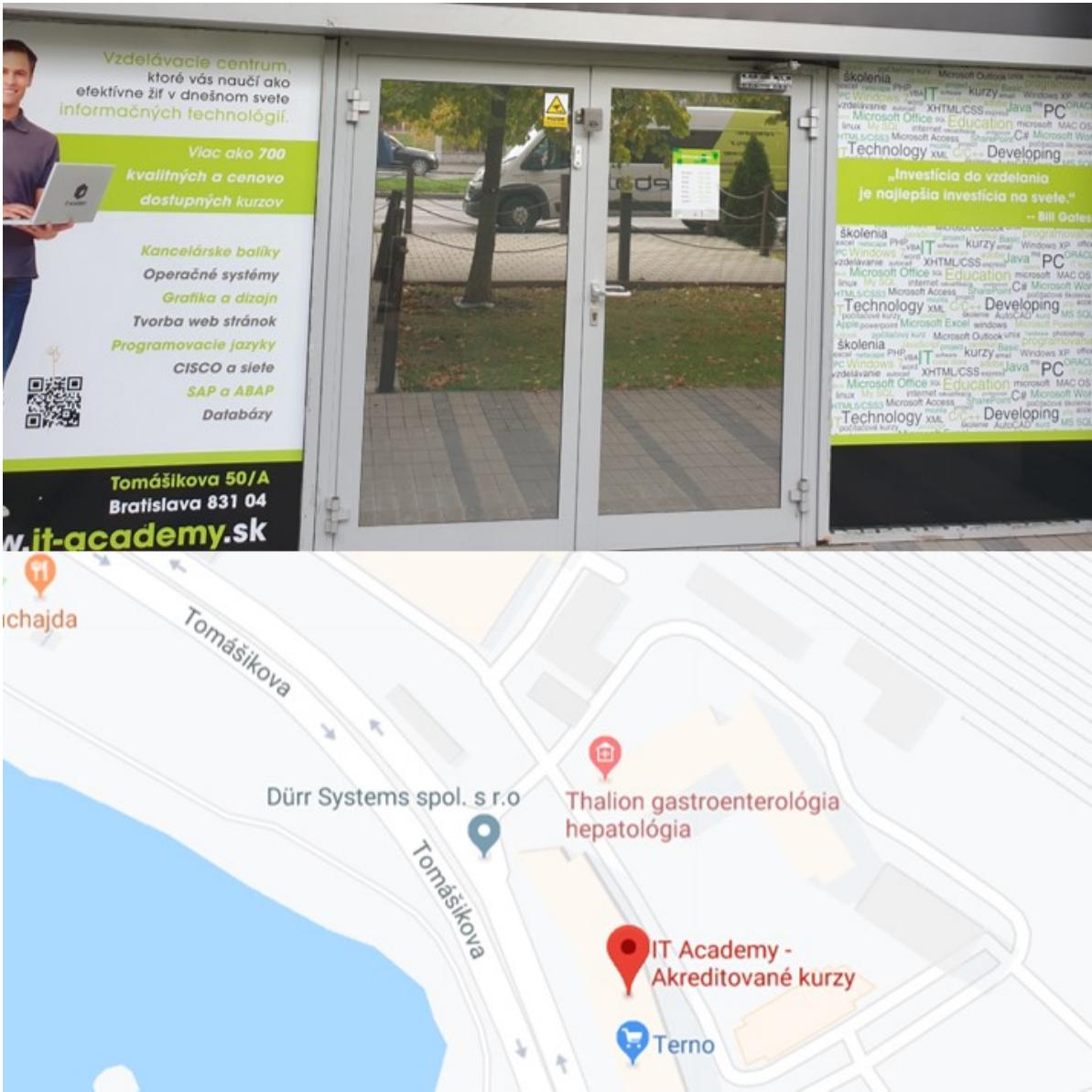
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