

Basic Programming

...

Before we start...

Let's get to know each other.

Who we are

Ewa Infeld - mathematician and cryptography researcher

Anna Olchowik - frontend JavaScript developer

Bartosz Owczarek - backend developer and future DevOps engineer

cryptography: <https://www.youtube.com/watch?v=Kf9KjCKmDcU>

frontend vs backend: <https://www.youtube.com/watch?v=5lIpVnpKCwA>

Before we start...

Let's get to know each other.

What are we going to talk about?

Why is it useful to try and what will we try to teach you?

Popular programming languages and why Java?

Main resources?

What is a program or application?

What you need in order to write it?

How to use a code repository?

Exercises :)

Programming market in Poland

Hundreds of job possibilities even for beginners:

- <https://nofluffjobs.com>
- <https://justjoin.it>

Big investments in outsourcing centres - Poland has quite a lot of possible employees.

Advantage over Asian countries due to time difference.

It seems that programming is splitting into two branches: those who write code and those who adapt the code.

One can also be a software tester.

Our objectives

Commercial courses are very expensive.

All important knowledge about programming is on the Internet.

After this short course you should know:

- How to write simple code and what programming tools to use.
- How to continue learning on your own.

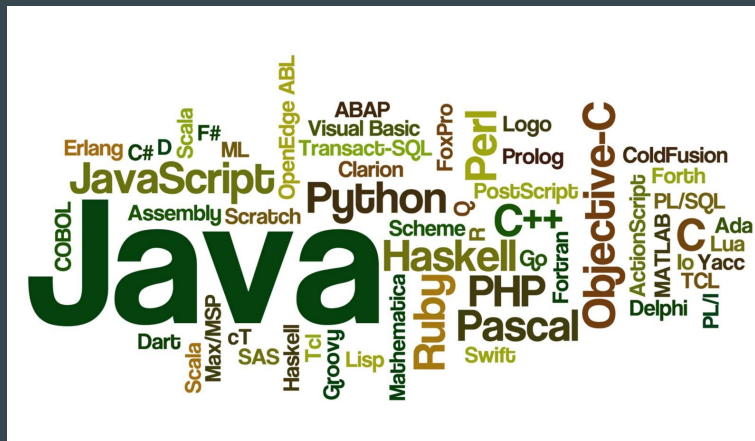
Learning new things is much simpler when doing it with others :)

Motivation (or not)

It usually takes people without technical education around a year of learning before they get their first programming job. But...

Sometimes it takes a little longer - that's OK. Keep trying, keep asking questions, take it step by step.

Programming languages



Bigger = more popular

Many options - no best pick

Comparison: <https://www.computerscience.org/resources/computer-programming-languages/>

Source: <https://codeburst.io/learn-to-program-not-a-programming-language-9c0f56c21935>

Why Java?

“Object oriented language” -

Popularity -> more job options

Complex out of the box -> no need of package management

Requires little usage of command line -> who used it?

Well documented with many useful tools -> good entry point for other languages

Useful and achievable certifications. Oracle Certified Associate, Java SE Programmer certification path:

https://education.oracle.com/java/java-se/product_267?certPage=true

Knowledge sources - books

Think Java (Eng)

- Online: <https://books.trinket.io/thinkjava/>
- Download: <http://greenteapress.com/wp/think-java/>

Head First Java (Eng, Rus)

- Eng: https://vk.com/doc83926163_218658741?hash=88c1b6ef045f5f5953&dl=d5530e5e7edba418da
- Rus: https://vk.com/doc-65959181_268426504

Руководство по Java (Rus)

- Download:
https://vk.com/doc182314867_475609586?hash=579f5cc8ad33bd3747&dl=958ab1657f46563750

Questions?

Browsers:

<https://duckduckgo.com> - good answers positioning from <https://stackoverflow.com> forum

<https://yandex.ru> - no filtering of pdf files :)

E-courses:

<https://www.coursera.org> - courses are free if not pursuing certification (choose the AUDIT option)

<https://www.udemy.com> - look for promotions, regular prices are high

Application or program?

Internet Browser

Email client

Game on mobile phone

Text editor

Webpage - sometimes :)

elevator driver

...everything running on devices that has some logic inside

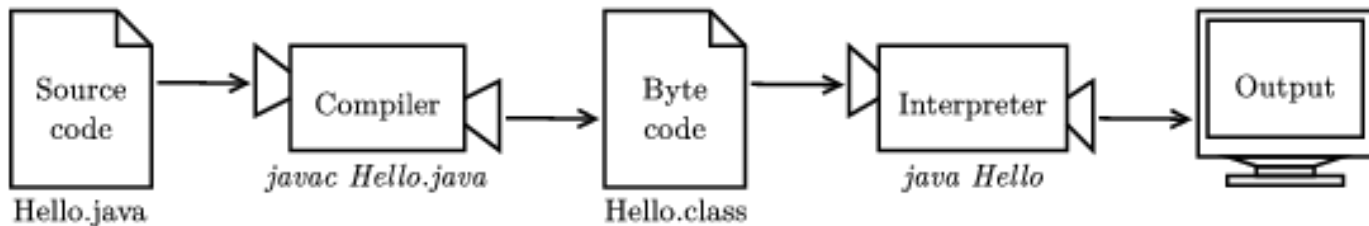
More theoretically....

A program is a sequence of instructions.

Each listed previously apps consist of:

- Input - a word, picture, file
- Output - result of operations: ex. confirmation of payment
- Math - calculations on numbers, logic values or words
- Decisions - logic that controls instructions sequences
- Repetition - some operations need to be executed many times.

How to instruct your device?

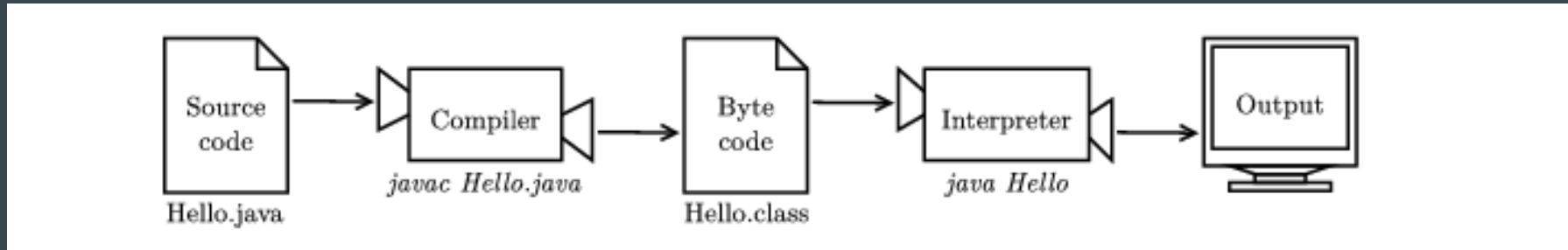


PC or Mobile or TV Controller operates based on numbers (0 or 1 - binaries)

It's hard to write sth using only two signs...

... so we need sth meaningful, like programming language to write a program.

What we need?



Text editor or better IDE - Integrated Development Environment

App called Compiler - part of Java Development Kit (JDK)

App called Interpreter - part of Java Runtime Environment (JRE)

Without them your device won't understand you.

IDE

Everyone has their favourite...

Biggest, robust and Java specific:

- IntelliJ
- Eclipse

Lightweight and general purpose:

- Atom Text Editor
- Visual Studio Code

Online editors

- Codingground

Online Editor -

Resources to learn programming:

Tutorialspoint <https://www.tutorialspoint.com>

Online editors: <https://www.tutorialspoint.com/codingground.htm>

Java Online: https://www.tutorialspoint.com/compile_java_online.php

Play with online editor

Secure | https://www.tutorialspoint.com/compile_java_online.php



Compile and Execute Java Online (JDK 1.8.0)



Execute

Share

Source File

STDIN

```
1
2 public class HelloWorld{
3
4     public static void main( String []args ){
5
6         System.out.println( "Hello World" );
7
8     }
9
10 }
```

Result

```
$javac HelloWorld.java
$java -Xmx128M -Xms16M HelloWorld
Hello World
```

Play with online editor

What is happening in the terminal?

```
javac HelloWorld.java
```

HelloWorld.java is the name of the file we compile.

Compilation is done by a program called **javac**

```
java HelloWorld
```

This is how we run previously compiled program

HelloWorld using Java Virtual Machine simply **java**

 Result

```
$javac HelloWorld.java
```

```
$java -Xmx128M -Xms16M HelloWorld
```

```
Hello World
```

What did we do?

`public class HelloWorld`

class , object, container

`public static void main()`

“main method”, entry

point to each program in Java

`System.out.println()` - “method”, program output to console

"Hello World" - “variable”, note that sentence need to be put inside “ ”

What are parentheses for?

Why? public, static, void ...

```
1
2 public class HelloWorld{
3
4     public static void main( String []args ){
5
6         System.out.println( "Hello World" );
7
8     }
9
10 }
```

EXERCISE

https://www.tutorialspoint.com/compile_java_online.php

Run the program and see what happens?

Analyze the code: What is the name of the Class? Where is the main method? What does `System.out.println()` do?

Change the program so that it would print **Hello Everybody** instead of HelloWorld

Bonus exercise - try:

`System.out.println(2+2);` and `System.out.println("2+2");`

See how the results differ.

Limitations of the online editors?

How does an online editor work?

Can I store my programs in online editor?

Can we do everything using online editors?

What about programs that have some graphics?

VS Code

Pros:

- Simple functionality out of the box
- 3 useful panels (file tree, command line, text editor)
- Intuitive github support

Cons:

- It's actually not a Java IDE
- Running simple code requires configuration



<- open file tree

<- global search

<- source control (Github)

<- run (debug)



WORKSHOP-LESSON-1

- .project
- Project2Lesson1
 - bin
 - src
 - example
 - MainPanel.java
 - .classpath
- Project4Lesson1
 - .gitignore
 - LICENSE
 - README.md
- OUTLINE

File tree

Application.java — workshop-lesson-1



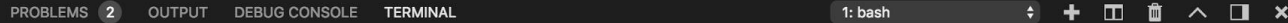
```

асса будут объяснены позже
*****/
HANGE HERE: write "English" or "русский"
ЗМЕНИТЕ ЗДЕСЬ: напишите "English" или "русский",
ate static String language = "русский";
ate static String[] questionsEnglish = {
    "What is your name?",
    "What is your surname?",
    "How old are you?",
    "Do you like Java? (true, false)",
    "Where are you from?"
};
private static void main(String[] args) {
    "Как вас зовут?",
    "Какая у вас фамилия?",
    "Сколько тебе лет?",
    "Вам нравится Java? (Напиши \"true\", если да и \"false\", если нет.)",
    "Откуда вы?"
};
}

/*
 * main method - entry point to our application.
 */

```

Text editor



Bartosz-MBP:workshop-lesson-1 bowczarek\$

Command line - terminal

Git , Github



- “Version tracking system” - imagine working with friend on application. It’s hard to give every change on pendrive or send via email :)



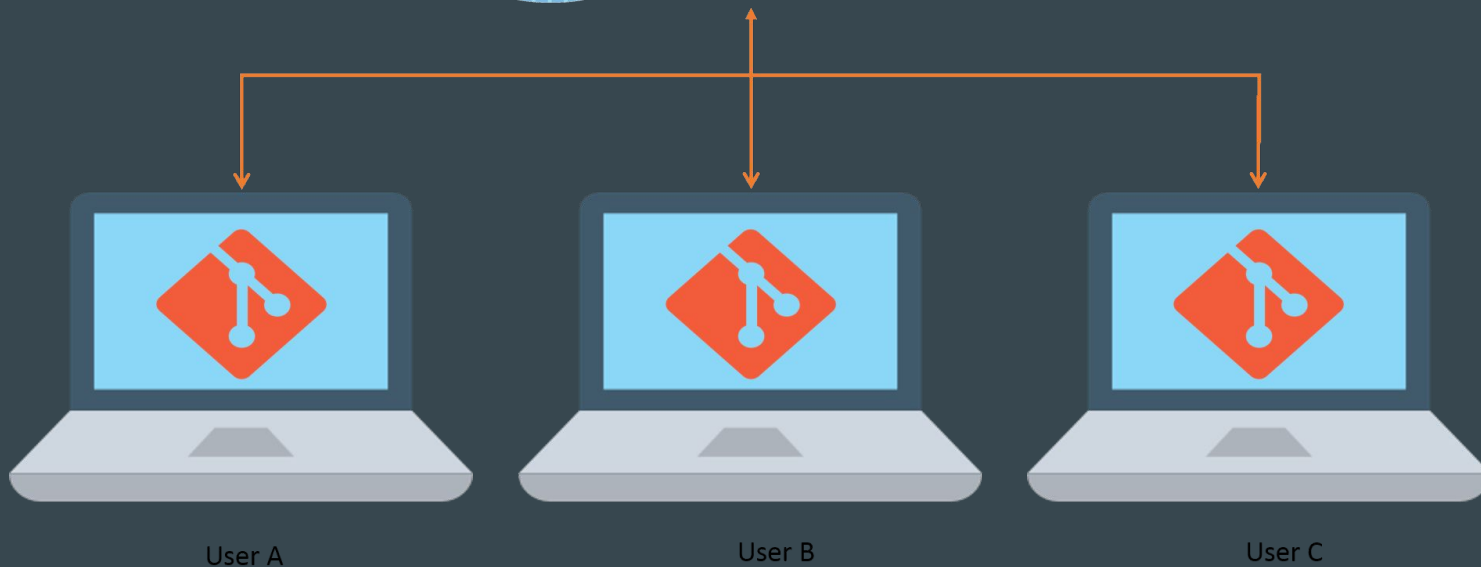
- “web-based hosting service for version control using Git” - imagine that each time you want to use Git you has to configure a server (ex. Computer in Internet). Quite unpleasant option :)

Using Git and Github is standard in workplace

Git , Github



GitHub



Git - high-level functions

Repository - “file directory in Github service”

Fork -----> Copying someone's repository in Github service

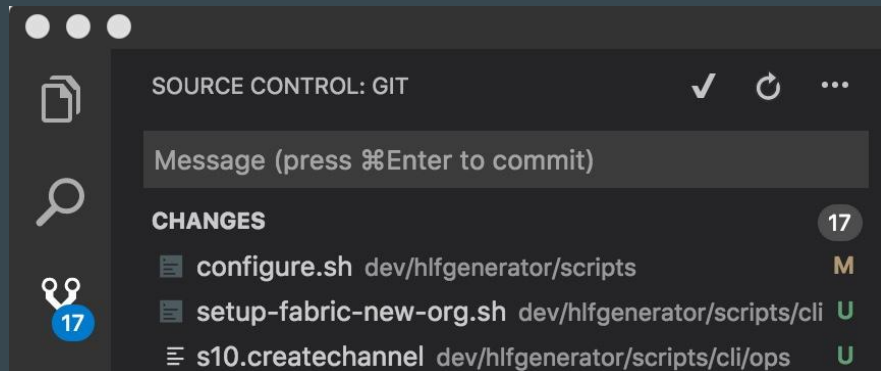
Clone -----> Creating your local copy of repository

Commit -----> After making local changes you may want to send them to Github. Commit is like packing a post-office parcel.

Push -----> Sending packed changes to Github

Pull -----> Imagine that your friend did some changes and pushed them. Pull is for receiving them. It's like going to post-office.

Git in VS Code



Note: first time usage:

```
git config --global user.email "my.name@example.com"  
git config --global user.name "my name"
```

- Go to “source control tab”
- In “message” write your commit message
- Navigate file or “changes”
- You will see “+” - clicking moves file(s) to your “package”
- Navigate “...” and click “push”
- You’ll be asked for your Github username and password

Live action :)

Your turn - fork exercise 1

<https://github.com/bjowczarek/workshop-lesson-1>

The screenshot shows the GitHub interface for the repository 'bjowczarek / workshop-lesson-1'. At the top, there is a navigation bar with the GitHub logo, a search bar, and links for 'Pull requests', 'Issues', 'Marketplace', and 'Explore'. On the right side of the navigation bar, there are notification, user, and grid icons. Below the navigation bar, the repository name 'bjowczarek / workshop-lesson-1' is displayed, along with 'Watch' (1), 'Star' (0), and 'Fork' (0) buttons. A secondary navigation bar includes 'Code', 'Issues' (0), 'Pull requests' (0), 'Projects' (0), 'Wiki', 'Insights', and 'Settings'. The main content area features the title 'Exercises for Java programming basic course' with an 'Edit' button and a 'Manage topics' link. Below this, a summary bar shows '12 commits', '1 branch', '0 releases', '2 contributors', and 'MIT' license. A secondary bar contains 'Branch: master', 'New pull request', 'Create new file', 'Upload files', 'Find file', and a green 'Clone or download' button. At the bottom, a commit history bar shows 'bjowczarek cp change' with the latest commit '10353eb' made '3 days ago'.

Click “Fork” and go to “Your Repositories”

Your turn - clone repository

- Open VS Code and click “open folder”. Select “workspace”
- Go to “View” - “Open View”
- Write “terminal”
- In terminal write:

```
git clone https://github.com/your username/workshop-lesson-1.git
```


Exercises

Remember to “push” your changes at the end :)

Additional “deep-dive” for those who finish all:

<https://www.codecademy.com/learn/learn-java>

Exercises for ThinkJava book:

<https://github.com/AllenDowney/ThinkJavaCode>

What we need to prepare to program in Java ?

- Java compiler (JAVA development kit - JDK)
- JAVA virtual machine (Java runtime environment - JRE)
- Git software
- Visual Studio code

This is a complicated process and may require extensive configuration to run on your computer to make it easier we installed it and prepared a file that can be run using VirtualBox.

Virtual Box is a software that allows you to run “other” operating system inside your windows.

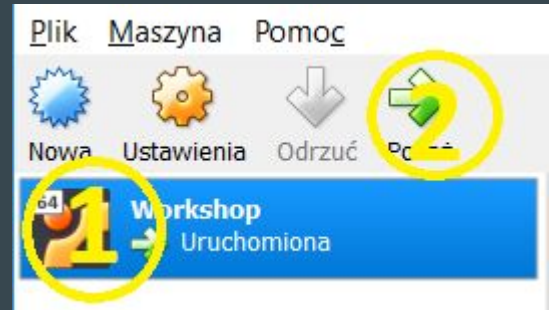
Use ova file in virtualbox

- Open Open VirtualBox and select
File > Import Appliance Plik > Importuj urządzenie wirtualne

- Select your OVA file in the import box

You are about to install virtual machine with **Ubuntu Linux**

- Select Import at the bottom ... now you need to wait
- Find your VM called Workshop, select it.
- Then click the green arrow.



Use ova file in virtualbox

- Open Open VirtualBox and select
File > Import Appliance Plik > Importuj urządzenie wirtualne
- Select your OVA file in the import box

You are about to install virtual machine with **Ubuntu Linux**

- Select Import at the bottom ... now you need to wait
- Find your VM called Workshop, select it.
- Then click the green arrow.

