Introduction to Java

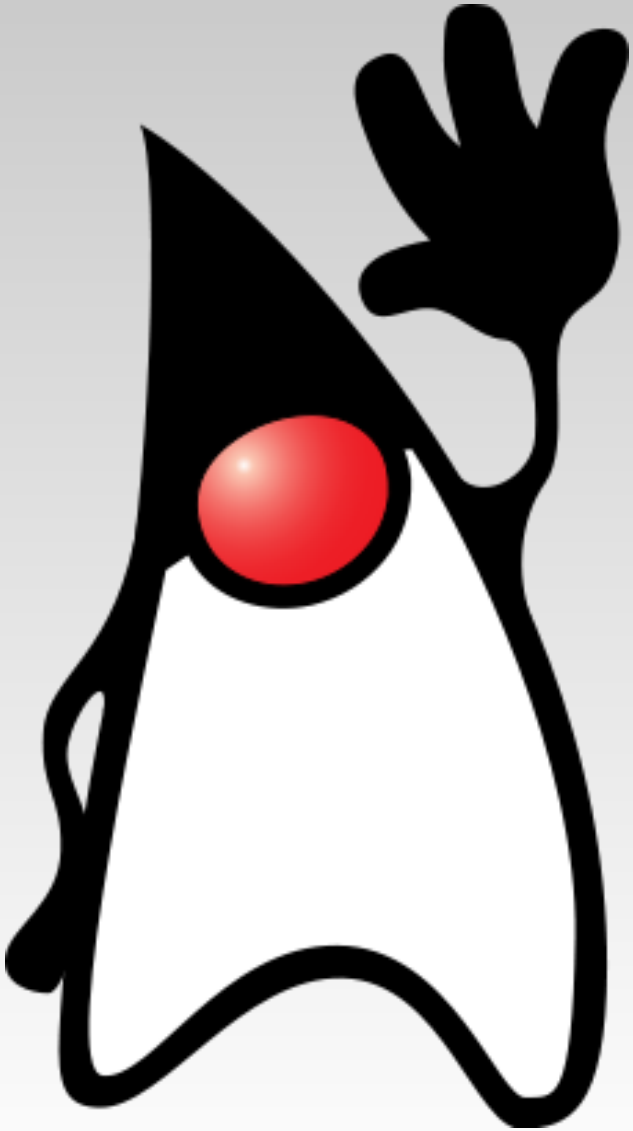
Adam Krechowicz

Java

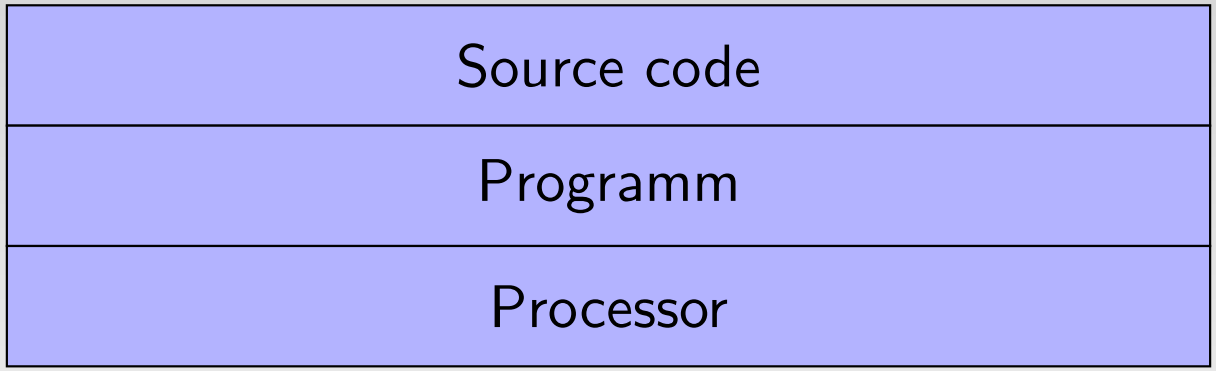
- Programming language + platform
- Created by Sun Microsystems
- Now Oracle
- *Object Oriented* Programming Language
- Portable
- For distributed applications
- Security

History

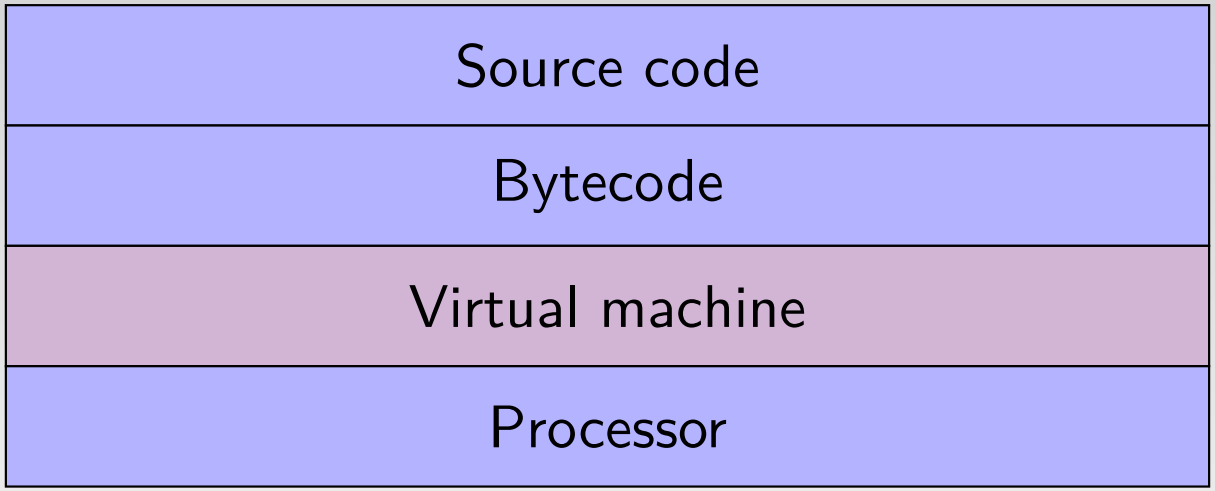
- The beginning: year 1991
- TV programming
- "Write once, run anywhere"
- Name:
  - Oak
  - Green
  - Java



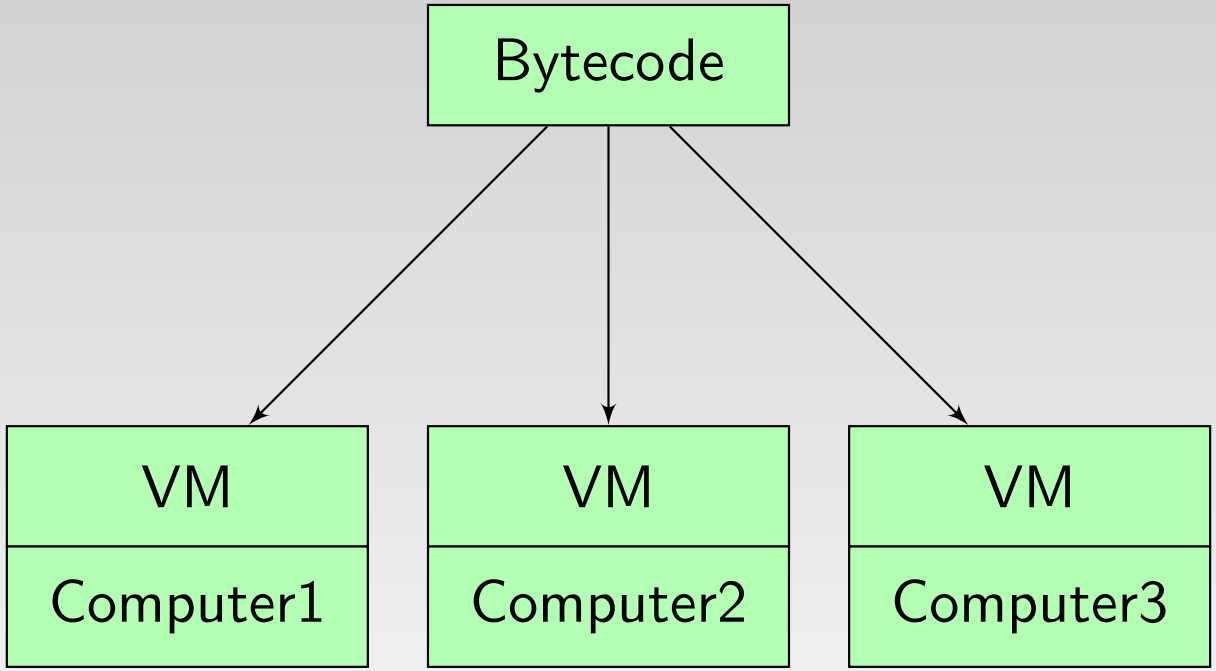
Standard programming



Java virtual machine



Java virtual machine



Java virtual machine

Efficiency

- Java and native languages
- Java and interpretative languages
- Just In Time compilation

Java Virtual Machine

- Specification
- Available implementations:
  - Oracle implementations
  - OpenJDK

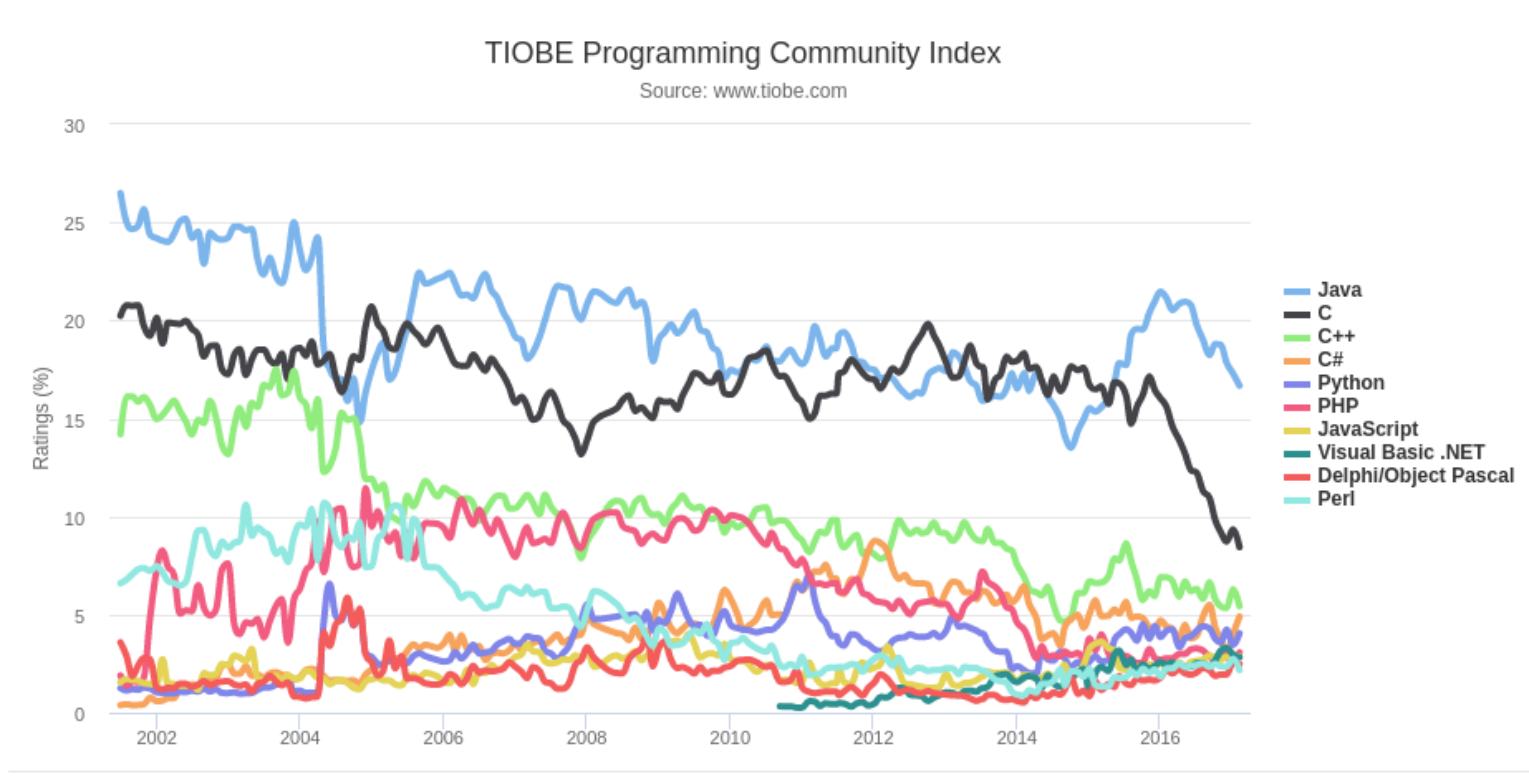
Java Virtual Machine

- bytecode interpreter
- a set of a standard packages

Applications

- Desktop applications
- Clients of a big systems (Applets)
- Enterprise Applications
- Mobile applications (Midlets, Android)
- Embedded systems: TV, DVBs decoders, smartcards

Programming languages popularity



Java popularity

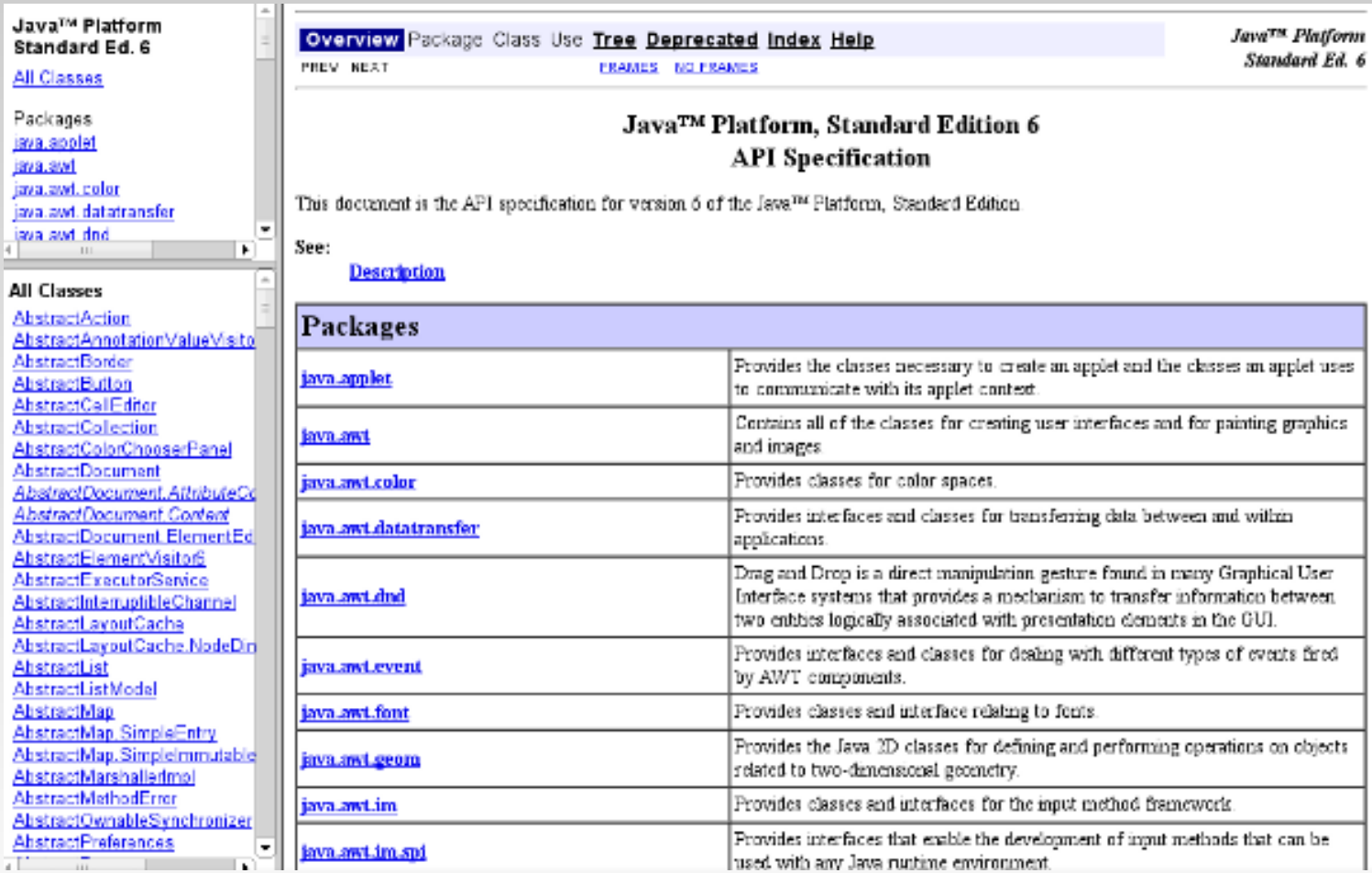
Java versions

- Java ME – Micro Edition
- Java SE – Standard Edition
- Java EE – Enterprise Edition

Sources

- Bruce Eckel; Thinking in java – https://www.mindviewllc.com/
- Cay S. Horstmann, Gary Cornell; Java. Fundamentals
- API: http://docs.oracle.com/javase/7/docs/api/
- tutorials: http://docs.oracle.com/javase/tutorial/

API


Java™ Platform
Standard Ed. 6
All Classes
Packages
java.applet
java.awt
java.awt.color
java.awt.datatransfer
java.awt.dnd
All Classes
AbstractAction
AbstractBorder
AbstractButton
AbstractCellEditor
AbstractCollection
AbstractColorChooserPanel
AbstractDocument
AbstractExecutorService
AbstractInterruptibleChannel
AbstractLayoutCache
AbstractList
AbstractListModel
AbstractMap
AbstractMethodError
AbstractOwnableSynchronizer
AbstractPreferences
Overview Package Class Use Tree Deprecated Index Help
PREV NEXT FRAMES NO FRAMES
Java™ Platform
Standard Ed. 6
Java™ Platform, Standard Edition 6
API Specification
This document is the API specification for version 6 of the Java™ Platform, Standard Edition.
See:
Description
Packages
java.applet
Provides the classes necessary to create an applet and the classes an applet uses to communicate with its applet context.
java.awt
Contains all of the classes for creating user interfaces and for painting graphics and images.
java.awt.color
Provides classes for color spaces.
java.awt.datatransfer
Provides interfaces and classes for transferring data between and within applications.
java.awt.dnd
Drag and Drop is a direct manipulation gesture found in many Graphical User Interface systems that provides a mechanism to transfer information between two entities logically associated with presentation elements in the GUI.
java.awt.event
Provides interfaces and classes for dealing with different types of events fired by AWT components.
java.awt.font
Provides classes and interface relating to fonts.
java.awt.geom
Provides the Java 2D classes for defining and performing operations on objects related to two-dimensional geometry.
java.awt.im
Provides classes and interfaces for the input method framework.
java.awt.im.spi
Provides interfaces that enable the development of input methods that can be used with any Java runtime environment.

Installation

- JRE – Java Runtime Environment
- JDK – Java Developer Kit

First code

```
1  public class First {
2
3    public First() {
4      super();
5    }
6
7    //Main method
8    public static void main(String[] args){
9      /*Displaying something on a screen
10     */
11     System.out.println("Hello World");
12   }
13
14 }
```

First.java

Lower and upper cases matters

Compilation, Running

Compilation

javac First.java

A new file First.class will be created

Running

java First

Running

- java – runs in console
- javaw – runs and takes back control to console

classpath

- javac -classpath <path> fileName.java
- javac -cp <path> fileName.java
- java -classpath <path> Klasa
- java -cp <path> Klasa

What is missing?

- sizeof()
- goto
- pointers

Standard I/O

- System.out
- System.in
- System.err

System.out

```
1  package com.wyklad.objects;
2
3  public class Out {
4
5    public Out() {
6      super();
7    }
8
9    public static void main(String[] args){
10     System.out.print("Hello ");
11     System.out.println("World "+ "!");
12     System.out.println(System.getProperty("line.separator"));
13     System.out.println(123);
14     System.out.println(new Out());
15   }
16
17 }
```

System.in

```
1  import java.io.IOException;
2
3  import java.util.Scanner;
4
5  public class In {
6
7    public static void main(String[] args){
8      int i;
9      try{
10       i = System.in.read();
11       System.out.println(i);
12     } catch (Exception e){
13        e.printStackTrace();
14     }
15   }
16
17 }
```

Scanner

```
1  package com.wyklad.objects;
2
3  import java.io.IOException;
4
5  import java.util.Scanner;
6
7  public class In {
8
9    public In() {
10     super();
11   }
12
13   public static void main(String[] args){
14     int i;
15     int read;
16     Scanner s = new Scanner(System.in);
17     System.out.println(s.nextLine());
18   }
19
20 }
```

Scanner class functionality

- get next line from console
- get next integer: nextInt(), nextLong, nextShort()...
- get next boolean value: nextBoolean()
- checking if next value is available

System.err

```
1  package com.wyklad.objects;
2
3  public class Err {
4
5    public Err() {
6      super();
7    }
8
9    public static void main(String[] args){
10     System.err.println("Error");
11   }
12 }
```

Flush

```
1  package com.wyklad.objects;
2
3  public class Flush {
4
5    public Flush() {
6      super();
7    }
8
9    public static void main(String[] args){
10     System.out.print("Hello");
11     System.out.flush();
12   }
13
14 }
```

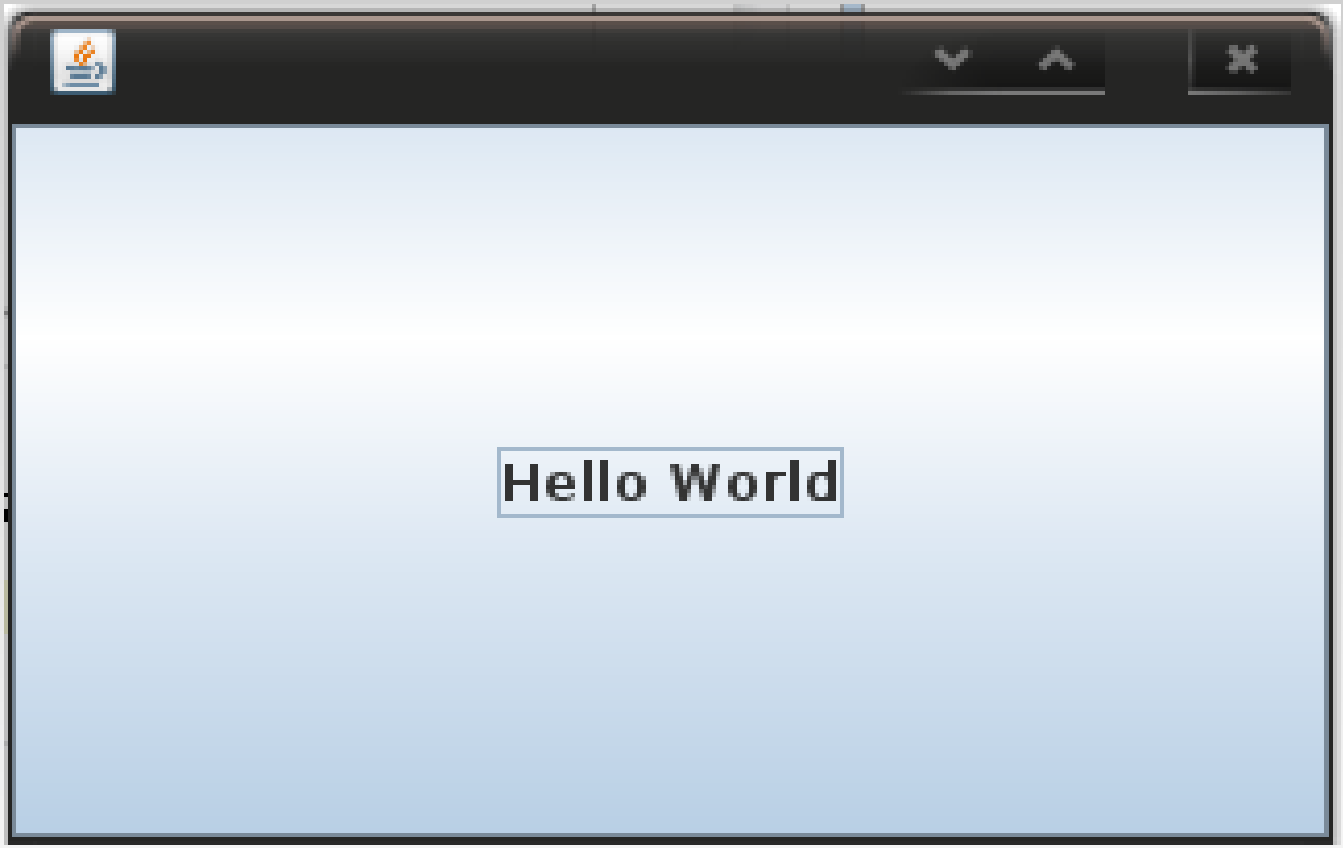
Command line arguments

```
1  package com.wyklad.first;
2
3  public class Parametry {
4    public Parametry() {
5      super();
6    }
7
8    public static void main(String[] args) {
9      System.out.println(args[0]);
10     System.out.println(args[1]);
11   }
12 }
```

GUI Applications

```
1  package com.wyklad.first;
2
3  import javax.swing.JButton;
4  import javax.swing.JFrame;
5
6  public class Okienko {
7
8    public Okienko() {
9      super();
10   }
11
12   public static void main(String[] args){
13     JFrame frame = new JFrame();
14     frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
15     frame.setSize(320, 200);
16     frame.add(new JButton("Hello World"));
17     frame.setVisible(true);
18   }
19 }
```

GUI applications



Applet

```
1  import javax.swing.JApplet;
2  import javax.swing.JLabel;
3
4  public  class  App extends JApplet{
5    public  void  init(){
6      add(new JLabel("Hello World"));
7    }
8    public  void  stop(){}
9  }
```

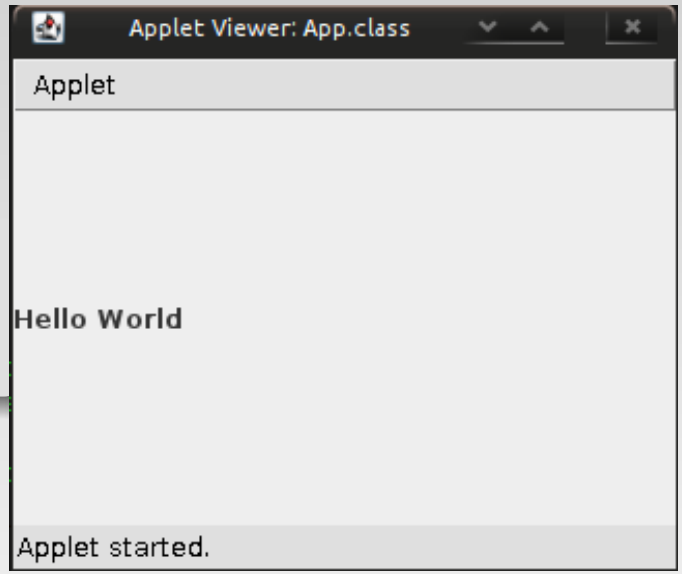
Applet embedding

```
1  <html>
2    <body>
3      <applet code="App.class" width="320" height="200">Alternative text</↩
        applet>
4    </body>
5  </html>
```

appletviewer

appletviewer

appletviewer Applet.html



Midlet

```
1  import java.lang.*;
2  import javax.microedition.midlet.*;
3  import javax.microedition.lcdui.Display;
4  import javax.microedition.lcdui.Form;
5  import javax.microedition.lcdui.TextField;
6
7  public class Testing extends MIDlet{
8    protected void startApp() throws MIDletStateChangeException{
9      Form form = new Form("Testing");
10     form.append(new TextField("Wpisz:", "tekst", 20, TextField.ANY));
11     Display.getDisplay(this).setCurrent(form);
12   }
13   protected void pauseApp(){
14   }
15   protected void destroyApp(boolean unconditional) throws ↩
       MIDletStateChangeException{
16   }
17 }
```

Midlet


+5550000 - DefaultColorPhone
MIDlet View Help
Sun
ABC
Testing
Wpisz:
tekst
1
2 ABC
3 DEF
4 GHI
5 JKL
6 MNO
7 PQRS
8 TUV
9 WXYZ
* .
0
- +
SHIFT
SPACE

Android

```
1  import android.app.Activity;
2  import android.os.Bundle;
3  import android.widget.TextView;
4
5  public  class  SimpleActivity extends Activity {
6
7      public  void  onCreate(Bundle savedInstanceState) {
8          super.onCreate(savedInstanceState);
9          TextView text = new TextView(this);
10         text.setText("Hello World!");
11         setContentView(text);
12     }
13 }
```

Servlet

```
1  public class Servlet extends HttpServlet {
2    public void doGet(HttpServletRequest request,
3                      HttpServletResponse response) throws ServletException,
4                                                           IOException {
5      PrintWriter out = response.getWriter();
6      out.println("<html>");
7      out.println("<head><title>Servlet</title></head>");
8      out.println("<body>");
9      out.println("<p>Hello World</p>");
10     out.println("</body></html>");
11     out.close();
12   }
13 }
```

javadoc

```
1  package com.wyklad.first;
2
3  /** Klasa
4    @author Adam
5  */
6  public  class  First {
7
8    public  First() {
9      super();
10   }
11
12   /** documentation comment
13       @param args argument description
14    */
15   public  static  void main(String[] args){
16     System.out.println("Hello World");
17   }
18
19 }
```

All Classes

First

SUMMARY: NESTED | FIELD | CONSTR | METHOD DETAIL: FIELD | CONSTR | METHOD

com.wyklad.first

Class First

```
java.lang.Object
  └com.wyklad.first.First
```

```
public class First
extends java.lang.Object
```

Constructor Summary

First()

Method Summary

static void	main(java.lang.String[] args) Komentarz dokumentacji

Methods inherited from class java.lang.Object
clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Constructor Detail

First

```
public First()
```

Method Detail

Java doc annotations

- @author – code's author
- @param – method parameters
- @return – returned value
- @see – reference

jar

jar

```
jar -cf Archive.jar First.class
```

Manifest

```
1 Created—By: Adam
2 Main—Class: First
```

Running from *.jar archive

Running from *.jar archive

java -jar Archiwum.jar

JNLP

- Java Network Launching Protocol
- Running from Internet
- XML description

Ant: an example

```
1  <?xml version="1.0"?>
2    <project name="Klasa" default="compile">
3      <target name="compile">
4          <javac srcdir="." destdir="."/>
5      </target>
6      <target name="jar">
7          <jar destfile="sloik.jar">
8              <fileset dir="." includes="*.class"/>
9              <manifest>
10                 <attribute name="Main-Class" value="Klasa"/>
11             </manifest>
12         </jar>
13     </target>
14   </project>
```

build.xml

Ant: using

- ant – compilation
- ant compile – compilation
- ant jar – jar creating

Other tools

- Maven
- Gradle

Debugger

Debugger

jdb Klasa

- run – program running
- stop at Klasa:7 – setting breakpointu
- step – next instruction
- list – code displaying

Debugger

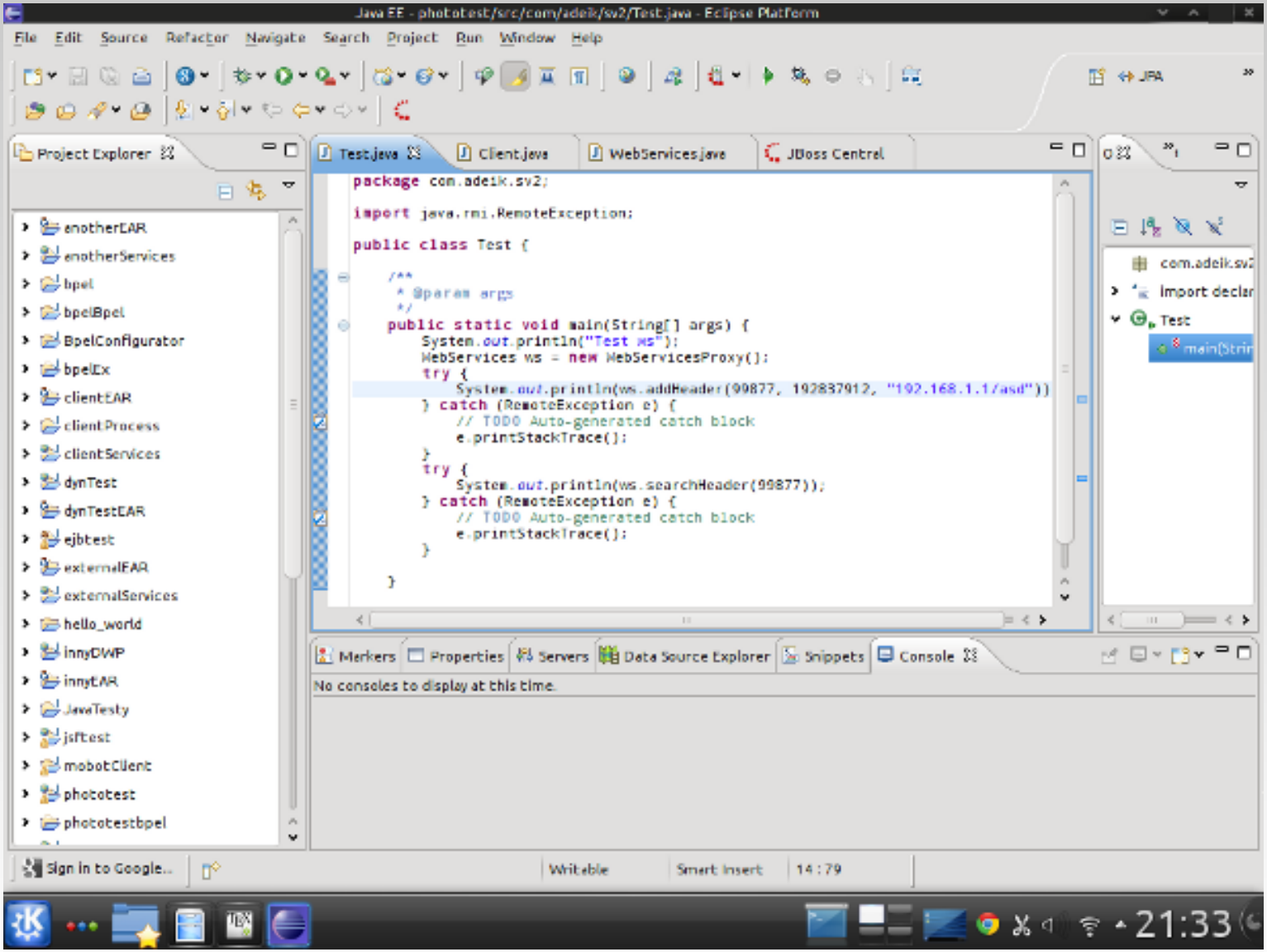
list

```
1  main[1] list
2  5     public class Source{
3  6       public static void main(String[] args){
4  7         JFrame f = new JFrame();
5  8         f.setSize(320, 200);
6  9 =>      f.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
7  10         f.setVisible(true);
8  11       }
9  12     }
```

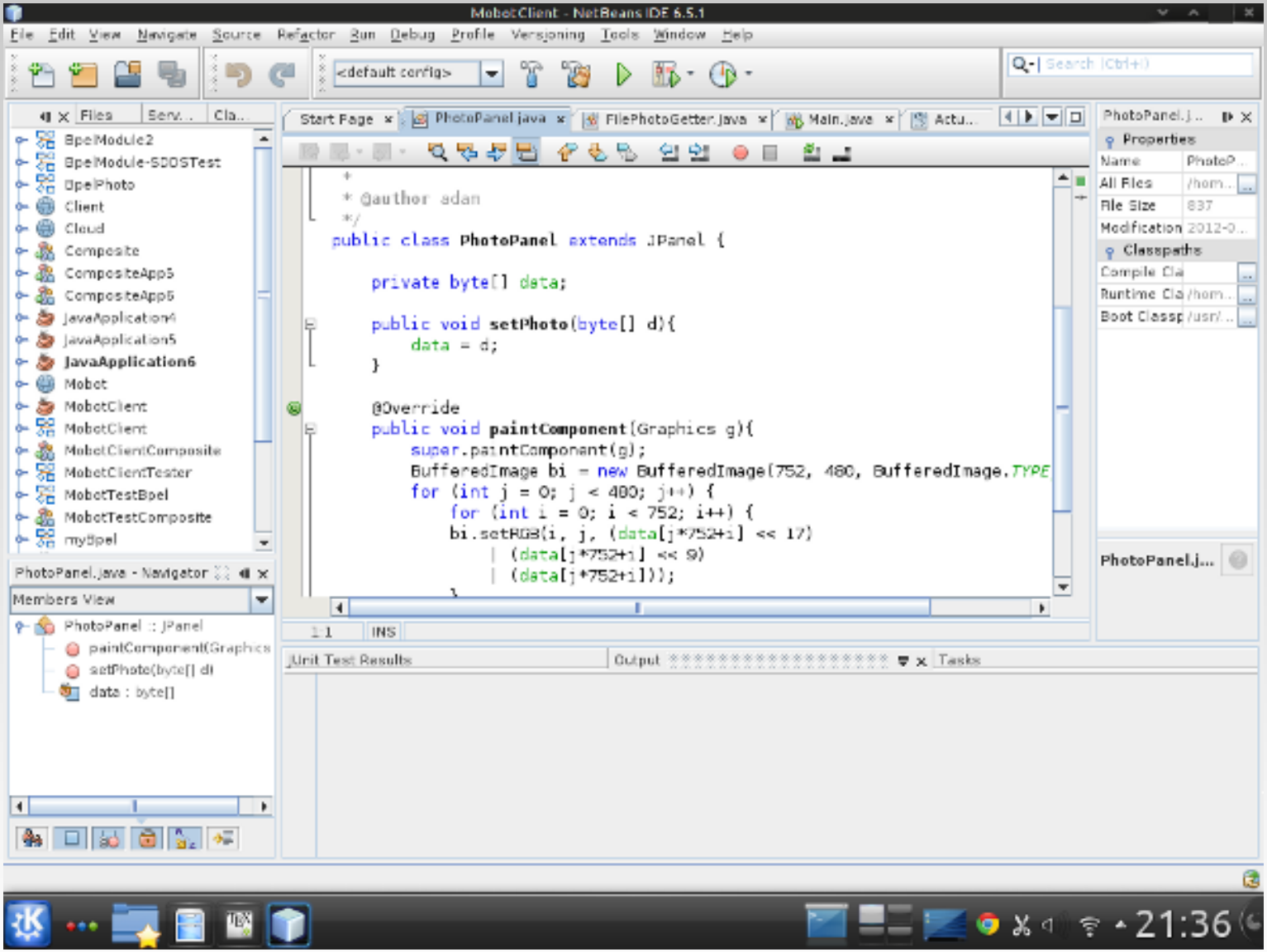
IDE

- eclipse
- NetBeans
- JDeveloper
- IntelliJ

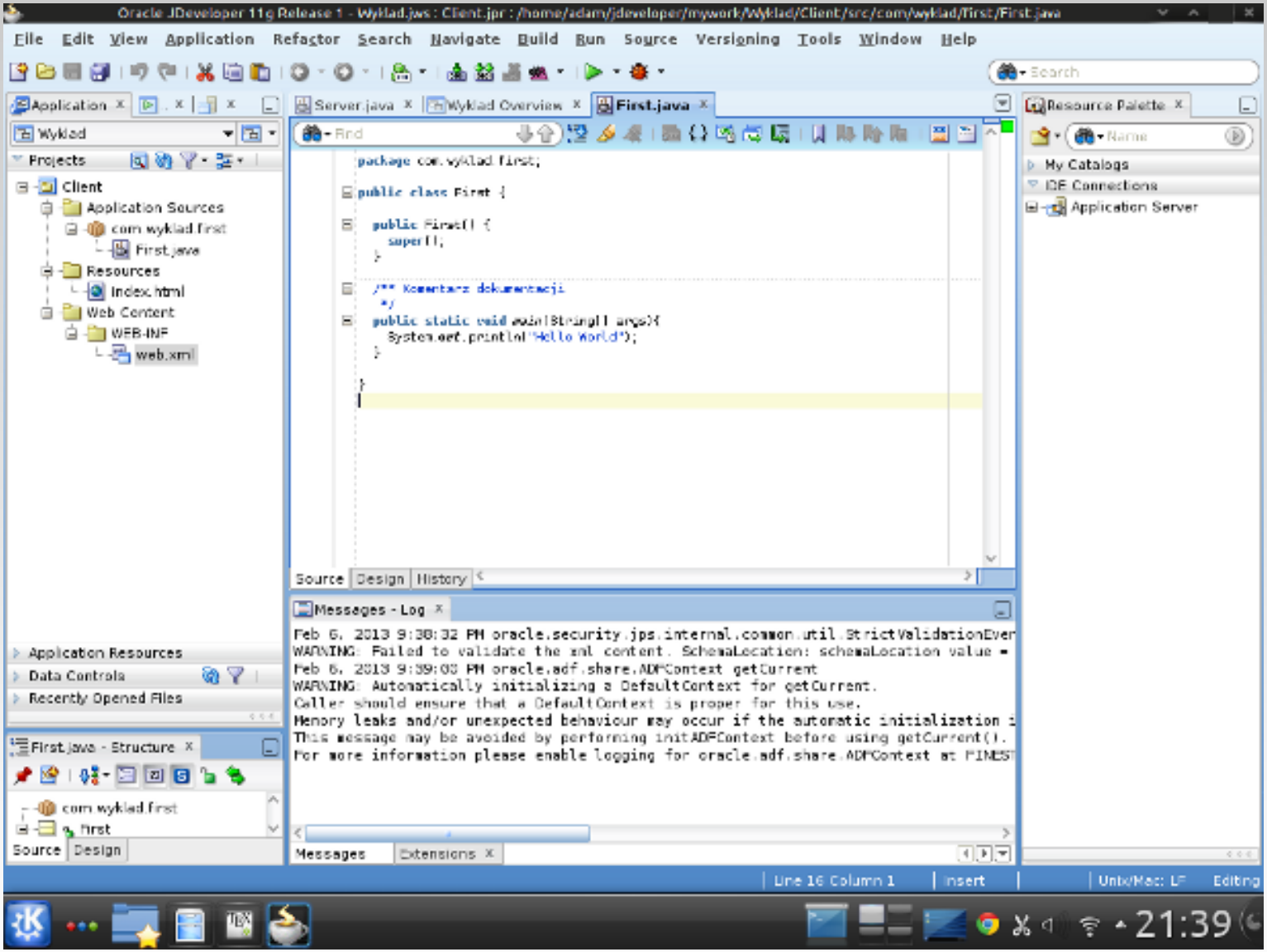
eclipse


Java EE - phototest/src/com/adeik/sv2/Test.java - Eclipse Platform
File Edit Source Refactor Navigate Search Project Run Window Help
Project Explorer
enotherEAR
enotherServices
bpel
bpelBpel
BpelConfigurator
bpelEx
clientEAR
clientProcess
clientServices
dynTest
dynTestEAR
ejbtest
externalEAR
externalServices
hello_world
innyDWP
innyEAR
JavaTesty
jsftest
mobotClient
phototest
phototestbpel
Test.java
Client.java
WebServices.java
JBoss Central
package com.adeik.sv2;
import java.rmi.RemoteException;
public class Test {
/**
* @param args
*/
public static void main(String[] args) {
System.out.println("Test ws");
WebServices ws = new WebServicesProxy();
try {
System.out.println(ws.addHeader(99877, 192837912, "192.168.1.1/asd"));
} catch (RemoteException e) {
// TODO Auto-generated catch block
e.printStackTrace();
}
try {
System.out.println(ws.searchHeader(99877));
} catch (RemoteException e) {
// TODO Auto-generated catch block
e.printStackTrace();
}
}
Markers Properties Servers Data Source Explorer Snippets Console
No consoles to display at this time.
Sign in to Google...
Writable
Smart Insert
14 : 79
21:33

NetBeans


MobotClient - NetBeans IDE 6.5.1
File Edit View Navigate Source Refactor Run Debug Profile Versioning Tools Window Help
<default config>
Start Page
PhotoPanel.java
FilePhotoGetter.java
Main.java
* @author adan
*/
public class PhotoPanel extends JPanel {
private byte[] data;
public void setPhoto(byte[] d){
data = d;
}
@Override
public void paintComponent(Graphics g){
super.paintComponent(g);
BufferedImage bi = new BufferedImage(752, 480, BufferedImage.TYPE
for (int j = 0; j < 480; j++) {
for (int i = 0; i < 752; i++) {
bi.setRGB(i, j, (data[j*752+i] << 17)
| (data[j*752+i] << 9)
| (data[j*752+i]));
Unit Test Results
Output
Tasks
21:36

JDeveloper


Oracle JDeveloper 11g Release 1 - Wyklad.jws : Client.jpr : /home/adam/jdeveloper/mywork/Wyklad/Client/src/com/wyklad/first/First.java
File Edit View Application Refactor Search Navigate Build Run Source Versioning Tools Window Help
Application
Wyklad
Projects
Client
Application Sources
com.wyklad.first
First.java
Resources
index.html
Web Content
WEB-INF
web.xml
Application Resources
Data Controls
Recently Opened Files
First.java - Structure
com.wyklad.first
first
Source Design
Server.java
Wyklad Overview
First.java
package com.wyklad.first;
public class First {
public First() {
super();
}
/** Komentarz dokumentacji
*/
public static void main(String[] args){
System.out.println("Hello World");
}
}
Source Design History
Messages - Log
Feb 6, 2013 9:38:32 PM oracle.security.jps.internal.common.util.StrictValidationEver
WARNING: Failed to validate the xml content. SchemaLocation: schemaLocation value =
Feb 6, 2013 9:39:03 PM oracle.adf.share.ADFContext getCurrent
WARNING: Automatically initializing a DefaultContext for getCurrent.
Caller should ensure that a DefaultContext is proper for this use.
Memory leaks and/or unexpected behaviour may occur if the automatic initialization
This message may be avoided by performing initADFContext before using getCurrent().
For more information please enable logging for oracle.adf.share.ADFContext at FINEST
Messages Extensions
Resource Palette
My Catalogs
IDE Connections
Application Server
Line 16 Column 1 Insert Unix/Mac: LF Editing
21:39