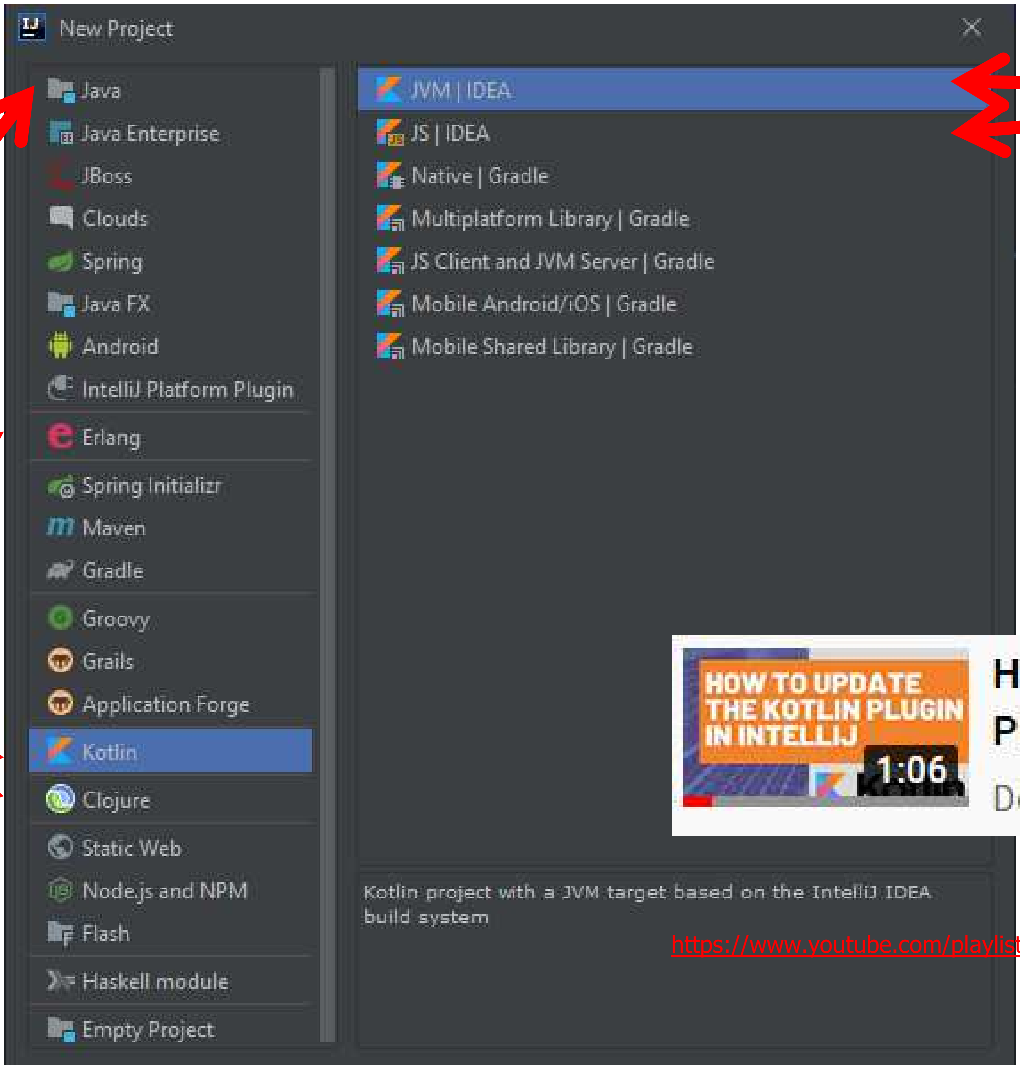
Kotlin

Peter Borovanský, KAI, I-18, borovan(a)ii.fmph.uniba.sk



Kotlin project with a JVM target based on the IntelliJ IDEA build system

Kotlin Plugin in IntelliJ

File/Settings/Plugins
MarketPlace/Kotlin

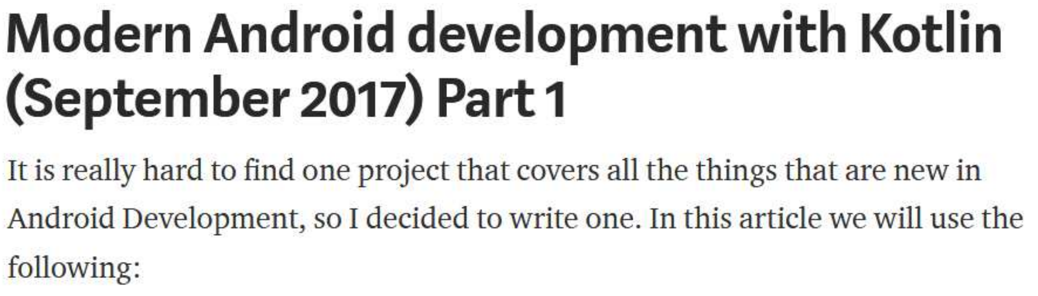
Plugin od JetBrains

How to Update the Kotlin Plugin in IntelliJ

Donn Felker - Freelancing for ...

https://www.youtube.com/playlist?list=PLVUm4IewkTXqwzuRXZisWg7shMTiQhUtz

Kotlin



Modern Android development with Kotlin (September 2017) Part 1

It is really hard to find one project that covers all the things that are new in Android Development, so I decided to write one. In this article we will use the following:

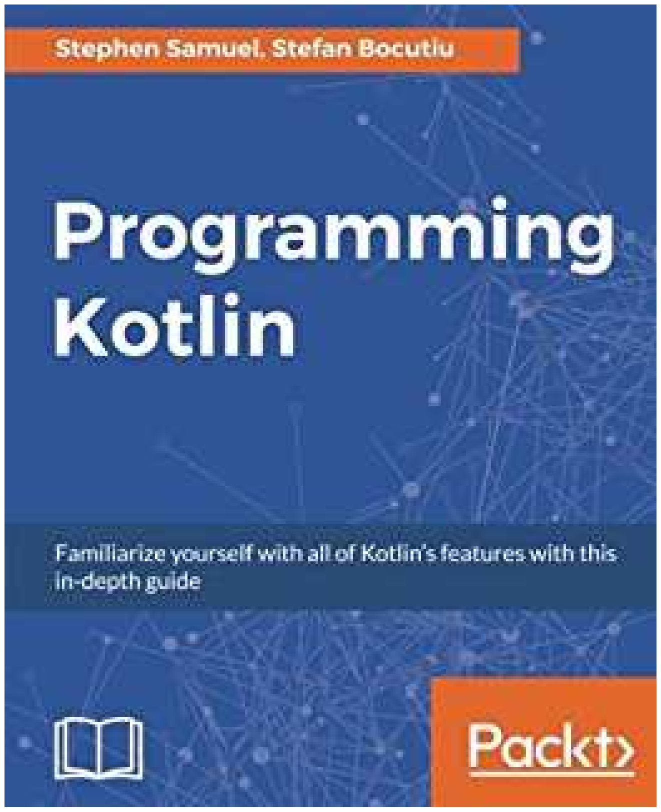
Rýchly nadhľad nad vlastnosťami jazyka Kotlin, dotyk s prvými aplikáciami

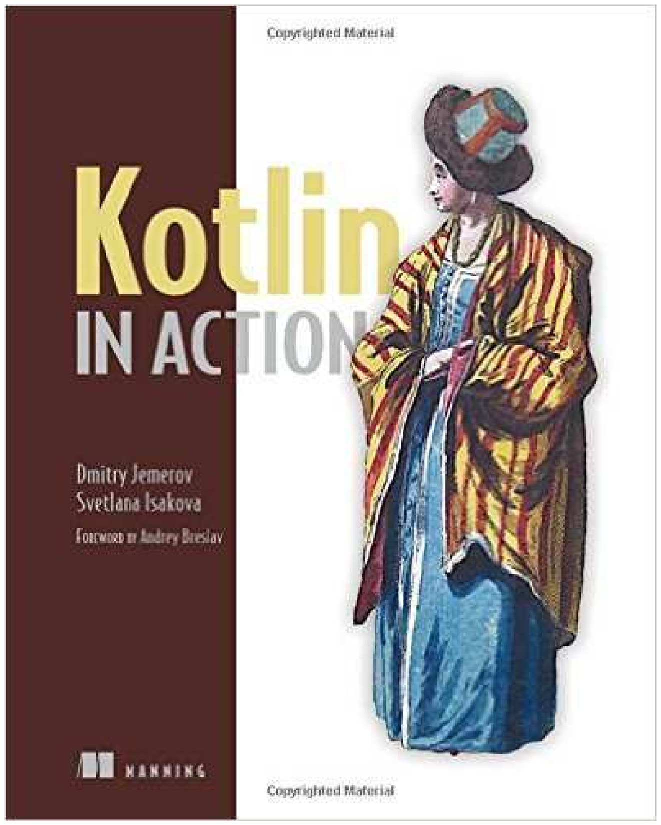
https://proandroiddev.com/modern-android-development-with-kotlin-september-2017-part-1-f976483f7bd6
https://proandroiddev.com/modern-android-development-with-kotlin-september-2017-part-2-17444fcdbe86

Literatúra

seriózne jšie čítanie

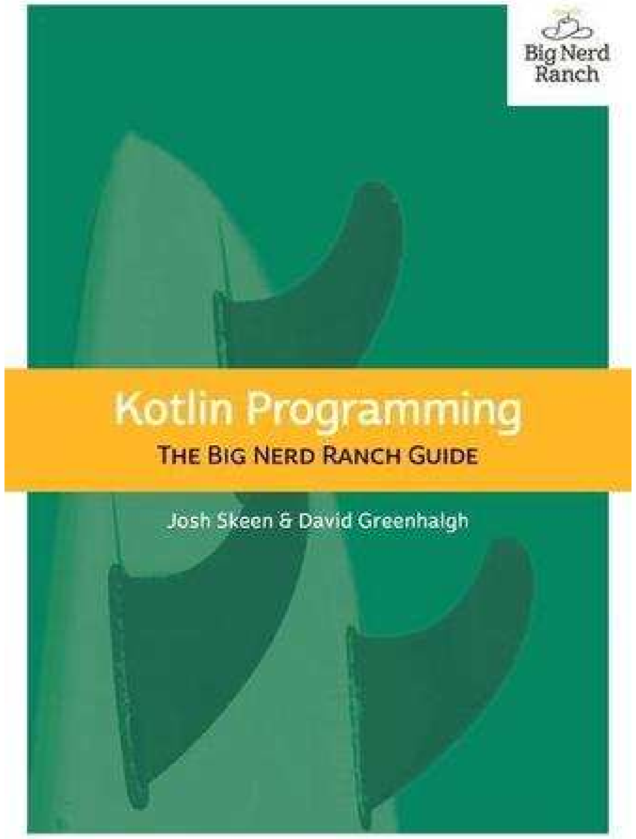
- Kotlin in Action
  https://www.manning.com/books/kotlin-in-action
- Programming in Kotlin
  https://www.packtpub.com/application-development/programming-kotlin

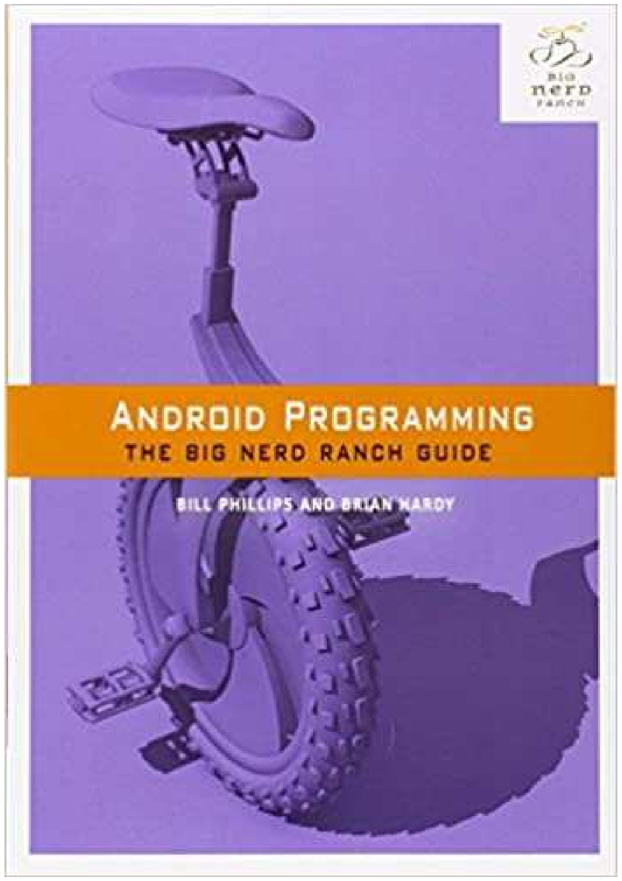

Stephen Samuel, Stefan Bocutiu
Programming Kotlin
Familiarize yourself with all of Kotlin's features with this in-depth guide
Packt



Literatúra
for nerds

- Kotlin Programming – The Big Nerd Ranch Guide
  https://www.amazon.com/Kotlin-Programming-Nerd-Ranch-Guide/dp/0135161630
- Android Programming: The Big Nerd Ranch Guide (4th Edition)
  https://www.bignerdranch.com/books/android-programming-the-big-nerd-ranch-guide-4th/



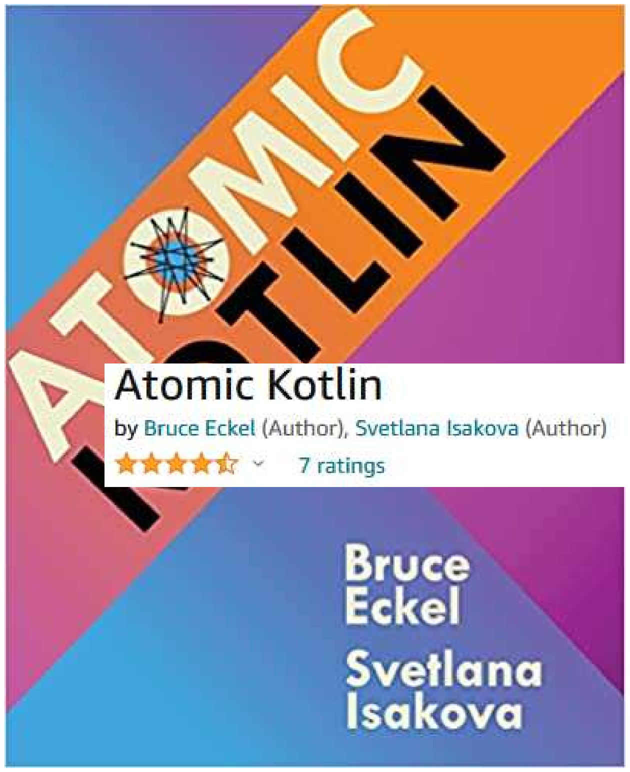


Literatúra

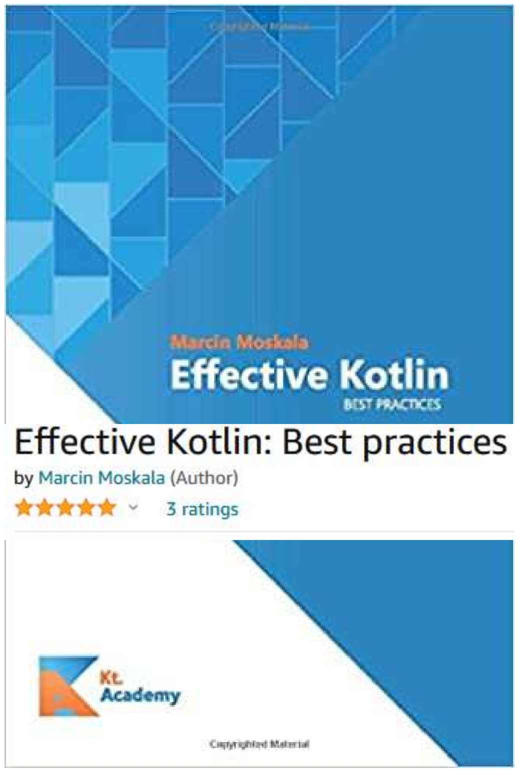
nežný úvod

Bruce Eckel, Svetlana Isakova: Atomic Kotlin - ideálne pre začiatočníkov
https://www.amazon.com/Atomic-Kotlin-Bruce-Eckel/dp/0981872557

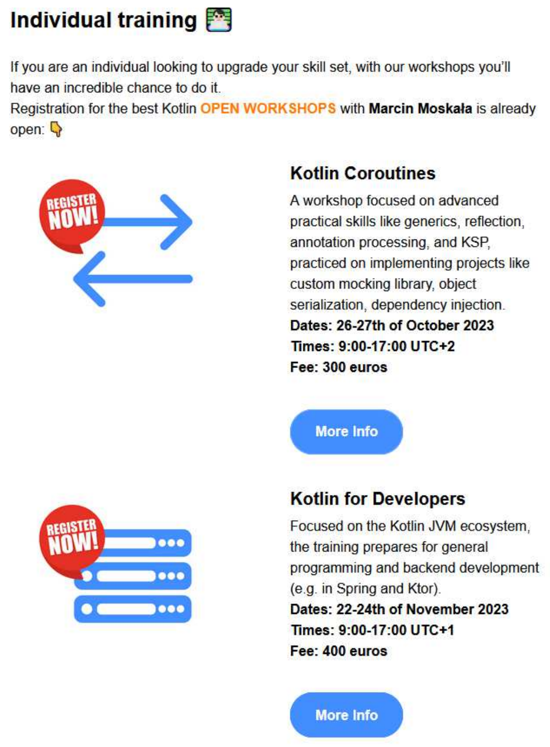
Marcin Moskala: Effective Kotlin – Best Practices - ideálne pre pokročilejších
https://www.amazon.com/Effective-Kotlin-practices-Marcin-Moskala/dp/8395452837



Atomic Kotlin
by Bruce Eckel (Author), Svetlana Isakova (Author)
7 ratings



Effective Kotlin: Best practices
by Marcin Moskala (Author)
3 ratings



Individual training

If you are an individual looking to upgrade your skill set, with our workshops you'll have an incredible chance to do it.
Registration for the best Kotlin OPEN WORKSHOPS with **Marcin Moskała** is already open:

Kotlin Coroutines
A workshop focused on advanced practical skills like generics, reflection, annotation processing, and KSP, practiced on implementing projects like custom mocking library, object serialization, dependency injection.
Dates: 26-27th of October 2023
Times: 9:00-17:00 UTC+2
Fee: 300 euros

More Info

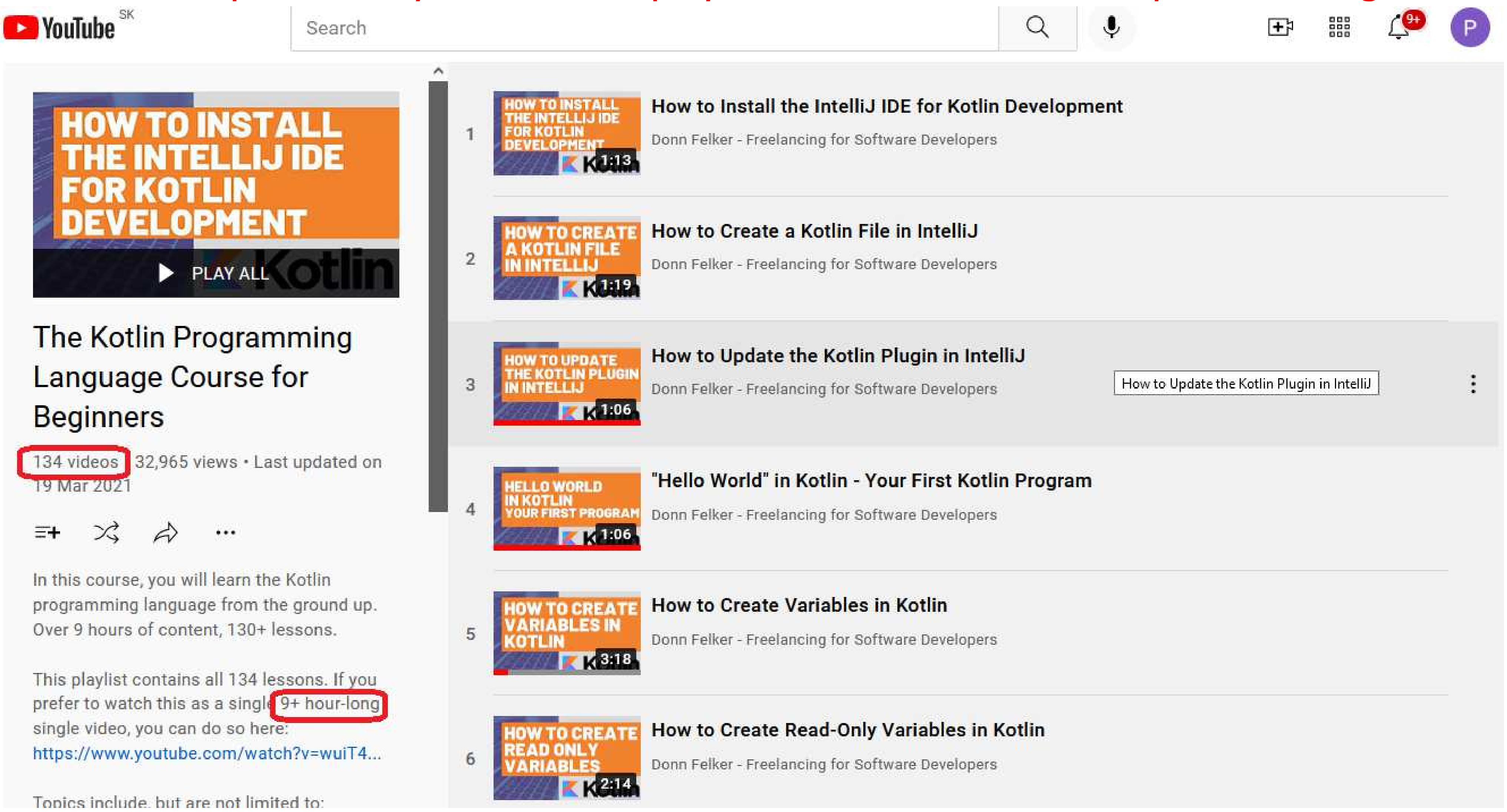
Kotlin for Developers
Focused on the Kotlin JVM ecosystem, the training prepares for general programming and backend development (e.g. in Spring and Ktor).
Dates: 22-24th of November 2023
Times: 9:00-17:00 UTC+1
Fee: 400 euros

More Info

Literatúra

ideálne pre „youtuberov"

https://www.youtube.com/playlist?list=PLVUm4IewkTXqwzuRXZisWg7shM



YouTube SK Search

The Kotlin Programming Language Course for Beginners

134 videos 32,965 views • Last updated on 19 Mar 2021

In this course, you will learn the Kotlin programming language from the ground up. Over 9 hours of content, 130+ lessons.

This playlist contains all 134 lessons. If you prefer to watch this as a single 9+ hour-long single video, you can do so here: https://www.youtube.com/watch?v=wuiT4...

Topics include, but are not limited to:

1 How to Install the IntelliJ IDE for Kotlin Development — Donn Felker - Freelancing for Software Developers — 1:13

2 How to Create a Kotlin File in IntelliJ — Donn Felker - Freelancing for Software Developers — 1:19

3 How to Update the Kotlin Plugin in IntelliJ — Donn Felker - Freelancing for Software Developers — 1:06

4 "Hello World" in Kotlin - Your First Kotlin Program — Donn Felker - Freelancing for Software Developers — 1:06

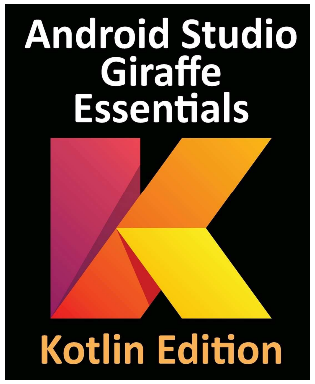
5 How to Create Variables in Kotlin — Donn Felker - Freelancing for Software Developers — 3:18

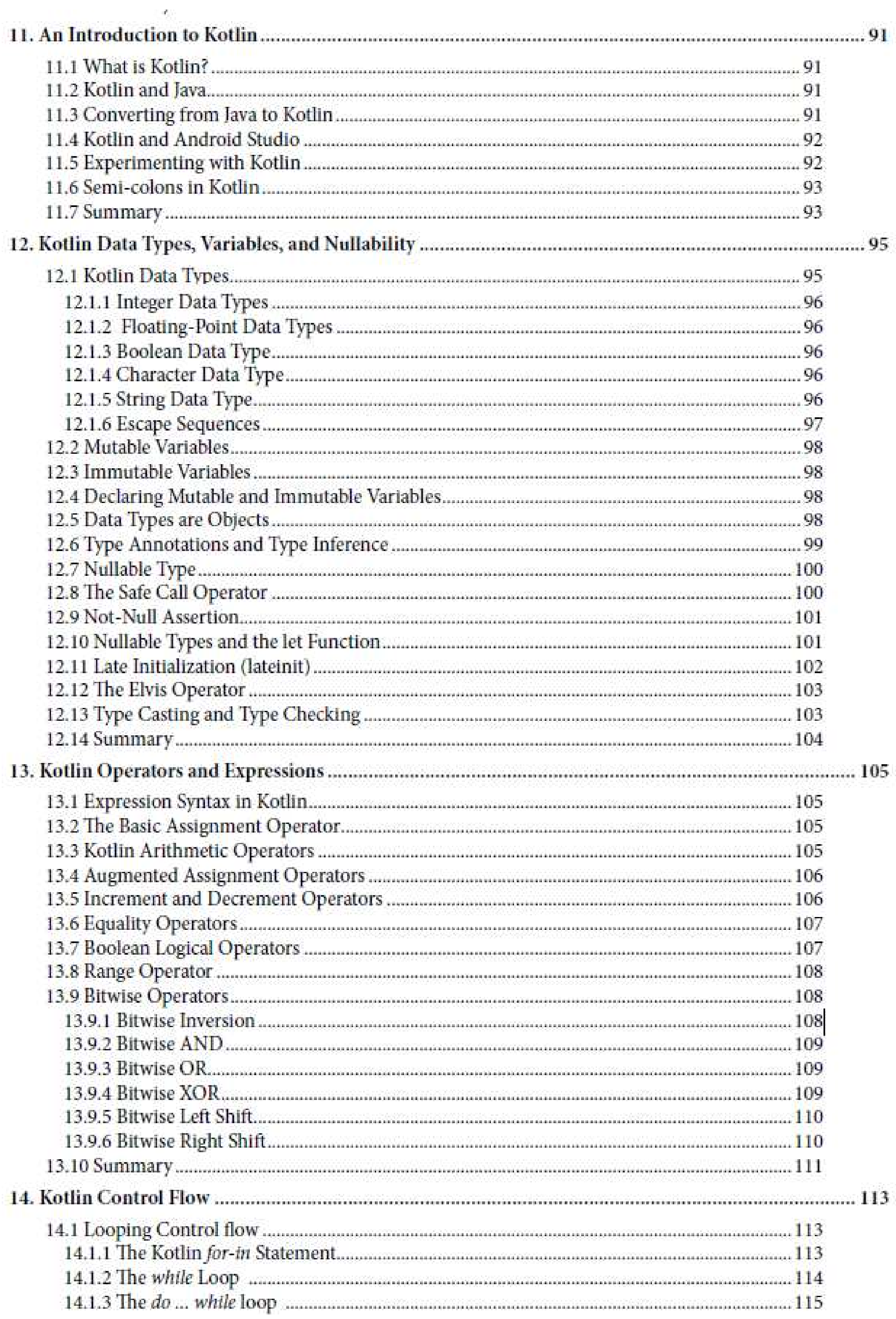
6 How to Create Read-Only Variables in Kotlin — Donn Felker - Freelancing for Software Developers — 2:14

Android Stu
Essentials -

Developing Android Apps Using Android Studio 2022.3.1 and Kotlin,

Neil Smyth



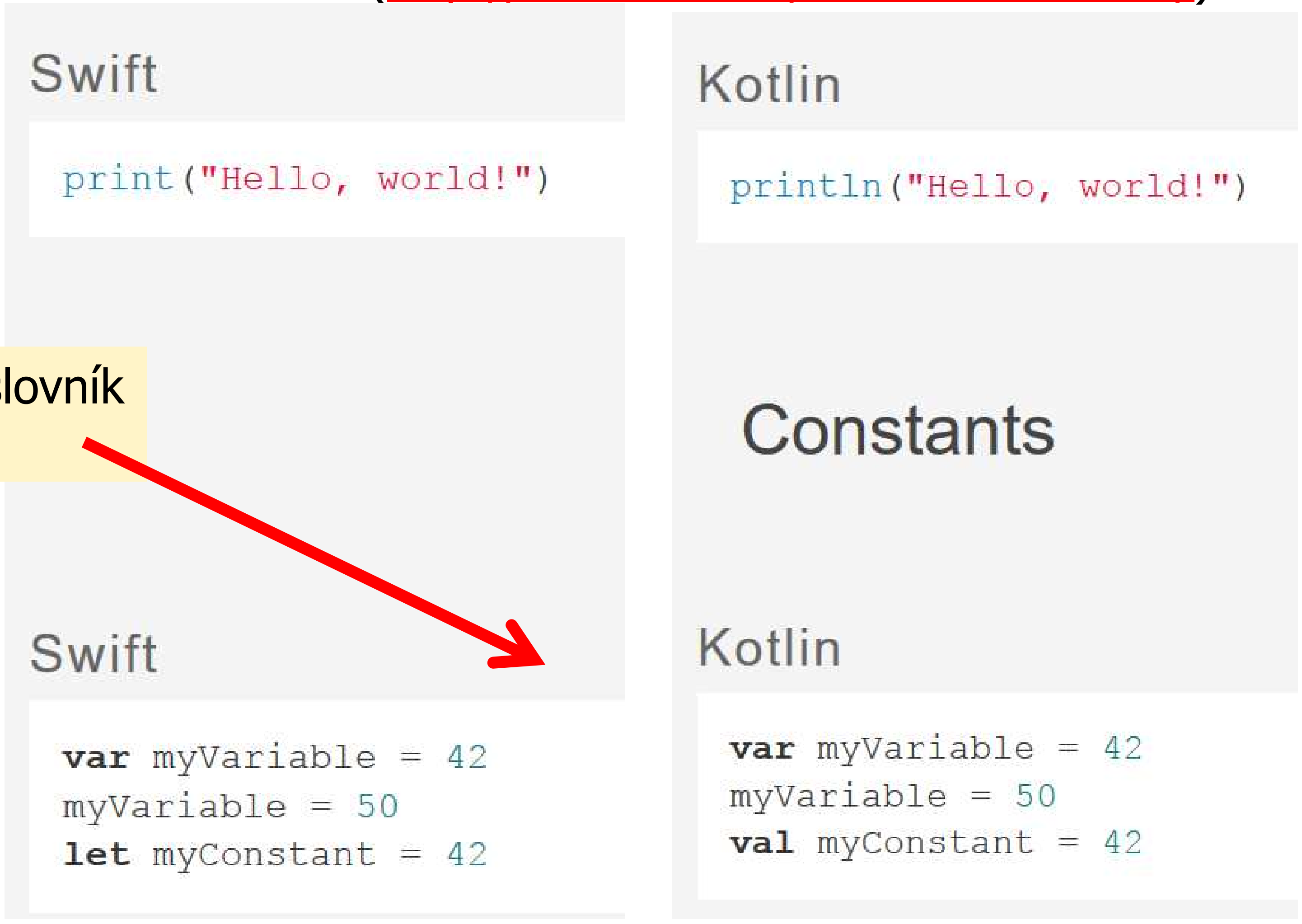


Kotlin vs. Swift

Swift is like Kotlin

- https://kotlinlang.org/ Kotlin Playground (https://play.kotlinlang.org/)
- Swift is like Kotlin (http://nilhcem.com/swift-is-like-kotlin/)

prekladový slovník pre iOSákov



Swift

```swift
print("Hello, world!")
```

Kotlin

```kotlin
println("Hello, world!")
```

Constants

Swift

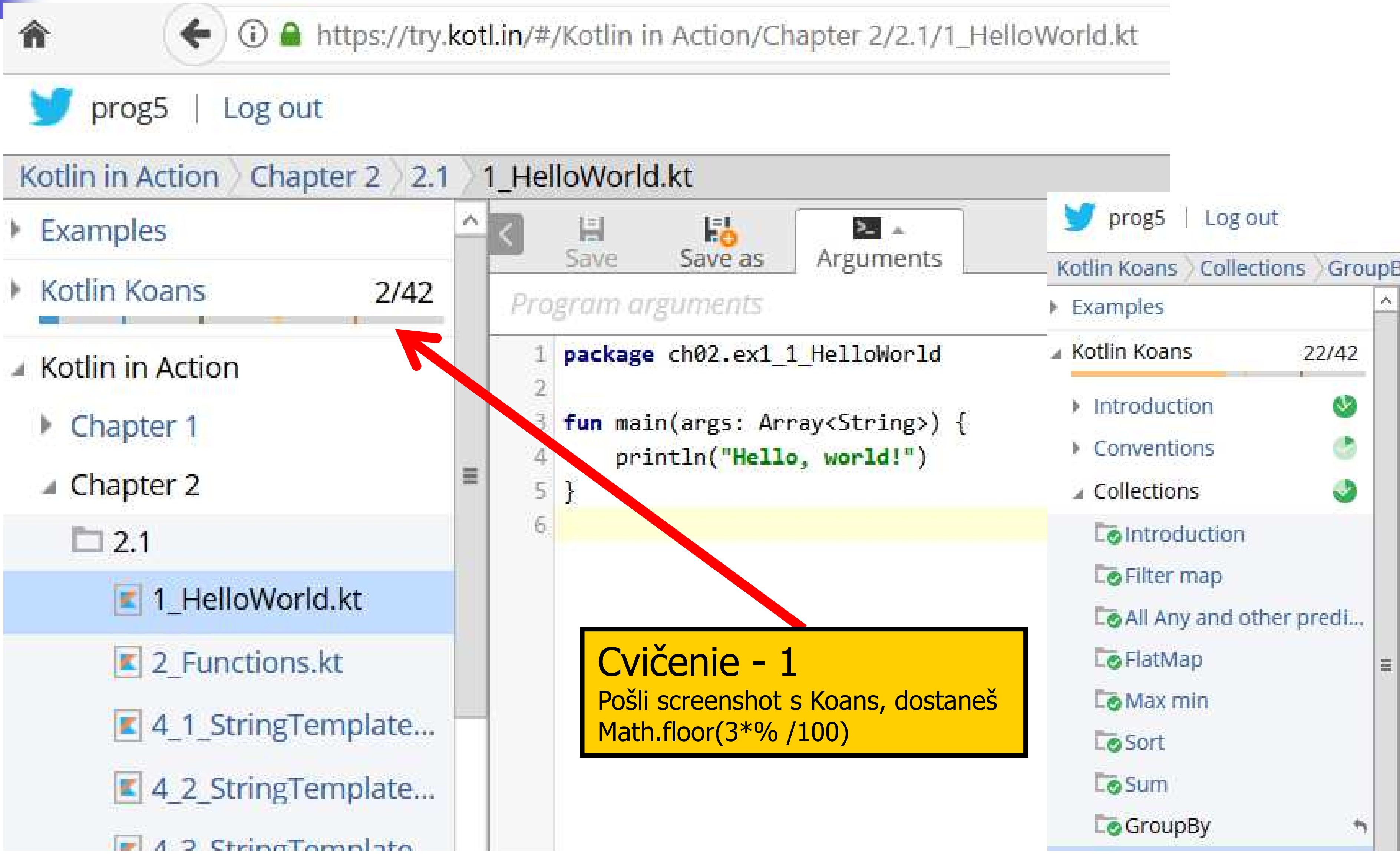
```swift
var myVariable = 42
myVariable = 50
let myConstant = 42
```

Kotlin

```kotlin
var myVariable = 42
myVariable = 50
val myConstant = 42
```

Kotlin Playground

https://play.kotlinlang.org/

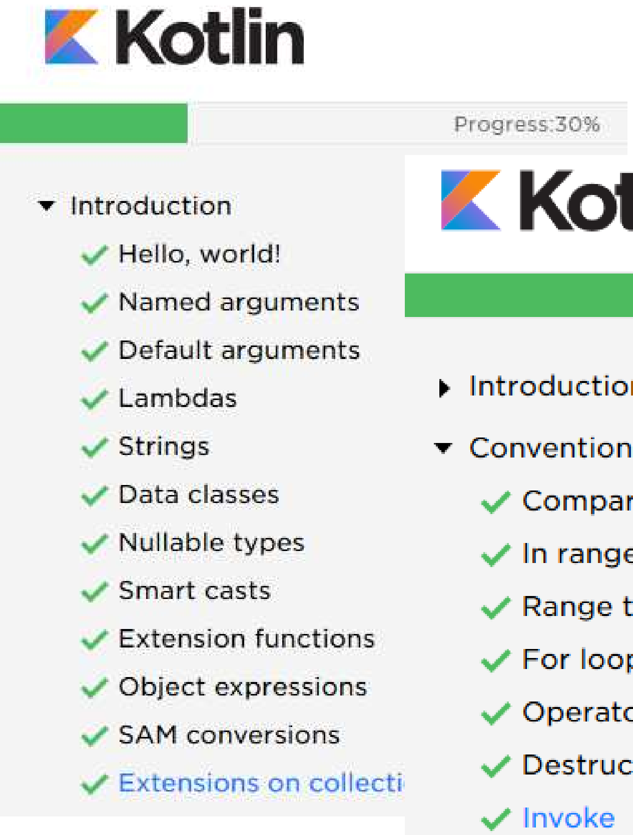

https://try.kotl.in/#/Kotlin in Action/Chapter 2/2.1/1_HelloWorld.kt

```kotlin
package ch02.ex1_1_HelloWorld

fun main(args: Array<String>) {
    println("Hello, world!")
}
```

Cvičenie - 1

Pošli screenshot s Koans, dostaneš Math.floor(3*% /100)

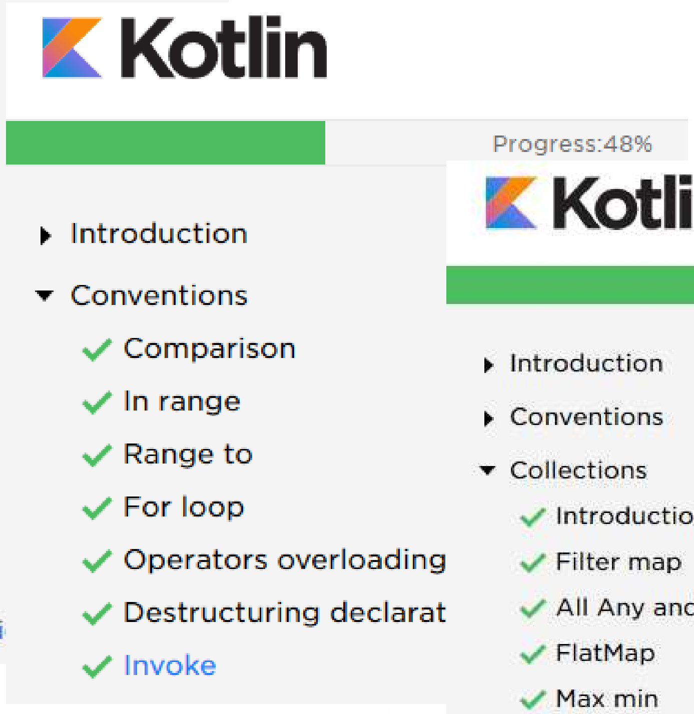
Čo sa naučíte na play.kotlinlang.org



Kotlin

Progress:30%

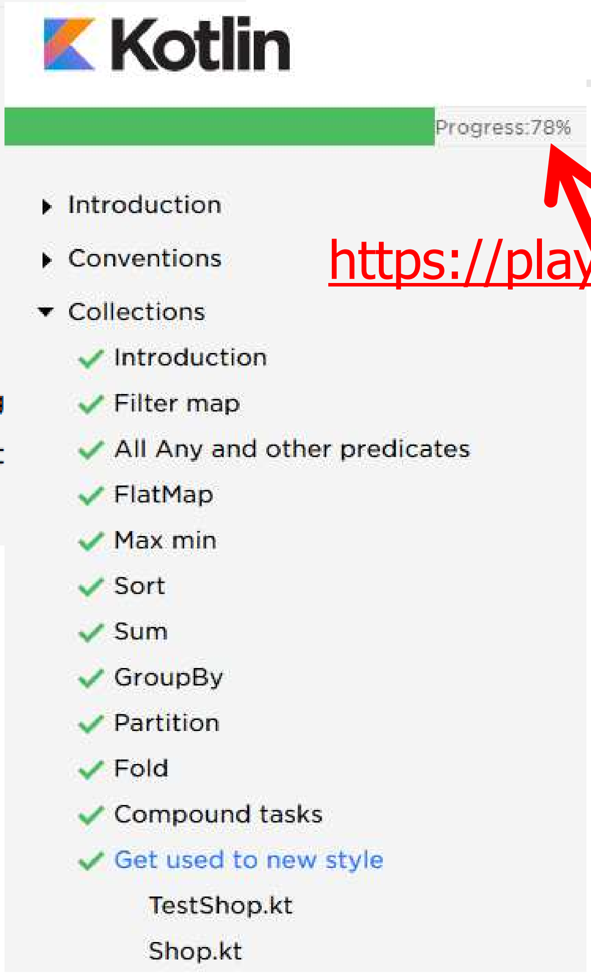
- Introduction
  - ✓ Hello, world!
  - ✓ Named arguments
  - ✓ Default arguments
  - ✓ Lambdas
  - ✓ Strings
  - ✓ Data classes
  - ✓ Nullable types
  - ✓ Smart casts
  - ✓ Extension functions
  - ✓ Object expressions
  - ✓ SAM conversions
  - ✓ Extensions on collecti



Kotlin

Progress:48%

- Introduction
- Conventions
  - ✓ Comparison
  - ✓ In range
  - ✓ Range to
  - ✓ For loop
  - ✓ Operators overloading
  - ✓ Destructuring declarat
  - ✓ Invoke



Kotlin

Progress:78%

- Introduction
- Conventions
- Collections
  - ✓ Introduction
  - ✓ Filter map
  - ✓ All Any and other predicates
  - ✓ FlatMap
  - ✓ Max min
  - ✓ Sort
  - ✓ Sum
  - ✓ GroupBy
  - ✓ Partition
  - ✓ Fold
  - ✓ Compound tasks
  - ✓ Get used to new style
    - TestShop.kt
    - Shop.kt

https://play.kotlinlang.org/koans/

MY KOAN IS TO COMPREHEND THE SOUND OF ONE HAND CLAPPING.
MINE IS TO FIGURE OUT HOW THIS SMART CARD WORKS.

Cvičenie - 1

Pošli screenshot s Koans, dostaneš Math.floor(3*% /100)

JET BRAINS Marketplace

IntelliJ EDU

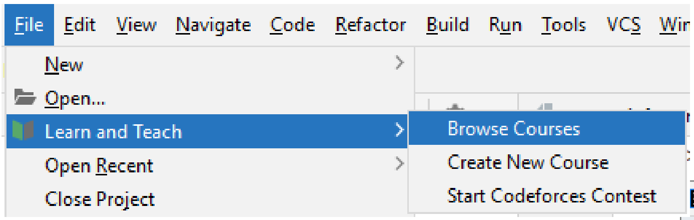
EduTools Plugin

Code tools

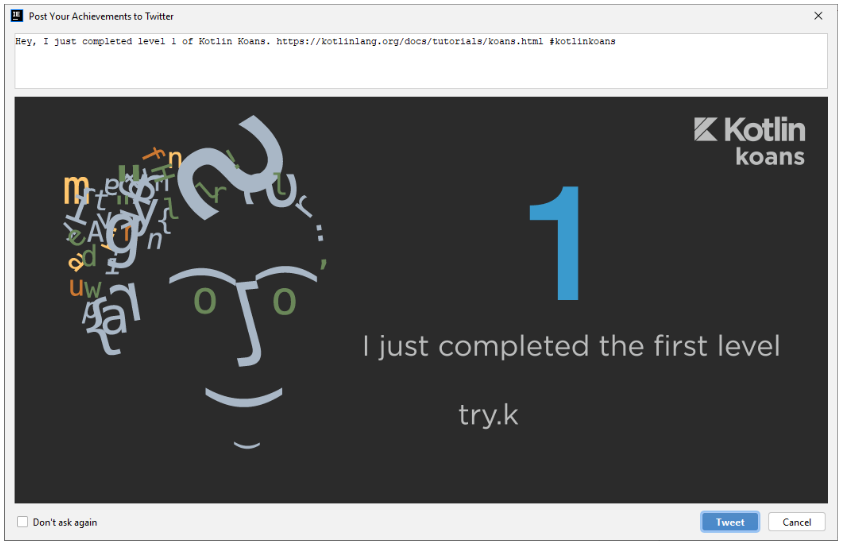
EduTools

JetBrains s.r.o.

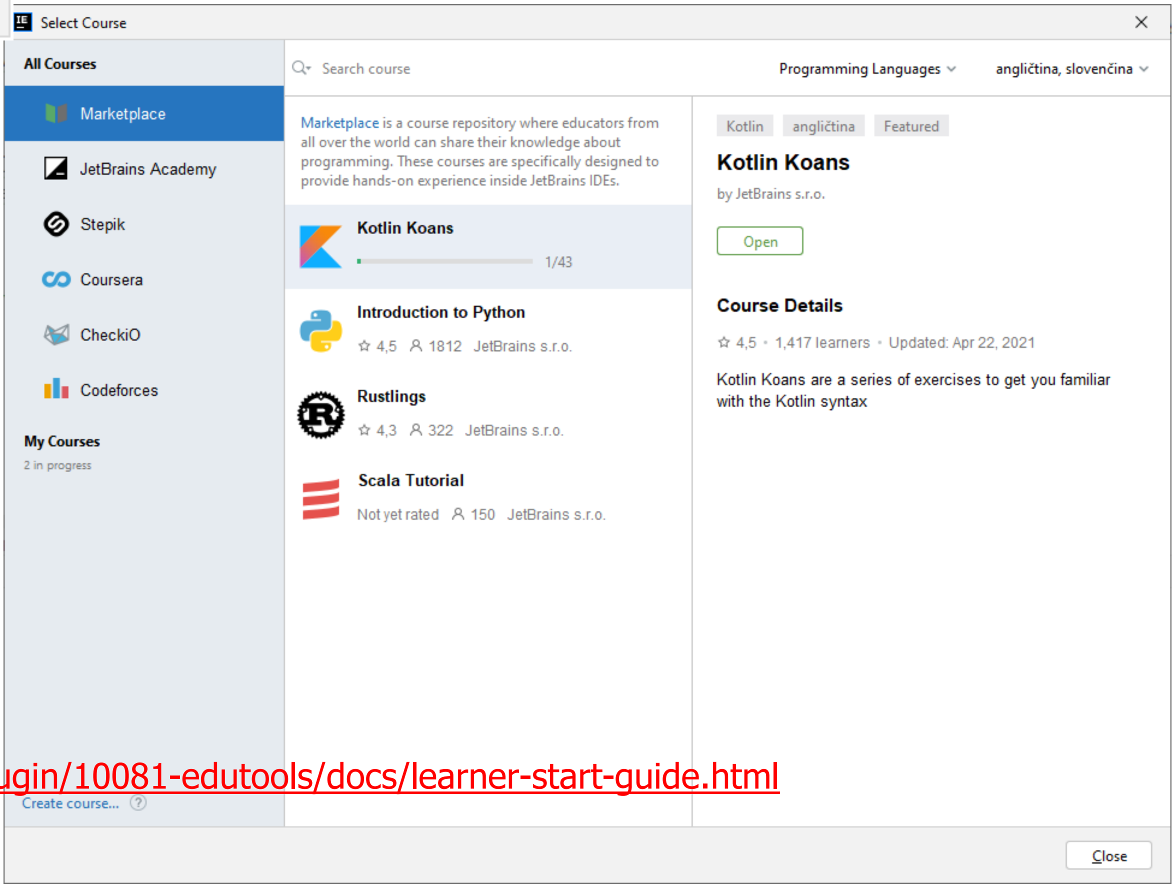
- možnosť sledovať/vytvárať kurzy, chce to IntelliJ aspoň 2021.2



- Game of Koans budeme robiť na cvičení...


Post Your Achievements to Twitter
Kotlin koans
1
I just completed the first level
try.k
Don't ask again
Tweet
Cancel

Hey, I just completed level 1 of Kotlin Koans. https://kotlinlang.org/docs/tutorials/koans.html #kotlinkoans



Marketplace is a course repository where educators from all over the world can share their knowledge about programming. These courses are specifically designed to provide hands-on experience inside JetBrains IDEs.

Kotlin Koans	1/43
Introduction to Python	4,5 · 1812 · JetBrains s.r.o.
Rustlings	4,3 · 322 · JetBrains s.r.o.
Scala Tutorial	Not yet rated · 150 · JetBrains s.r.o.

Kotlin Koans

by JetBrains s.r.o.

Course Details

4,5 · 1,417 learners · Updated: Apr 22, 2021

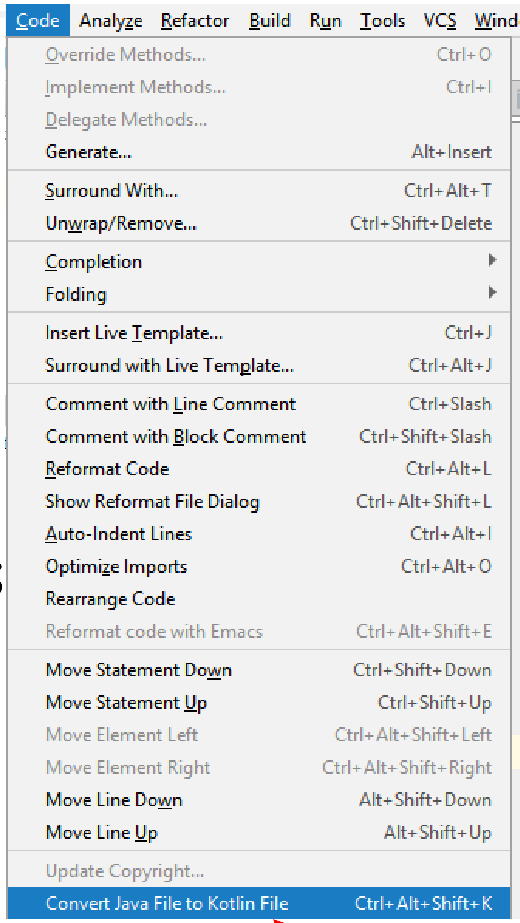
Kotlin Koans are a series of exercises to get you familiar with the Kotlin syntax

https://plugins.jetbrains.com/plugin/10081-edutools/docs/learner-start-guide.html

Java -> Kotlin

„klasický“ Java kód pre Fibonacciho s memoizáciou

```
public class Fib {
   static Integer[] table = new Integer[100];
   private static int fib(int n) {
      Integer result = table[n];
      if (result == null) {
          if (n < 2)
              result = 1;
          else
              result = fib(n - 2) + fib(n - 1);
          table[n] = result;
      }
      return result;
   }
   public static void main(String[] args) {
       for(int i = 0; i<20; i++)
           System.out.println("fib(" + i + ")=" + fib(i));
   }
}
```


Code Analyze Refactor Build Run Tools VCS Wind
Override Methods... Ctrl+O
Implement Methods... Ctrl+I
Delegate Methods...
Generate... Alt+Insert
Surround With... Ctrl+Alt+T
Unwrap/Remove... Ctrl+Shift+Delete
Completion
Folding
Insert Live Template... Ctrl+J
Surround with Live Template... Ctrl+Alt+J
Comment with Line Comment Ctrl+Slash
Comment with Block Comment Ctrl+Shift+Slash
Reformat Code Ctrl+Alt+L
Show Reformat File Dialog Ctrl+Alt+Shift+L
Auto-Indent Lines Ctrl+Alt+I
Optimize Imports Ctrl+Alt+O
Rearrange Code
Reformat code with Emacs Ctrl+Alt+Shift+E
Move Statement Down Ctrl+Shift+Down
Move Statement Up Ctrl+Shift+Up
Move Element Left Ctrl+Alt+Shift+Left
Move Element Right Ctrl+Alt+Shift+Right
Move Line Down Alt+Shift+Down
Move Line Up Alt+Shift+Up
Update Copyright...
Convert Java File to Kotlin File Ctrl+Alt+Shift+K

Automatická konverzia do Kotlinu

Java -> Kotlin

výsledok automatickej konverzie

Čo nás prekvapilo

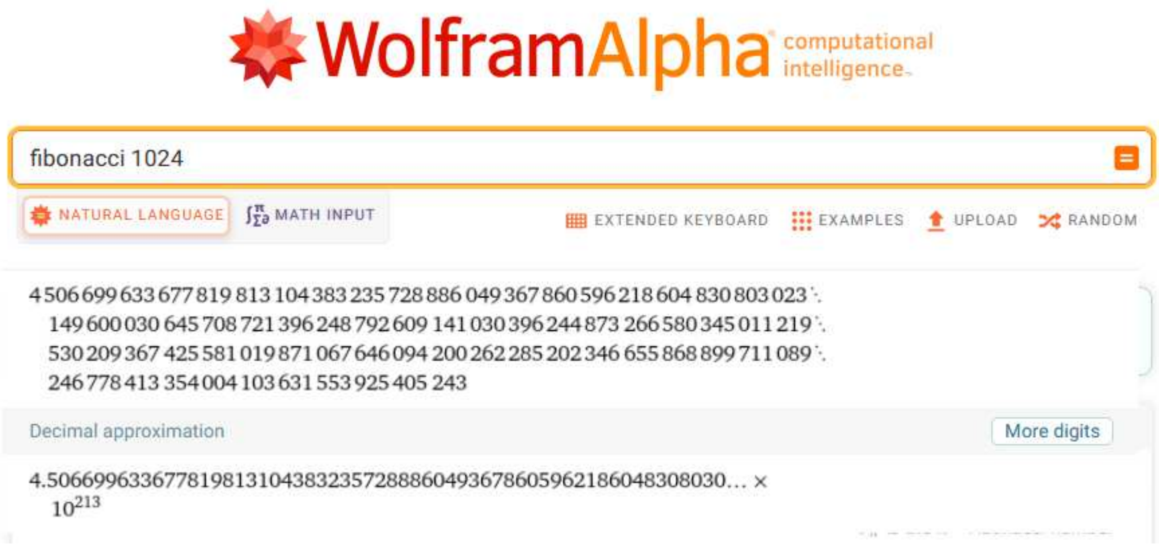
```
object fib {
   internal var table = arrayOfNulls<Int>(100)
   private fun fib(n: Int): Int {
       var result: Int? = table[n]
       if (result == null) {
           if (n < 2)
               result = 1
           else
               result = fib(n - 2) + fib(n - 1)
           table[n] = result
       }
       return result
   }
   @JvmStatic fun main(args: Array<String>) {
       for (i in 0..19)
           println("fib(" + i + ")=" + fib(i))
   }
}
```

Už nenájdete pôvodný zdroják

DÚ podobne vygenerované sa neuznajú

Kotlinish verzia

```
import java.math.BigInteger

val table = mutableMapOf<Int, BigInteger>()   // HashMap

fun fib(n: Int): BigInteger = table.getOrPut(n) {
    if (n <= 2)
        BigInteger.ONE
    else
        fib(n - 1) + fib(n - 2)
}

fun main() {
    println(fib(1024))
}
```



```
4 506 699 633 677 819 813 104 383 235 728 886 049 367 860 596 218 604 830 803 023 ⋱
  149 600 030 645 708 721 396 248 792 609 141 030 396 244 873 266 580 345 011 219 ⋱
  530 209 367 425 581 019 871 067 646 094 200 262 285 202 346 655 868 899 711 089 ⋱
  246 778 413 354 004 103 631 553 925 405 243
```

Decimal approximation

$4.5066996336778198131043832357288860493678605962186048308030\ldots \times 10^{213}$

https://www.wolframalpha.com/input/?i=fibonacci+1024

if je výraz

- **if** je výraz

```
fun binCifSum(n : Int) : Int =
   if (n <= 0) 0
   else binCifSum(n/2) + if (n % 2 == 0) 0 else 1
   else binCifSum(n/2) + (n % 2 == 0)

fun binCifSumClassic(n : Int) : Int {
   if (n <= 0) return 0
   else if (n % 2 == 0) return binCifSumClassic(n / 2)
   else return 1 + binCifSumClassic(n / 2)
}

fun main(args:Array<String>) : Unit {
   for (n in 0..10)
       println("binCifSum $n je ${binCifSum(n)}")
}
```

0.kt

when je switch, tiež je to výraz

```
val kategoria =
       if (vek < 6) "predskolsky"
       else if (vek <= 11) "1.stupen"
       else if (vek <= 18) "2.stupen"
       else "mimo"
val kategoria1 =
       when (vek) {
           in 0..5 -> "predskolsky"
           in 5..11 -> "1.stupen"
           in 12..18 -> "2.stupen"
           else -> "mimo"
       }
var kategoria2 = "mimo"
when (vek) {
     in 0..5 -> kategoria2 = "predskolsky"
     in 5..11 -> kategoria2 = "1.stupen"
     in 12..18 -> kategoria2 = "2.stupen“
}
```

0.kt

For/foreach cyklus

```
for (x in 1..10) println(x)                        // 1, 2, …, 10
for (x in (1..10).toList()) println(x)             // 1, 2, …, 10
for (x in (10 downTo 1).toList()) println(x) // 10, 9, …, 1
for (x in 10 downTo 1) println(x)                  // 10, 9, …, 1
for (x in 1 until 10) println(x)                   // 1, 2, …, 9
for (x in 1 until 10 step 2) println(x)            // 1, 3, 5, 7, 9
for (x in listOf(2,3,5,7,11,13)) println(x)

for (x in 'a'..'z') println(x)                     // a, b, …, z
for ((index, value) in ('a'..'z').withIndex())
   println("[$index]=$value")                     // [0]=a, [1]=b,…

val map=mapOf(1 to "gula",2 to "zelen",3 to "zalud",4 to"srdce")
for ((key, value) in map) println("[$key]=$value")
                       // [1]=gula, [2]=zelen, [3]=zalud, [4]=srdce
```

0.kt

Cykly

```
fun main(args: Array<String>) {
    for(a in args)
        print("$a, ")

    for (c in 'A'..'F’)
         println(Integer.toBinaryString(c.toInt()))

    for (c in ' '..'z')
         if (c in 'a'..'z' || c in 'A'..'Z')
                 print(c)

    for (c in ' '..'z’)
         when (c) {
                 in '0'..'9' -> println("digit")
                 in 'a'..'z', in 'A'..'Z' -> println("letter")
         }
}
```

7.kt

Operátory porovnania

- podobne ako Java `<=, <, >=, >, !=`

ale

`==` je porovnanie hodnôt

`===` je porovnanie referencií

```
val a = "kot"
val b = "lin"
val c = (a+b).trim()
val d = "kotlin"
println("c==d ${c==d}, c===d ${c===d}")
```

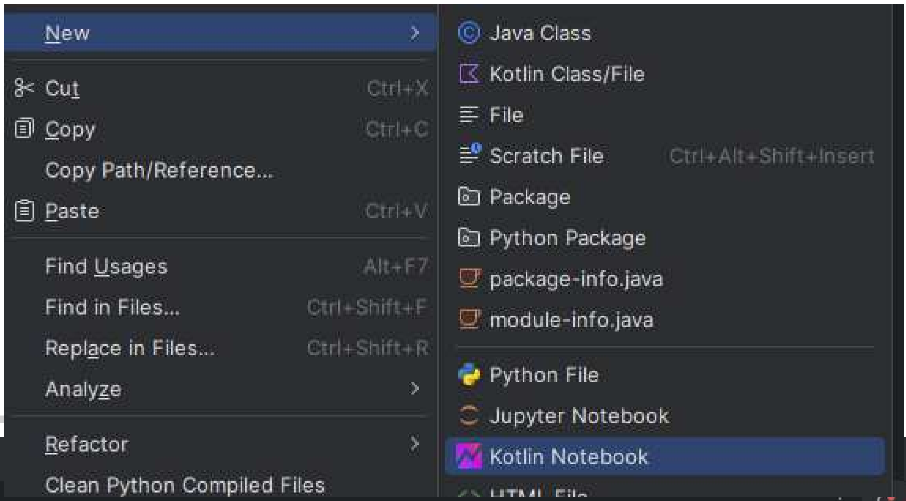
```
c==d true, c===d false
```

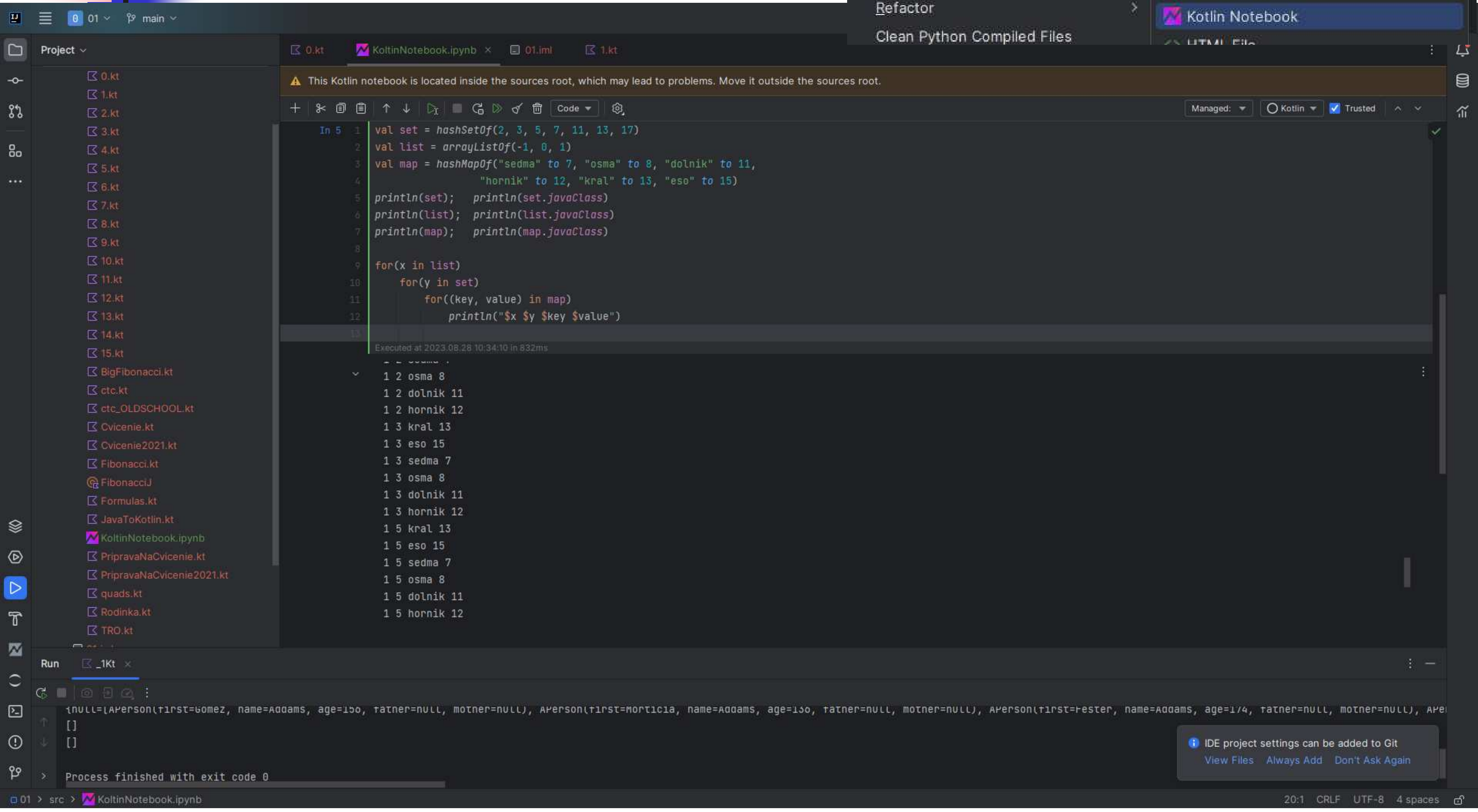
Kolekcie

```
val set = hashSetOf(2, 3, 5, 7, 11, 13, 17)
val list = arrayListOf(-1, 0, 1)
val map = hashMapOf("sedma" to 7, "osma" to 8, "dolnik" to 11,
                   "hornik" to 12, "kral" to 13, "eso" to 15)

println(set)   println(set.javaClass)
println(list)  println(list.javaClass)
println(map)   println(map.javaClass)

for(x in list)                          // cyklus cez list
   for(y in set)                        // cyklus cez set
      for((key, value) in map)          // cyklus cez map
         println("$x $y $key $value")
```

8.kt

Kotlin Notebook





This Kotlin notebook is located inside the sources root, which may lead to problems. Move it outside the sources root.

```kotlin
val set = hashSetOf(2, 3, 5, 7, 11, 13, 17)
val list = arrayListOf(-1, 0, 1)
val map = hashMapOf("sedma" to 7, "osma" to 8, "dolnik" to 11,
                 "hornik" to 12, "kral" to 13, "eso" to 15)
println(set);   println(set.javaClass)
println(list);  println(list.javaClass)
println(map);   println(map.javaClass)

for(x in list)
    for(y in set)
        for((key, value) in map)
            println("$x $y $key $value")
```

Executed at 2023.08.28 10:34:10 in 832ms

```
1 2 osma 8
1 2 dolnik 11
1 2 hornik 12
1 3 kral 13
1 3 eso 15
1 3 sedma 7
1 3 osma 8
1 3 dolnik 11
1 3 hornik 12
1 5 kral 13
1 5 eso 15
1 5 sedma 7
1 5 osma 8
1 5 dolnik 11
1 5 hornik 12
```

```
{null=[APerson(first=Gomez, name=Addams, age=156, father=null, mother=null), APerson(first=Morticia, name=Addams, age=136, father=null, mother=null), APerson(first=Fester, name=Addams, age=174, father=null, mother=null), APe
[]
[]

Process finished with exit code 0
```

Číselné funkcie, String template

```kotlin
fun fib(n: Int): Int {
      return if (n < 2) 1 else fib(n-1) + fib(n-2)
}
fun fib1(n: Int): Int {
   fun fib(n: Int, a : Int = 0, b : Int = 1): Int {
      return if (n < 0) a else fib(n-1, b, a+b)
   }
   return fib(n)
}
fun main(args: Array<String>) {
   val lst = listOf(1,2,3,4,5,6,7,8,9,10)
   println(lst.map { n -> fib(n) })
   println(lst.map { fib1(it) })
   lst.forEach { println("fib($it) = ${fib1(it)}")}
   for(i in 1..11) println("fib($i) = ${fib1(i)}" )
   println("Maximum:${lst.map { fib(it) }.max()}")
}
```

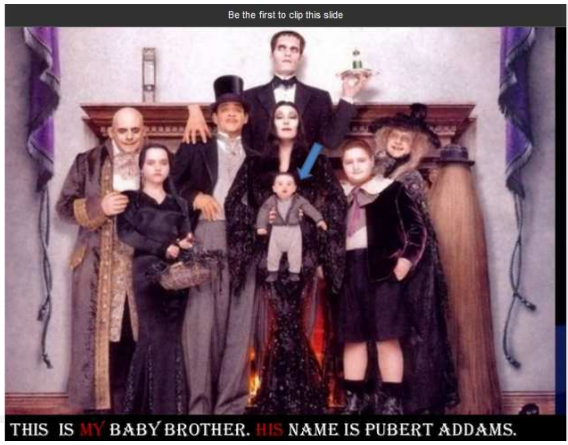
2.kt

Funkcie

```
val fcia = { x:Int, y : Int -> println("sucet $x+$y"); x+y}
val proc = { x:Int, y : Int -> println("sucet $x+$y")}

println(fcia(12,7))
proc(13,9)
println({ x:Int -> x+1 }(2))
; // inak neopochopí, že nejde o blok, ale lambda konštantu
{ x:Int -> println(x)}(4)
       // preto jasnejší zápis
run {{ x:Int -> println(x)}(4)}

val delta = 5
println(listOf(1,2,3)
               .map { it + delta}   // x -> x + delta, clojure
               .filter {it % 2 == 0} )
```

10.kt

Addams Kotlin family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THIS IS MY BABY BROTHER. HIS NAME IS PUBERT ADDAMS.

```kotlin
data class Person(val first : String, val name: String,
                  val age: Int? = null,
                  val father : Person?, val mother : Person?)

Data class je class s predgenerovanými equals, hashCode, toString, copy

fun main(args: Array<String>) {
       val father = Person("Gomez", "Addams", 156, null, null)
       val mother = Person("Morticia", "Addams", 136, null, null)
       val daugther  = Person("Wednesday", "Addams", 46, father, mother)
       val son  = Person("Pugsley", "Addams", 36, father, mother)
       val family = listOf( father, mother, daugther, son,
             Person("Fester", "Addams", 174, null, null), // uncle
             Person("Pubert", "Addams", null, null, null) // on the picture
           )
       val oldest = family.maxBy { it.age ?: 0 }
       println("The oldest is: $oldest")
   }
```

1.kt

Funkcie

```
println(family.map { it.first })  // mapToObj
println(family.filter { it.age?:0 > 100 } )
println(family.all { it.age?:0 < 100 } )
println(family.all { it.name == "Dracula" } )
println(family.groupBy { it.father } )
println(family.filter {
   it.age == family.maxBy { person: Person -> person.age?:0 }?:0 } )
Ak by .age bol Int, nie Int?
   it.age == family.maxBy { person: Person -> person.age }?:0 } )

val numbers = mapOf(0 to "zero", 1 to "one")
for((father, persons) in family.groupBy { it.father })
   println("${persons.size} ma otca $father")

println(listOf("a", "aba", "b", "ba", "abba").groupBy { it.length })
println(listOf("a", "aba", "b", "ba", "abba").flatMap { it.toList() })
```

10.kt

Funkcie

```
class Book(val title: String, val authors: List<String>)
val books = listOf(
        Book("Action in Kotlin", listOf("Dmitry Jemerov", "Svetlana Isakova")),
        Book("Mort", listOf("Terry Pratchett")),
        Book("Good Omens", listOf("Terry Pratchett", "Neil Gaiman")),
        Book("Discworld", listOf("Terry Pratchett", "Paul Kidby")))
println(books.flatMap { it.authors }.toSet())

listOf(1, 2, 3, 4)
        .asSequence()
            .map { print("map($it) "); it * it }
            .filter { print("filter($it) "); it % 2 == 0 }
        .toList()

val nats = generateSequence(1) { it + 1 }
println(nats.takeWhile { it <= 100 }.sum())
println(nats.takeWhile { it <= 10 }.reduce({ x:Int, y : Int -> x*y}))
```

10.kt

Collection vs. sequence

```
val collection = (-100..100)
    .filter {it % 2 == 0}
    .map { it * 2 }
    .map { it/it }
    .take(10)
println(collection)
java.lang.ArithmeticException
```

```
val sequence = (-100..100)
    .asSequence()
    .filter {it % 2 == 0}
    .map { it * 2 }
    .map { it/it }
    .take(10)
println(sequence.toList())
[1, 1, 1, 1, 1, 1, 1, 1, 1, 1]
```

Kolekcie:

- vyhodnocujú sa dravo -eager
- každá transformácia sa aplikuje na celú kolekciu
- vytvorí sa nová kolekcia
- dobré pre neveľké kolekcie

Sekvencie:

- vyhodnocujú sa lenivo -lazy
- každá transformácia sa aplikuje element-po-elemente
- nevytvorí sa nová kolekcia
- vhodné pre veľké kolekcie

Break point

pokračovanie niekedy na budúce