

# Kotlin

Dmitry Jemerov, JetBrains



# JetBrains: Develop with Pleasure

 IntelliJ**IDEA**

 Re**Sharper**

 **Ruby**Mine

 Py**Charm**

 **Php**Storm

 **App**Code

 **Team**City

 You**TRACK**

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- Statically typed
- JVM targeted
- open-source
- general-purpose programming language
- developed by JetBrains with help from the community

# Background

- Started in mid 2010
- Huge Java codebase (>50k classes, 10 years old)
- Building tools for many nice languages
- Still using Java to write the tools

# Design Goals



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- Simple enough to learn for ordinary programmers

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generics, overloading, arrays, primitives...
- Compiles and runs as fast as Java
- More concise than Java
- Prevents more kinds of errors than Java
- Simple enough to learn for ordinary programmers
- **Efficient tooling from the very beginning**



# Performance

- Straightforward, Java-like generated bytecode
- No constant runtime overhead
- No boxing for non-nullable primitive types

# Easy to Learn

- Not a research project
- "Too few exciting features" is a feature
- Building upon skills learned from other languages  
Groovy, Scala, C#, Gosu...

# Hello World

```
package hello           // optional semicolons

// namespace-level functions
// types on the right
// no special syntax for arrays
fun main(args: Array<String>): Unit {
    println("Hello, world!")
}
```

# Classes

```
class User(val name: String, // primary constructor
           val age: Int) {
    // name and age become public properties

    fun fullName() = "$name, age $age"
    // shorthand syntax for single-expression functions
}

println(User("John Doe", 30).fullName())
// no 'new' in constructor calls
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# Traits

```
trait StuffContainer {  
    fun isEmpty(): Boolean    // abstract by default  
    fun containsStuff(): Boolean = !isEmpty()  
}
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```
class MyList<T>() : ArrayList<T>(), StuffContainer
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val list = MyList<String>()  
list.add("foo")  
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class StringIterator(val s: String) : Iterator<Char> {
    private var i = 0
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for (c in "abcd") { // calls "abcd".iterator()
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    User("John Doe", 30),  
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val ages = users.map { it.age }  
    // users.map({ (u: User) -> u.age})  
    // 'it' is implicit closure parameter  
    // closure can be outside of parentheses  
  
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    // closure can be outside of parentheses  
  
println("Youngest user is ${ages.min()} years old")
```

# Function Literals

```
val users = arrayList(  
    User("John Doe", 30),  
    User("Jane Doe", 27))  
  
val ages = users.map { it.age }  
    // users.map({ (u: User) -> u.age})  
    // 'it' is implicit closure parameter  
    // closure can be outside of parentheses  
  
println("Youngest user is ${ages.min()} years old")
```

# Operator Overloading

```
fun BigDecimal.minus(other: BigDecimal) = this.subtract(other)
    // 'minus' function corresponds to '-' operator

val String.bd : BigDecimal
    get() = BigDecimal(this)
    // extension property (may not have backing field)

val a = "2.0".bd
val b = "1.10".bd
println(a - b)
```

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# Nullability

```
val f = File("readme.txt")
println("$f has ${f.listFiles().size} children")
```

Only safe calls (?.) are allowed on a nullable receiver of type `jet.Array<java.io.File?>?`

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val f = File("readme.txt")  
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Only safe calls (`?.`) are allowed on a nullable receiver of type `jet.Array<java.io.File?>?`

## Safe Calls

```
f.listFiles()?.size() ?: 0
```

# Nullability

```
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## Safe Calls

```
f.listFiles()?.size()!
```

## Data Flow

```
val f = File("readme.txt")
val files = f.listFiles()
if (files != null) {
    println("$f has ${files.size} children")
}
```

# Nullability

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trait Expr
class Number(val value: Int): Expr
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fun eval(e: Expr): Int = when(e) {
  is Number -> e.value
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# Typesafe Builders

```
val result = html {  
  head {  
    title {+"XML encoding with Kotlin"}  
  }  
  body {  
    h1 {+"XML encoding with Kotlin"}  
    p {+"this format can be used as an alternative markup to XML"}  
  
    // an element with attributes and text content  
    a(href = "http://jetbrains.com/kotlin") {+"Kotlin"}  
  }  
}  
println(result)
```

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# Typesafe Builders: Implementation

```
abstract class TagWithText(name : String) : Tag(name) {  
    // unary '+' operator as extension function in class scope  
    // unary operator argument becomes 'this' inside 'plus'  
    fun String.plus() {  
        children.add(TextElement(this))  
    }  
}
```

```
class HTML() : TagWithText("html") {  
    // 'head' and 'body' accept extension function literals  
    fun head(init : Head.() -> Unit) = initTag(Head(), init)  
  
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  // unary '+' operator as extension function in class scope  
  // unary operator argument becomes 'this' inside 'plus'  
  fun String.plus() {  
    children.add(TextElement(this))  
  }  
}
```

```
class HTML() : TagWithText("html") {  
  // 'head' and 'body' accept extension function literals  
  fun head(init : Head.() -> Unit) = initTag(Head(), init)  
  
  fun body(init : Body.() -> Unit) = initTag(Body(), init)  
}
```

# Typesafe Builders: Implementation

```
abstract class TagWithText(name : String) : Tag(name) {  
  // unary '+' operator as extension function in class scope  
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# Typesafe Builders

```
val result = html {  
  head {  
    title {+"XML encoding with Kotlin"}  
  }  
  body {  
    h1 {+"XML encoding with Kotlin"}  
    p {+"this format can be used as an alternative markup to XML"}  
  
    // an element with attributes and text content  
    a(href = "http://jetbrains.com/kotlin") {+"Kotlin"}  
  }  
}  
println(result)
```

# Typesafe Builders

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  }  
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# Kotlin Libraries

- Not trying to replace the JDK or ecosystem
- Extension functions for JDK classes
- Play! Framework integration planned for Web development

# Tooling and Integration

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- IntelliJ IDEA plugin

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- JavaScript backend

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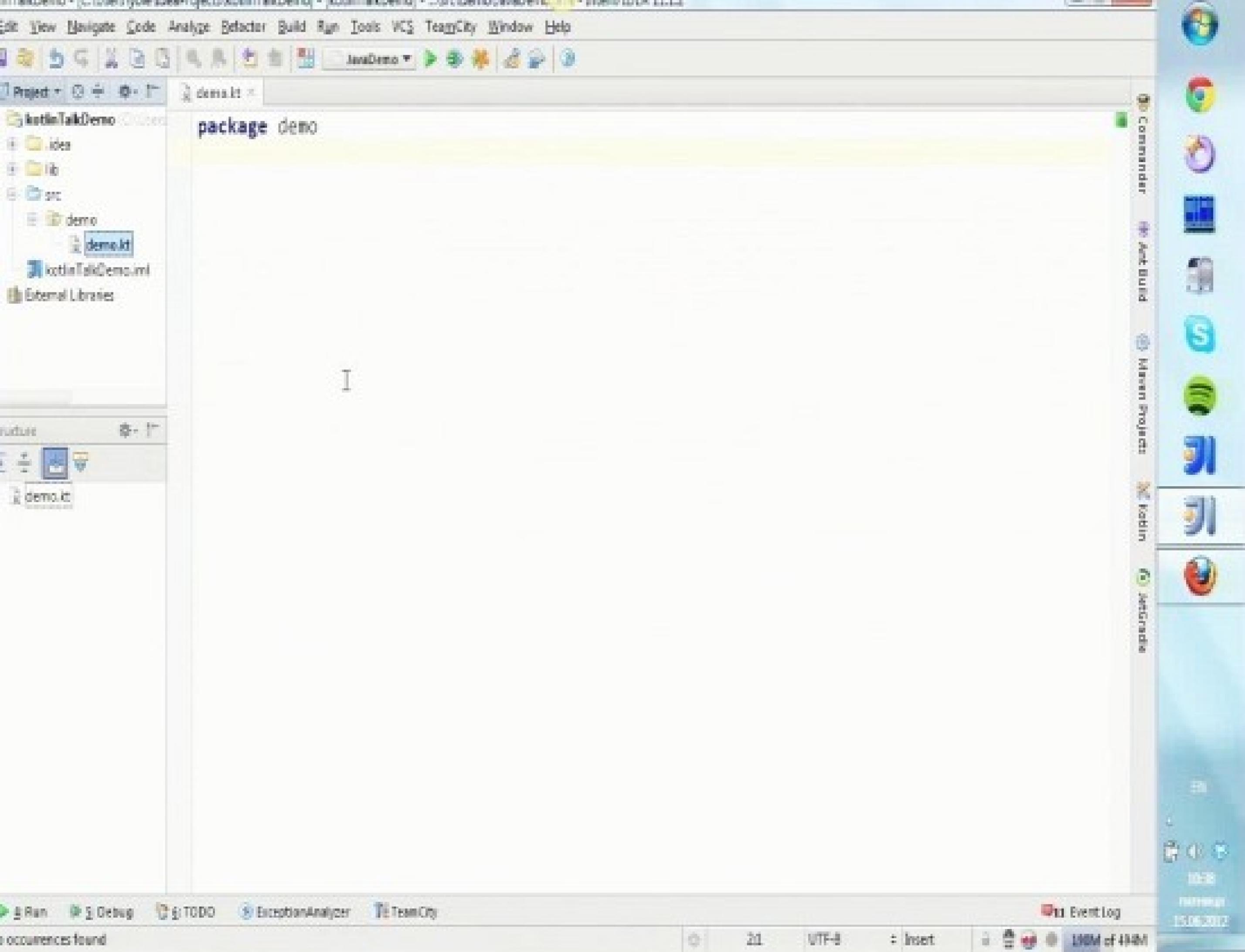
# Tooling and Integration

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# Tooling and Integration

- IntelliJ IDEA plugin
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- Android development support
- Building via Ant, Maven and Gradle
- Java to Kotlin converter
- kdoc (documentation generator)
- and more to come...

# IntelliJ IDEA Plugin Demo



Edit View Navigate Code Analyze Refactor Build Run Tools VCS TeamCity Window Help

JavaDemo

Project demo.kt

Project Structure: kotlinTalkDemo, idea, lib, src, demo, demo.kt, kotlinTalkDemo.iml, External Libraries

```
package demo
```

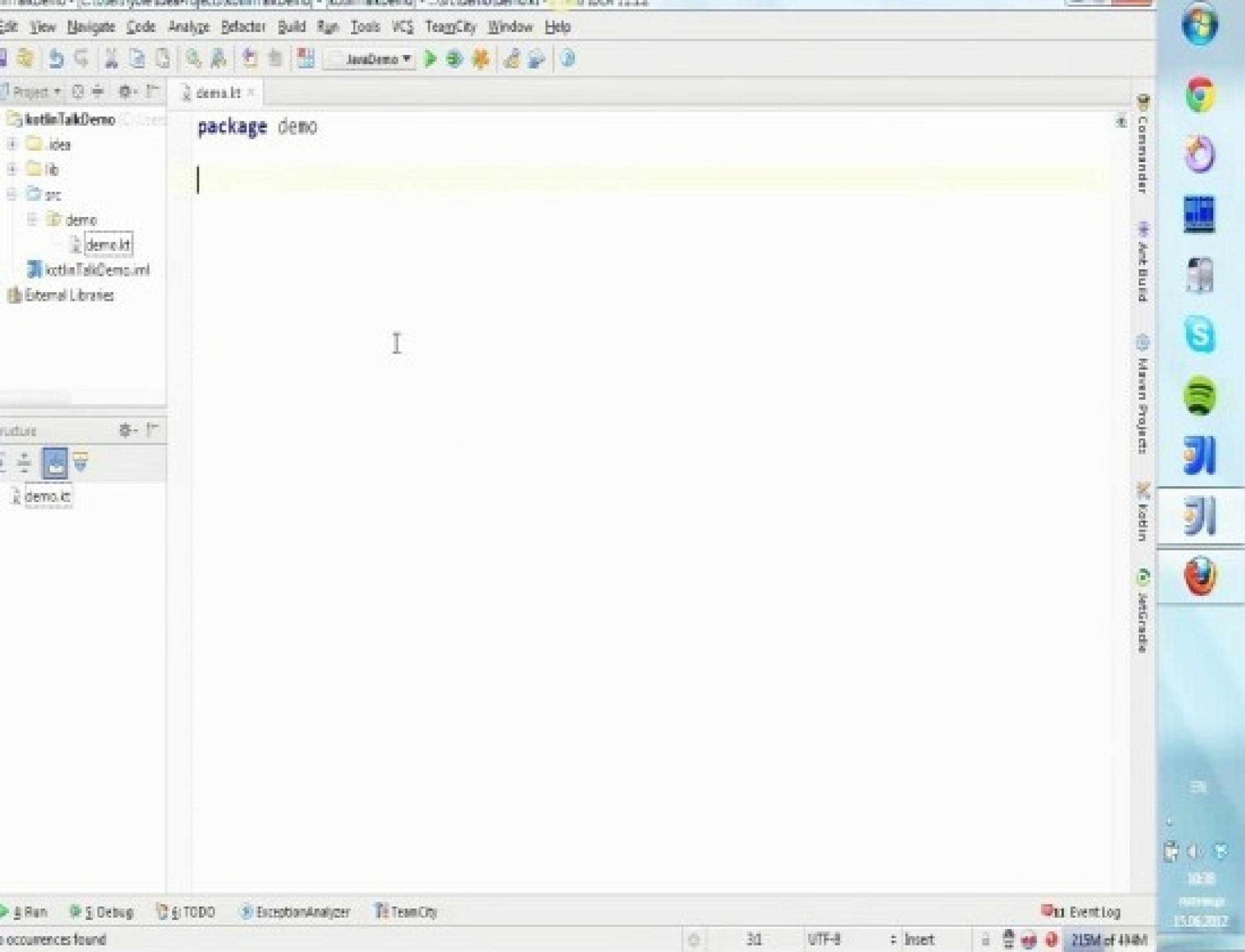
Structure demo.kt

demo.kt

Run Debug TODO ExceptionAnalyzer TeamCity Event Log

Occurrences found 21 UTF-8 Insert 190M of 494M





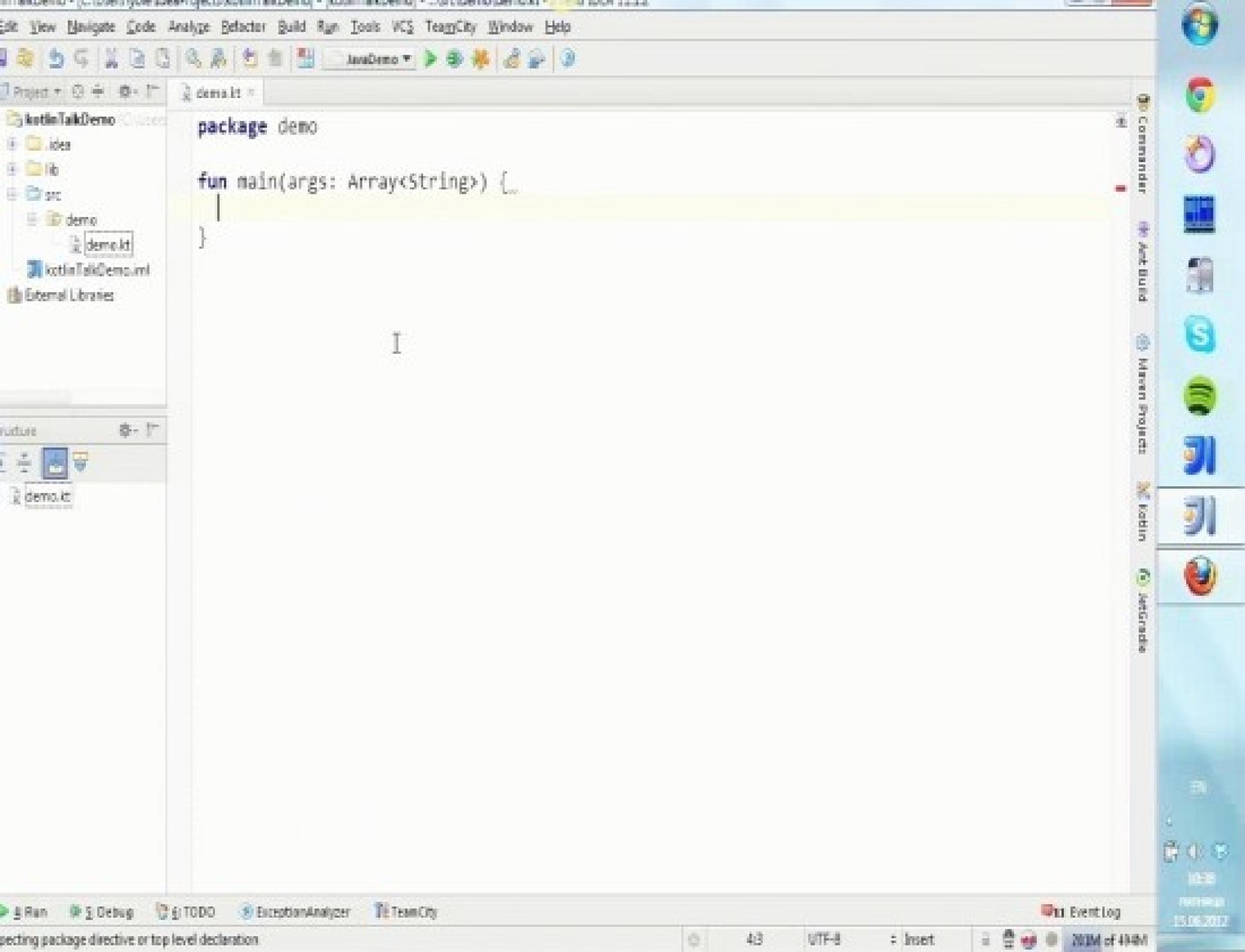
- idea
- lib
- src
- demo
  - demo.kt
- External Libraries

package demo

I

- demo.kt

- Commander
- Art Build
- My Project
- Robin
- Security



package demo

```
fun main(args: Array<String>) {  
    |  
}
```

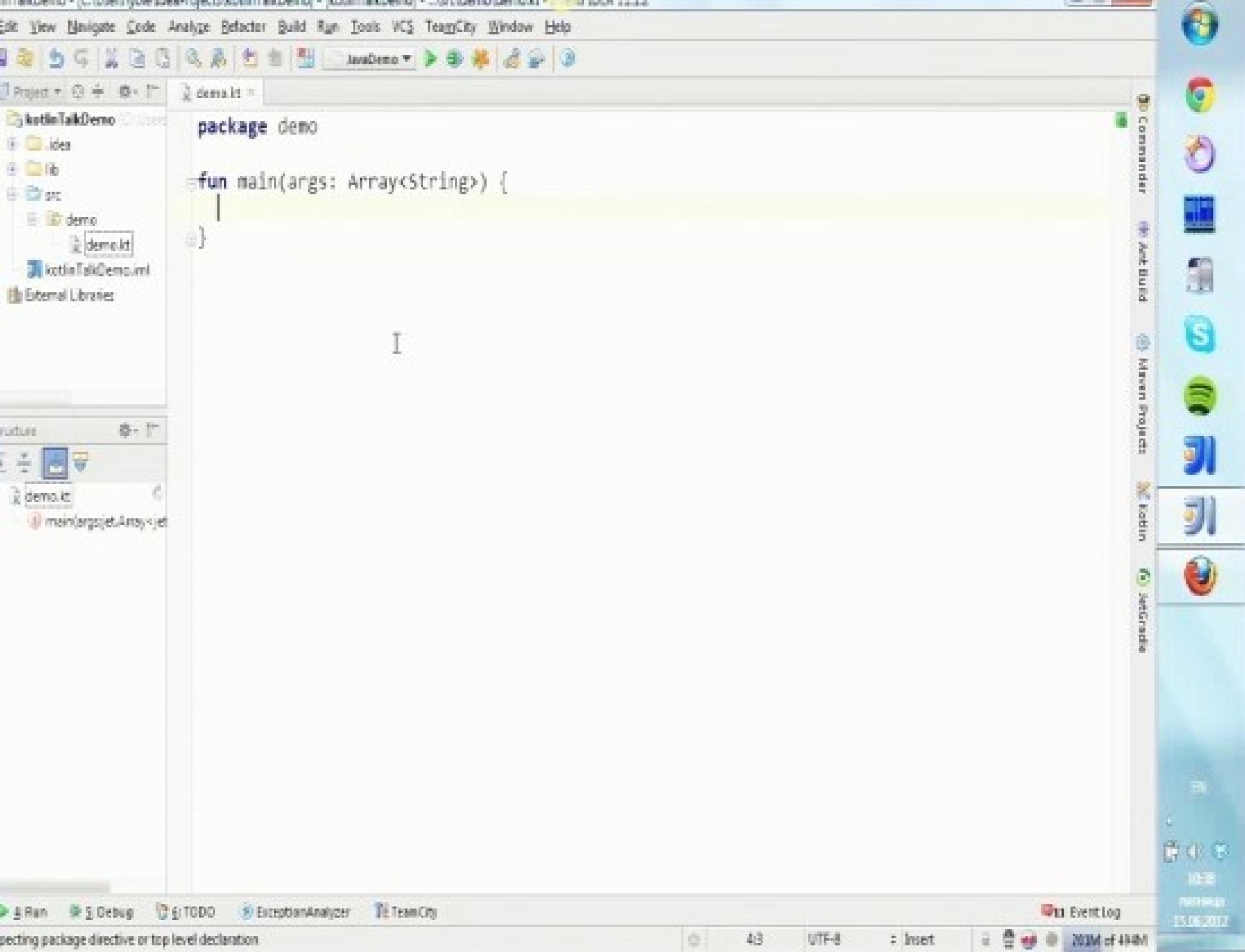
Expecting package directive or top level declaration

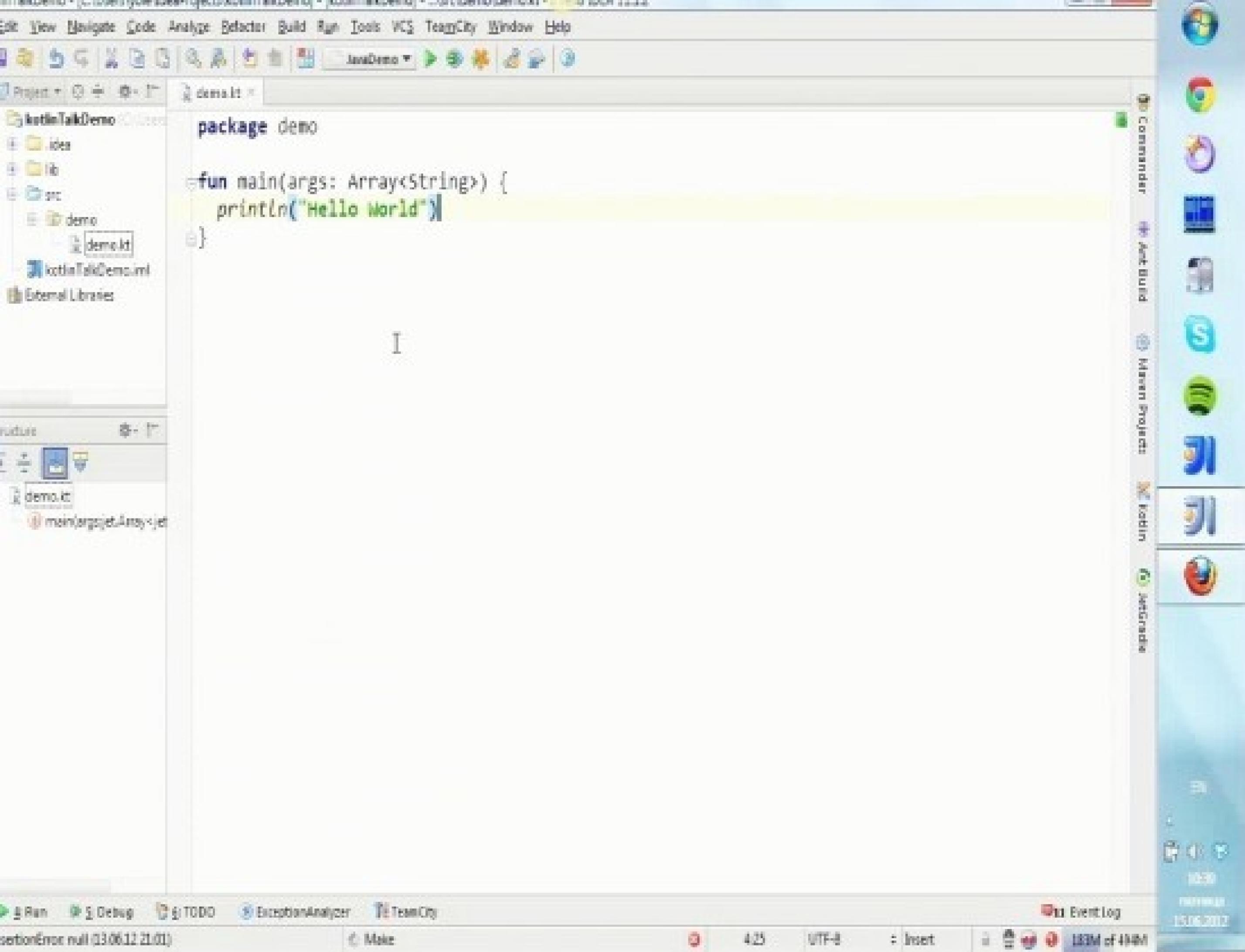
43

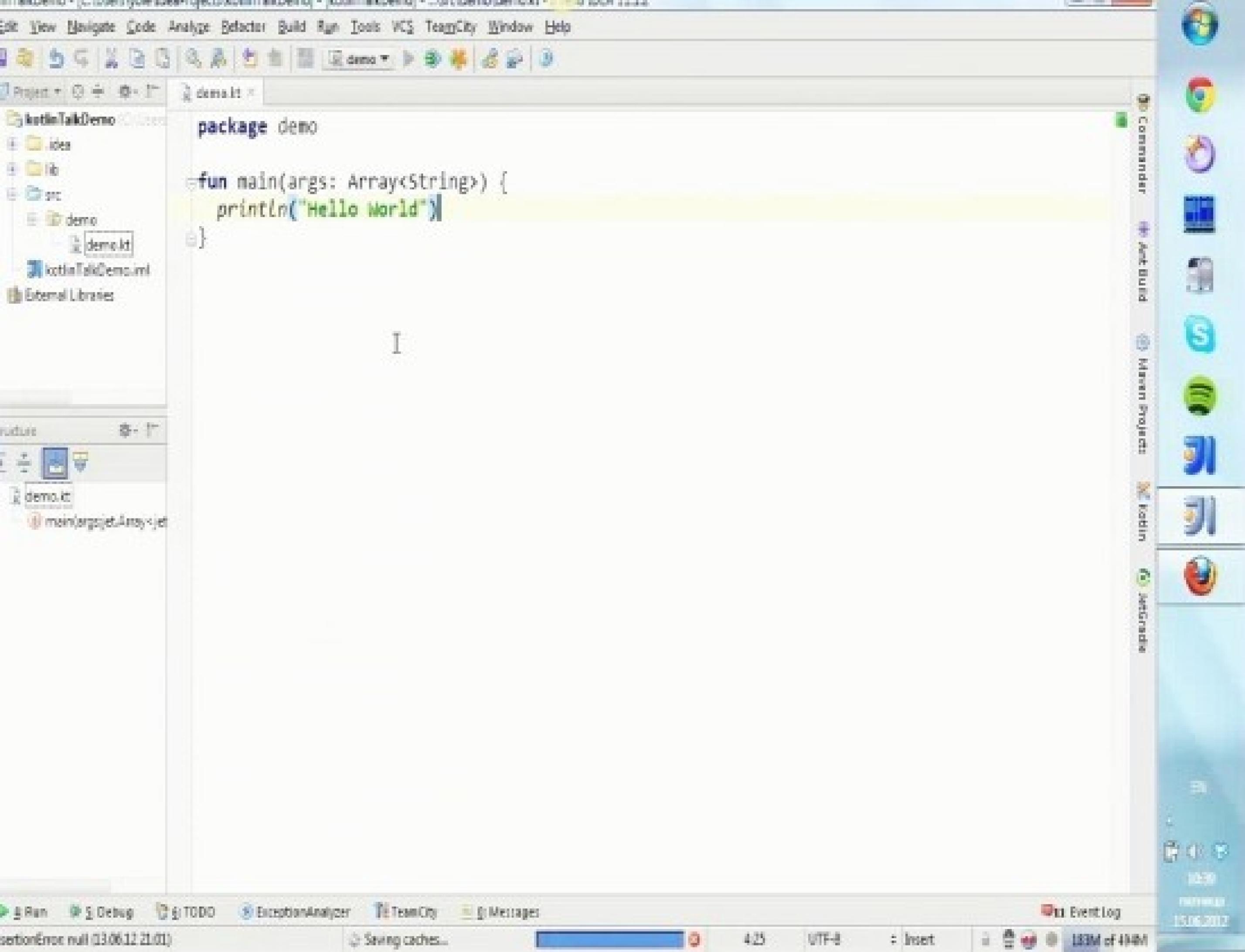
UTF-8

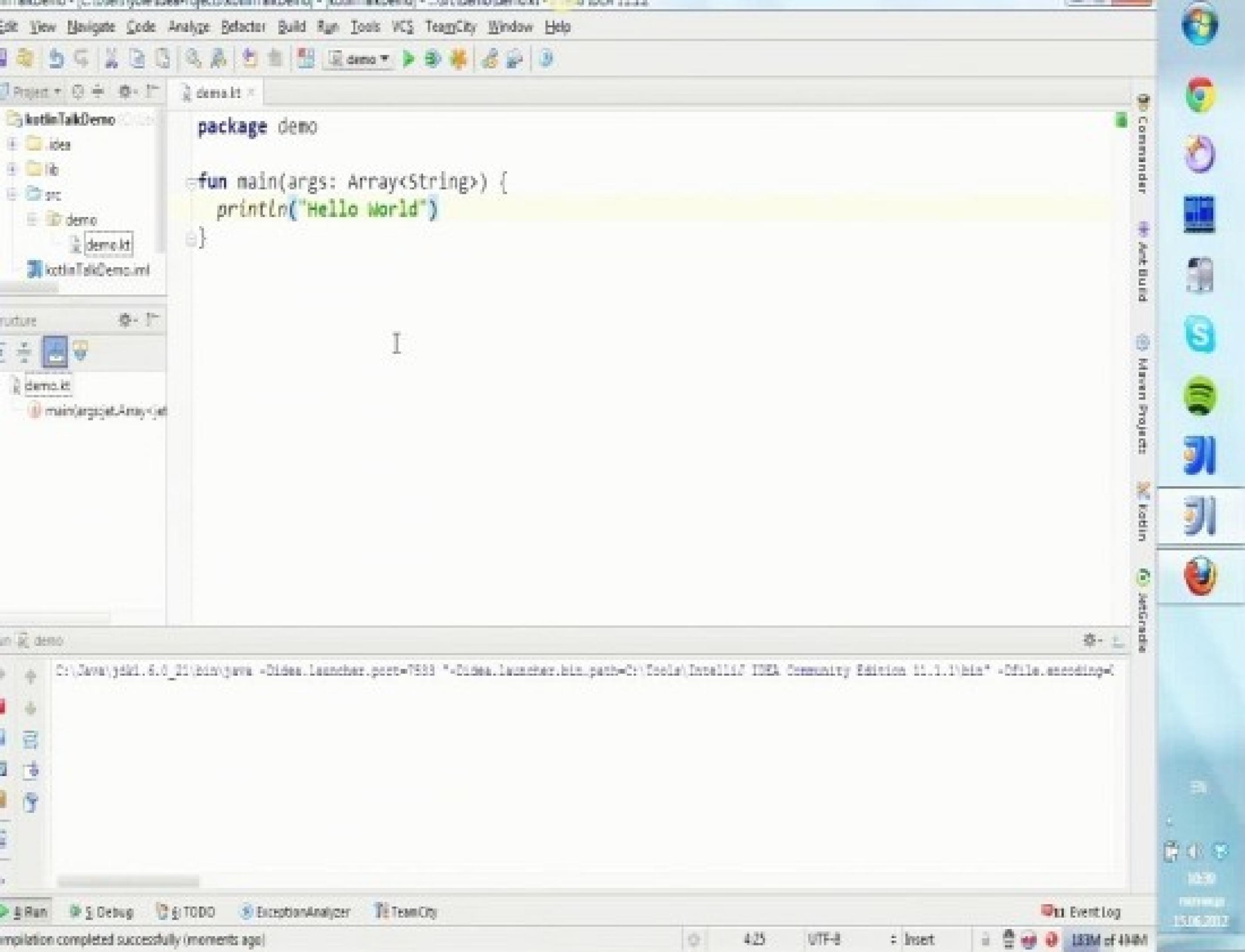
= Insert

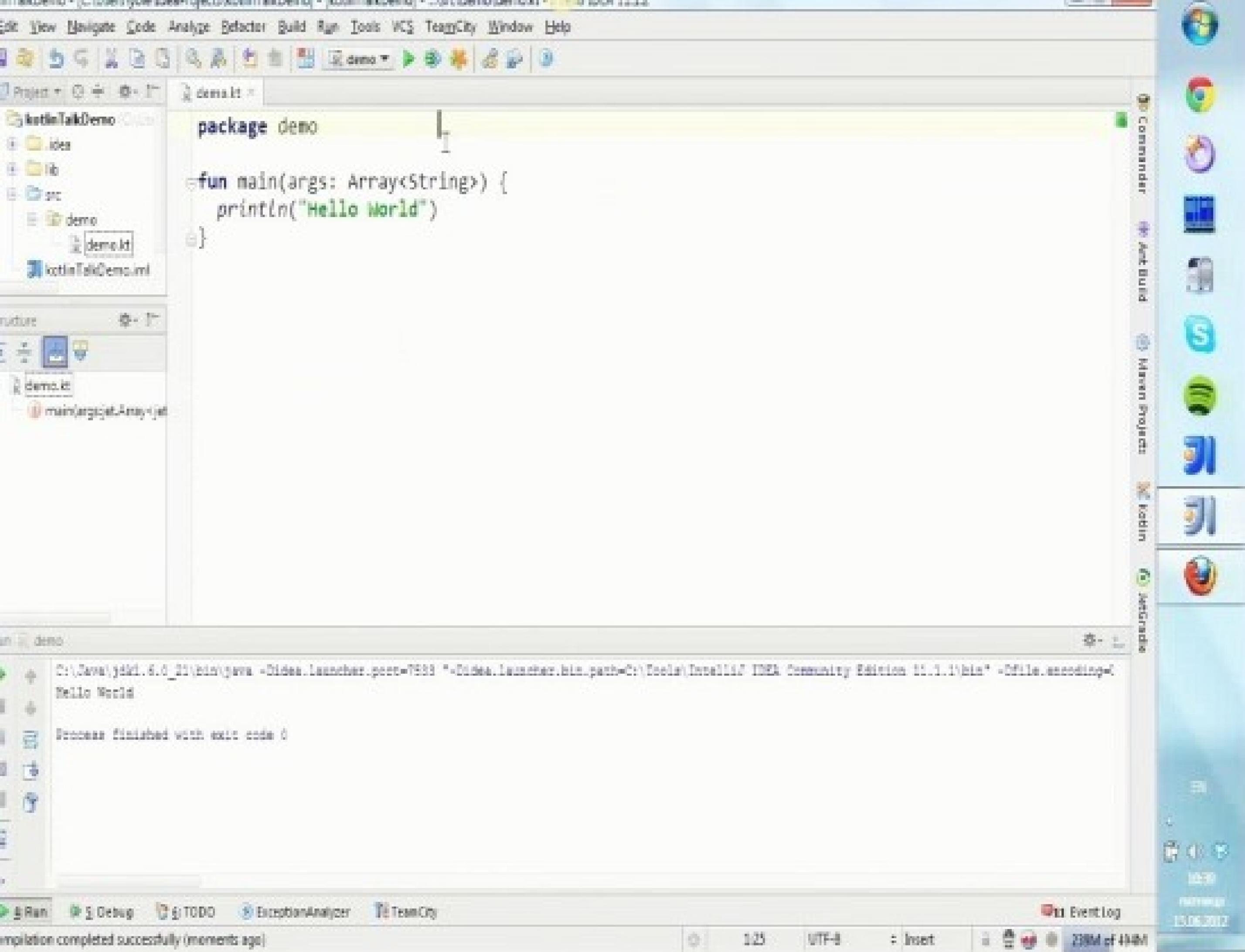
2014 of 404M





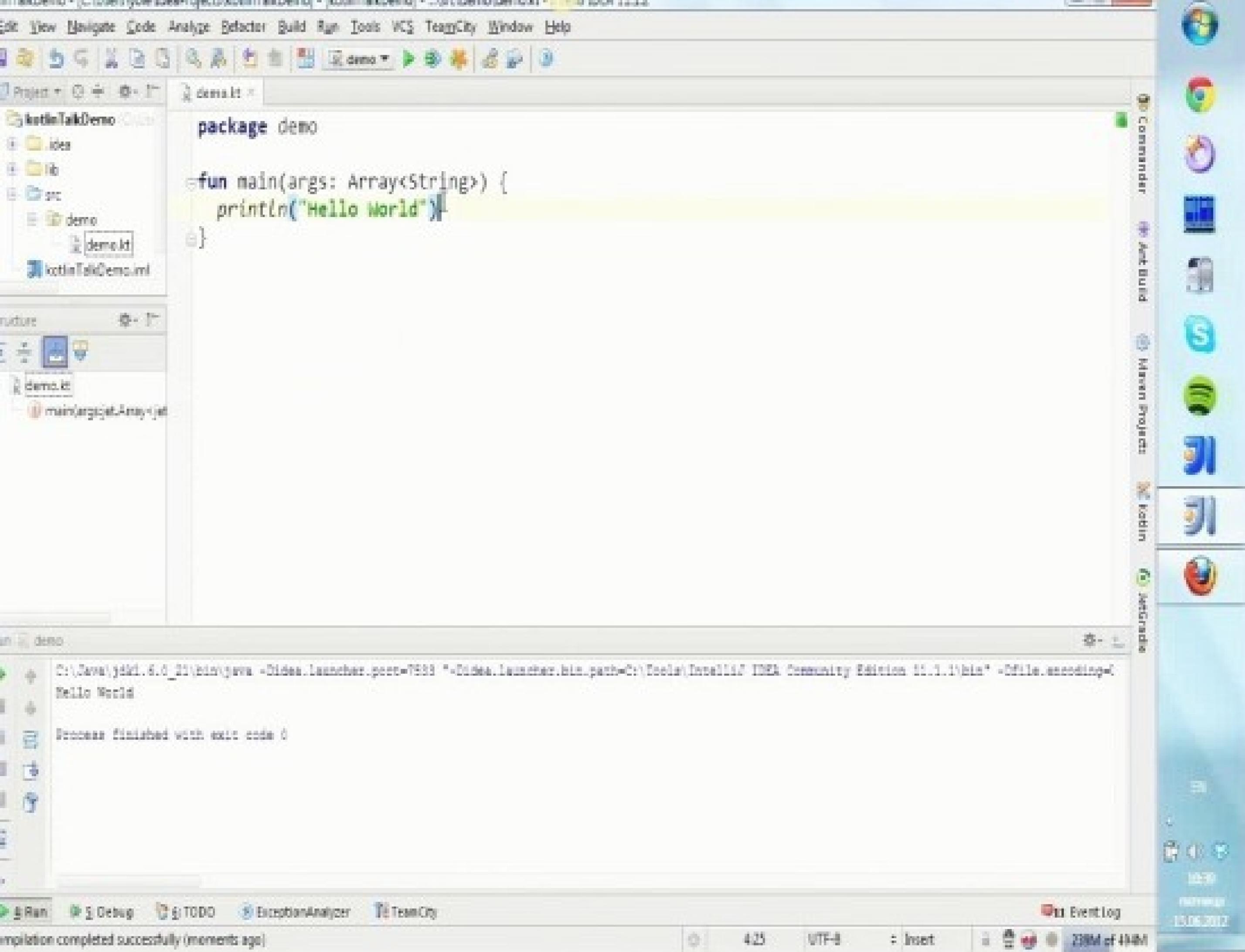


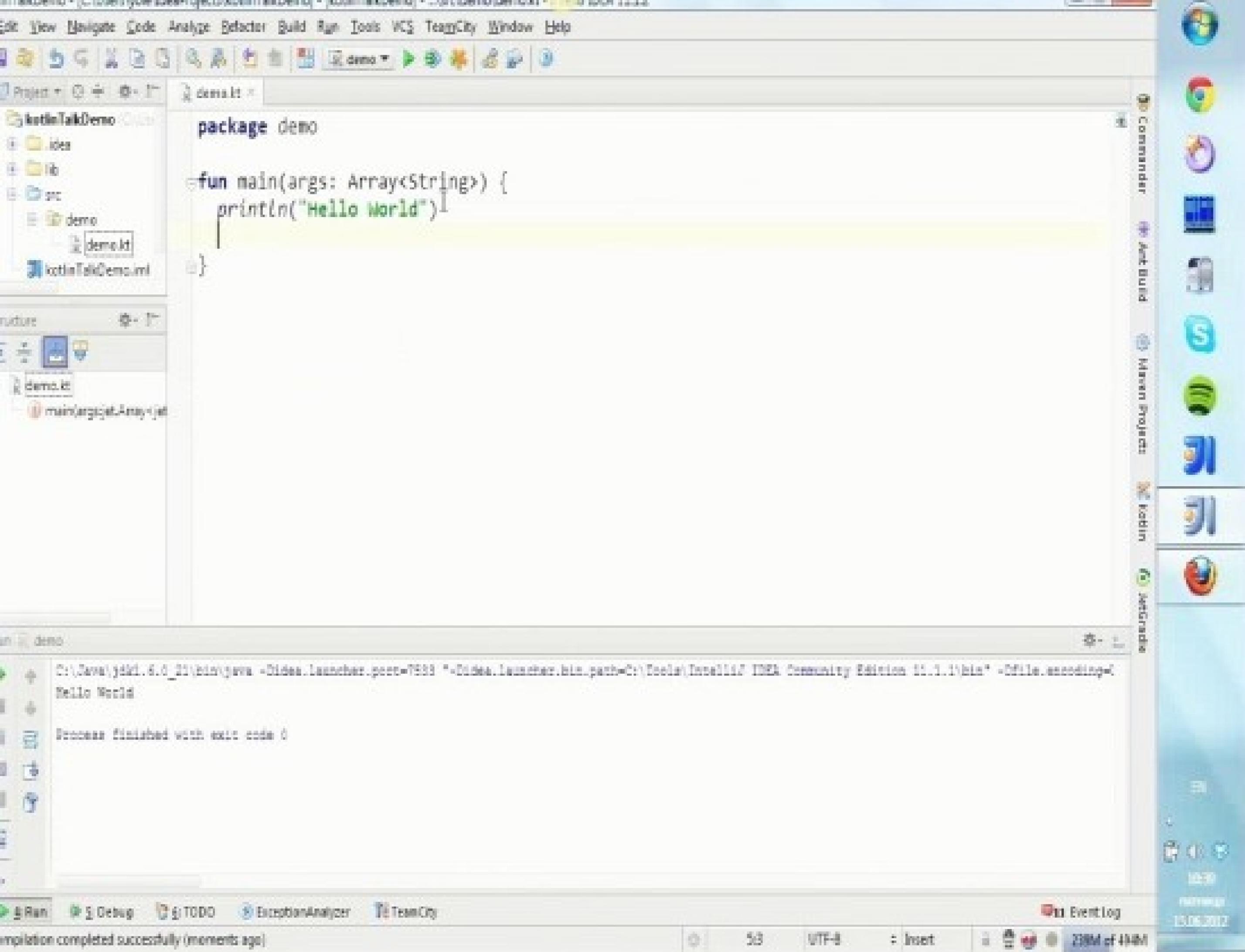


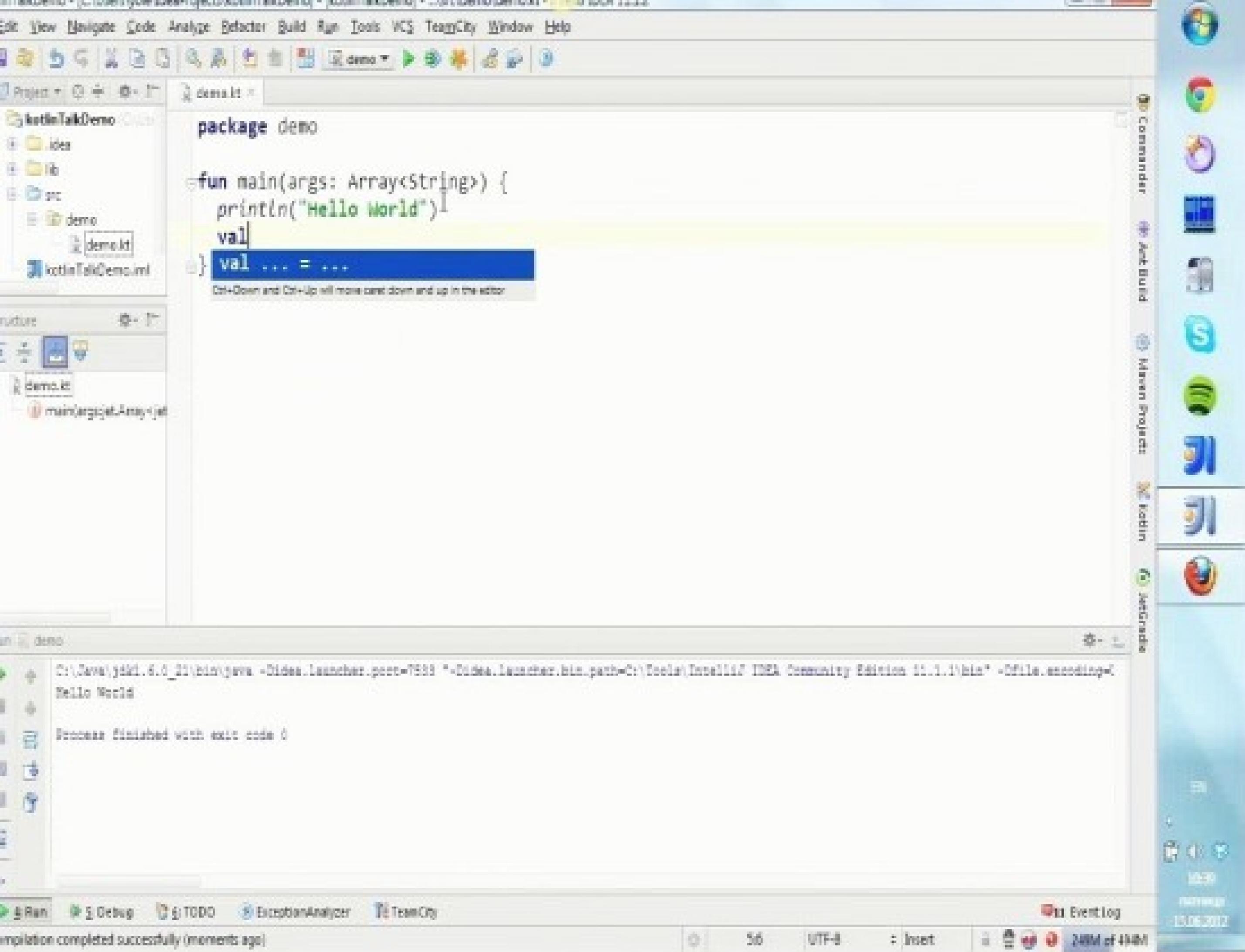


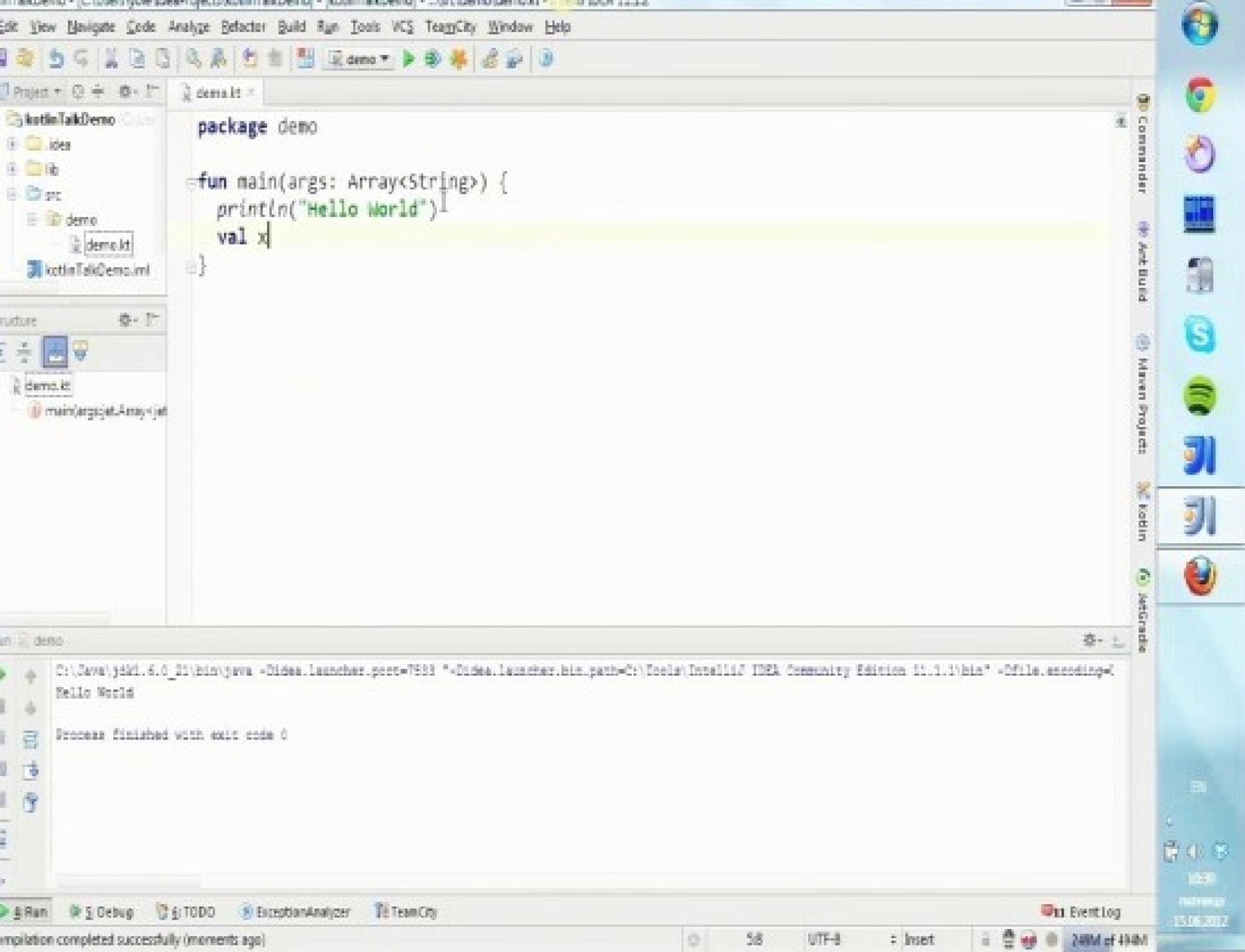
```
package demo  
  
fun main(args: Array<String>) {  
    println("Hello World")  
}
```

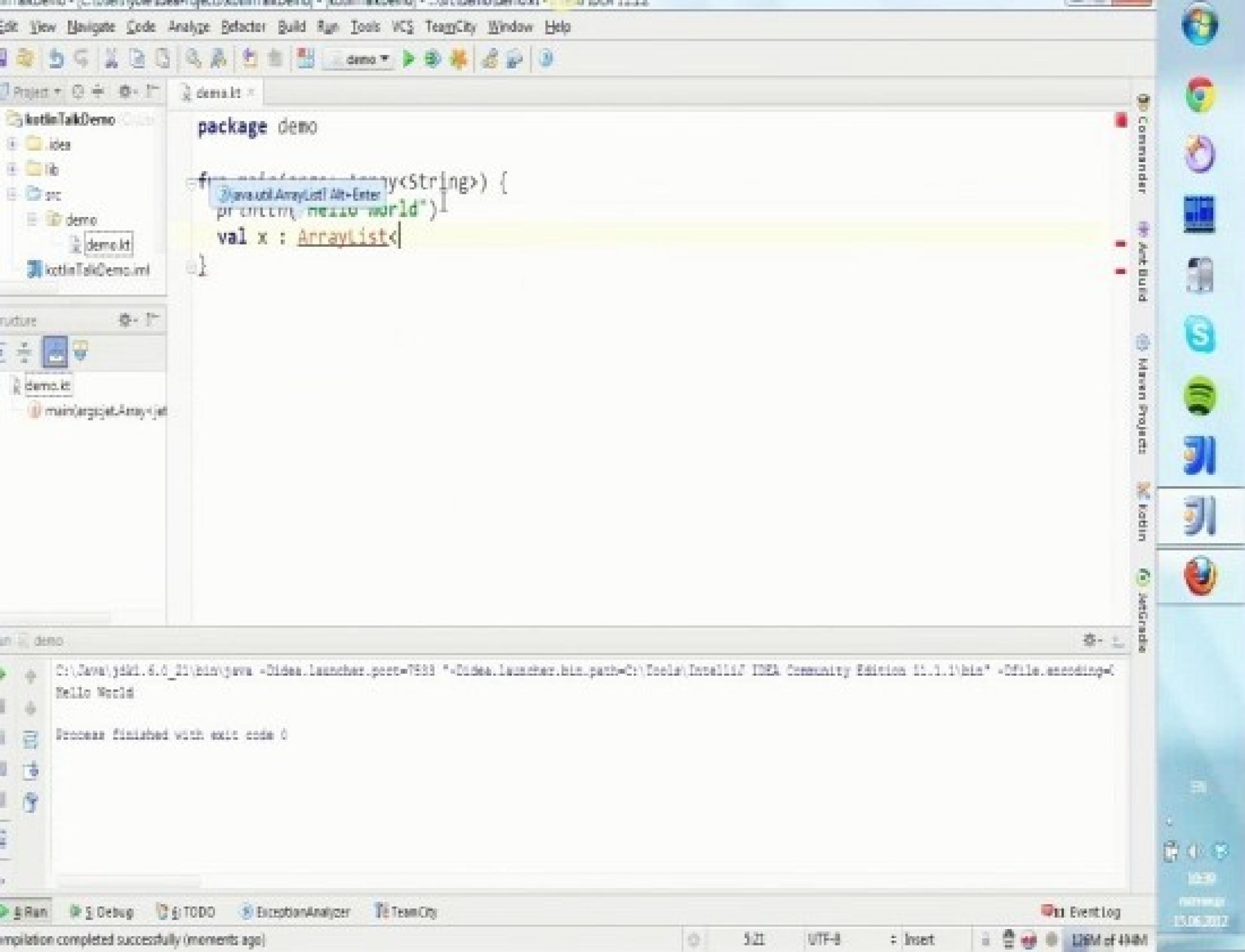
```
C:\Java\jdk1.6.0_21\bin>java -Didea.launcher.port=7533 -Didea.launcher.bin.path=C:\Tools\IntelliJ IDEA Community Edition 11.1.1\bin -Dfile.encoding=UTF-8  
Hello World  
  
Process finished with exit code 0
```







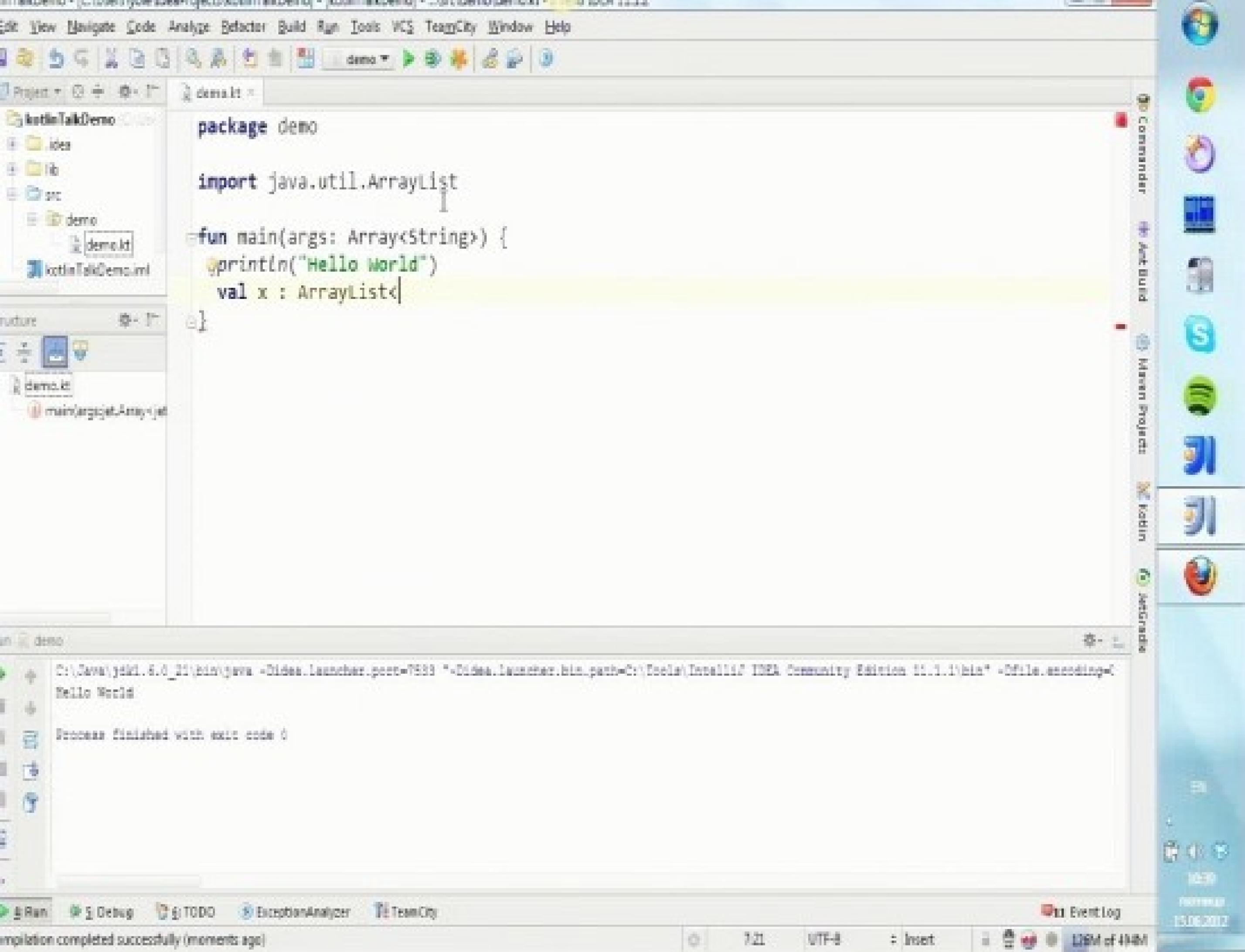




package demo

```
fun main(args: Array<String>) {  
    println("Hello World")  
    val x : ArrayList<  
}
```

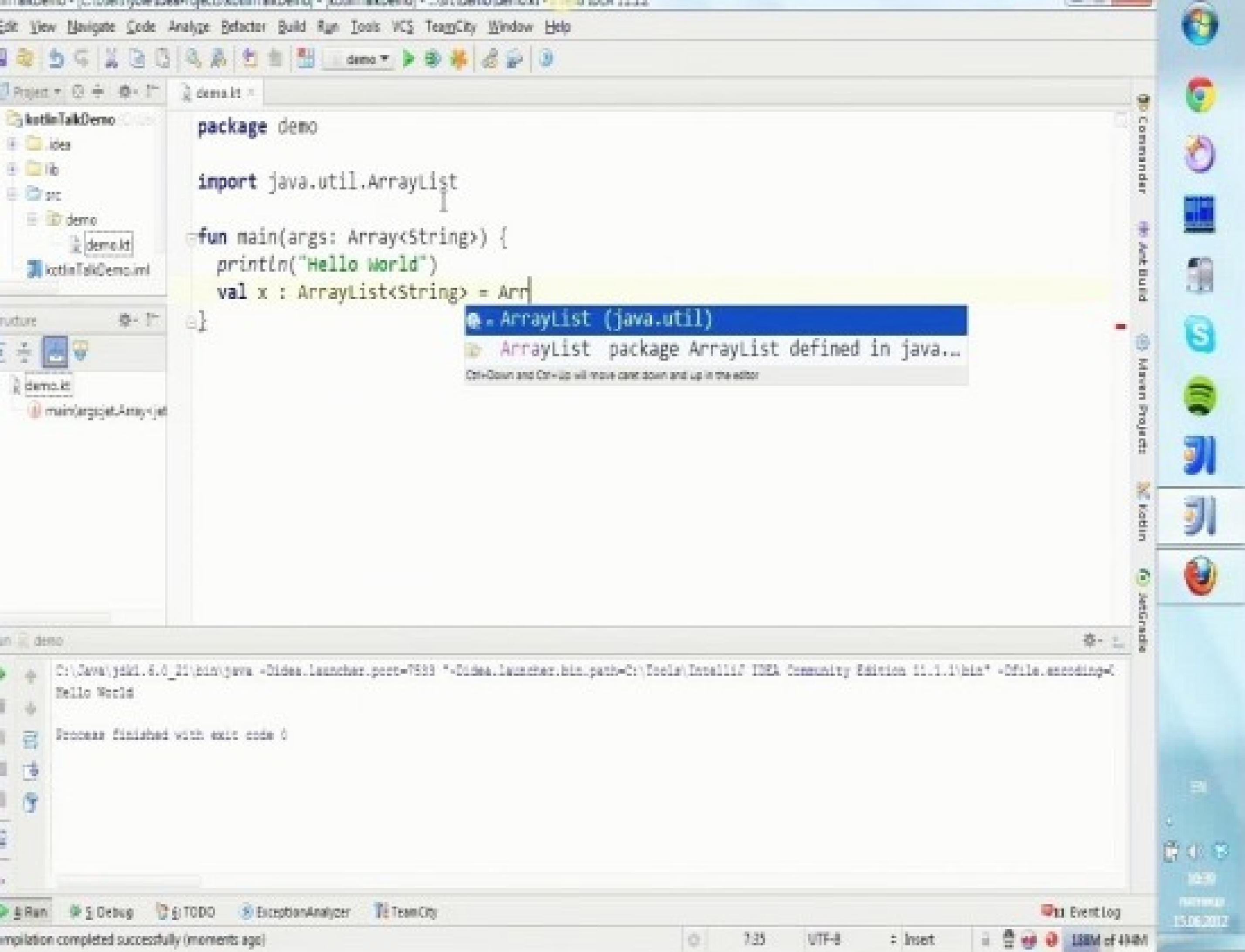
```
demo  
C:\Java\jdk1.8.0_21\bin>java -Didea.launcher.port=7533 -Didea.launcher.bin.path=C:\Tools\IntelliJ IDEA Community Edition 11.1.1\bin -Dfile.encoding=UTF-8  
Hello World  
Process finished with exit code 0
```



```
package demo

import java.util.ArrayList

fun main(args: Array<String>) {
    println("Hello World")
    val x : ArrayList<
}
```



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package demo

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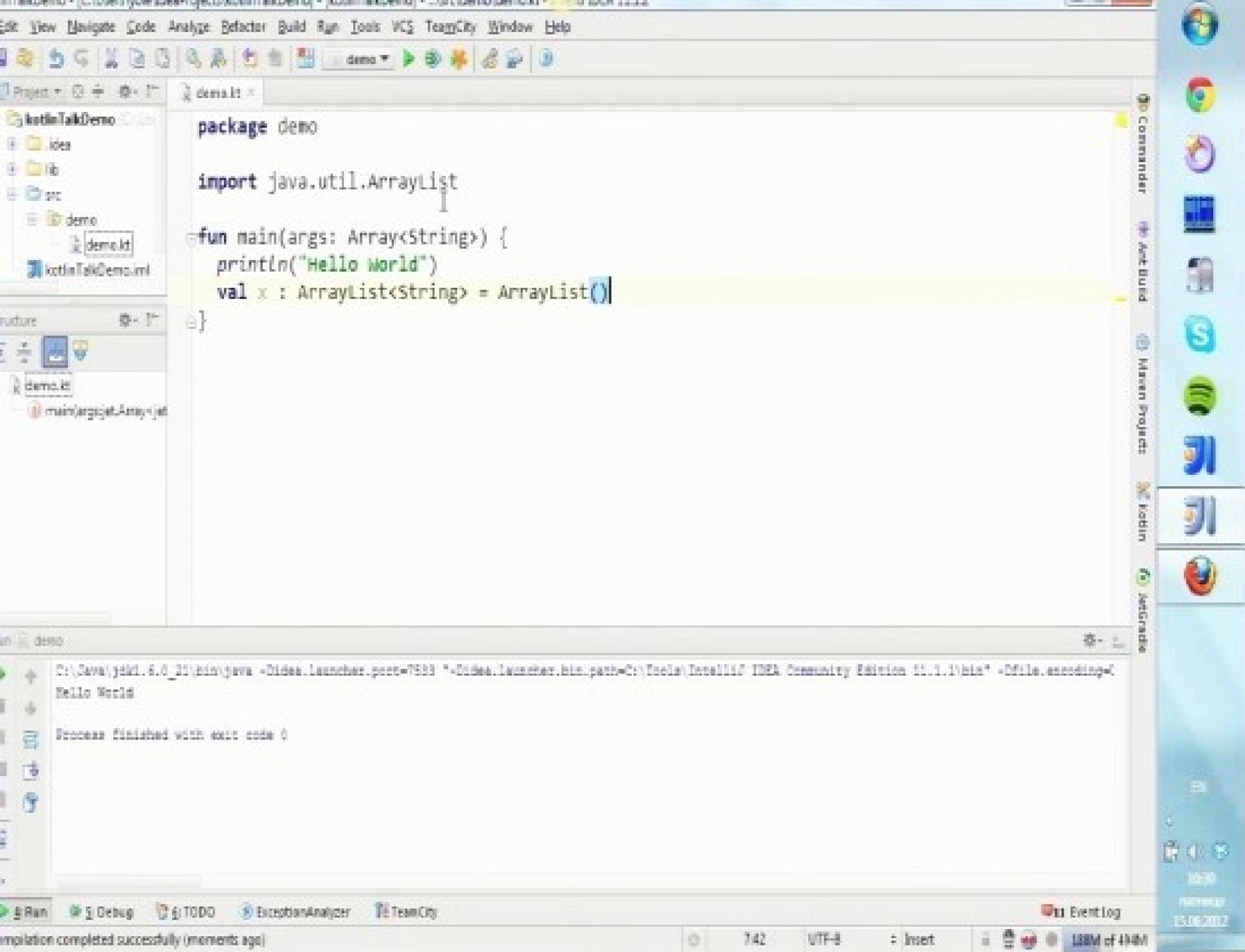
fun main(args: Array<String>) {
    println("Hello world")
    val x : ArrayList<String> = Arr
}
```

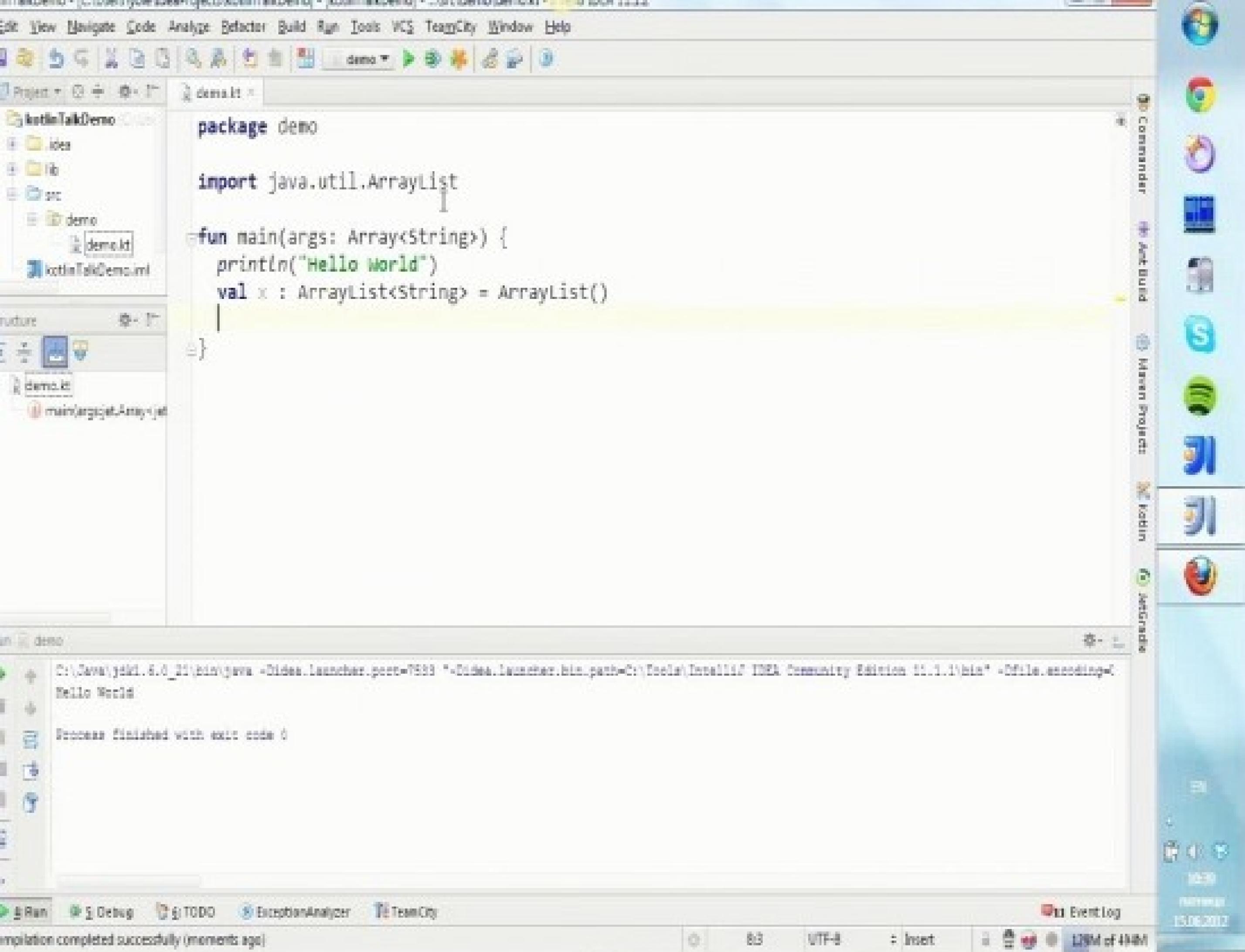
**ArrayList (java.util)**  
ArrayList package ArrayList defined in java...  
Ctrl-Down and Ctrl-Up will move caret down and up in the editor

```
C:\Java\jdk1.8.0_21\bin>java -Didea.launcher.port=7533 -Didea.launcher.bin.path=C:\Tools\IntelliJ IDEA Community Edition 11.1.1\bin* -Dfile.encoding=UTF-8
Hello World

Process finished with exit code 0
```







```
package demo

import java.util.ArrayList

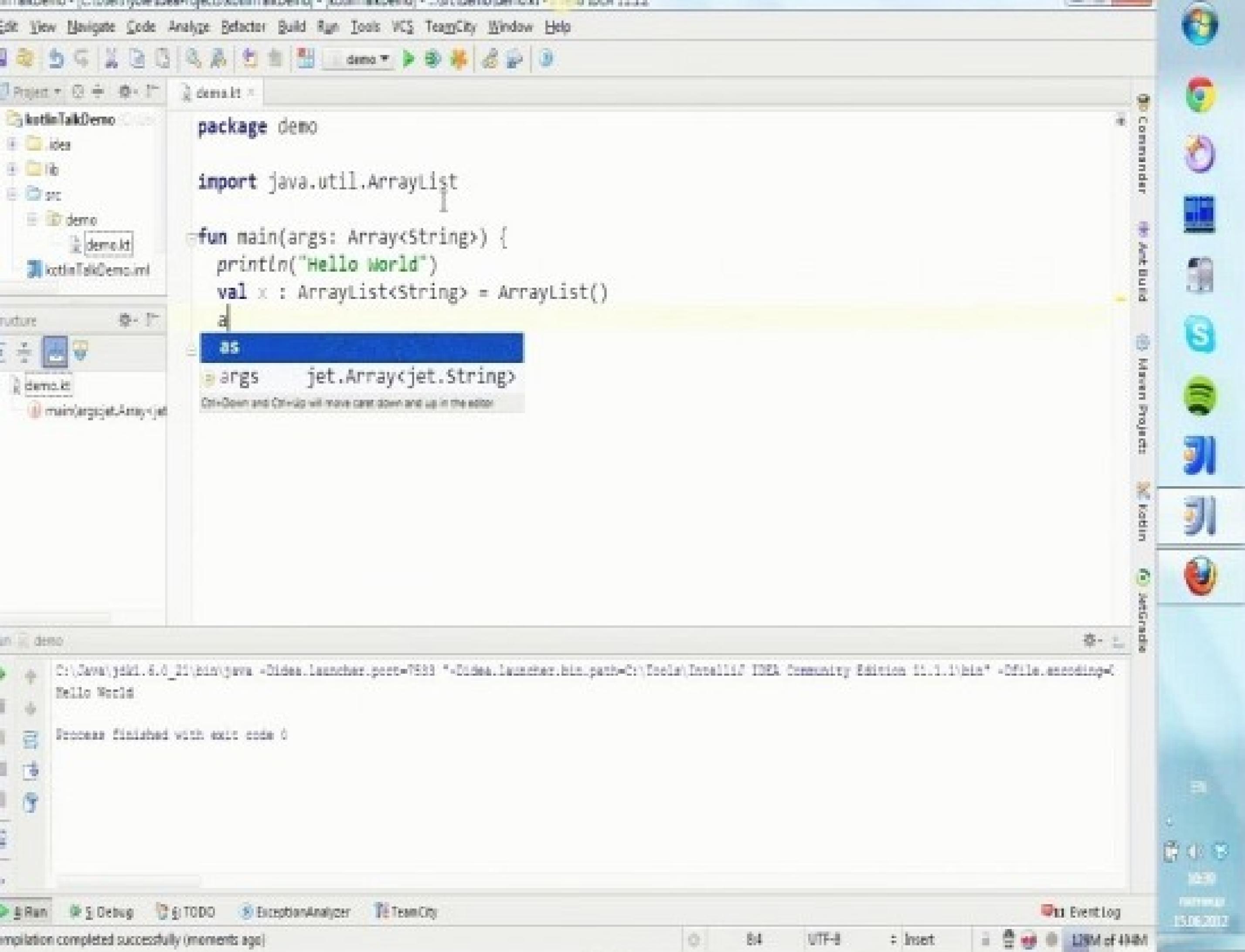
fun main(args: Array<String>) {
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}

```

```
C:\Java\jdk1.8.0_21\bin\java -Didea.launcher.port=7533 -Didea.launcher.bin.path=C:\Tools\IntelliJ IDEA Community Edition 11.1.1\bin -Dfile.encoding=UTF-8
Hello World

Process finished with exit code 0

```



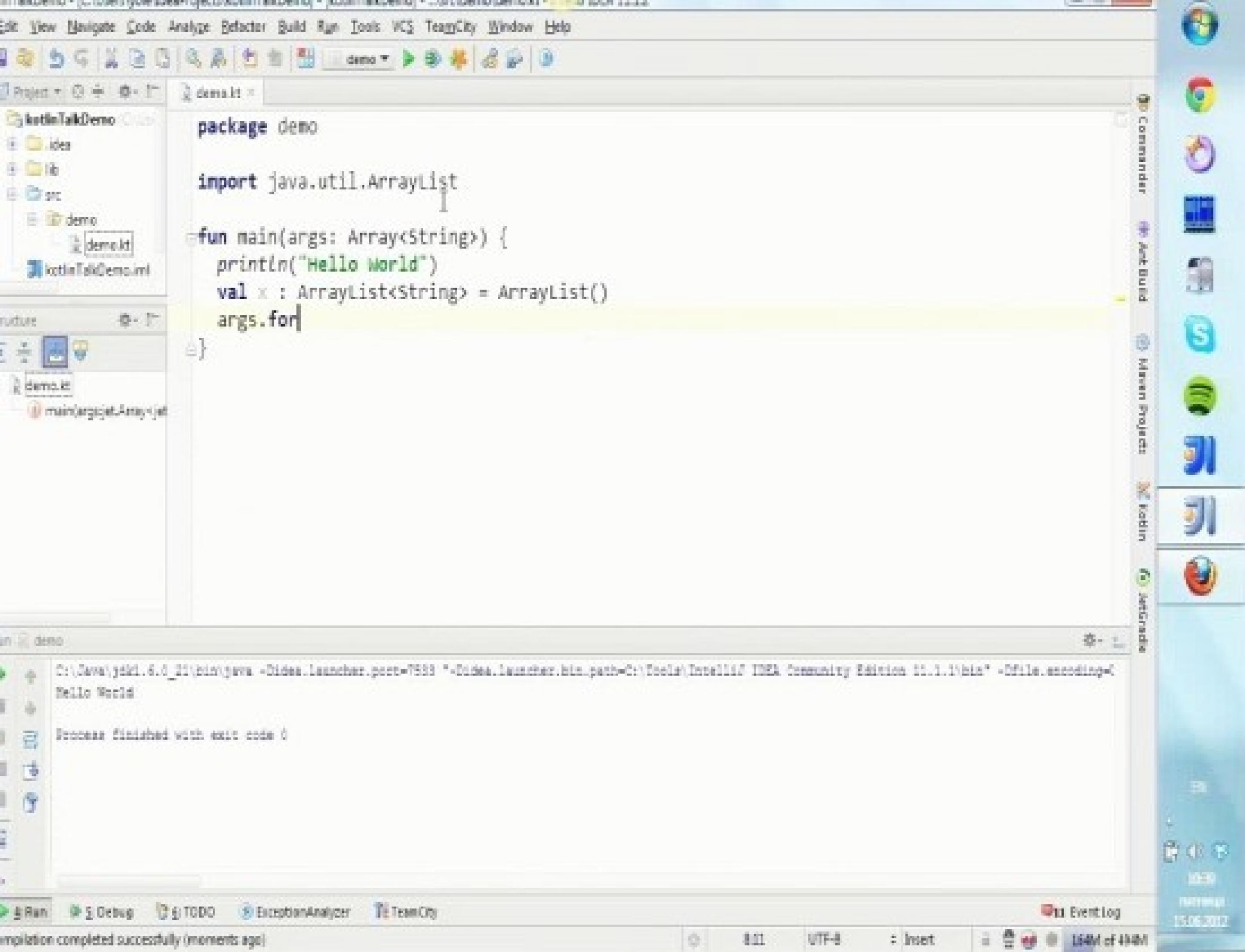
```
package demo

import java.util.ArrayList

fun main(args: Array<String>) {
    println("Hello world")
    val x : ArrayList<String> = ArrayList()
    a
}

args jet.Array<jet.String>
Ctrl+Down and Ctrl+Up will move caret down and up in the editor
```

C:\Java\jdk1.8.0\_21\bin\java -Didea.launcher.port=7533 -Didea.launcher.bin.path=C:\Tools\IntelliJ IDEA Community Edition 11.1.1\bin -Dfile.encoding=UTF-8  
Hello World  
Process finished with exit code 0



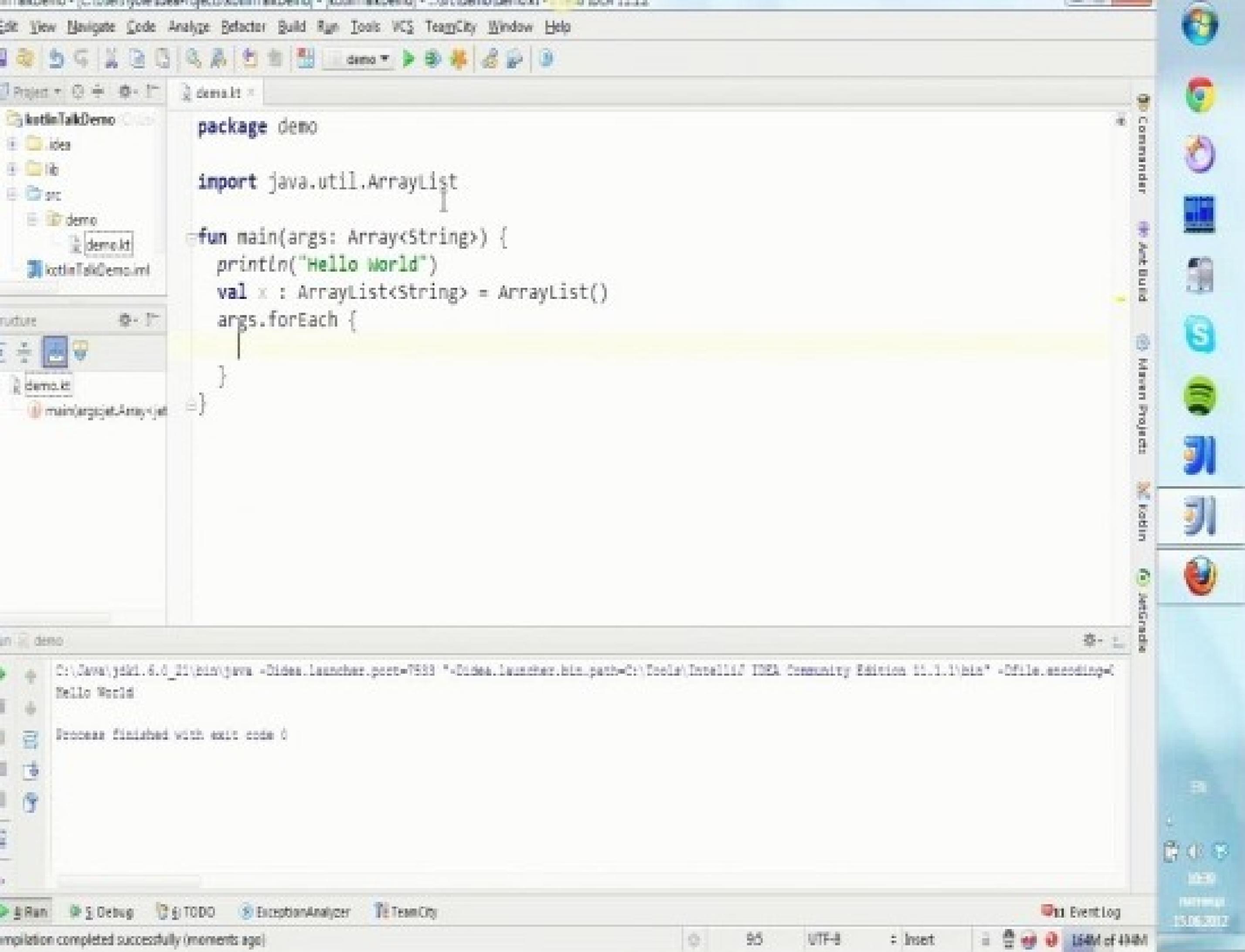
```
package demo

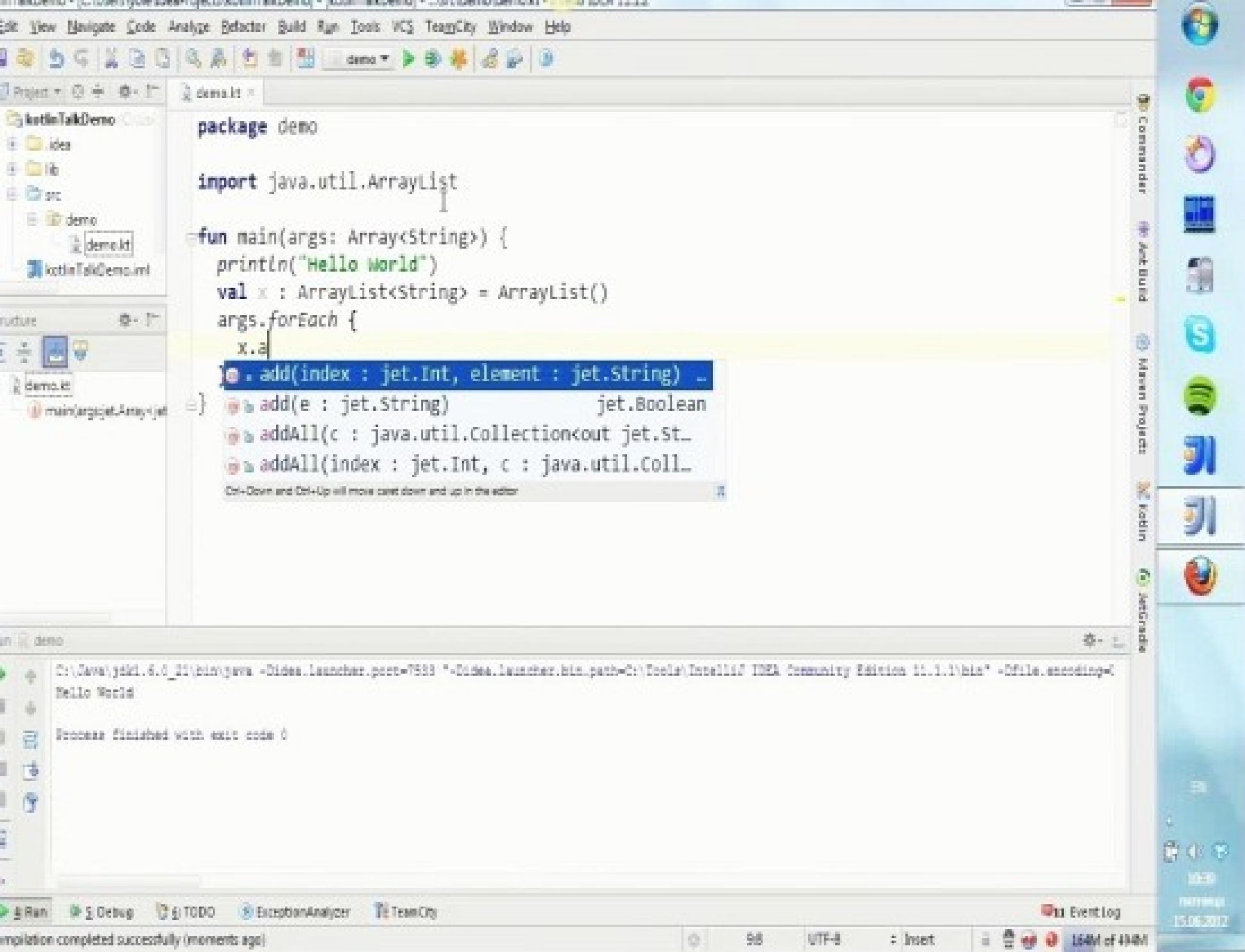
import java.util.ArrayList

fun main(args: Array<String>) {
    println("Hello world")
    val x : ArrayList<String> = ArrayList()
    args.for
}
```

```
C:\Java\jdk1.6.0_21\bin>java -Didea.launcher.port=7533 -Didea.launcher.bin.path=C:\Tools\IntelliJ IDEA Community Edition 11.1.1\bin -Dfile.encoding=UTF-8
Hello World

Process finished with exit code 0
```





```
package demo
```

```
import java.util.ArrayList
```

```
fun main(args: Array<String>) {  
    println("Hello world")  
    val x : ArrayList<String> = ArrayList()  
    args.forEach {  
        x.add
```

```
        .add(index : jet.Int, element : jet.String) -
```

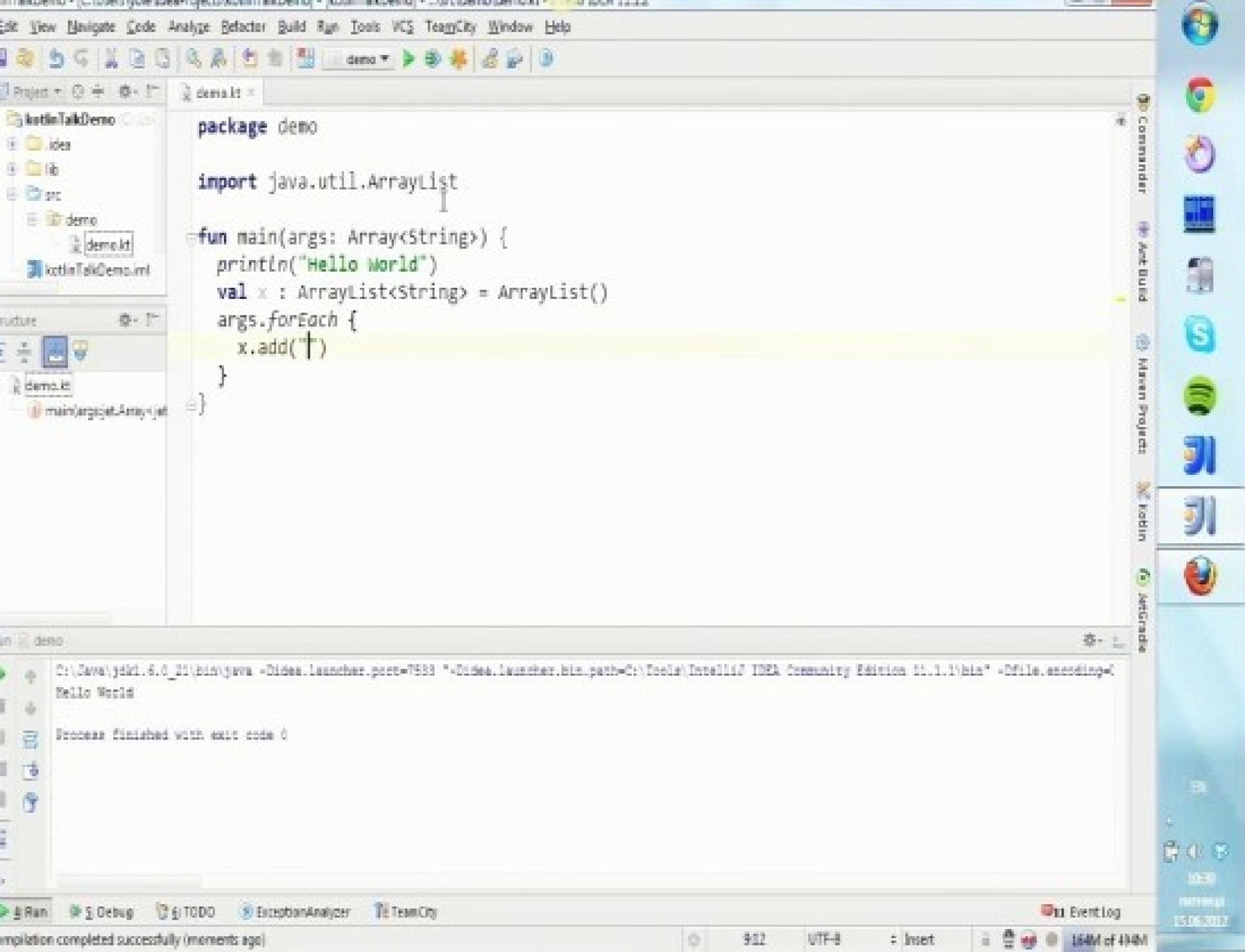
```
        add(e : jet.String) jet.Boolean
```

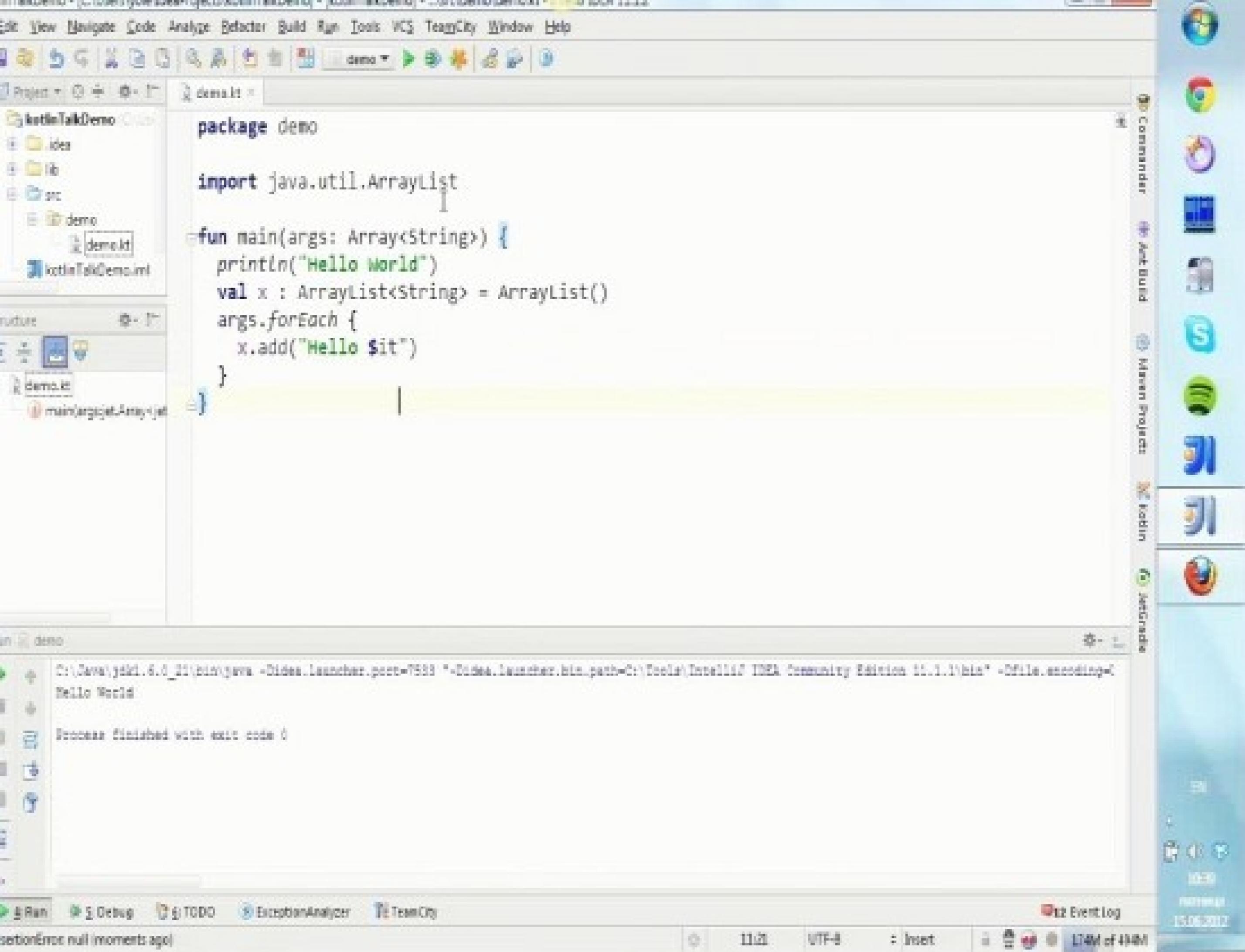
```
        addAll(c : java.util.Collection<out jet.St.
```

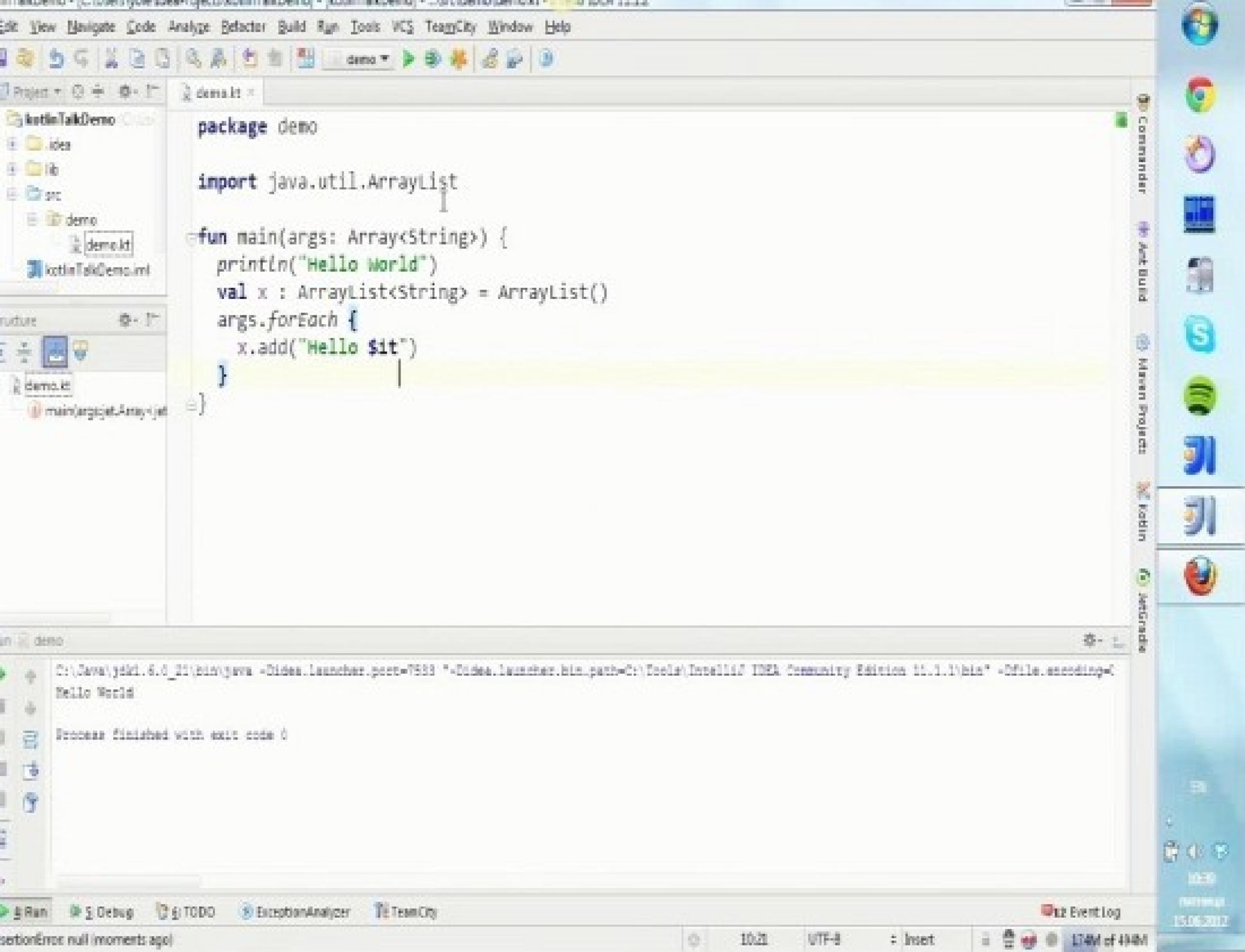
```
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demo  
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package demo

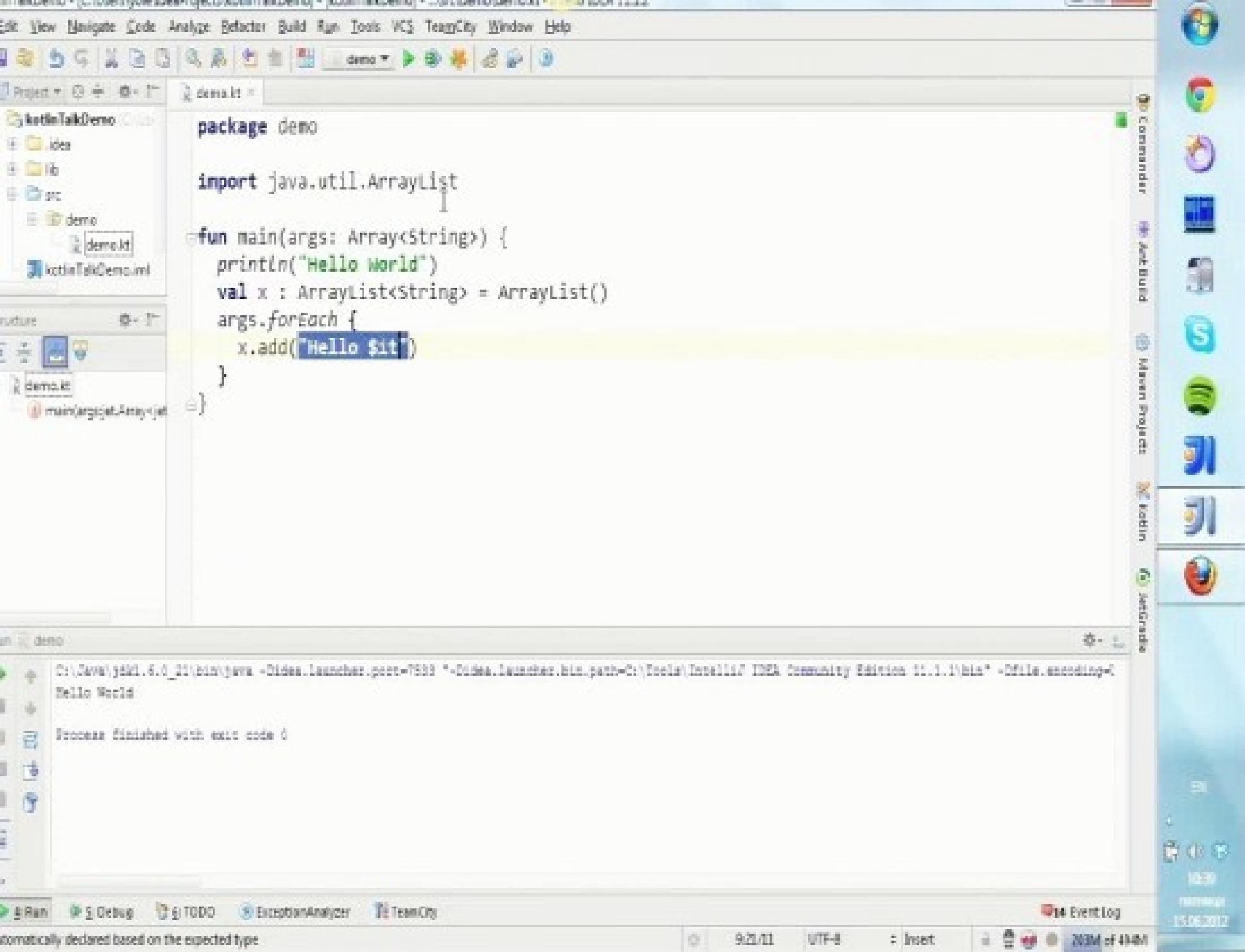
import java.util.ArrayList

fun main(args: Array<String>) {
    println("Hello world")
    val x : ArrayList<String> = ArrayList()
    args.forEach {
        x.add("Hello $it")
    }
}
```

```
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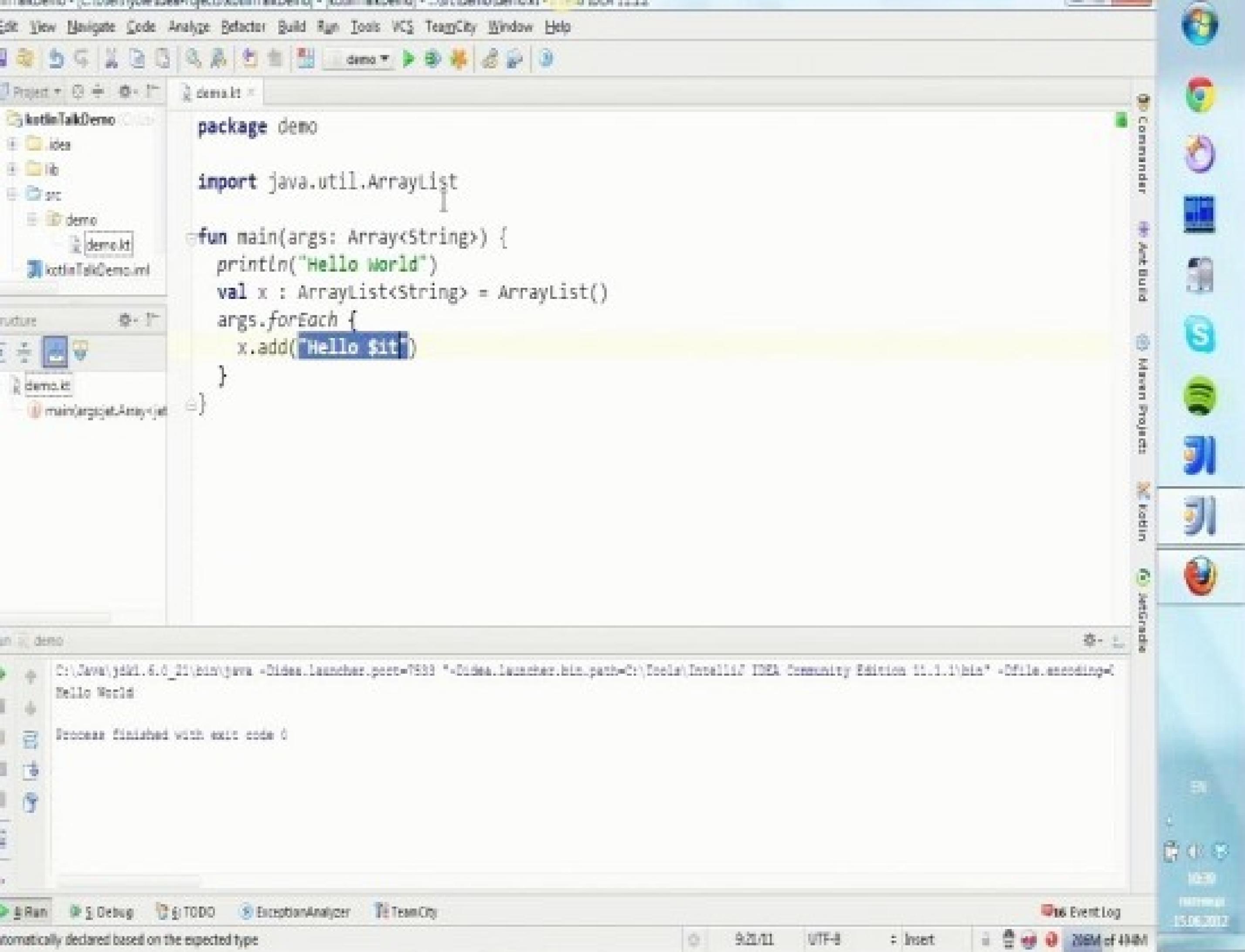
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package demo

import java.util.ArrayList

fun main(args: Array<String>) {
    println("Hello world")
    val x : ArrayList<String> = ArrayList()
    args.forEach {
        x.add("Hello $it")
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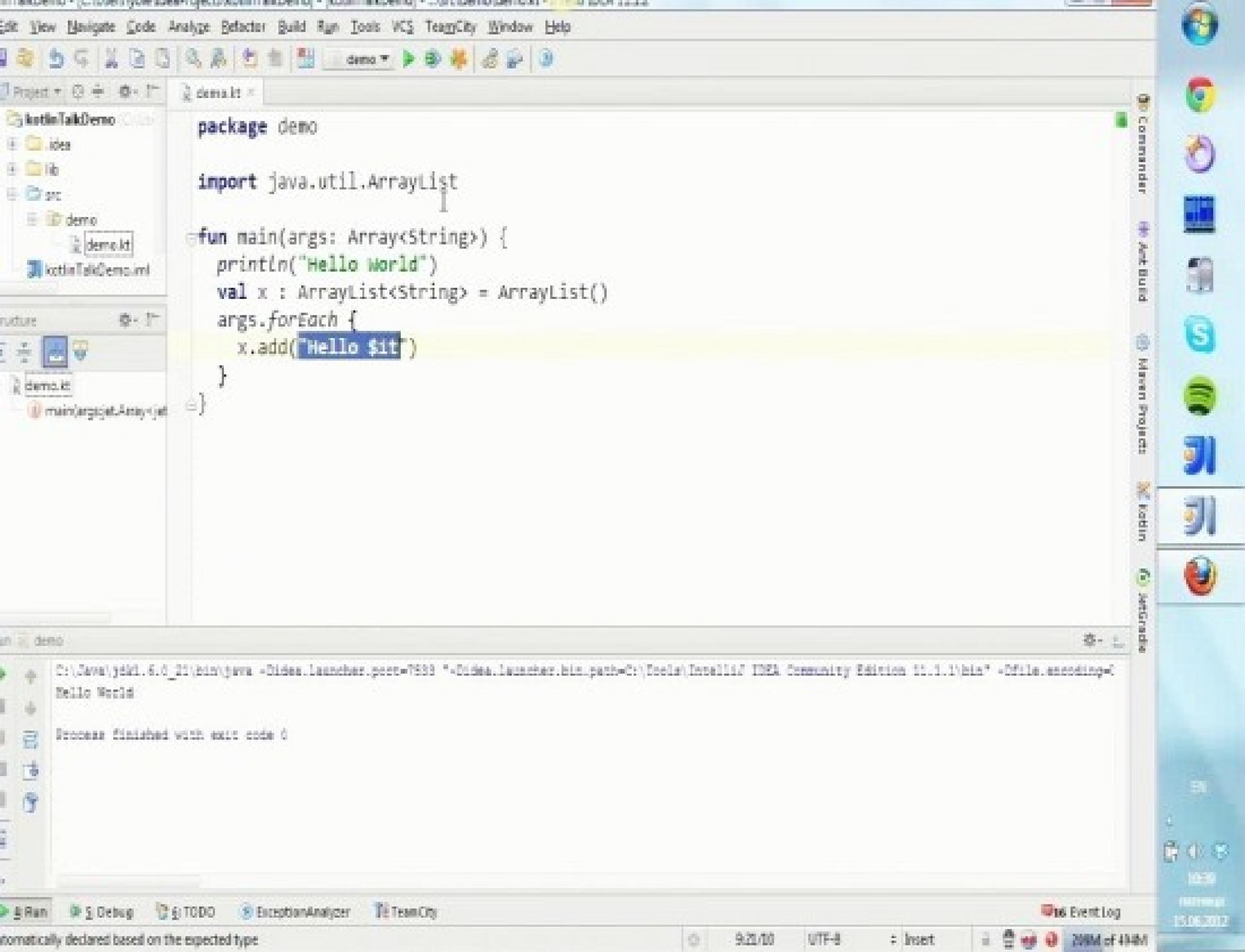
```
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```

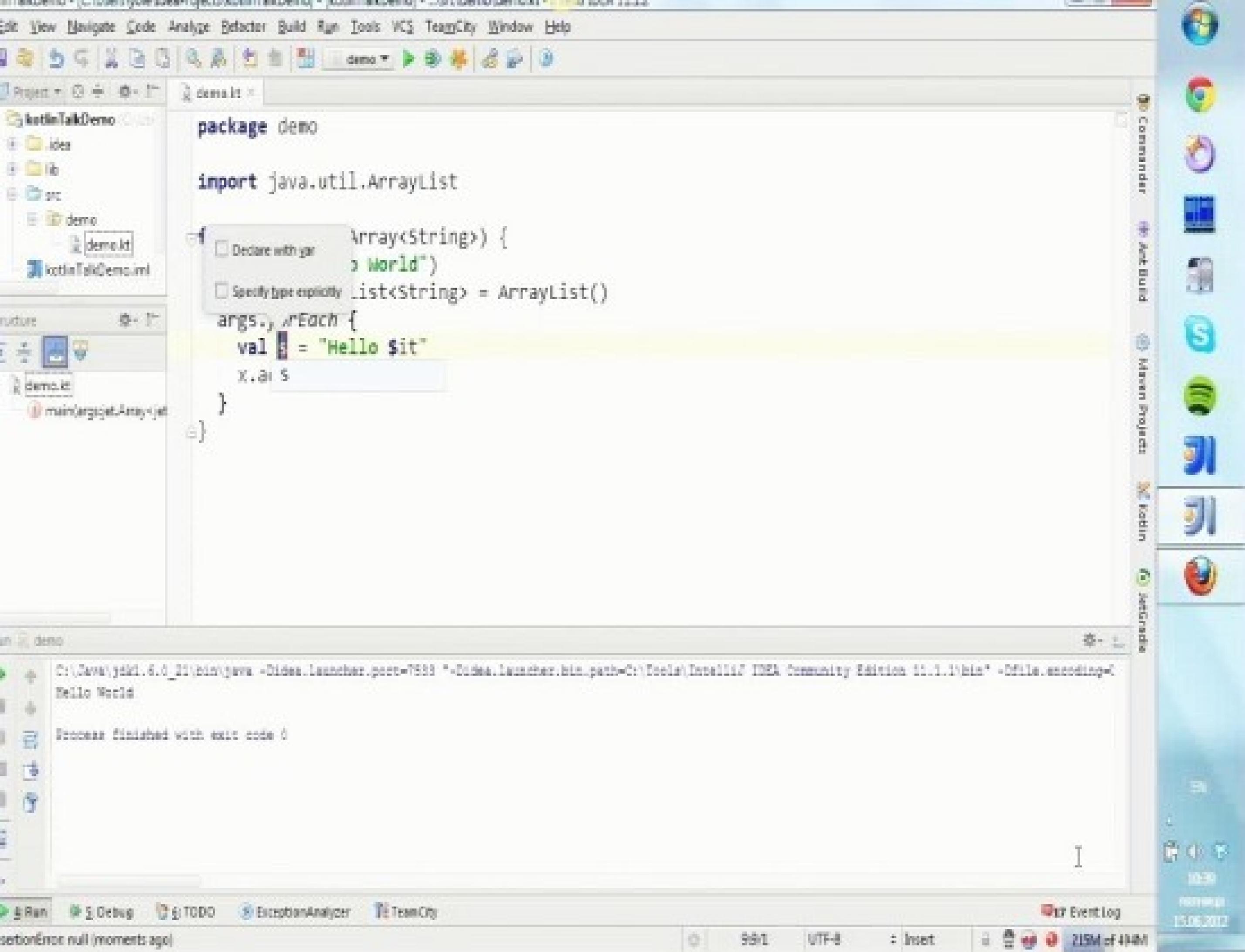
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import java.util.ArrayList
```

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fun main(args: Array<String>) {  
    println("Hello world")  
    val x : ArrayList<String> = ArrayList()  
    args.forEach {  
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    }  
}
```

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C:\Java\jdk1.6.0_21\bin\java -Didea.launcher.port=7533 "-Didea.launcher.bin.path=C:\Tools\IntelliJ IDEA Community Edition 11.1.1\bin" -Dfile.encoding=UTF-8  
Hello World  
Process finished with exit code 0
```







- kotlinaltdemo
- idea
- lib
- src
- demo
- demo.kt
- kotlinaltdemo.iml

```
package demo

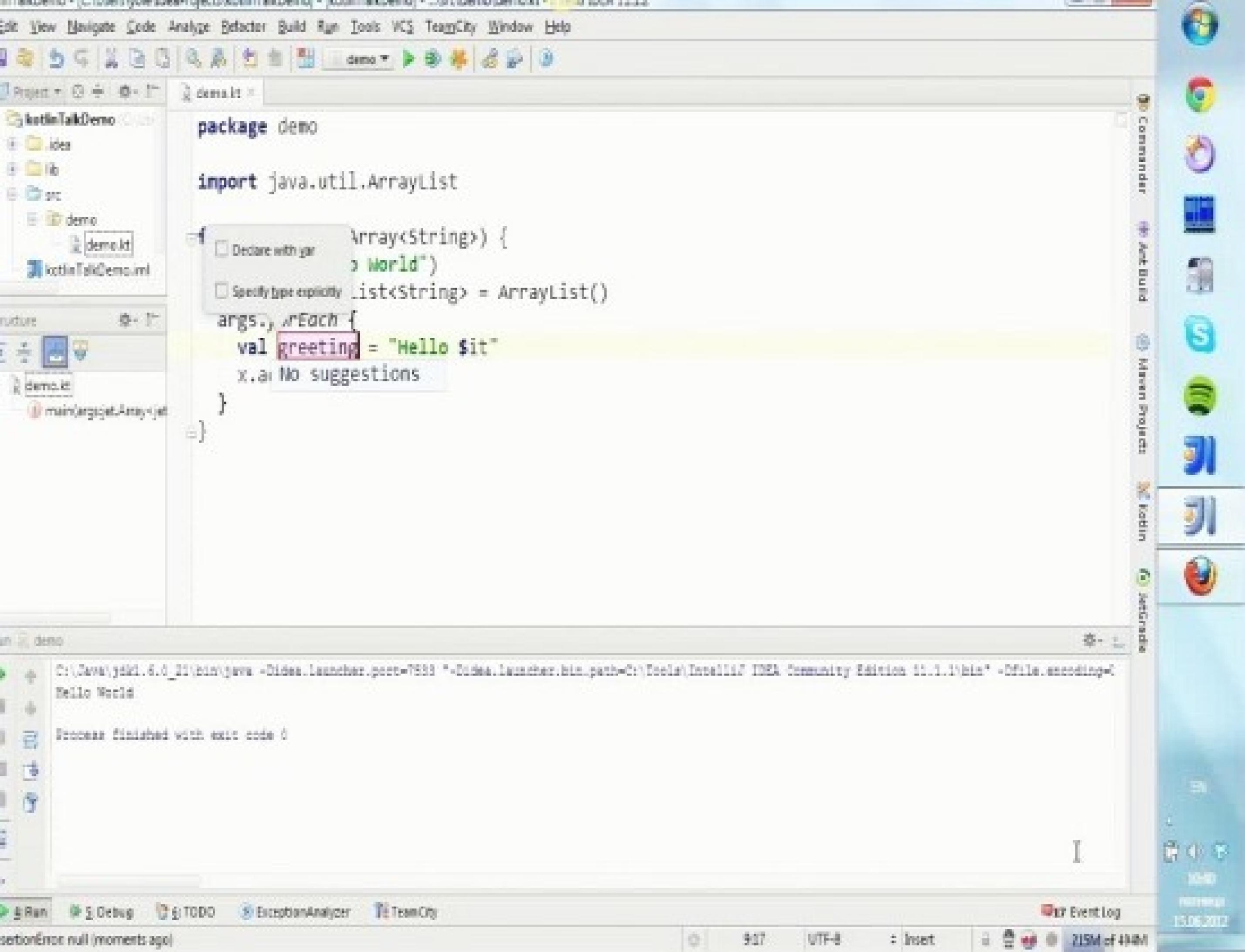
import java.util.ArrayList

fun main(args: Array<String>){
    <input type="checkbox" value="declareWithVar"/> Declare with var world = "world"
    <input type="checkbox" value="specifyTypeExplicitly"/> Specify type explicitly list<String> = ArrayList()
    args.forEach {
        val s = "Hello $it"
        x: @S
    }
}
```

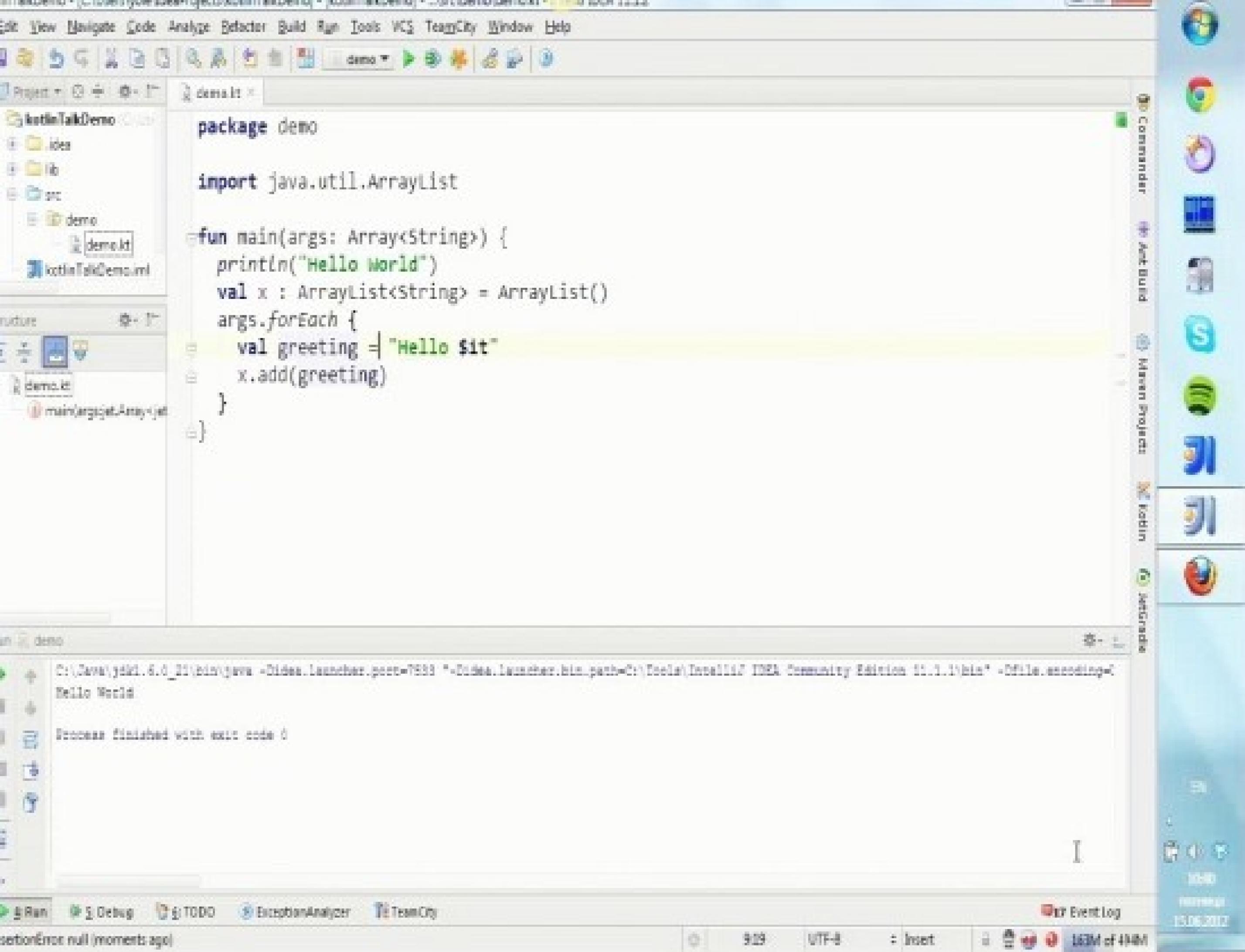
- demo.kt
- main/args:jet.Array<jet

```
C:\Java\jdk1.6.0_21\bin\java -Didea.launcher.port=7533 -Didea.launcher.bin.path=C:\Tools\IntelliJ IDEA Community Edition 11.1.1\bin -Dfile.encoding=UTF-8
Hello World

Process finished with exit code 0
```







```
package demo

import java.util.ArrayList

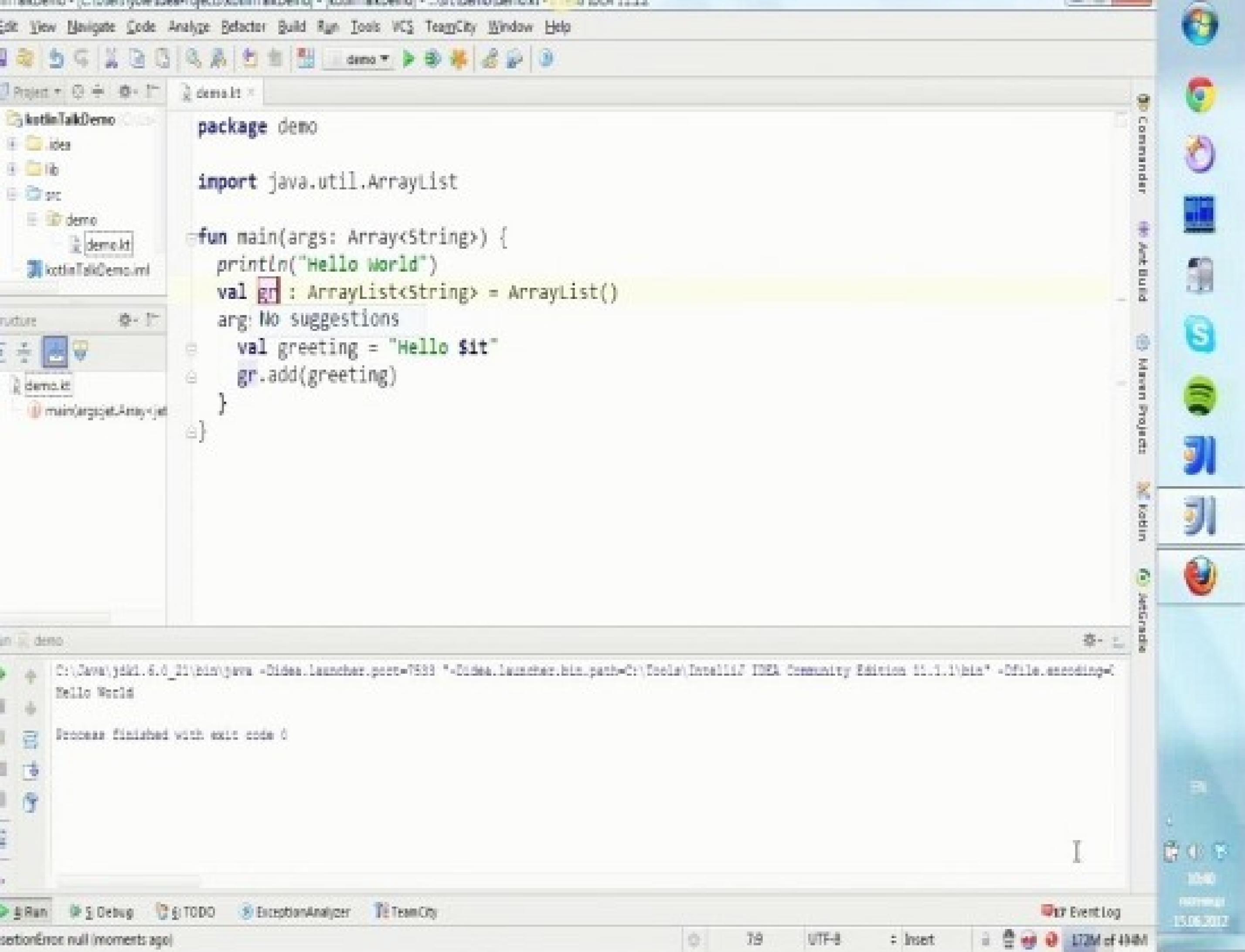
fun main(args: Array<String>) {
    println("Hello world")
    val x : ArrayList<String> = ArrayList()
    args.forEach {
        val greeting = "Hello $it"
        x.add(greeting)
    }
}
```

```
C:\Java\jdk1.8.0_11\bin\java -Didea.launcher.port=7533 -Didea.launcher.bin.path=C:\Tools\IntelliJ IDEA Community Edition 11.1.1\bin -Dfile.encoding=UTF-8
Hello World

Process finished with exit code 0
```







```
package demo

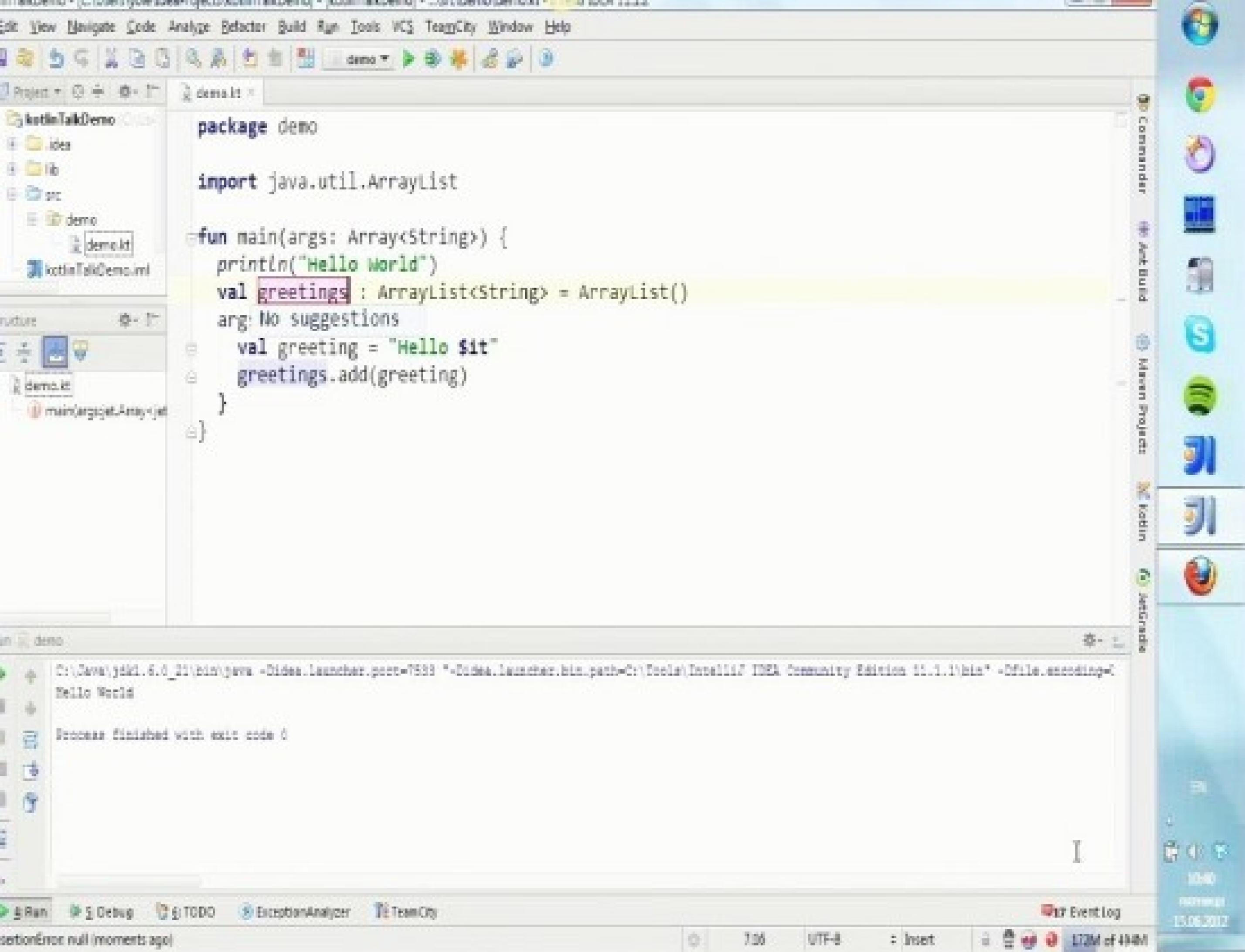
import java.util.ArrayList

fun main(args: Array<String>) {
    println("Hello world")
    val gr: ArrayList<String> = ArrayList()
    arg: No suggestions
    val greeting = "Hello $it"
    gr.add(greeting)
}
```

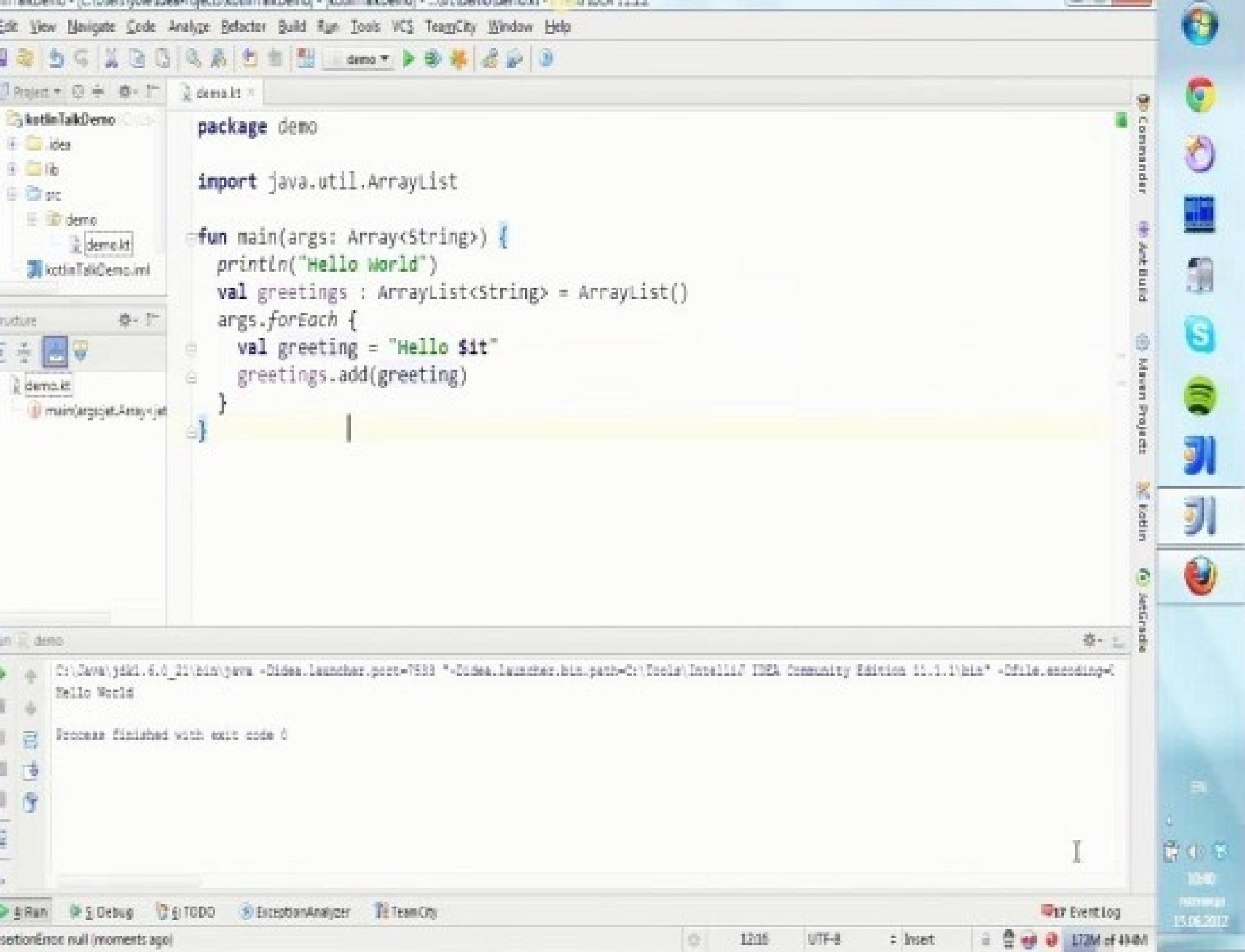
```
C:\Java\jdk1.6.0_21\bin>java -Didea.launcher.port=7533 -Didea.launcher.bin.path=C:\Tools\IntelliJ IDEA Community Edition 11.1.1\bin -Dfile.encoding=UTF-8
Hello World

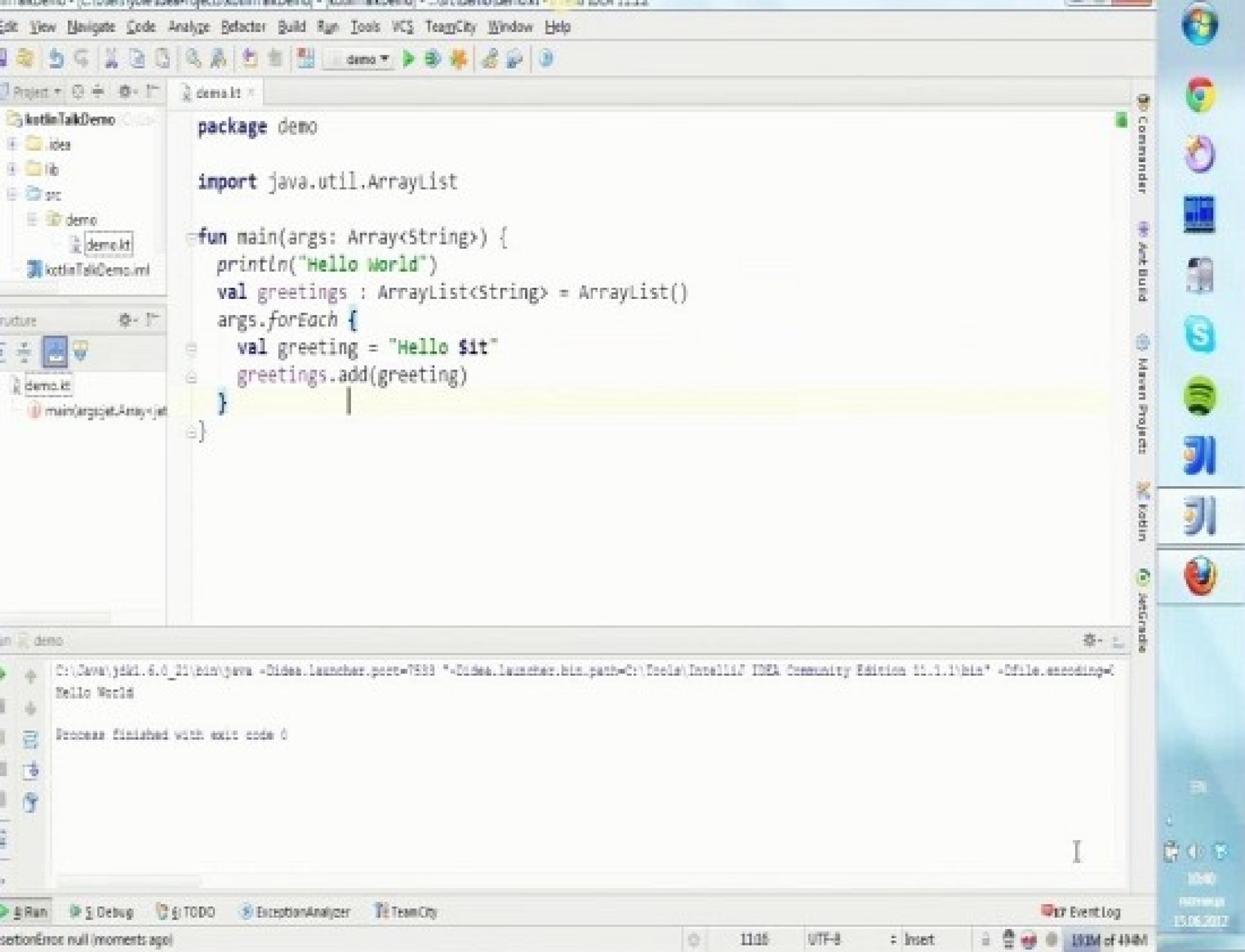
Process finished with exit code 0
```











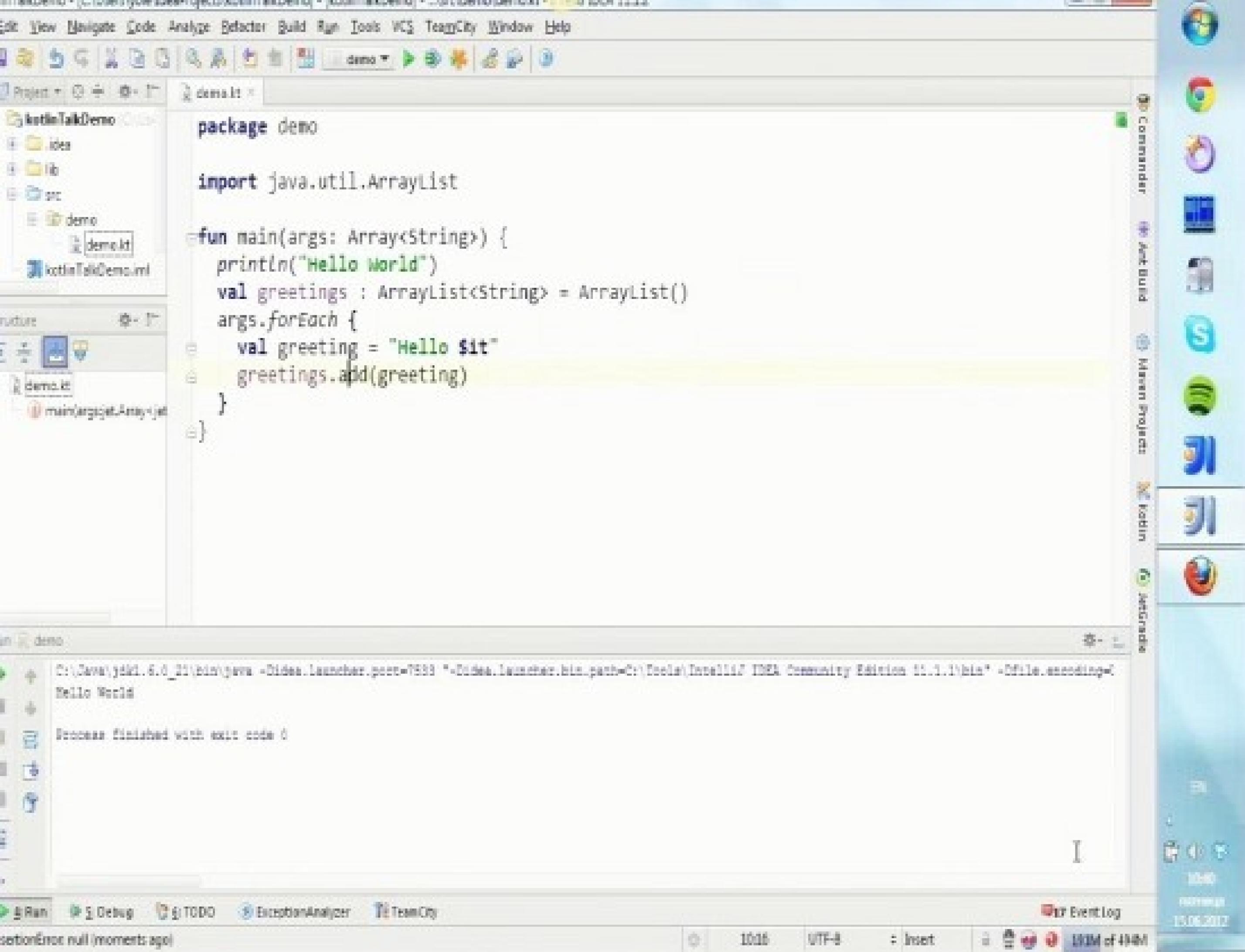
```
package demo

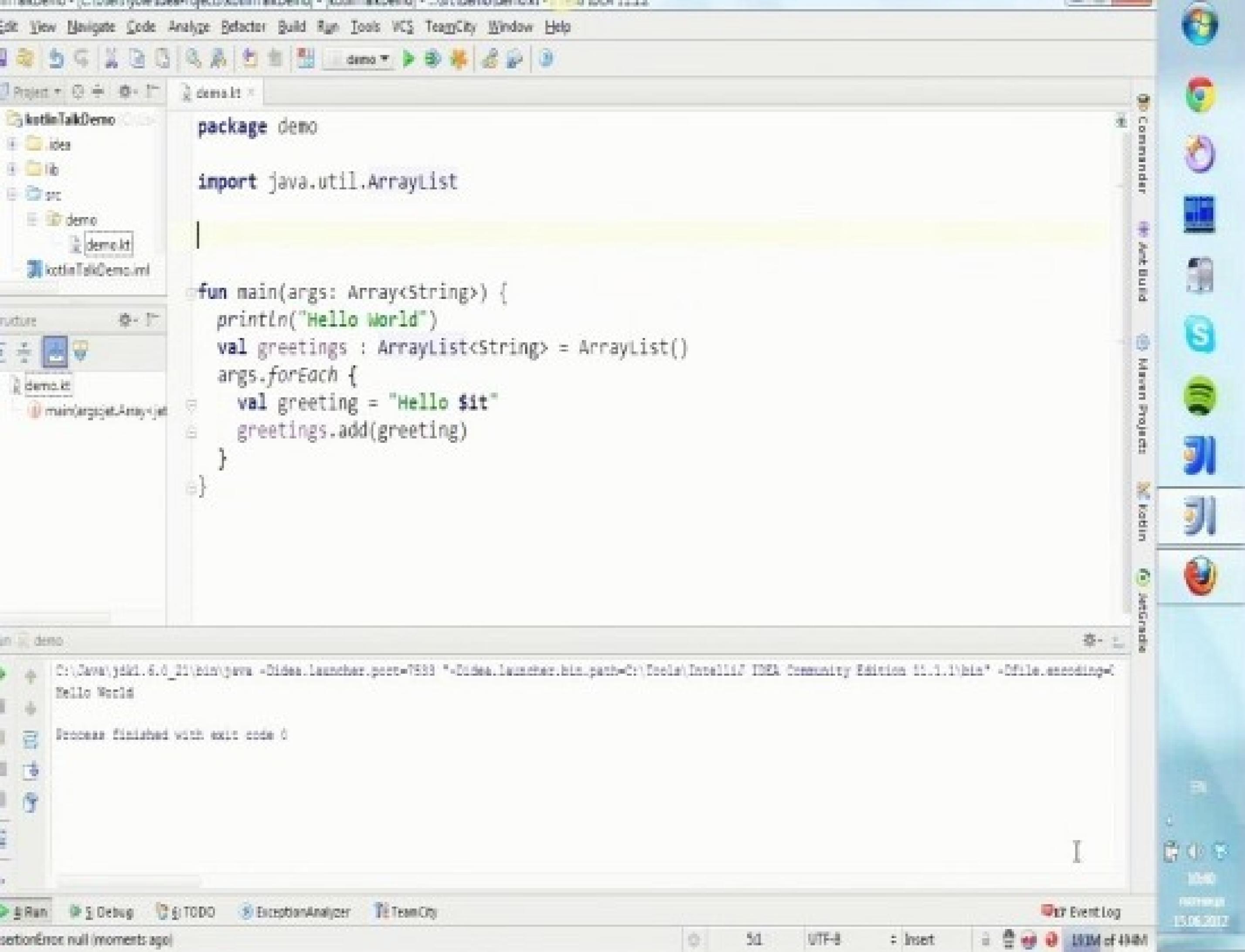
import java.util.ArrayList

fun main(args: Array<String>) {
    println("Hello World")
    val greetings : ArrayList<String> = ArrayList()
    args.forEach {
        val greeting = "Hello $it"
        greetings.add(greeting)
    }
}
```

```
C:\Java\jdk1.6.0_21\bin\java -Didea.launcher.port=7533 "-Didea.launcher.bin.path=C:\Tools\IntelliJ IDEA Community Edition 11.1.1\bin" -Dfile.encoding=UTF-8
Hello World

Process finished with exit code 0
```





```
package demo

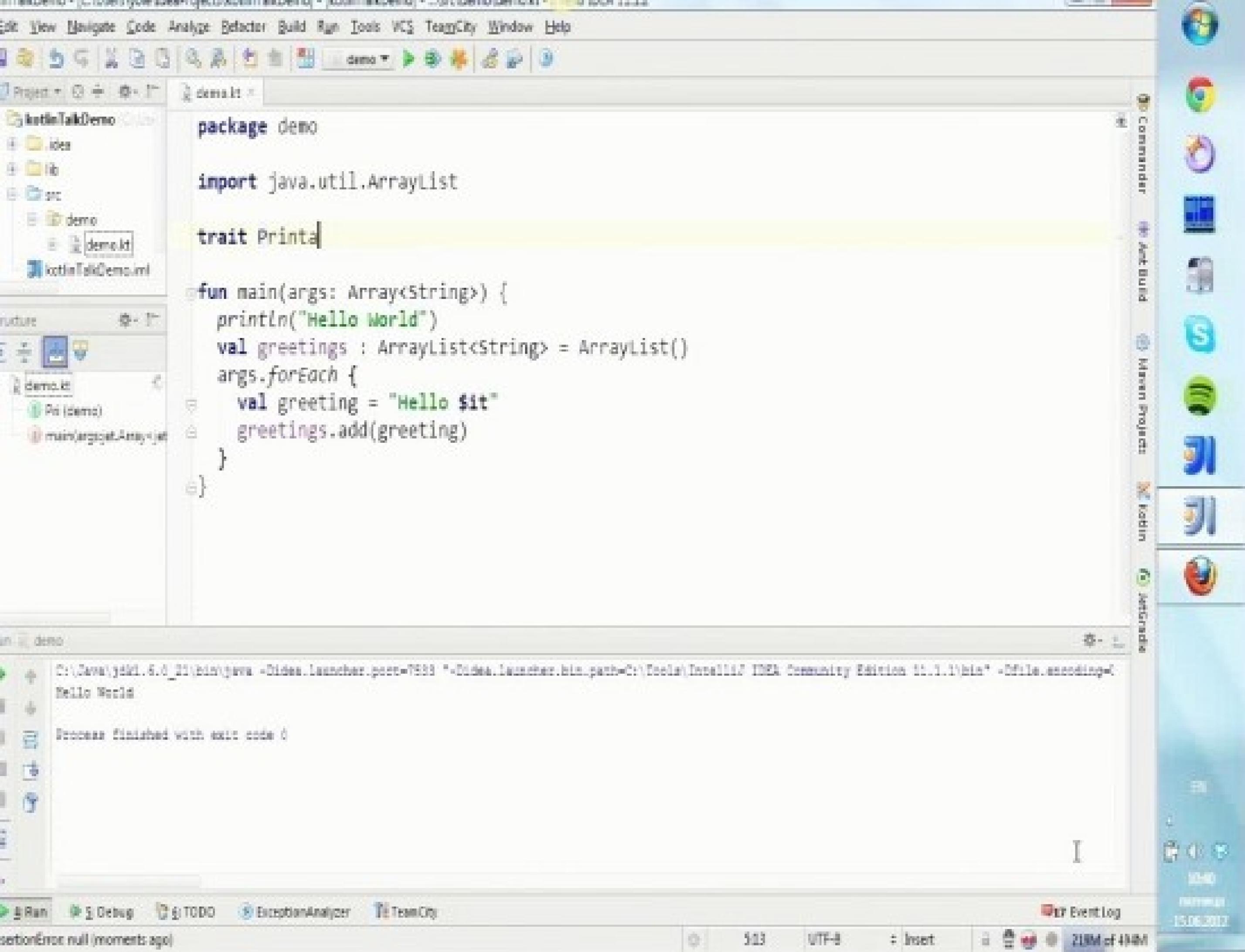
import java.util.ArrayList

|

fun main(args: Array<String>) {
    println("Hello World")
    val greetings : ArrayList<String> = ArrayList()
    args.forEach {
        val greeting = "Hello $it"
        greetings.add(greeting)
    }
}
```

```
C:\Java\jdk1.6.0_21\bin>java -Didea.launcher.port=7533 "-Didea.launcher.bin.path=C:\Tools\IntelliJ IDEA Community Edition 11.1.1\bin" -Dfile.encoding=UTF-8
Hello World

Process finished with exit code 0
```



```
package demo

import java.util.ArrayList

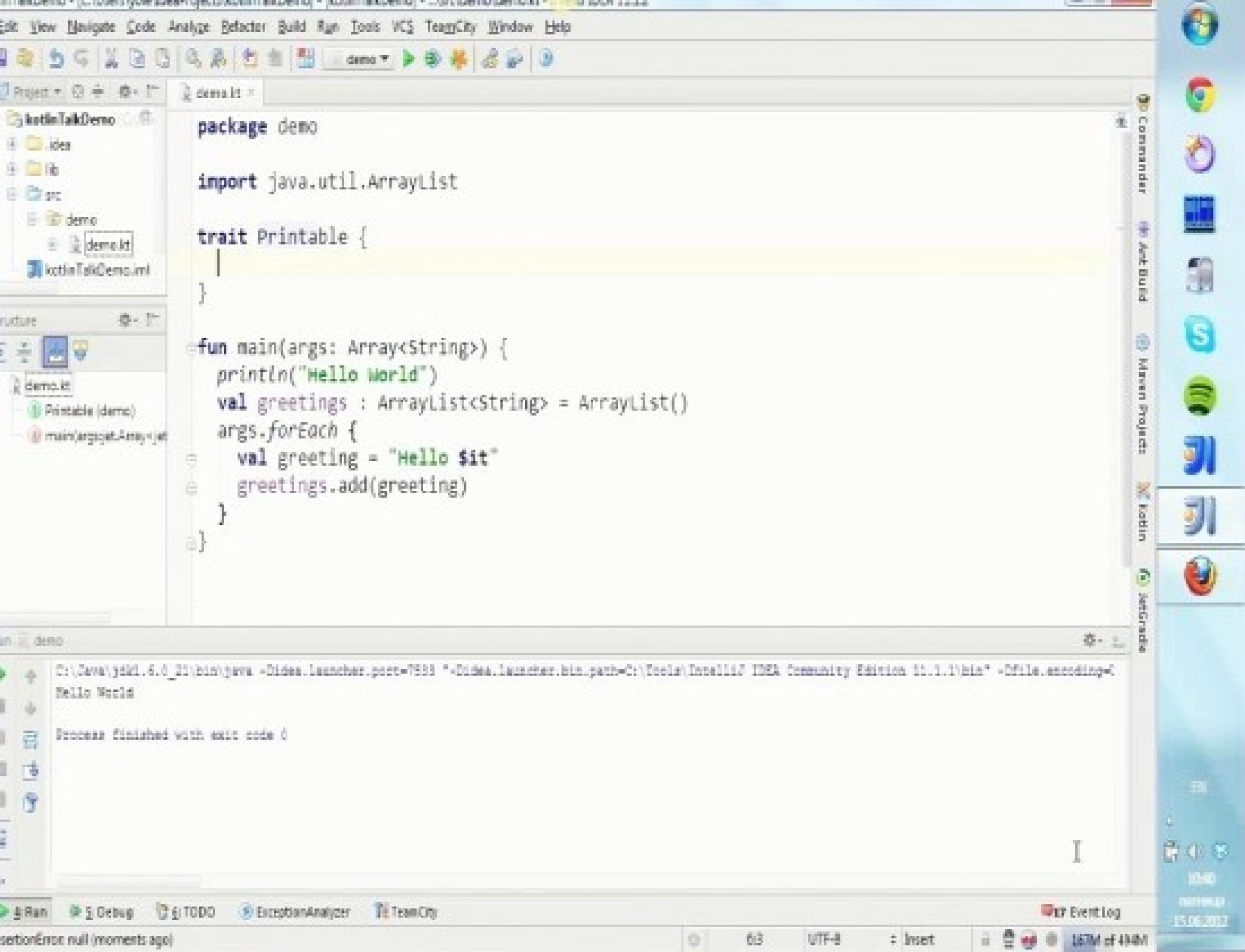
trait Printa

fun main(args: Array<String>) {
    println("Hello World")
    val greetings : ArrayList<String> = ArrayList()
    args.forEach {
        val greeting = "Hello $it"
        greetings.add(greeting)
    }
}
```

```
C:\Java\jdk1.6.0_21\bin>java -Didea.launcher.port=7533 -Didea.launcher.bin.path=C:\Tools\IntelliJ IDEA Community Edition 11.1.1\bin* -Dfile.encoding=UTF-8
Hello World

Process finished with exit code 0
```





```
package demo

import java.util.ArrayList

trait Printable {
}

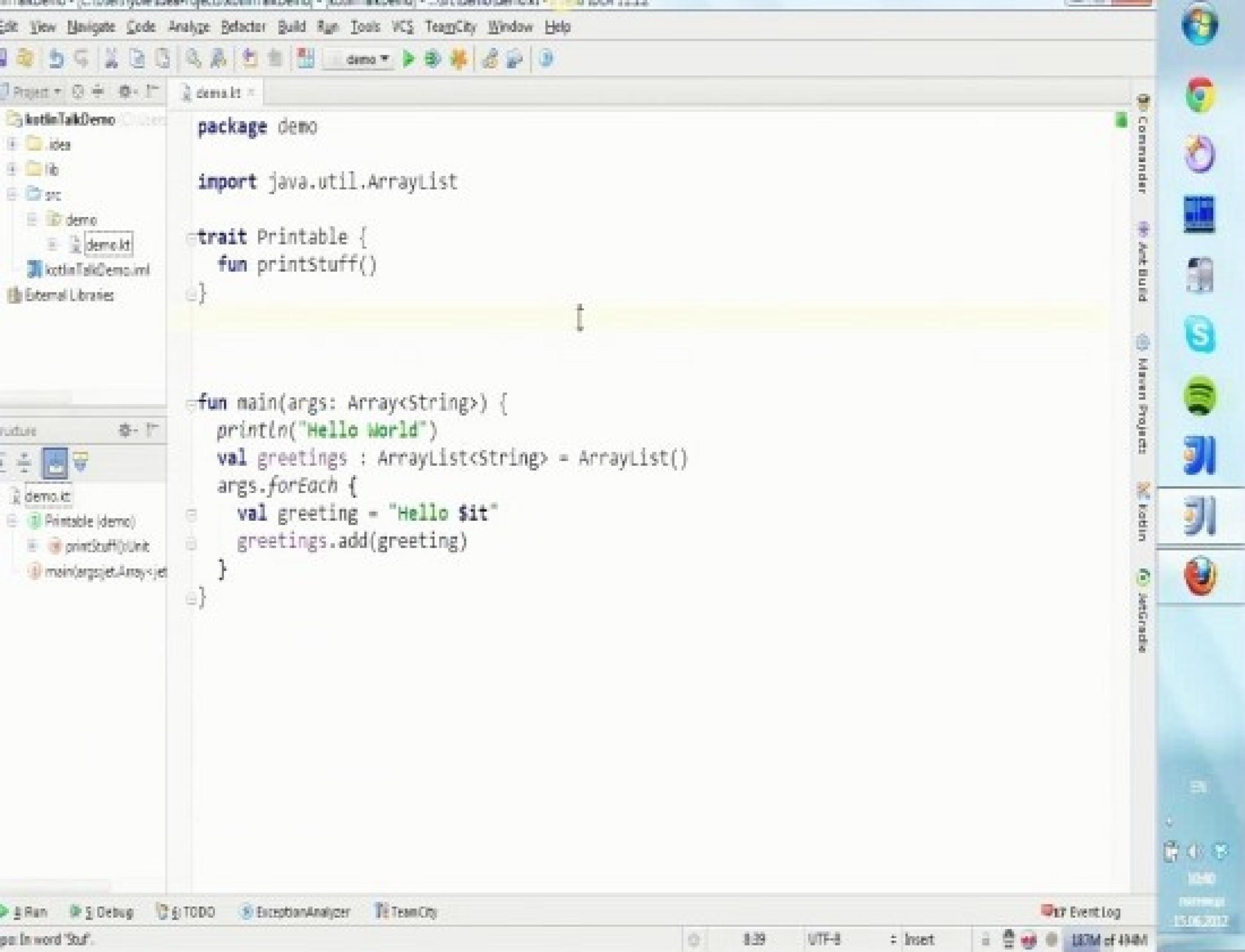
fun main(args: Array<String>) {
    println("Hello world")
    val greetings : ArrayList<String> = ArrayList()
    args.forEach {
        val greeting = "Hello $it"
        greetings.add(greeting)
    }
}
```

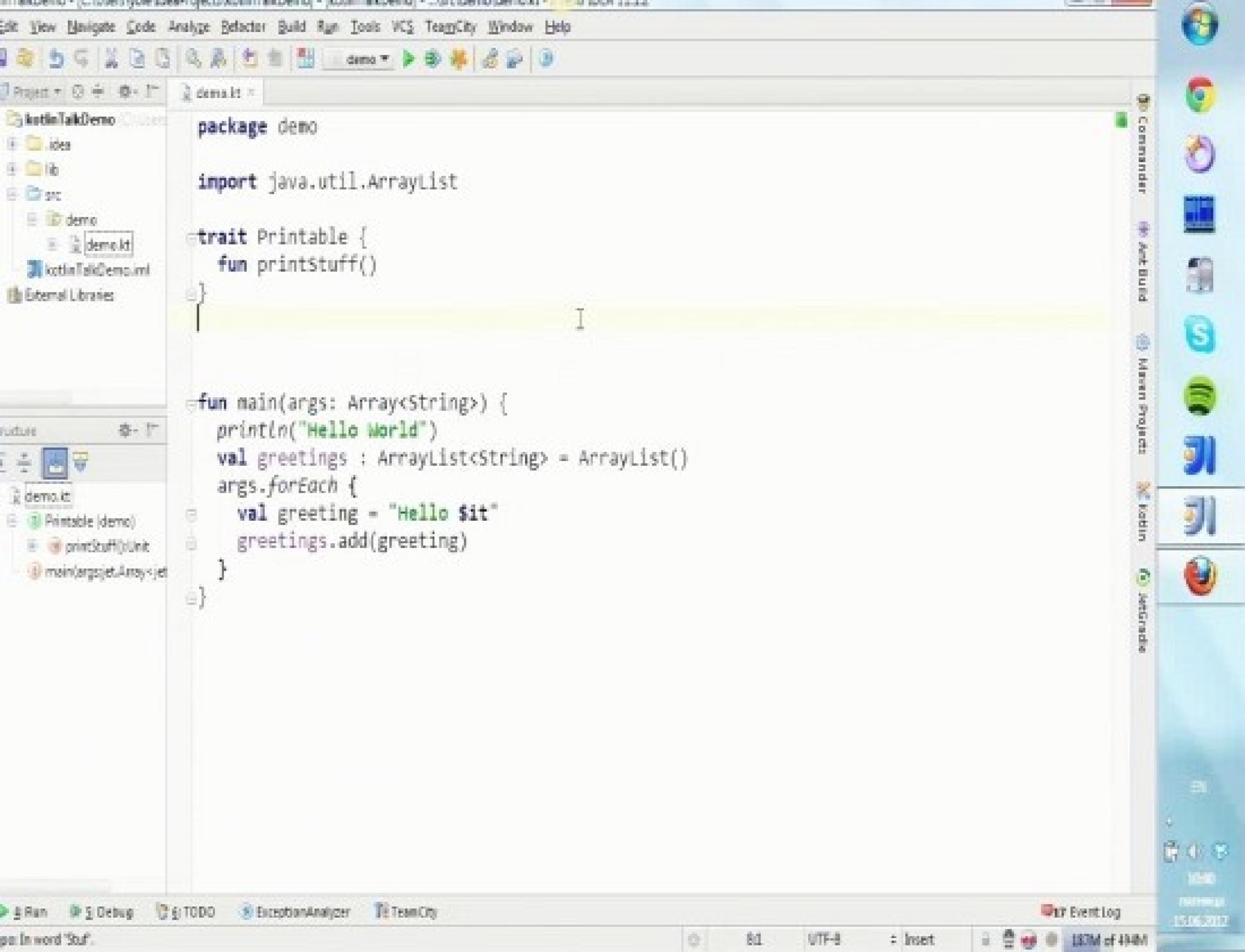
```
C:\Java\jdk1.8.0_11\bin\java -Didea.launcher.port=7533 "-Didea.launcher.bin.path=C:\Tools\IntelliJ IDEA Community Edition 15.1.1\bin" -Dfile.encoding=UTF-8
Hello World

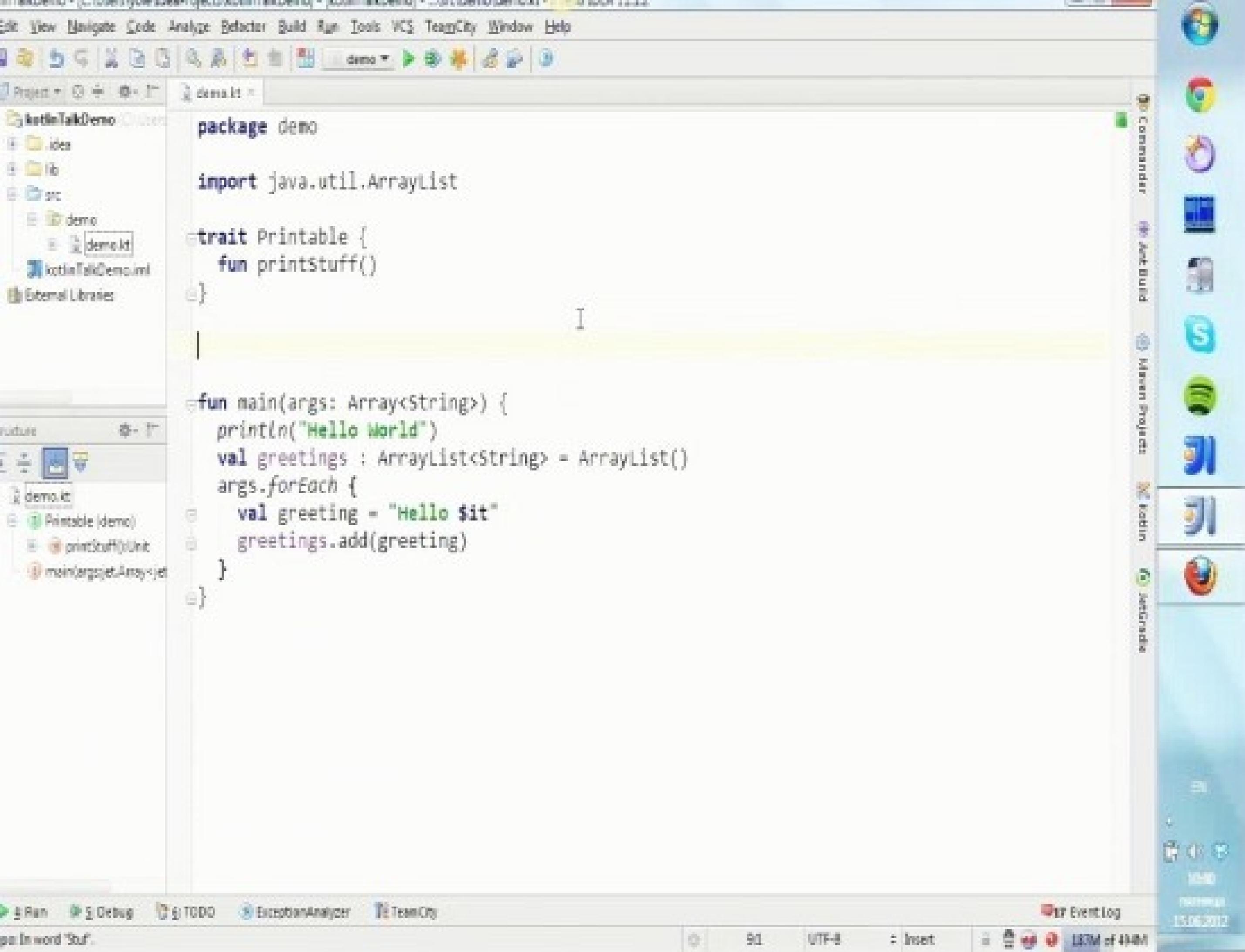
Process finished with exit code 0
```

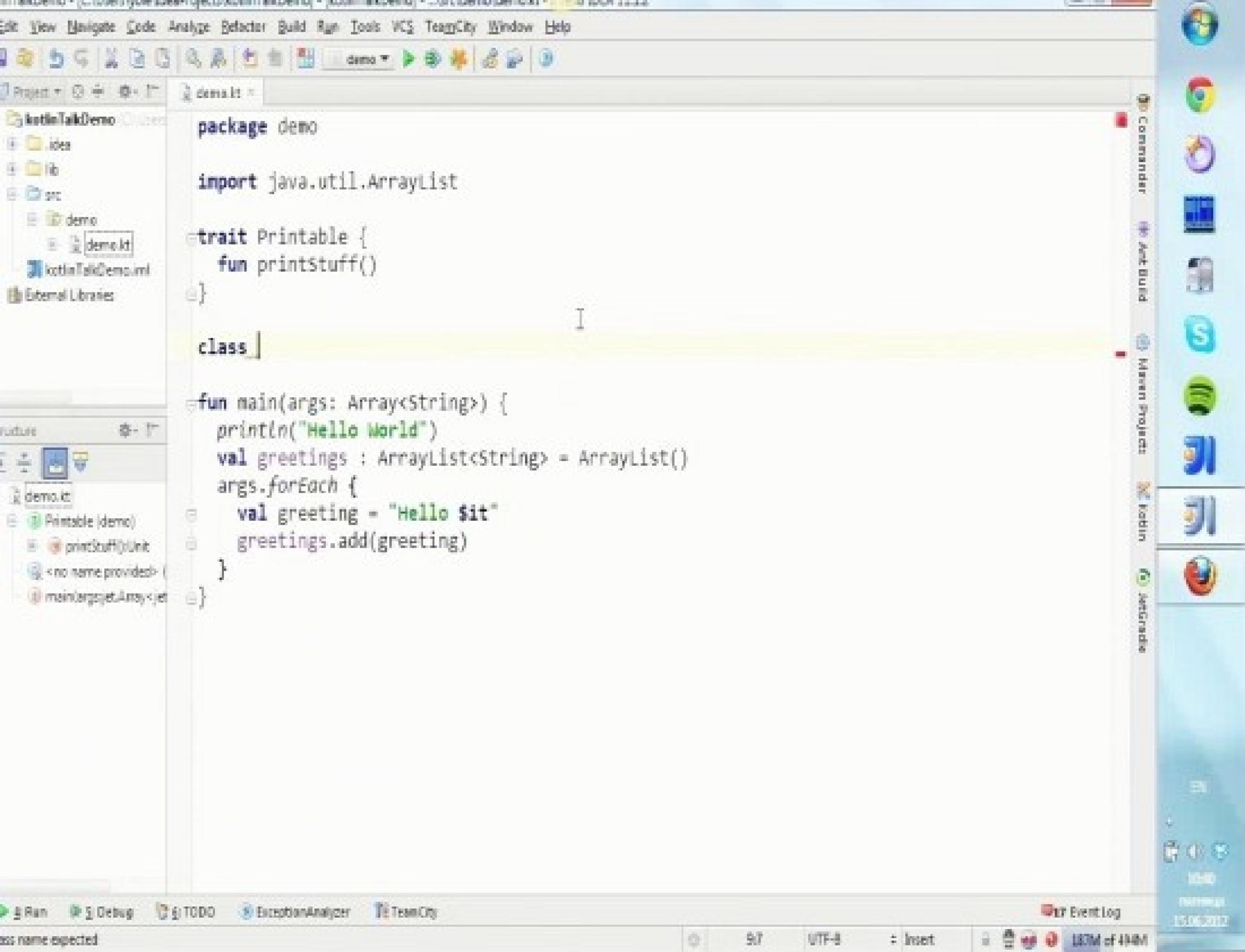


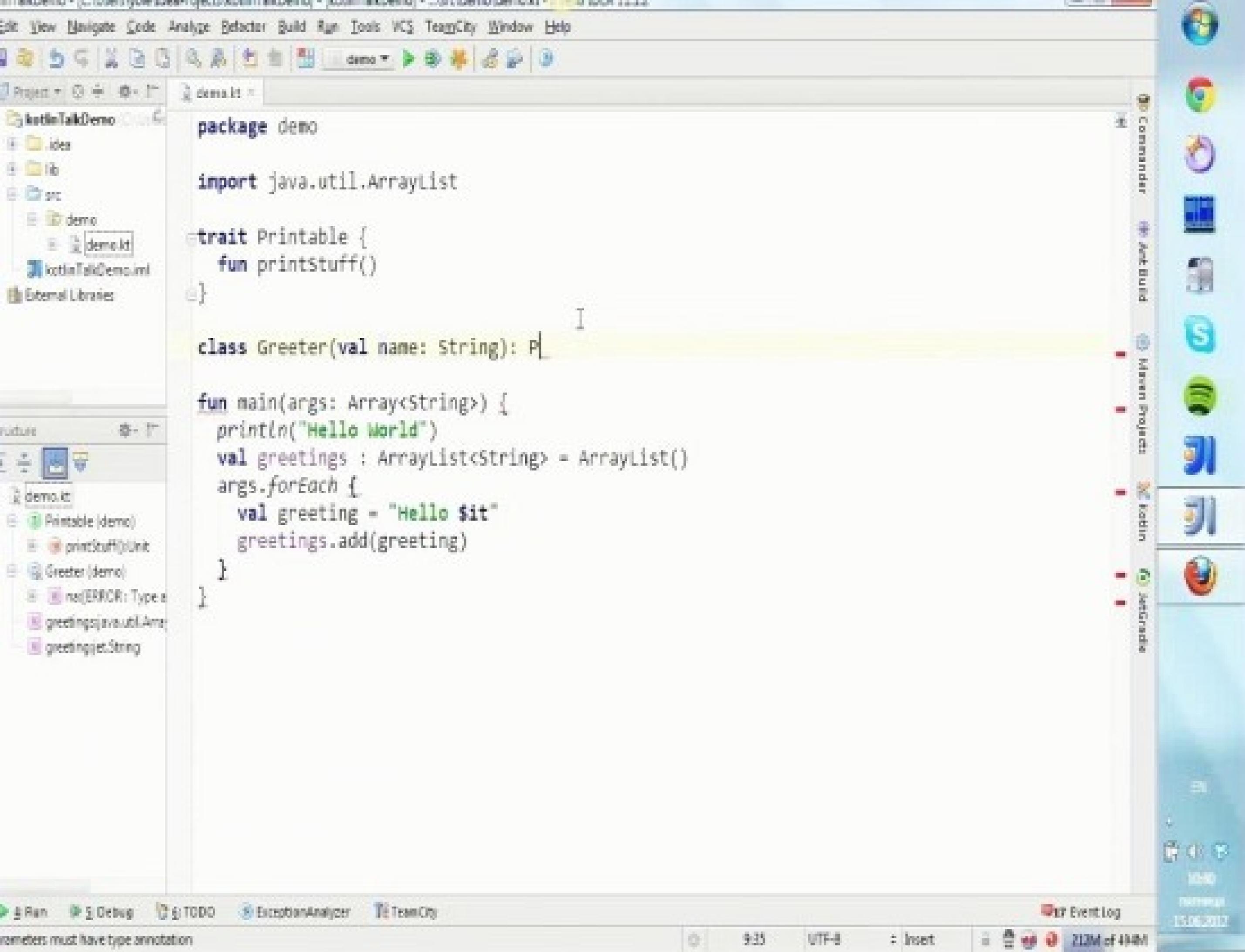












Project

- kotlinTalkDemo
  - idea
  - lib
  - src
    - demo
      - demo.kt
- kotlinTalkDemo.iml
- External Libraries

```

package demo

import java.util.ArrayList

trait Printable {
    fun printStuff()
}

class Greeter(val name: String): Printable {

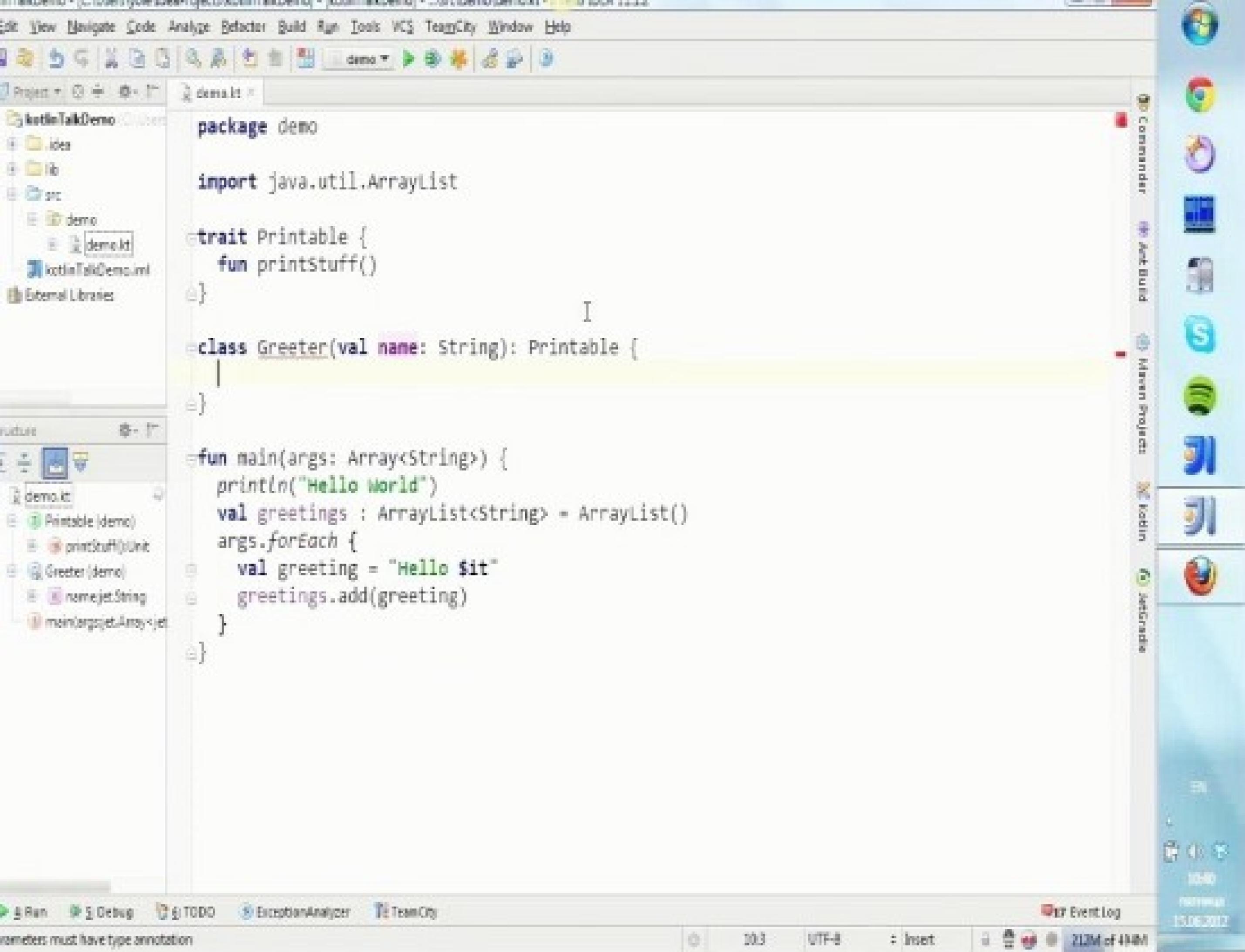
fun main(args: Array<String>) {
    println("Hello World")
    val greetings : ArrayList<String> = ArrayList()
    args.forEach {
        val greeting = "Hello $it"
        greetings.add(greeting)
    }
}

```

demo.kt

- Printable (demo)
- printStuff() (unit)
- Greeter (demo)
- no(ERROr: Type e
- greetings: java.util.Ame
- greeting: et.String

- Commander
- Art Build
- My Project
- Robin
- JetBrains



- Project: kotlinTalkDemo
  - .idea
  - lib
  - src
    - demo
      - demo.kt
- External Libraries

```

package demo

import java.util.ArrayList

trait Printable {
    fun printStuff()
}

class Greeter(val name: String): Printable {

}

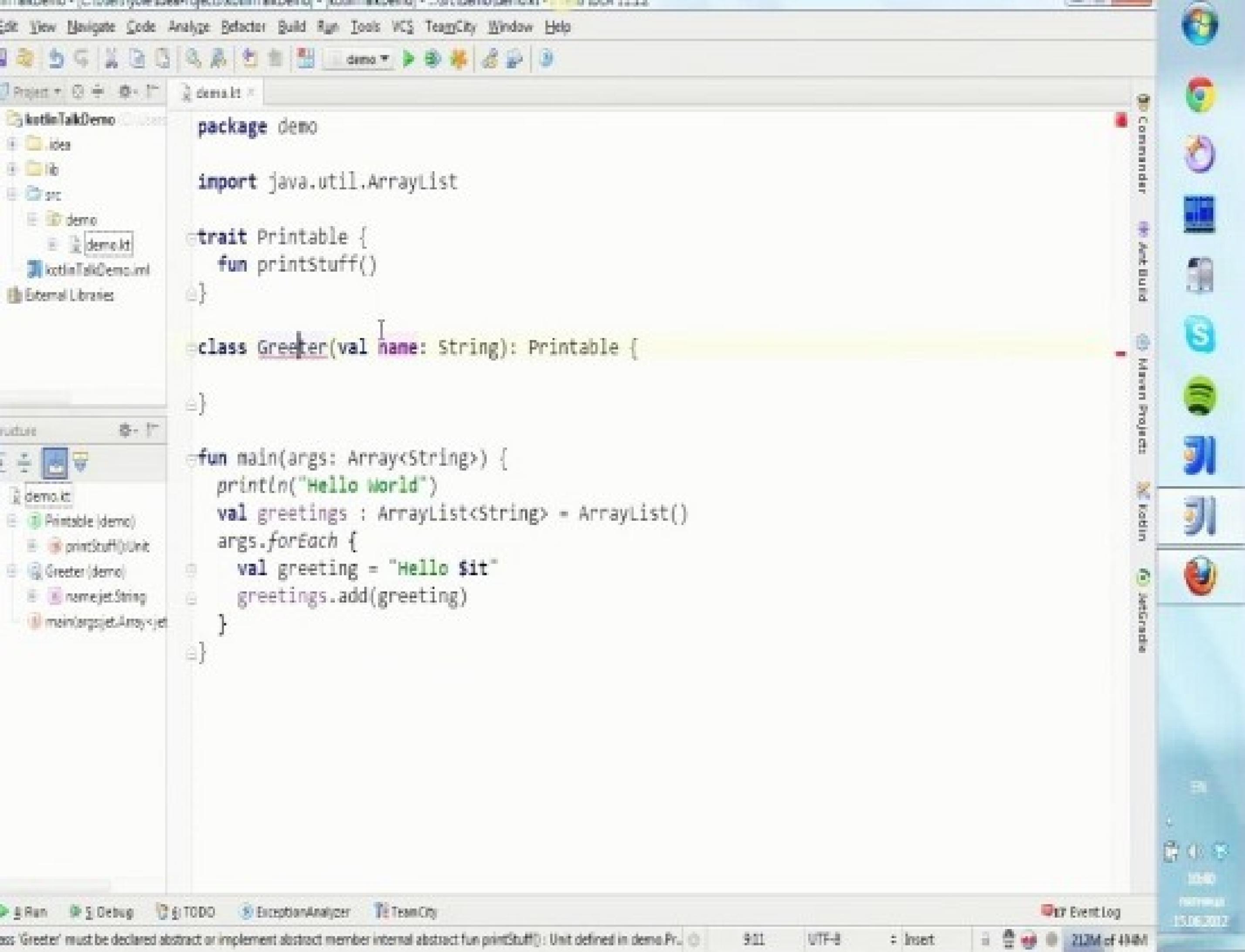
fun main(args: Array<String>) {
    println("Hello world")
    val greetings : ArrayList<String> = ArrayList()
    args.forEach {
        val greeting = "Hello $it"
        greetings.add(greeting)
    }
}

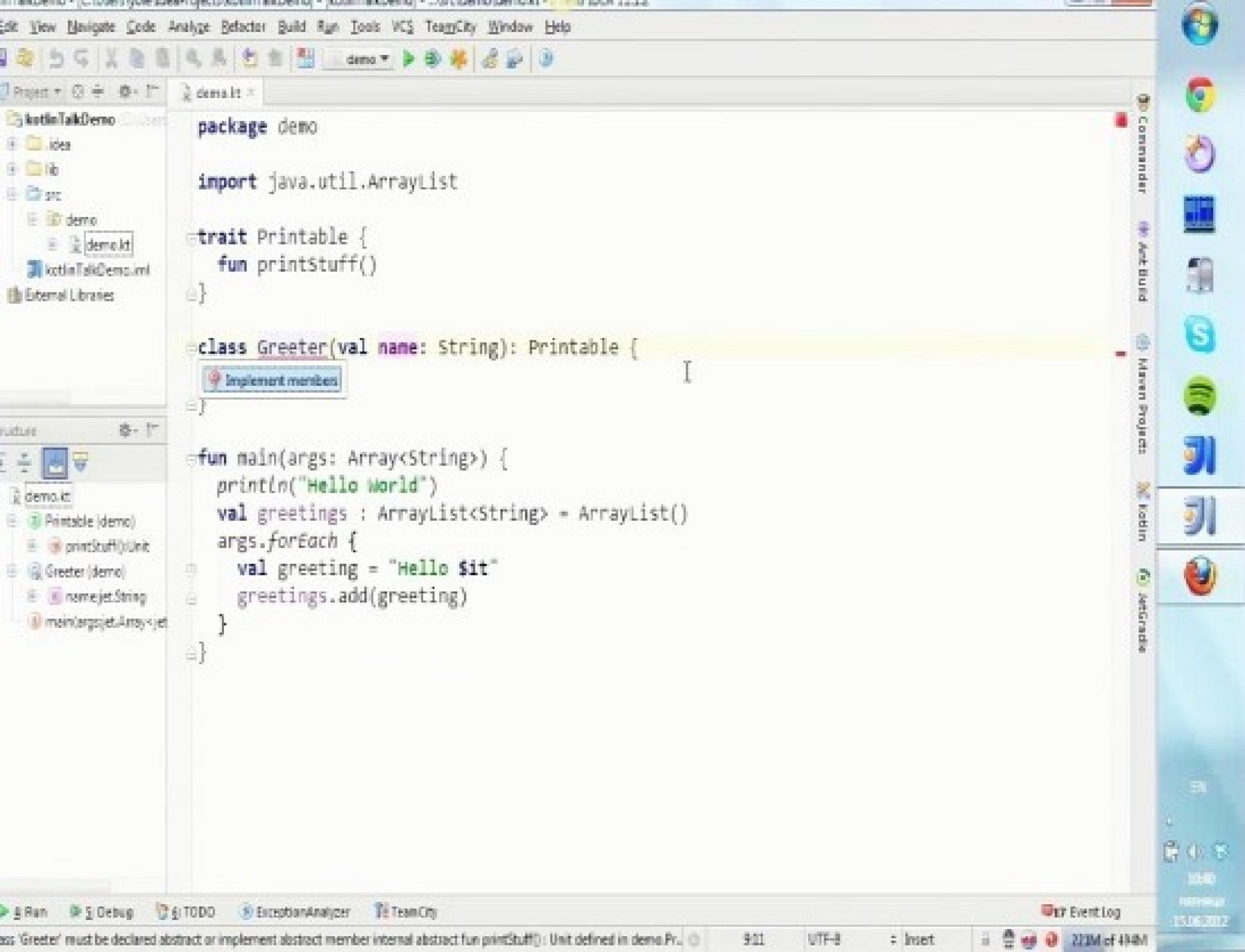
```

- demo.kt
  - Printable (demo)
  - printStuff() Unit
  - Greeter (demo)
  - name: jet.String
  - main(args: jet.Array<jet

- Commander
- Art Build
- My Recent Projects
- Roblin
- JetBrains

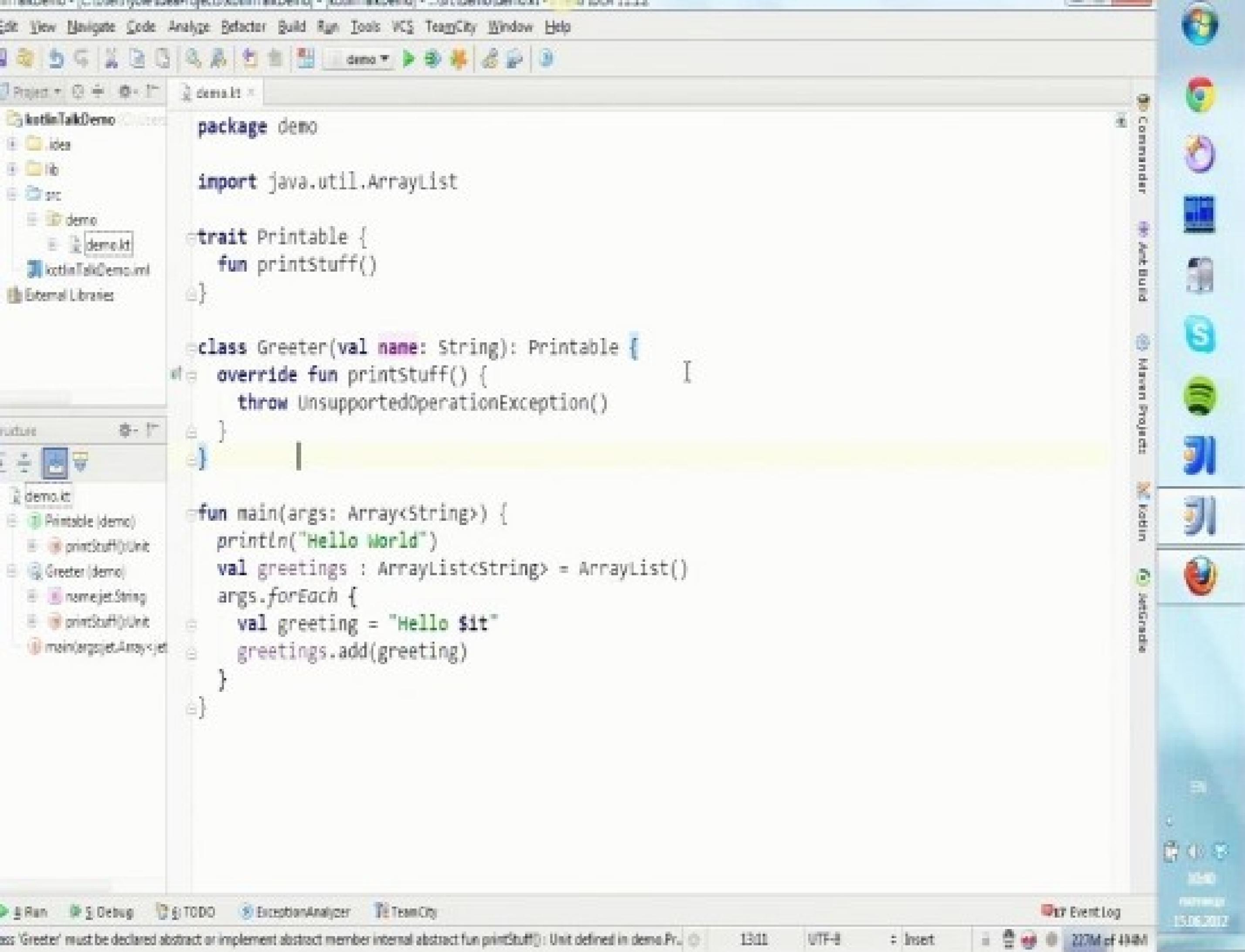
Windows taskbar with icons for Internet Explorer, Google Chrome, Firefox, VLC media player, LibreOffice, Skype, and other applications. System tray shows date and time: 13/06/2017 10:50.











```

package demo

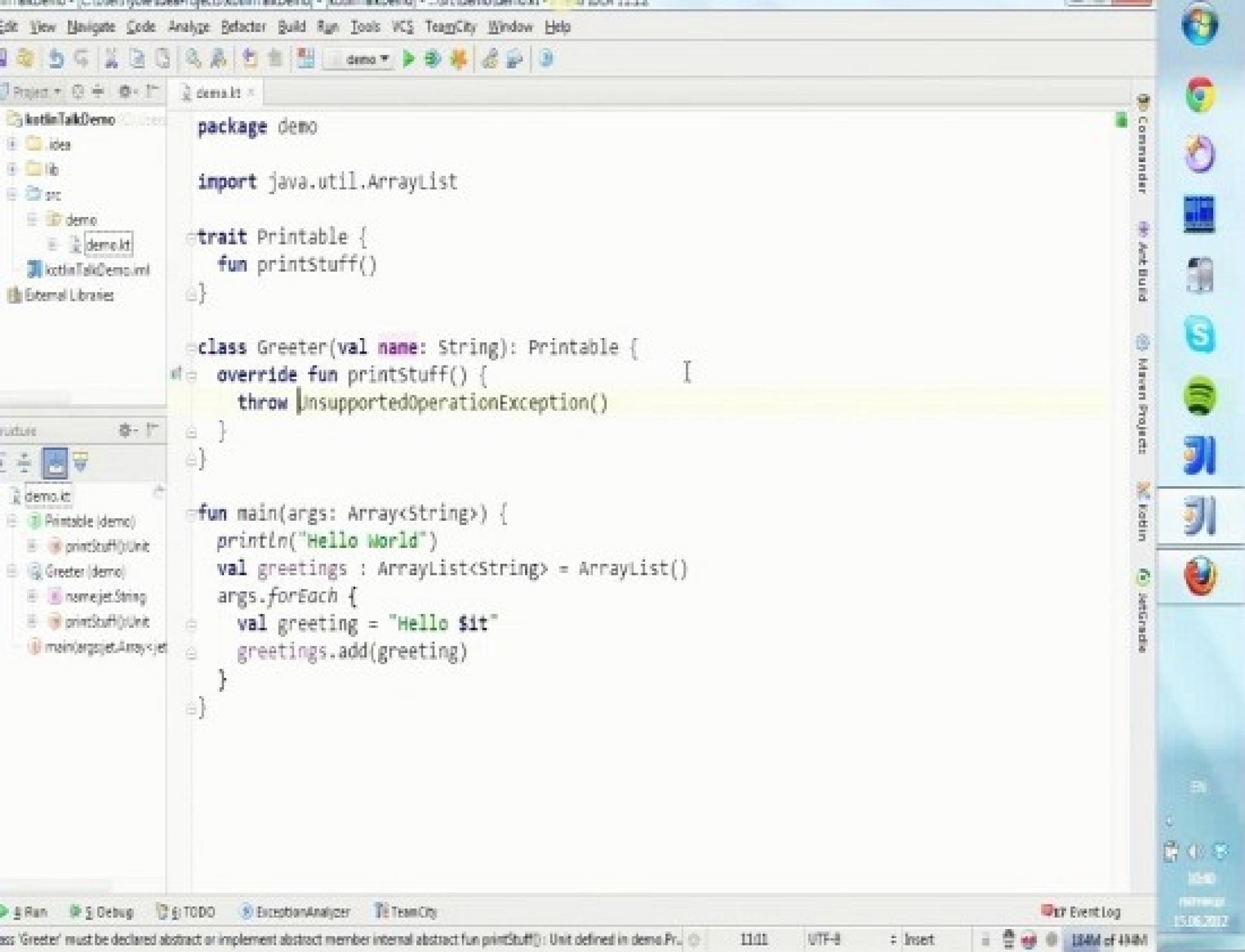
import java.util.ArrayList

trait Printable {
    fun printstuff()
}

class Greeter(val name: String): Printable {
    override fun printstuff() {
        throw UnsupportedOperationException()
    }
}

fun main(args: Array<String>) {
    println("Hello world")
    val greetings : ArrayList<String> = ArrayList()
    args.forEach {
        val greeting = "Hello $it"
        greetings.add(greeting)
    }
}

```



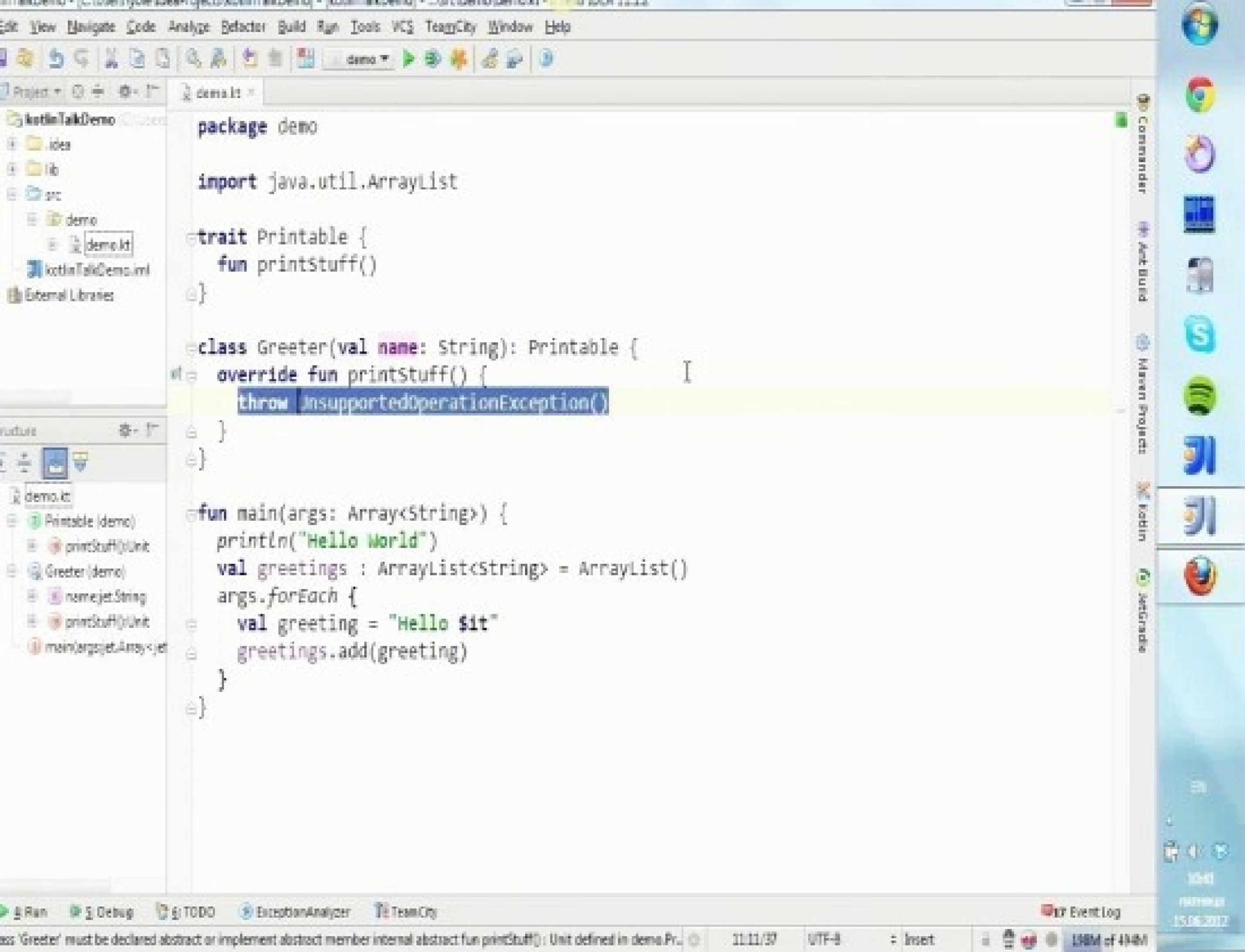
```
package demo

import java.util.ArrayList

trait Printable {
    fun printStuff()
}

class Greeter(val name: String): Printable {
    override fun printStuff() {
        throw UnsupportedOperationException()
    }
}

fun main(args: Array<String>) {
    println("Hello World")
    val greetings : ArrayList<String> = ArrayList()
    args.forEach {
        val greeting = "Hello $it"
        greetings.add(greeting)
    }
}
```



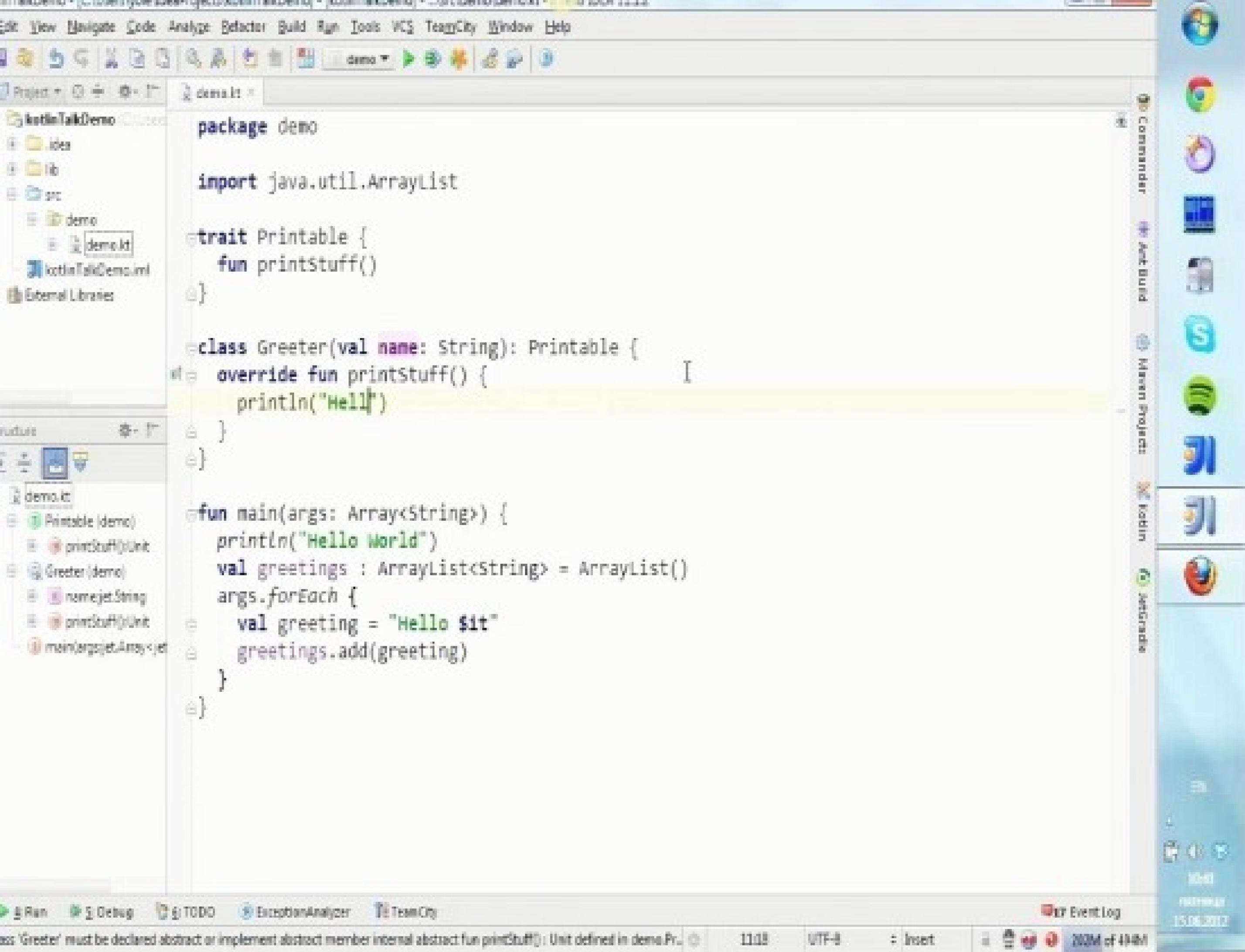
```
package demo

import java.util.ArrayList

trait Printable {
    fun printStuff()
}

class Greeter(val name: String): Printable {
    override fun printStuff() {
        throw UnsupportedOperationException()
    }
}

fun main(args: Array<String>) {
    println("Hello World")
    val greetings : ArrayList<String> = ArrayList()
    args.forEach {
        val greeting = "Hello $it"
        greetings.add(greeting)
    }
}
```



```

package demo

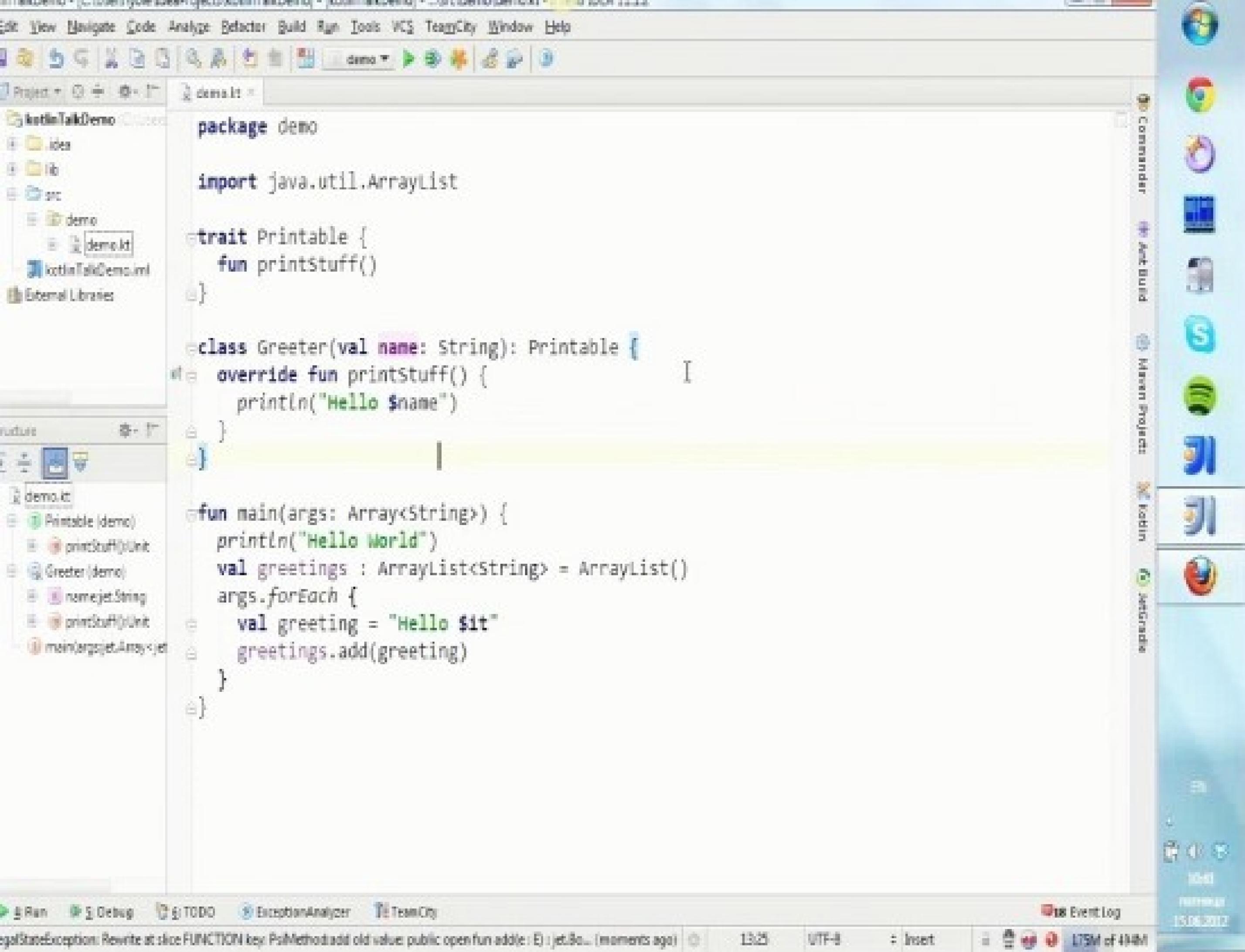
import java.util.ArrayList

trait Printable {
    fun printStuff()
}

class Greeter(val name: String): Printable {
    override fun printStuff() {
        println("Hello")
    }
}

fun main(args: Array<String>) {
    println("Hello World")
    val greetings : ArrayList<String> = ArrayList()
    args.forEach {
        val greeting = "Hello $it"
        greetings.add(greeting)
    }
}

```



Project: demo.kt

- kotlincDemo
  - .idea
  - lib
  - src
    - demo
      - demo.kt
- External Libraries

```

package demo

import java.util.ArrayList

trait Printable {
    fun printStuff()
}

class Greeter(val name: String): Printable {
    override fun printStuff() {
        println("Hello $name")
    }
}

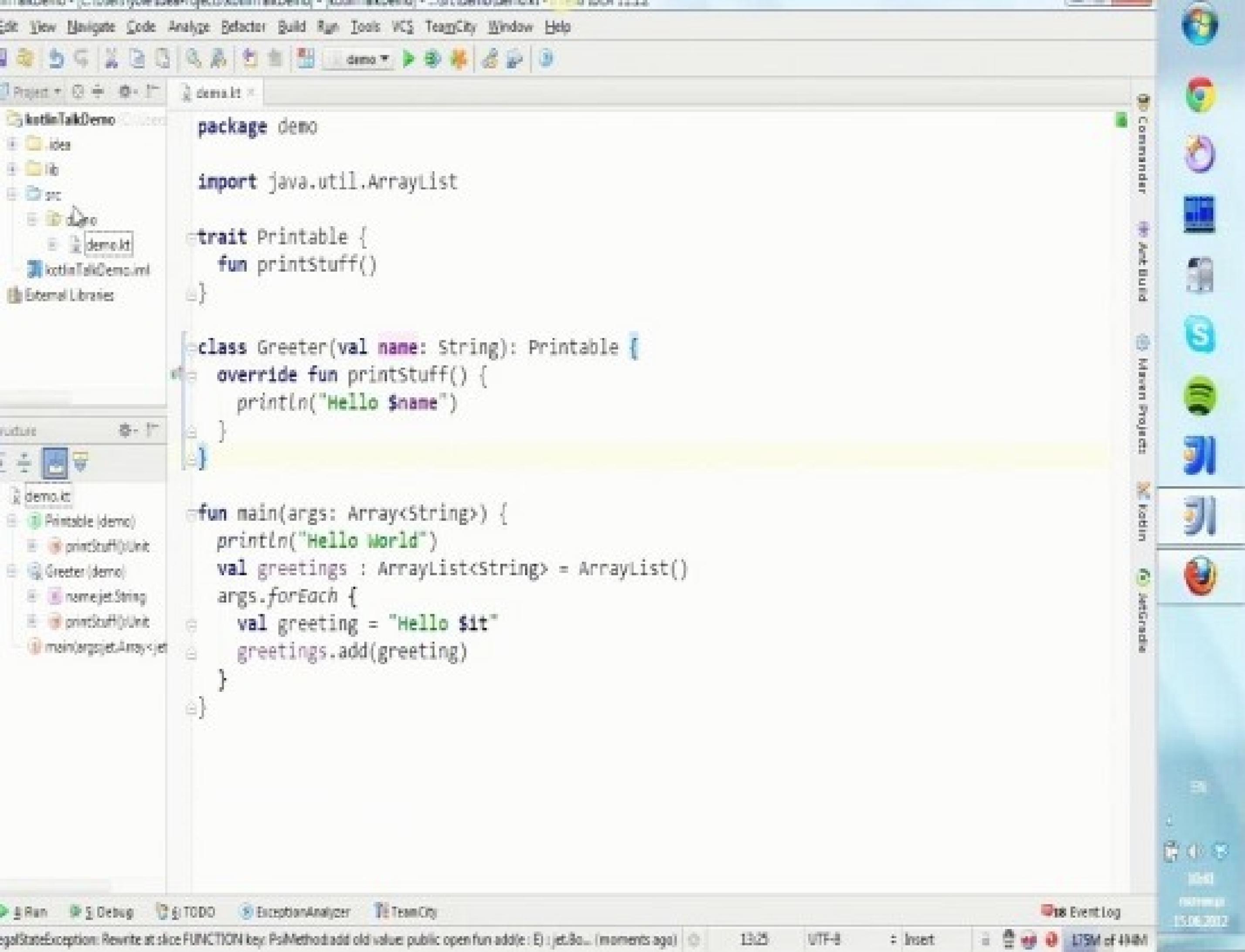
fun main(args: Array<String>) {
    println("Hello World")
    val greetings : ArrayList<String> = ArrayList()
    args.forEach {
        val greeting = "Hello $it"
        greetings.add(greeting)
    }
}

```

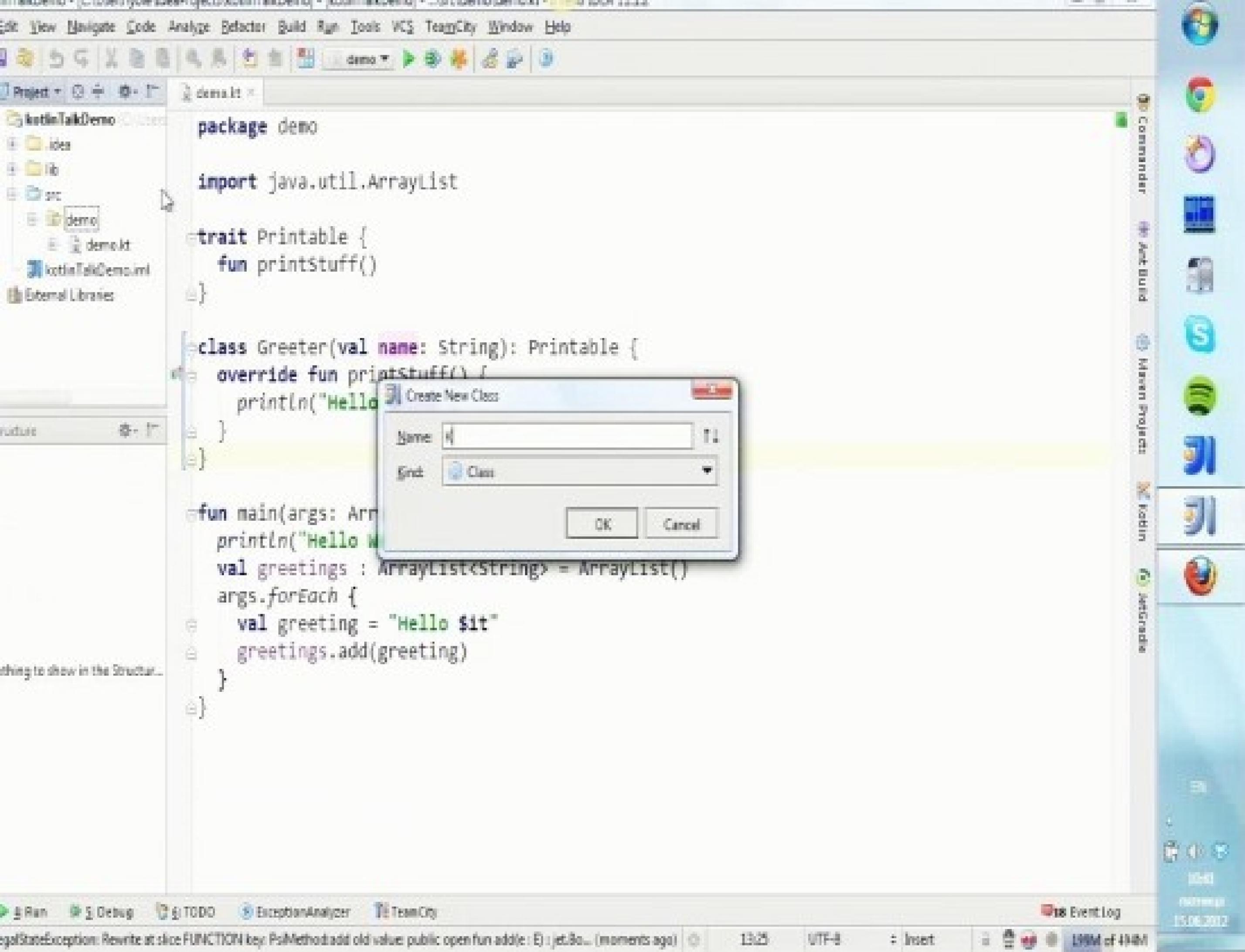
Structure

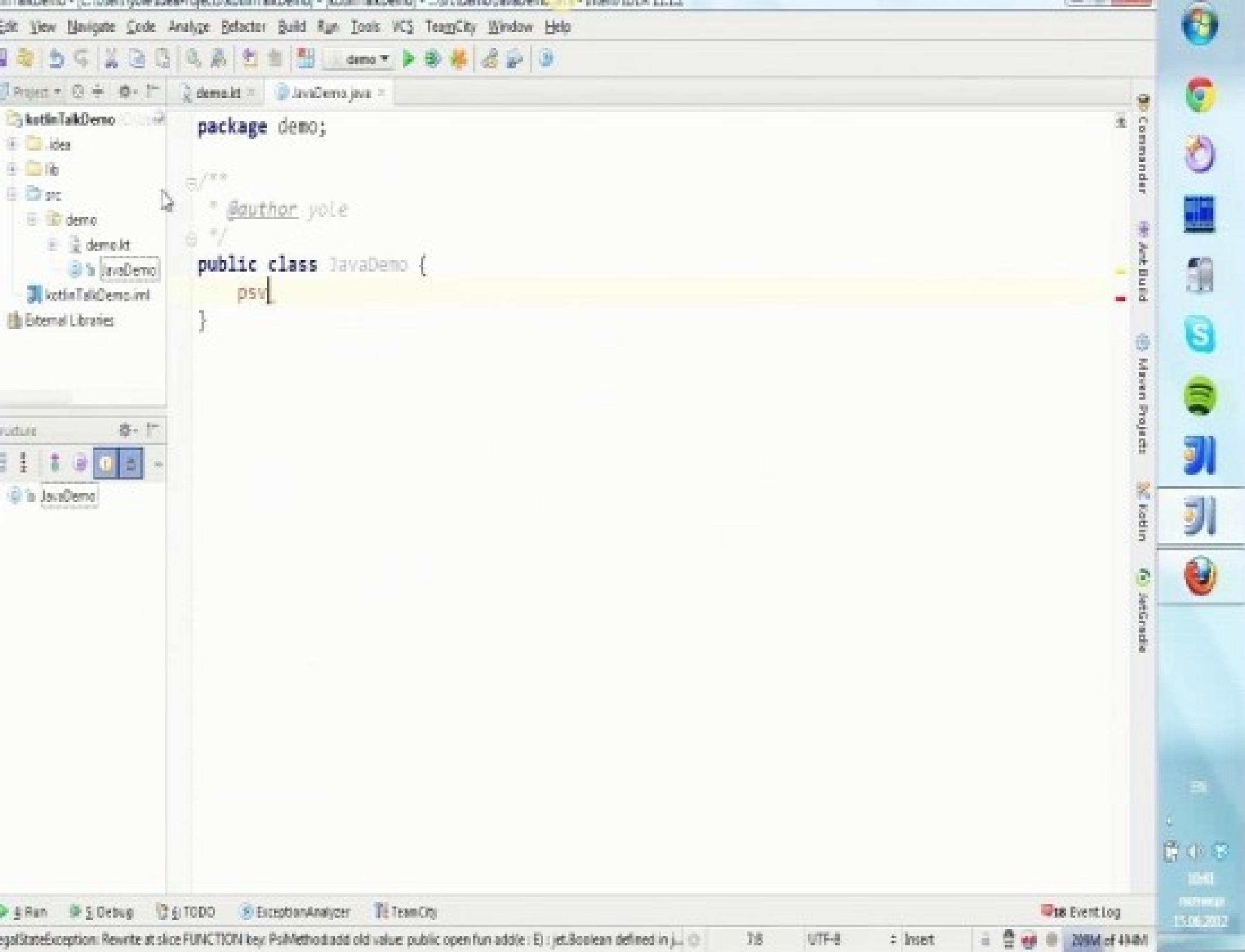
- demo.kt
  - Printable (demo)
  - printStuff() (Unit)
  - Greeter (demo)
  - name: jet.String
  - printStuff() (Unit)
  - main(args: jet.Array<jet.String>)

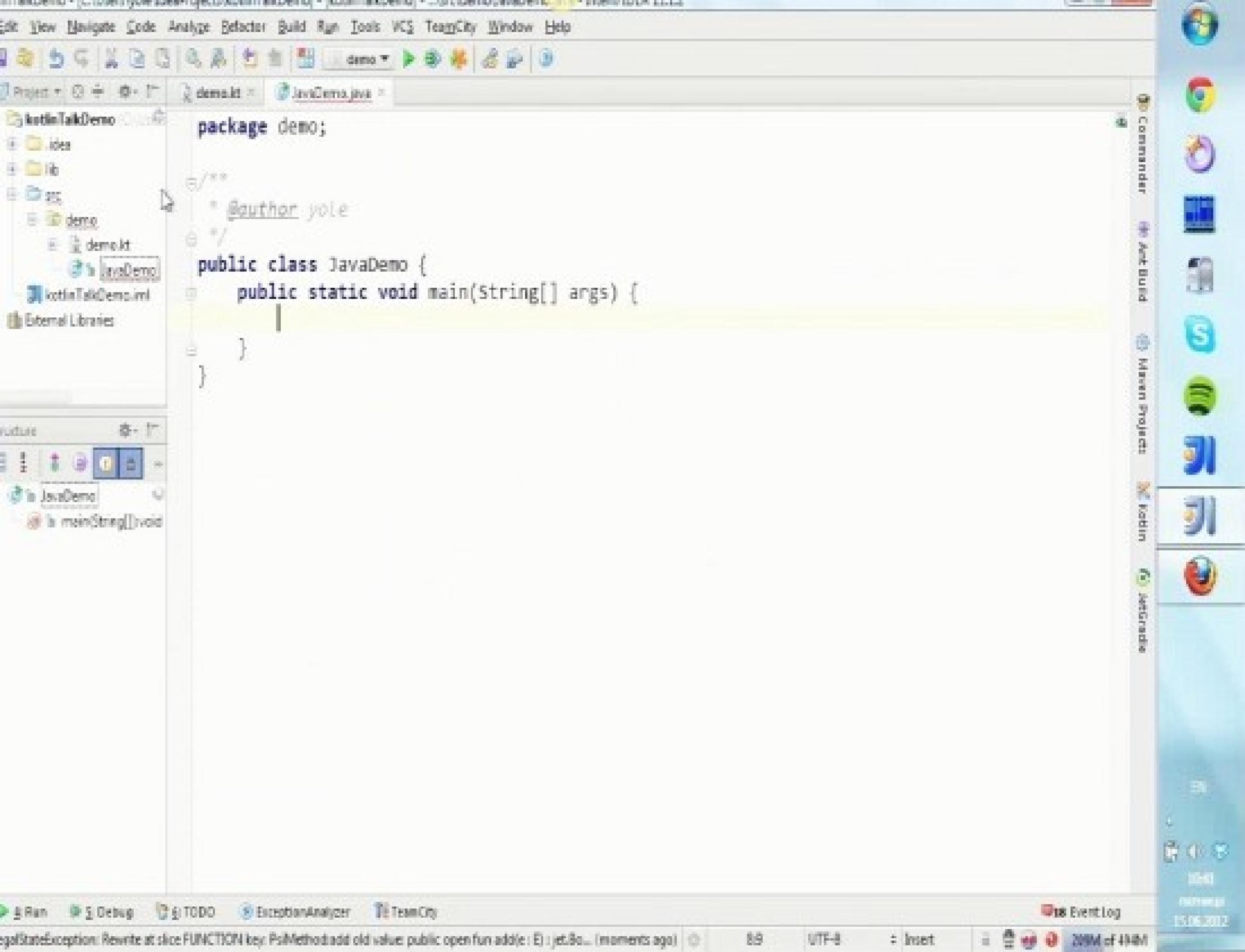
Commander  
Art Build  
Maven Projects  
M Robin  
Javadoc

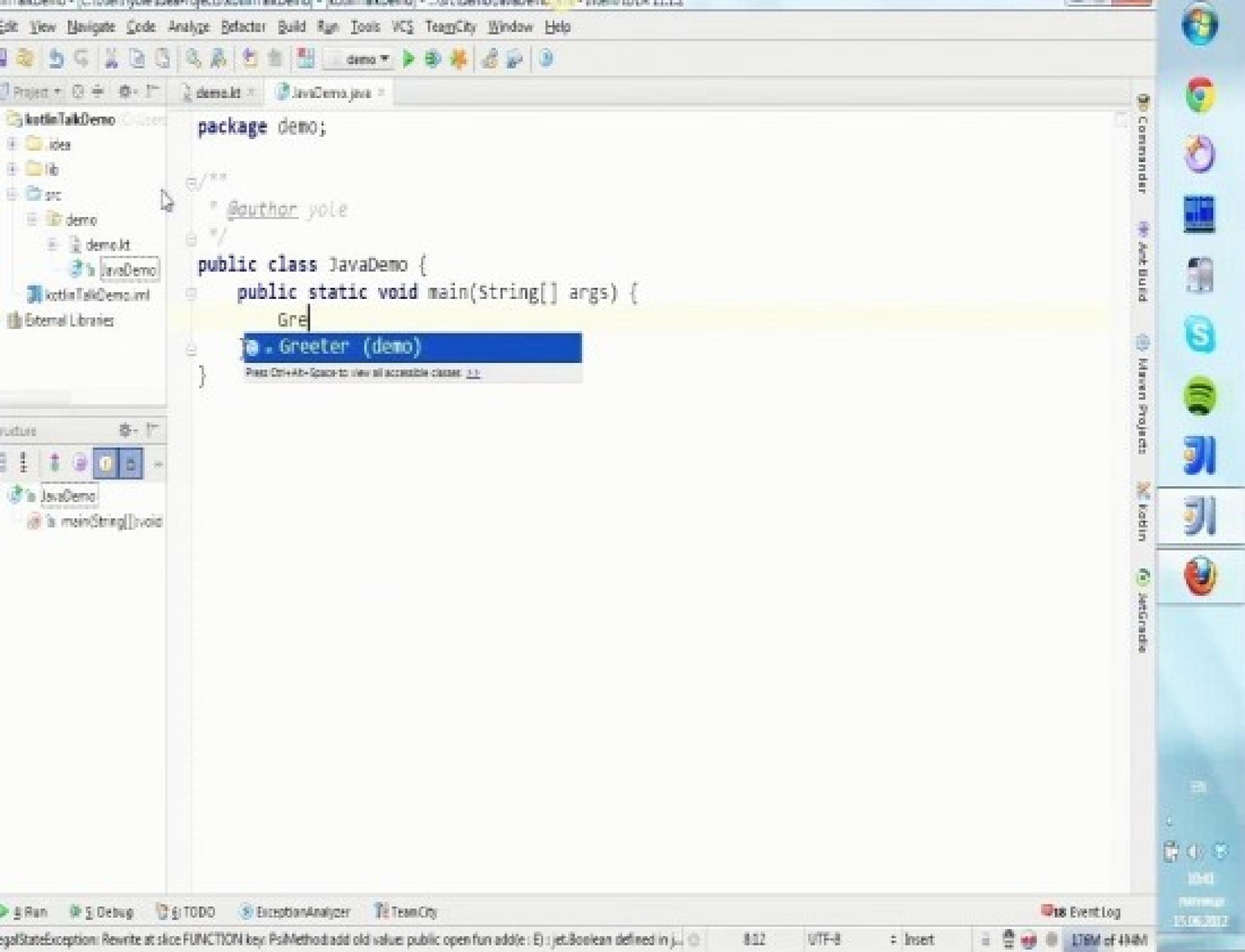


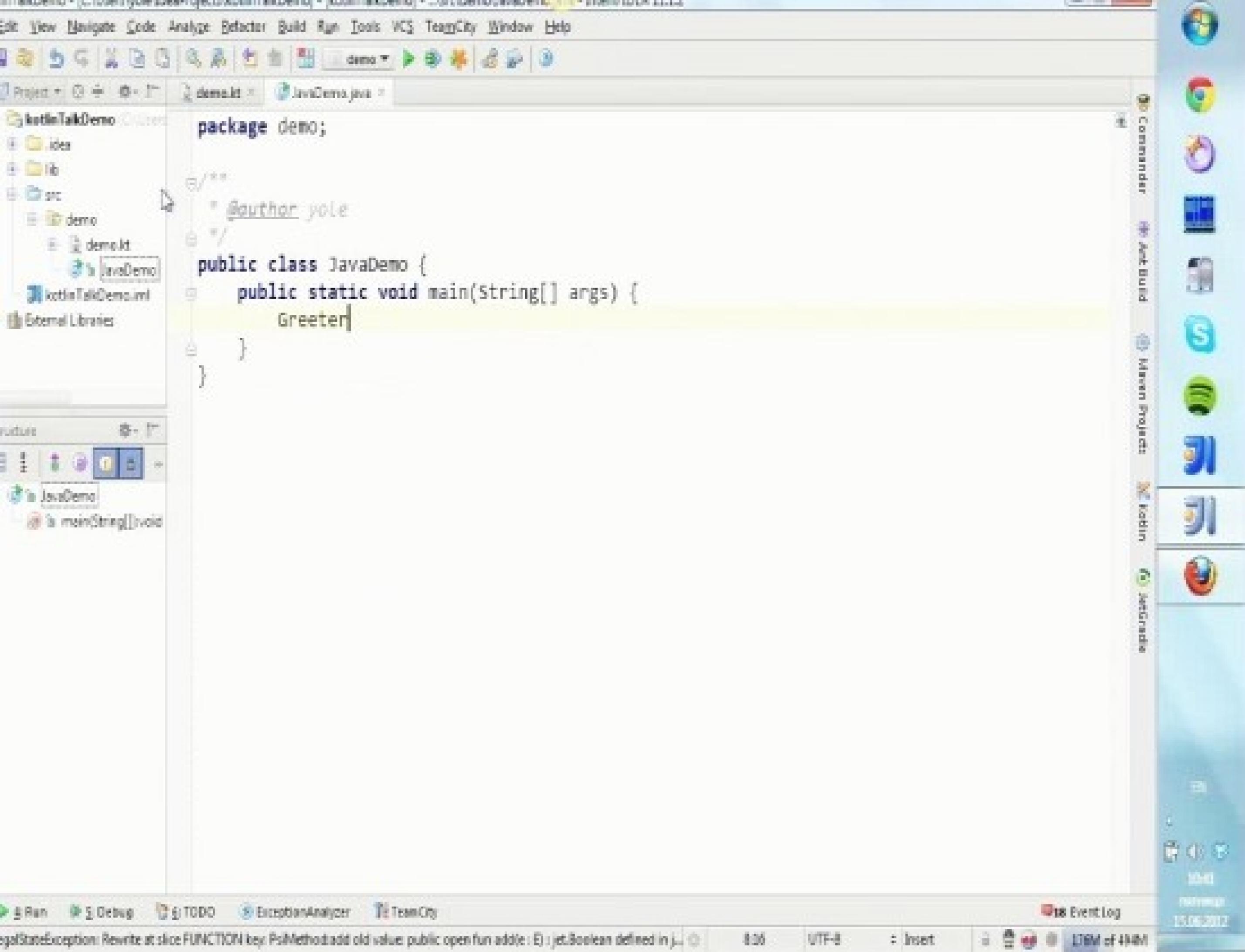


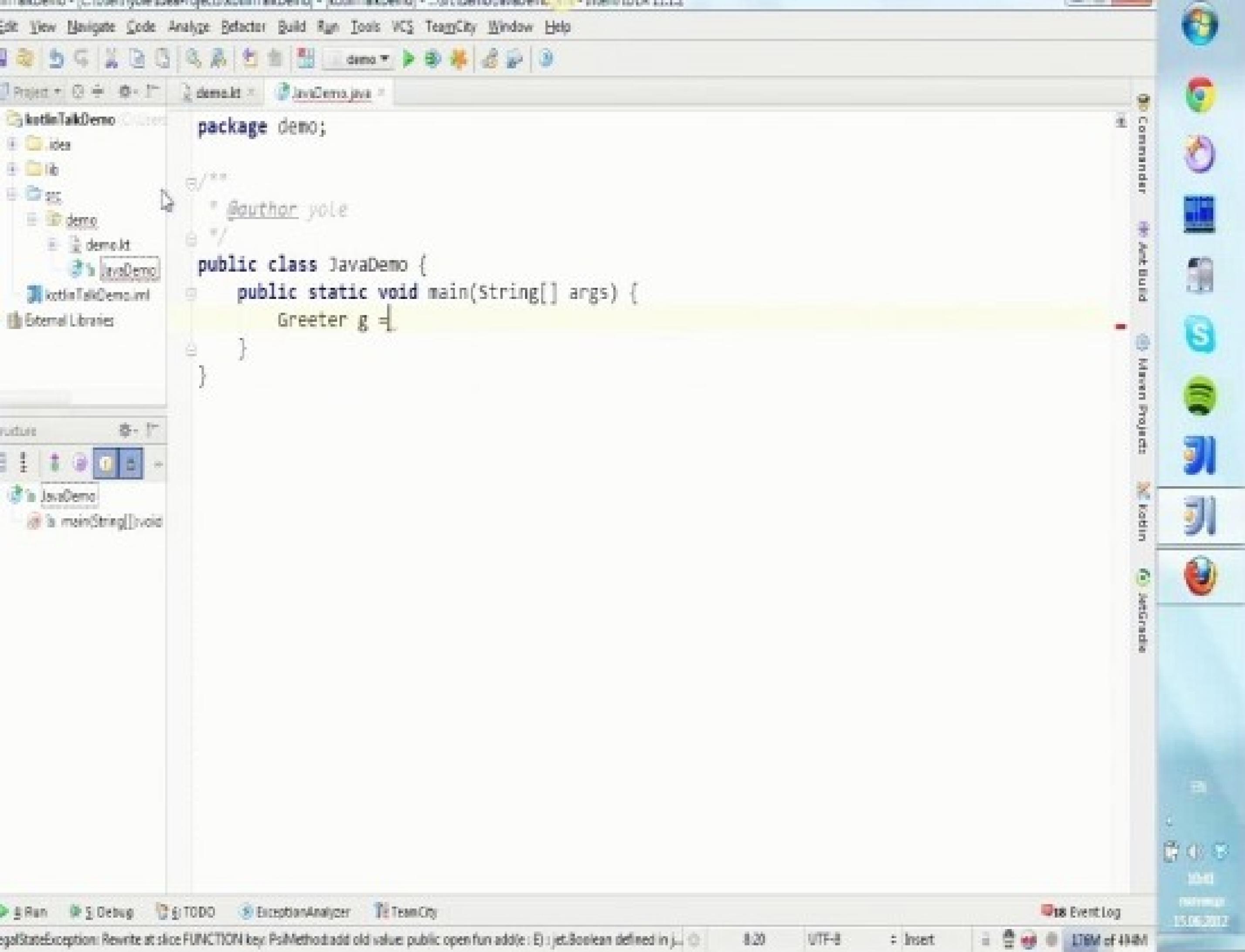








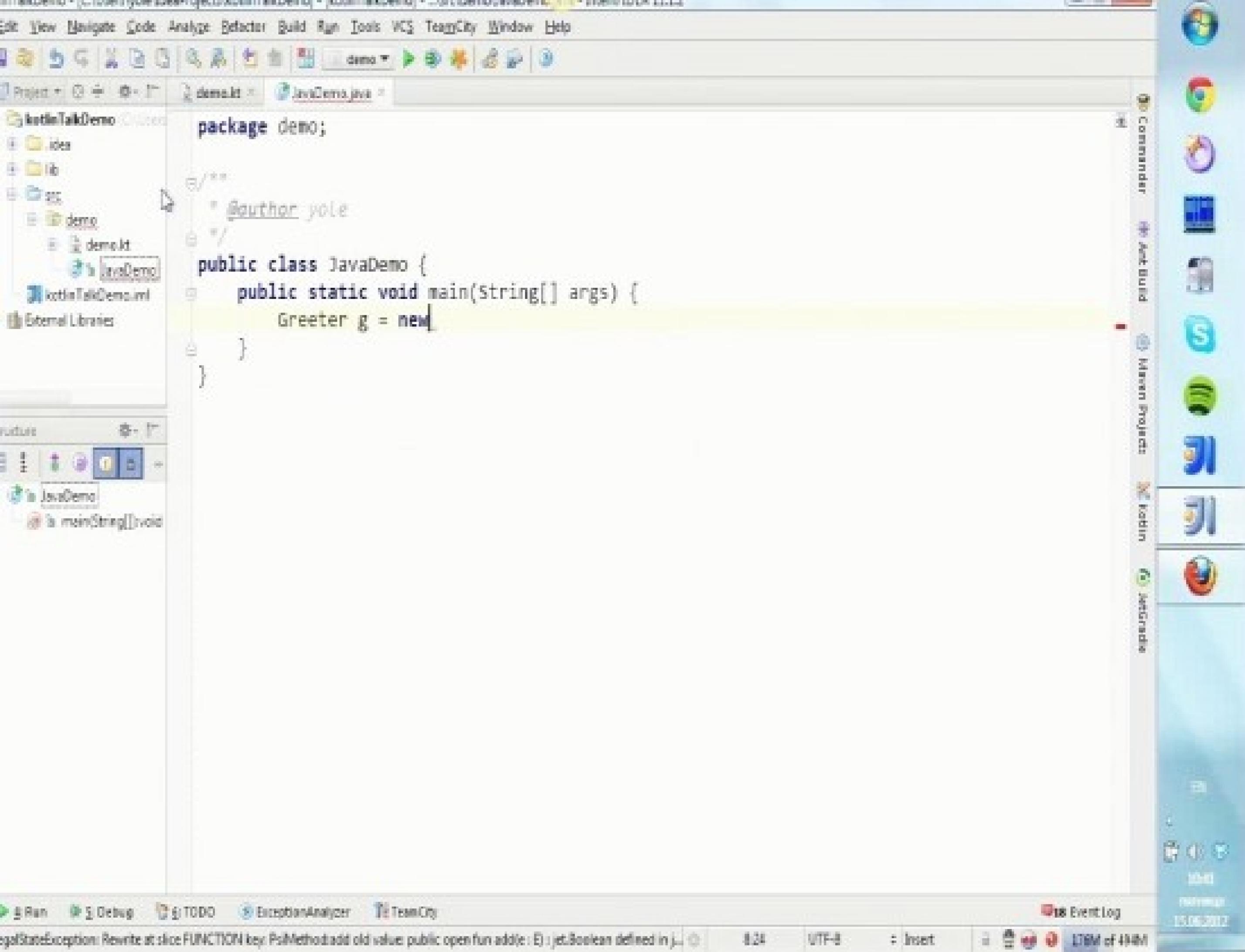




package demo;

/\*\*  
 \* @author yole  
 \*/

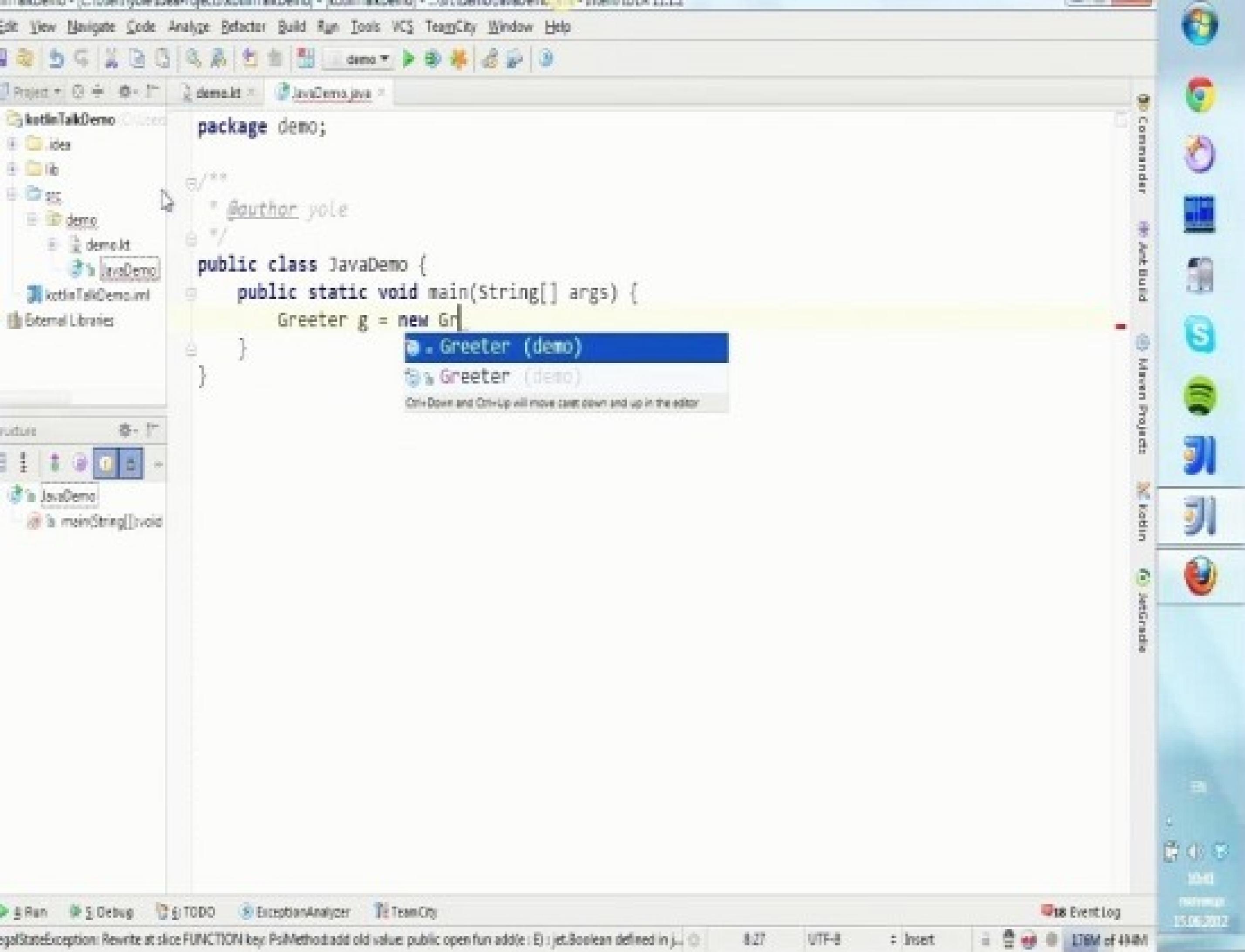
public class JavaDemo {  
 public static void main(String[] args) {  
 Greeter g =  
 }  
}

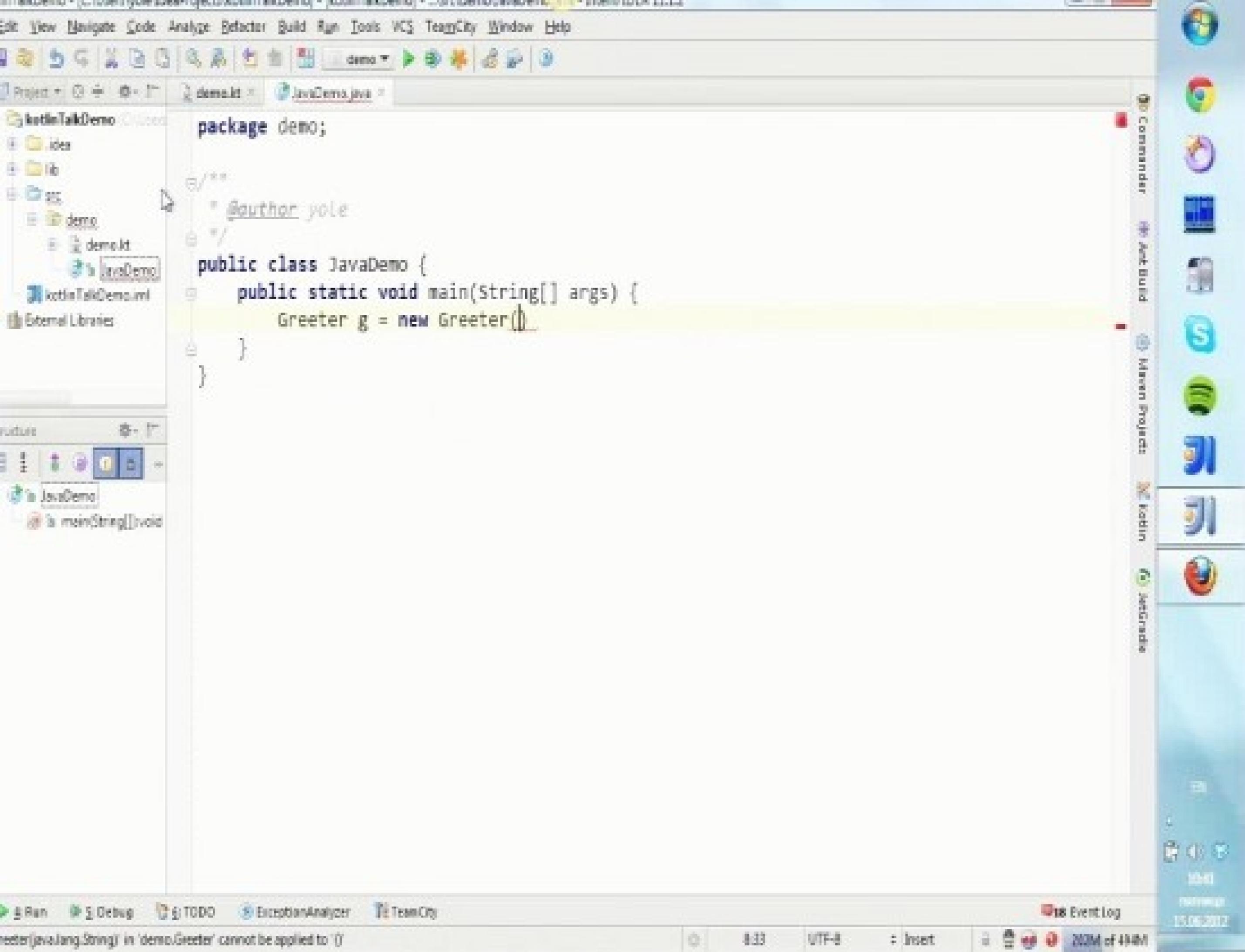


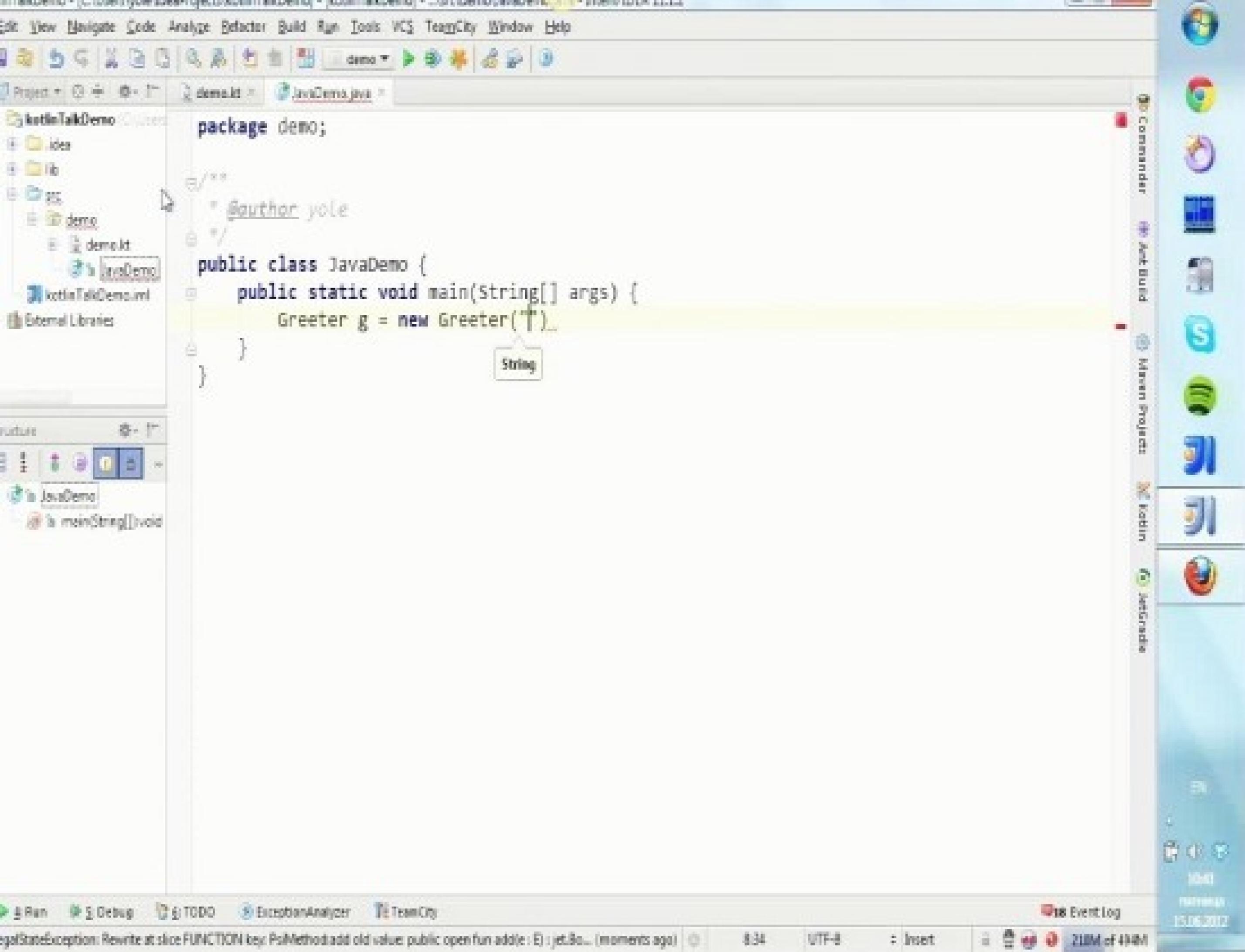
package demo;

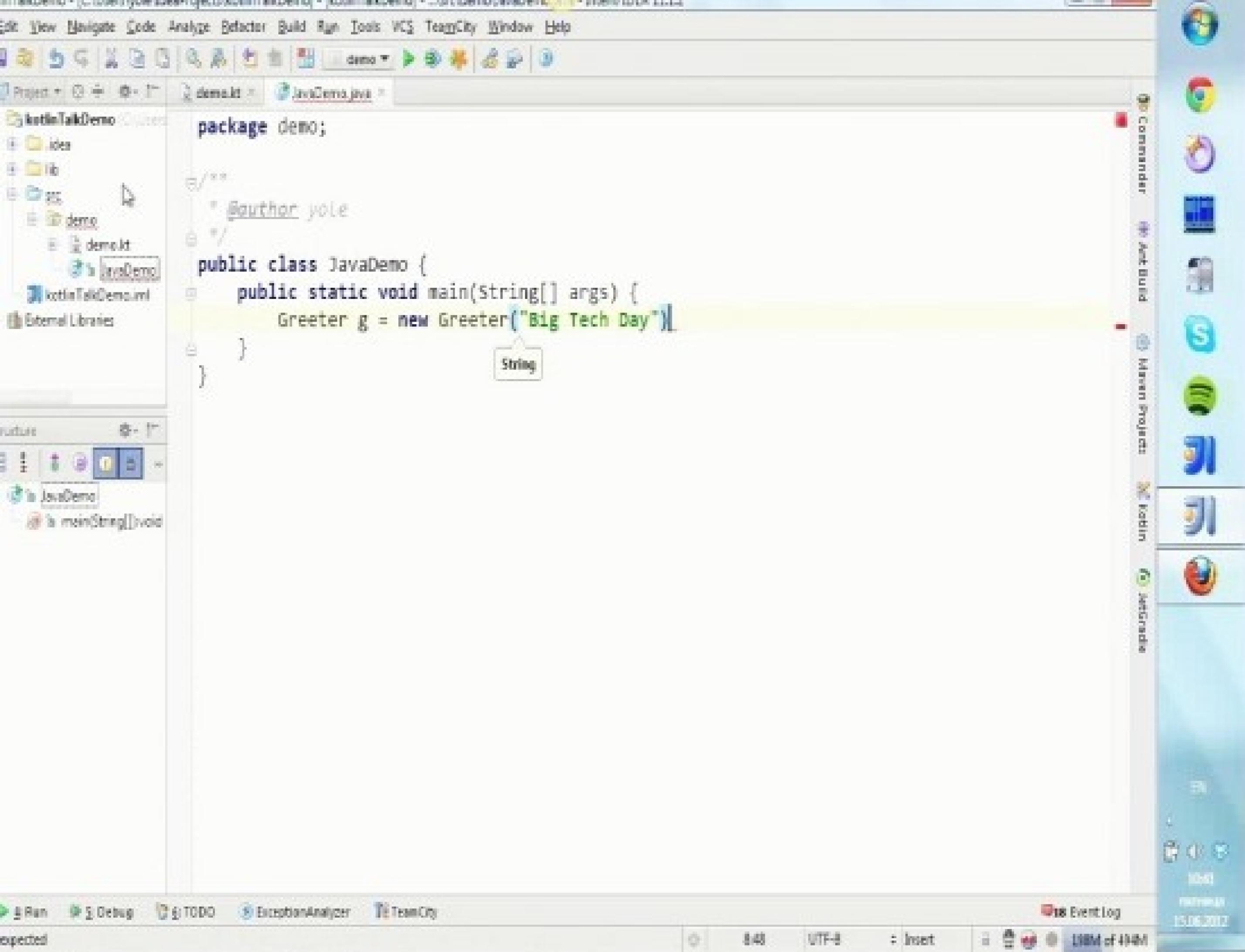
/\*\*  
 \* @author yole  
 \*/

public class JavaDemo {  
 public static void main(String[] args) {  
 Greeter g = new  
 }  
}







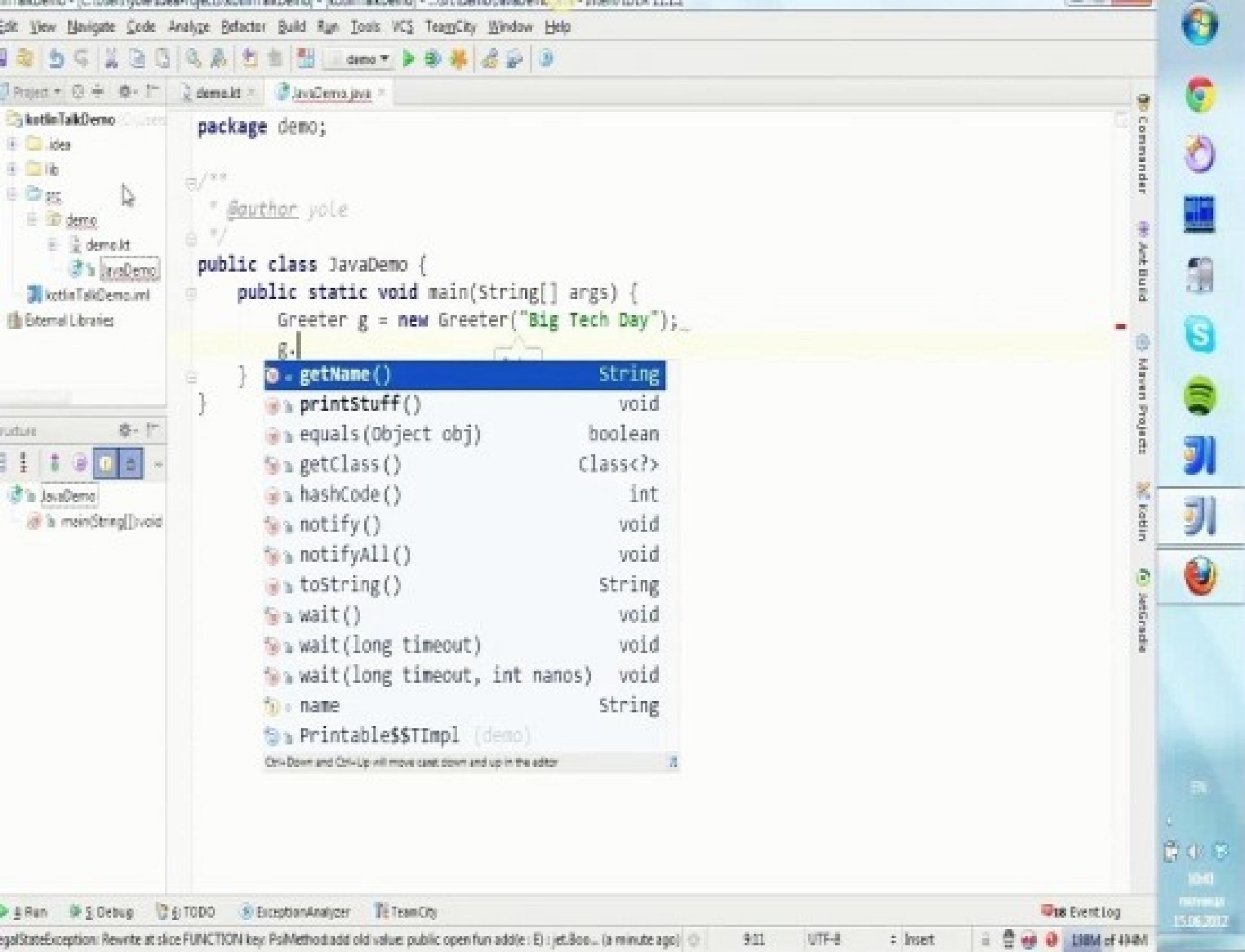


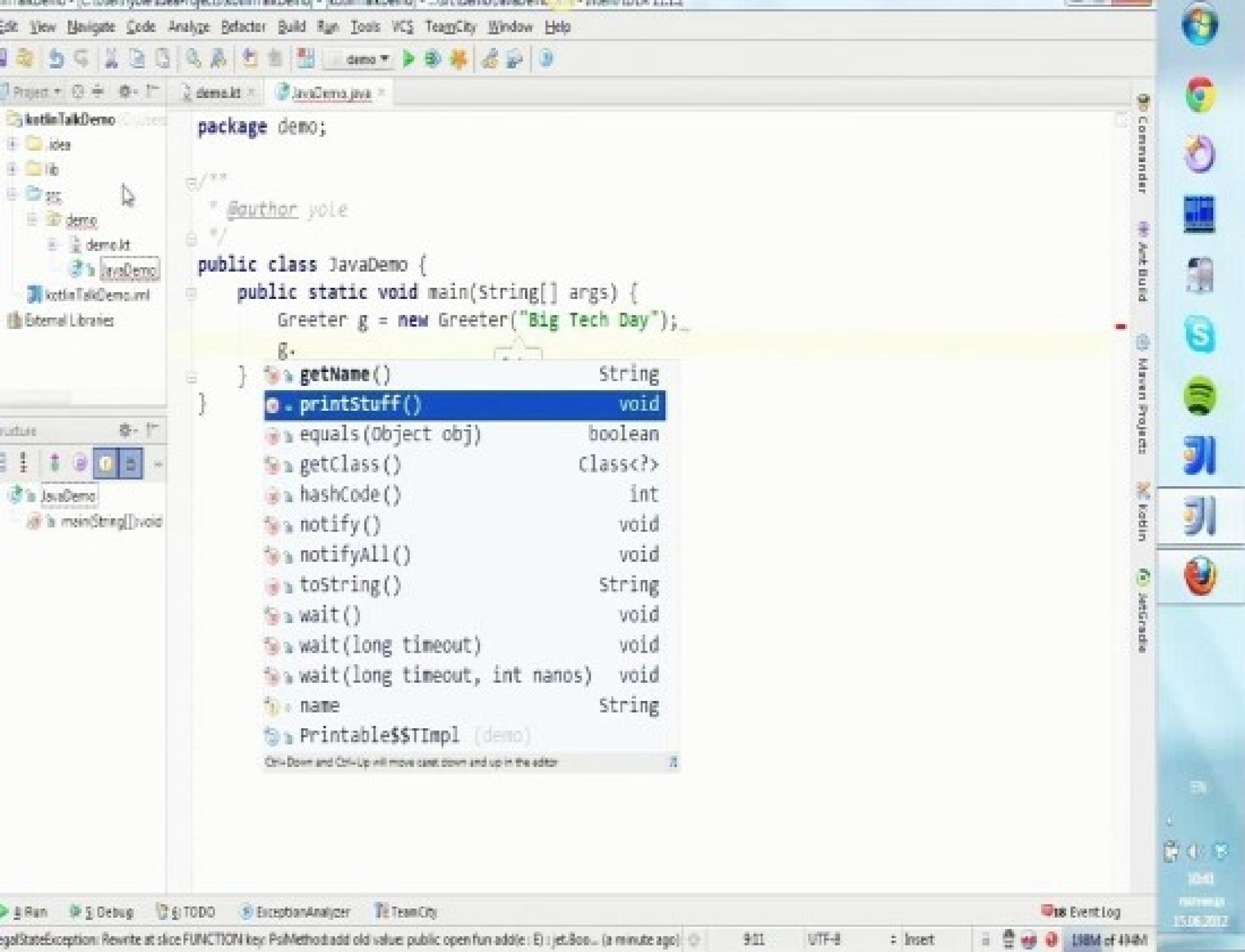
package demo;

/\*\*  
 \* @author yole  
 \*/

public class JavaDemo {  
 public static void main(String[] args) {  
 Greeter g = new Greeter("Big Tech Day");  
 }  
}

String





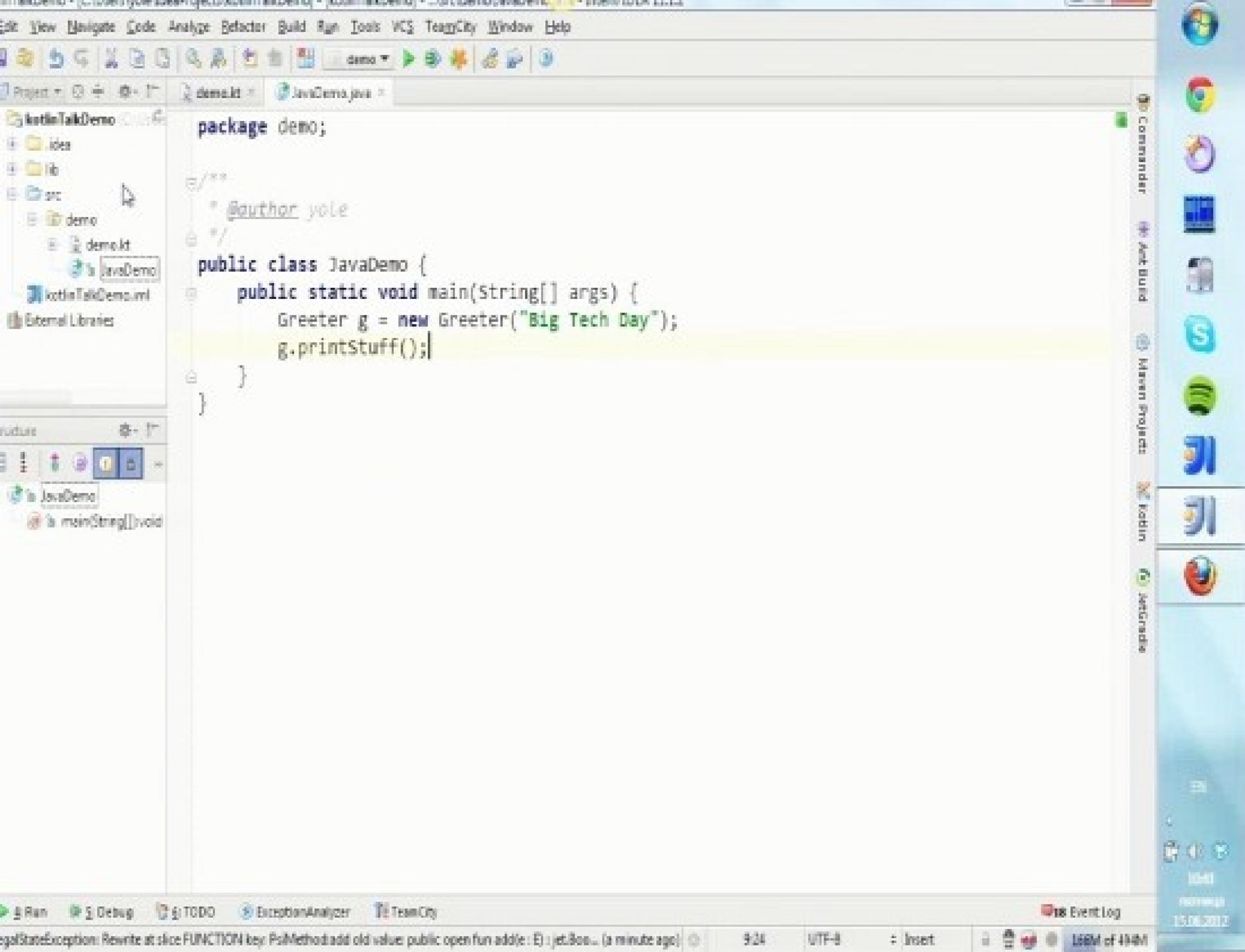
```
package demo;
```

```
/**  
 * @author yole  
 */
```

```
public class JavaDemo {  
    public static void main(String[] args) {  
        Greeter g = new Greeter("Big Tech Day");  
        g.  
    }  
}
```

- getName() String
- printStuff() void**
- equals(Object obj) boolean
- getClass() Class<?>
- hashCode() int
- notify() void
- notifyAll() void
- toString() String
- wait() void
- wait(long timeout) void
- wait(long timeout, int nanos) void
- name String
- Printable\$\$TImpl (demo)

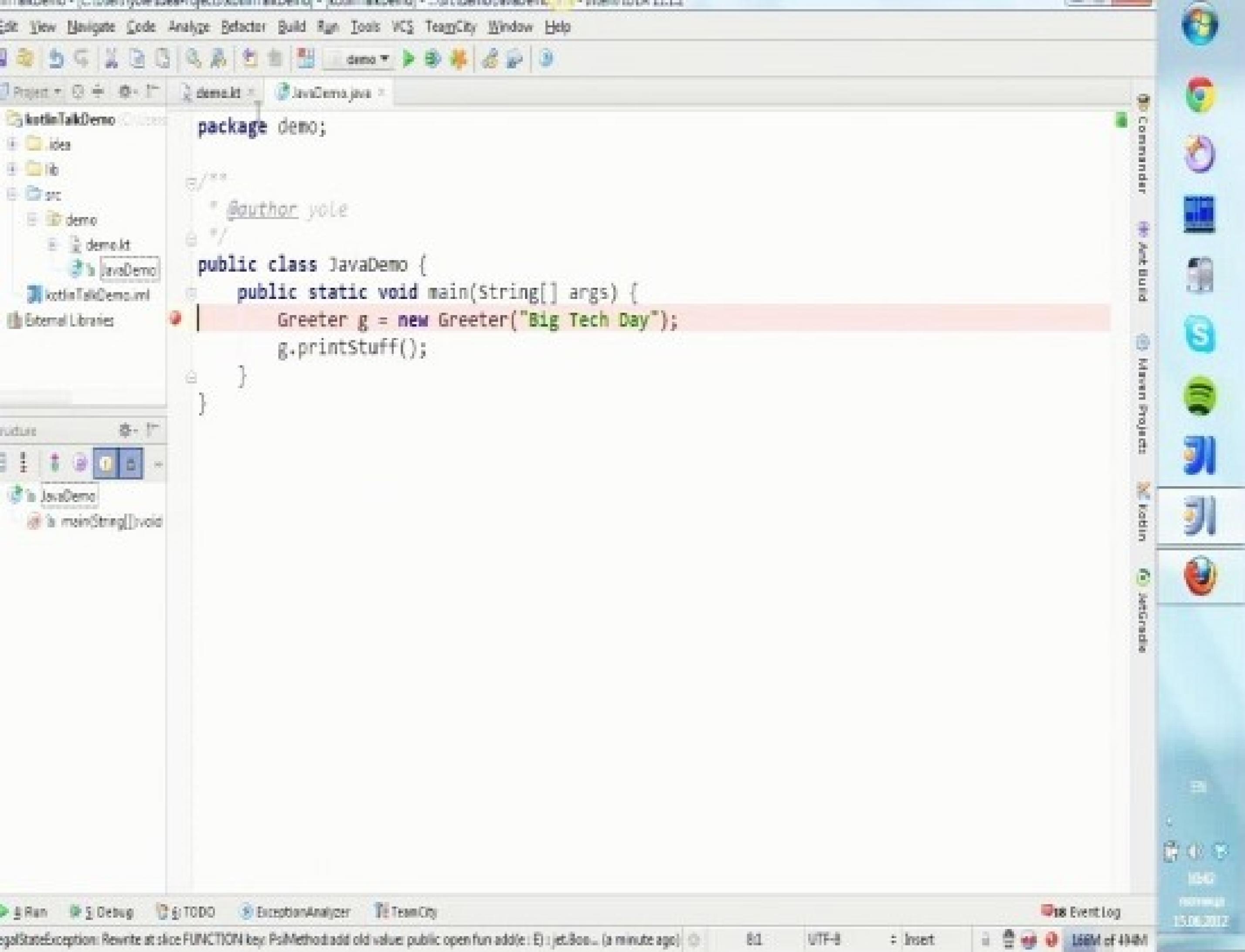
Ctrl-Down and Ctrl-Up will move caret down and up in the editor

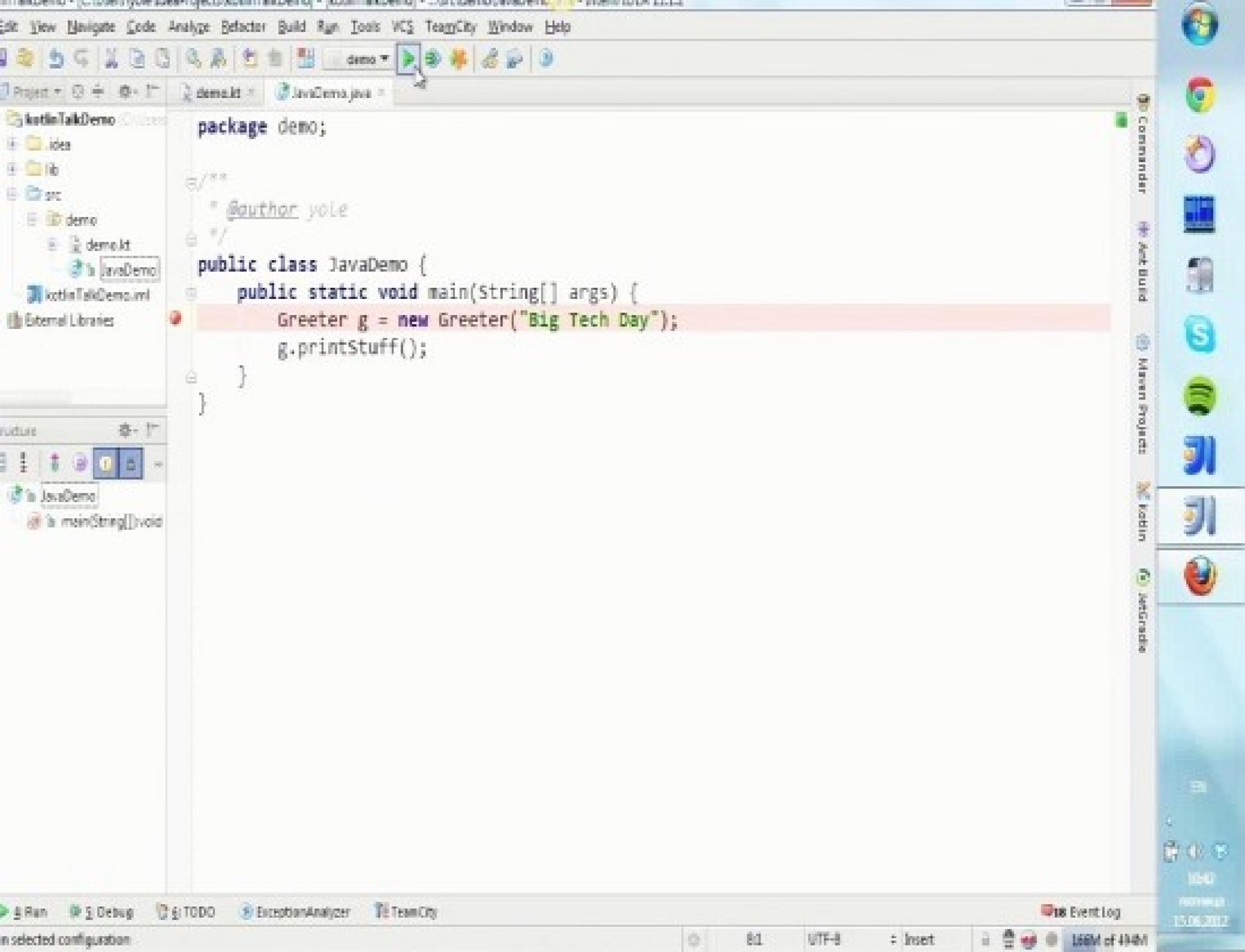


package demo;

/\*\*  
 \* @author yole  
 \*/

```
public class JavaDemo {
    public static void main(String[] args) {
        Greeter g = new Greeter("Big Tech Day");
        g.printStuff();
    }
}
```





package demo;

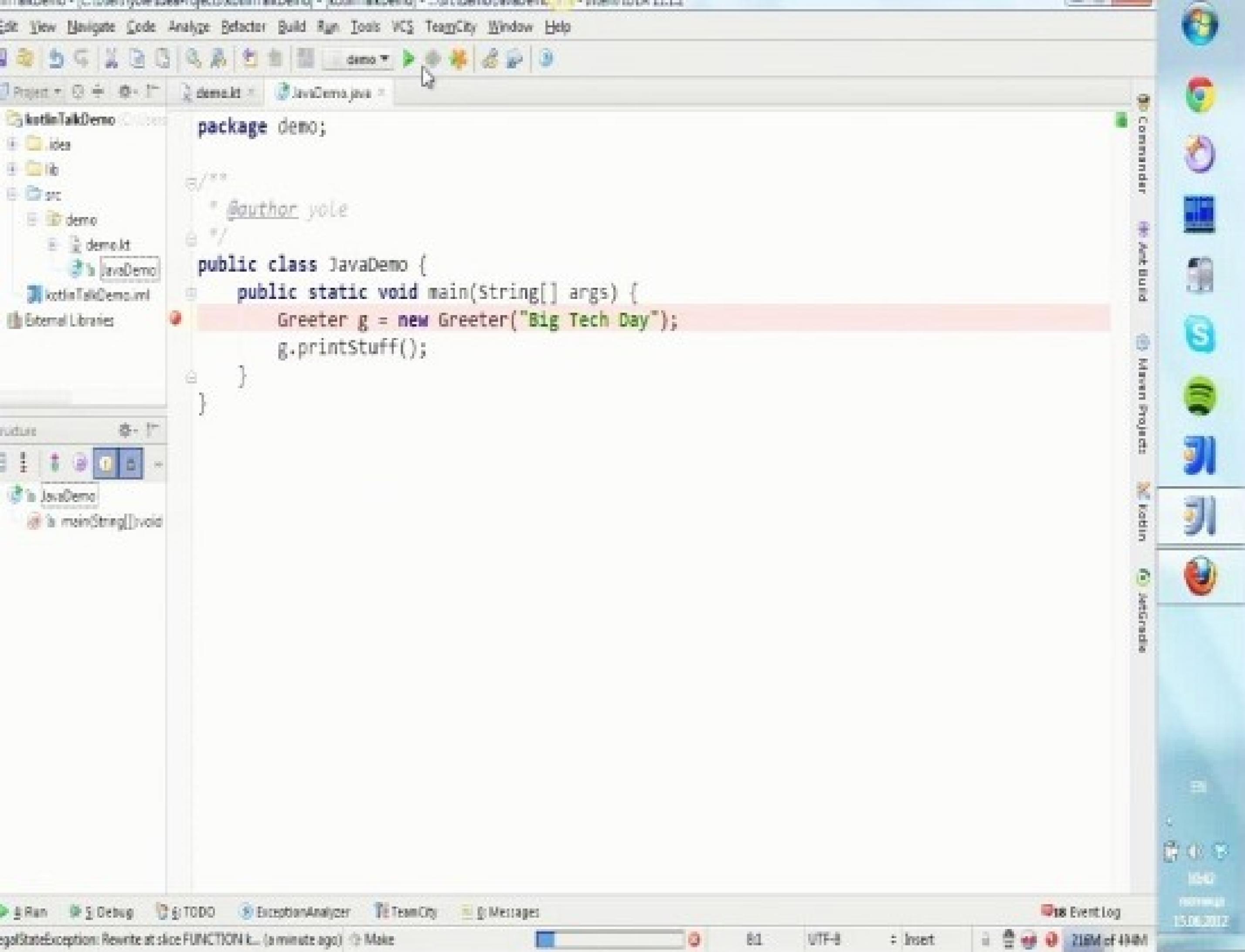
/\*\*  
 \* @author yole  
 \*/

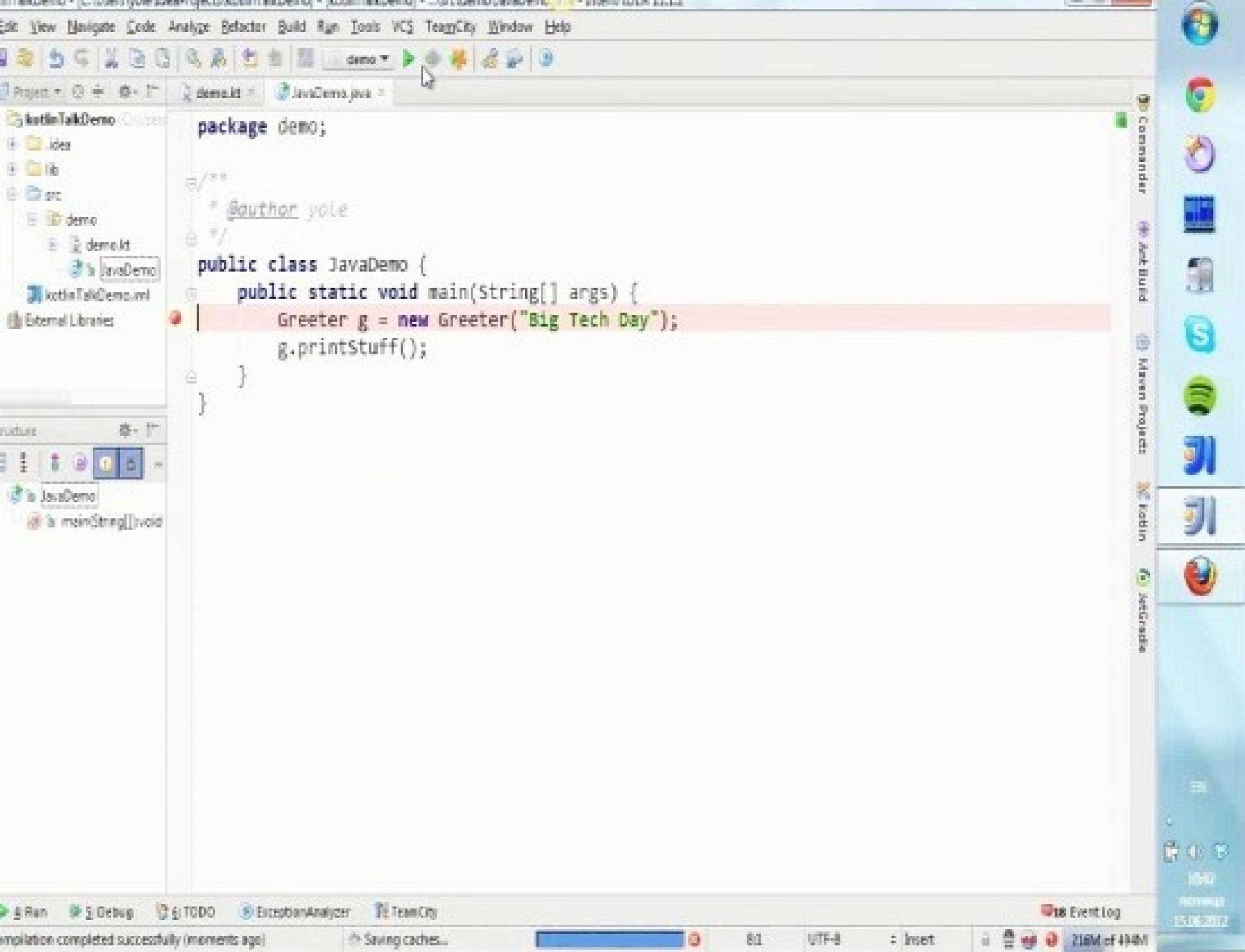
public class JavaDemo {  
 public static void main(String[] args) {

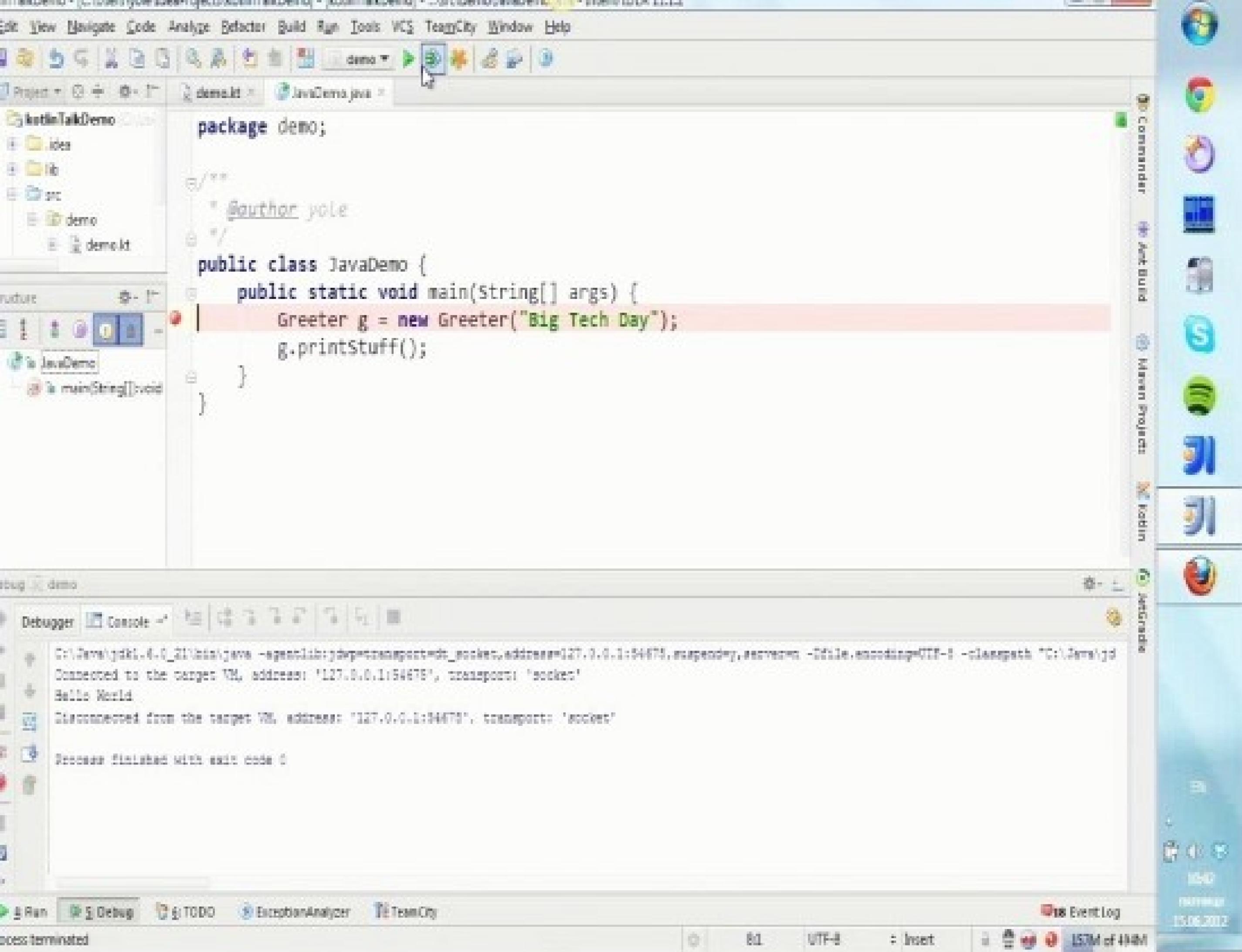
Greeter g = new Greeter("Big Tech Day");  
 g.printStuff();

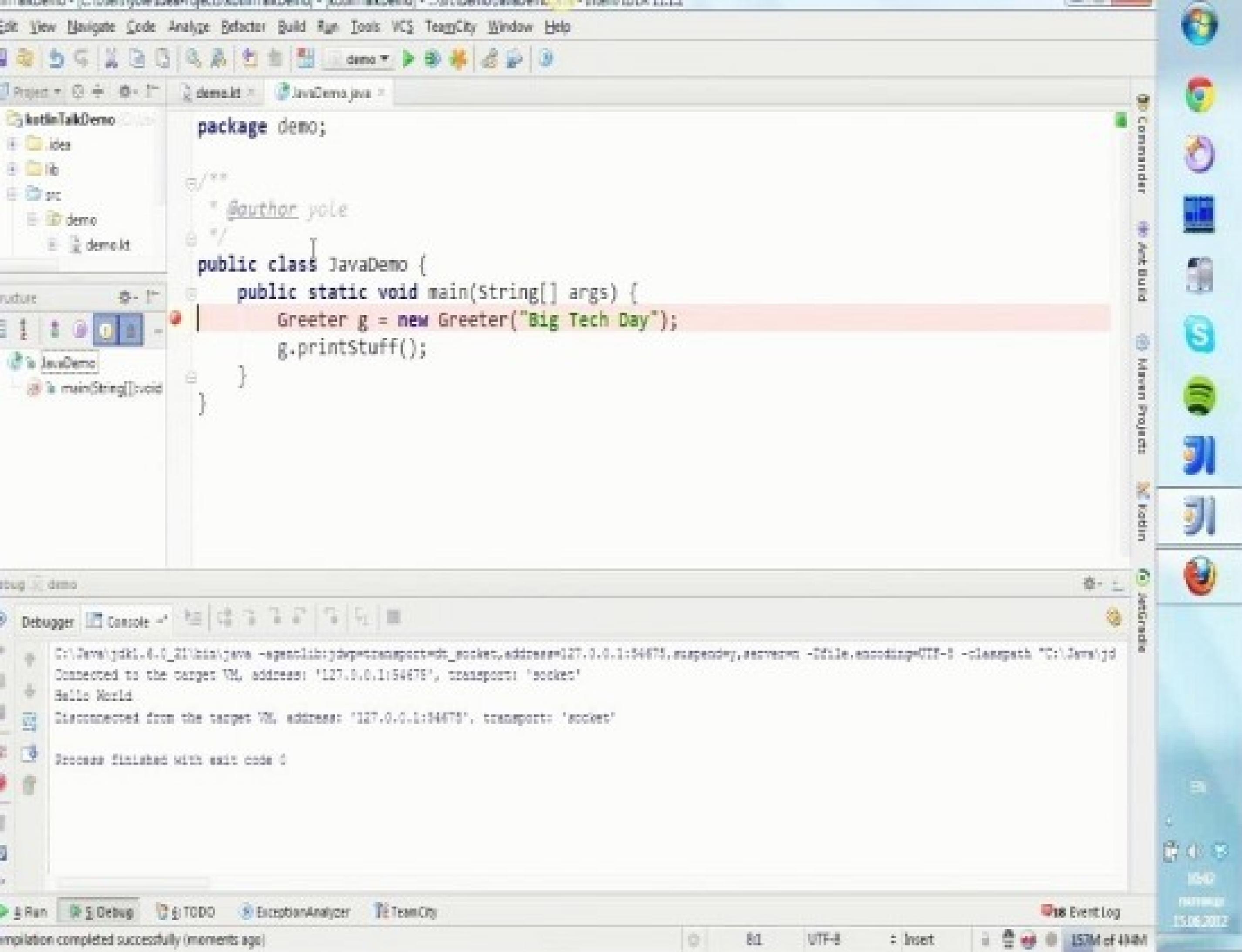
}  
}

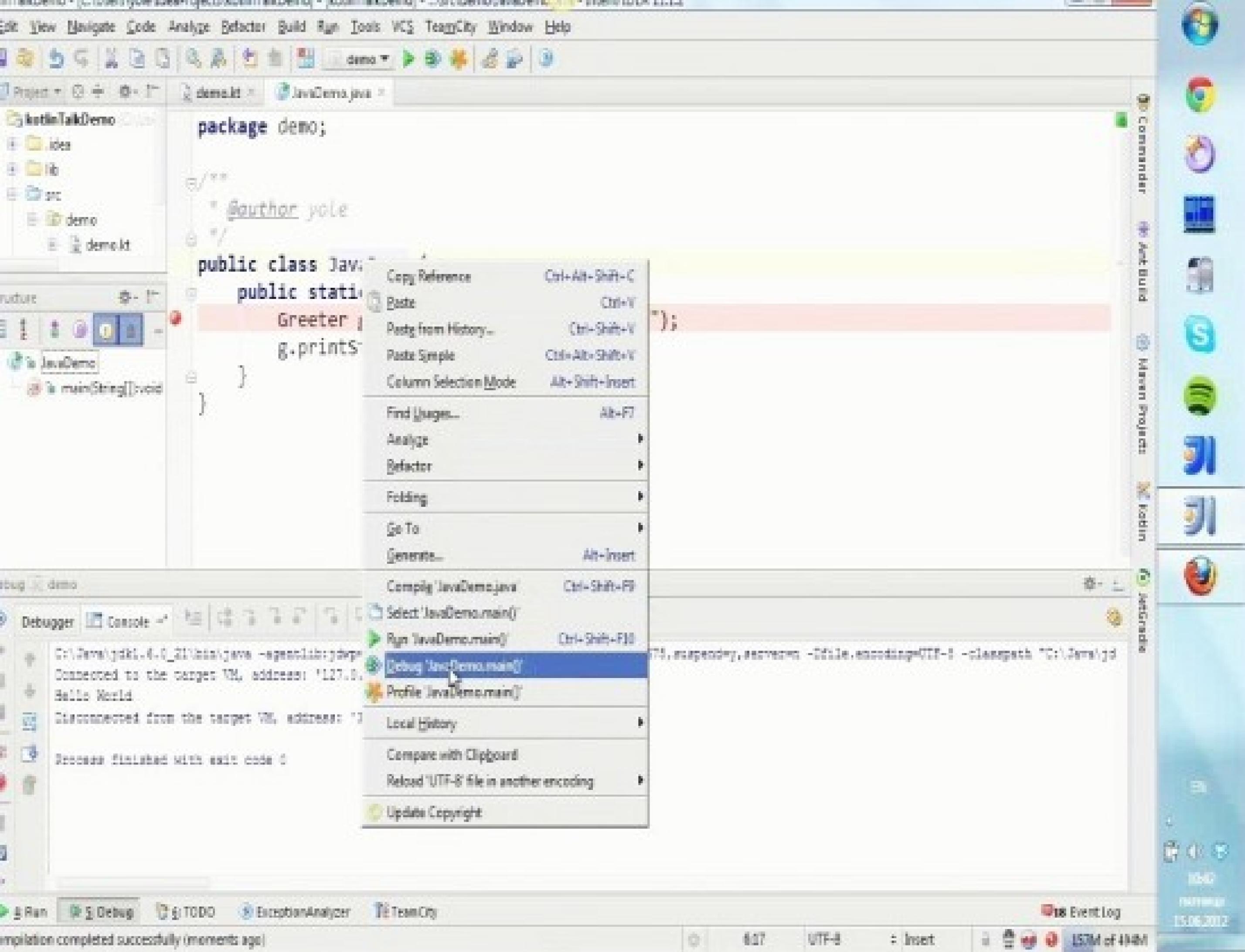
Run tool window showing the execution of the `main(String[] args)` method in the `JavaDemo` class.











```
package demo;
```

```
/**
 * @author yole
 */
```

```
public class Java {
    public static Greeter
        g = new Greeter();
    public static void main(String[] args) {
        g.print();
    }
}
```

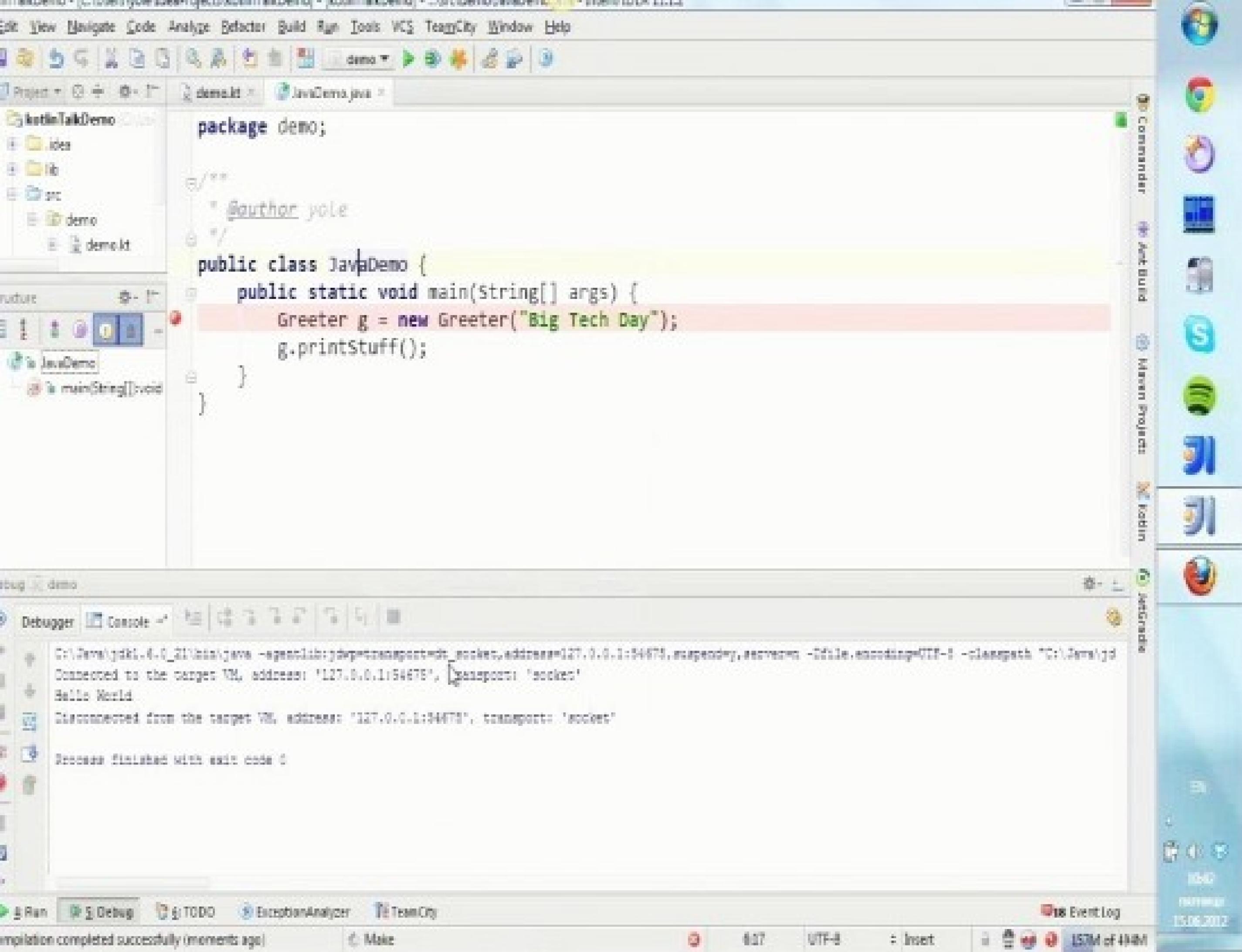
- Copy Reference Ctrl+Alt+Shift+C
- Paste Ctrl+V
- Pastg from History... Ctrl+Shift+V
- Paste Simple Ctrl+Alt+Shift+V
- Column Selection Mode Alt+Shift+Insert
- Find Usages... Alt+F7
- Analyze
- Refactor
- Folding
- Go To
- Generate... Alt+Insert
- Compile 'JavaDemo.java' Ctrl+Shift+F9
- Select 'JavaDemo.main()' Ctrl+Shift+F10
- Run 'JavaDemo.main()' Ctrl+Shift+F10
- Debug 'JavaDemo.main()'**
- Profile 'JavaDemo.main()'
- Local History
- Compare with Clipboard
- Reload 'UTF-8' file in another encoding
- Update Copyright

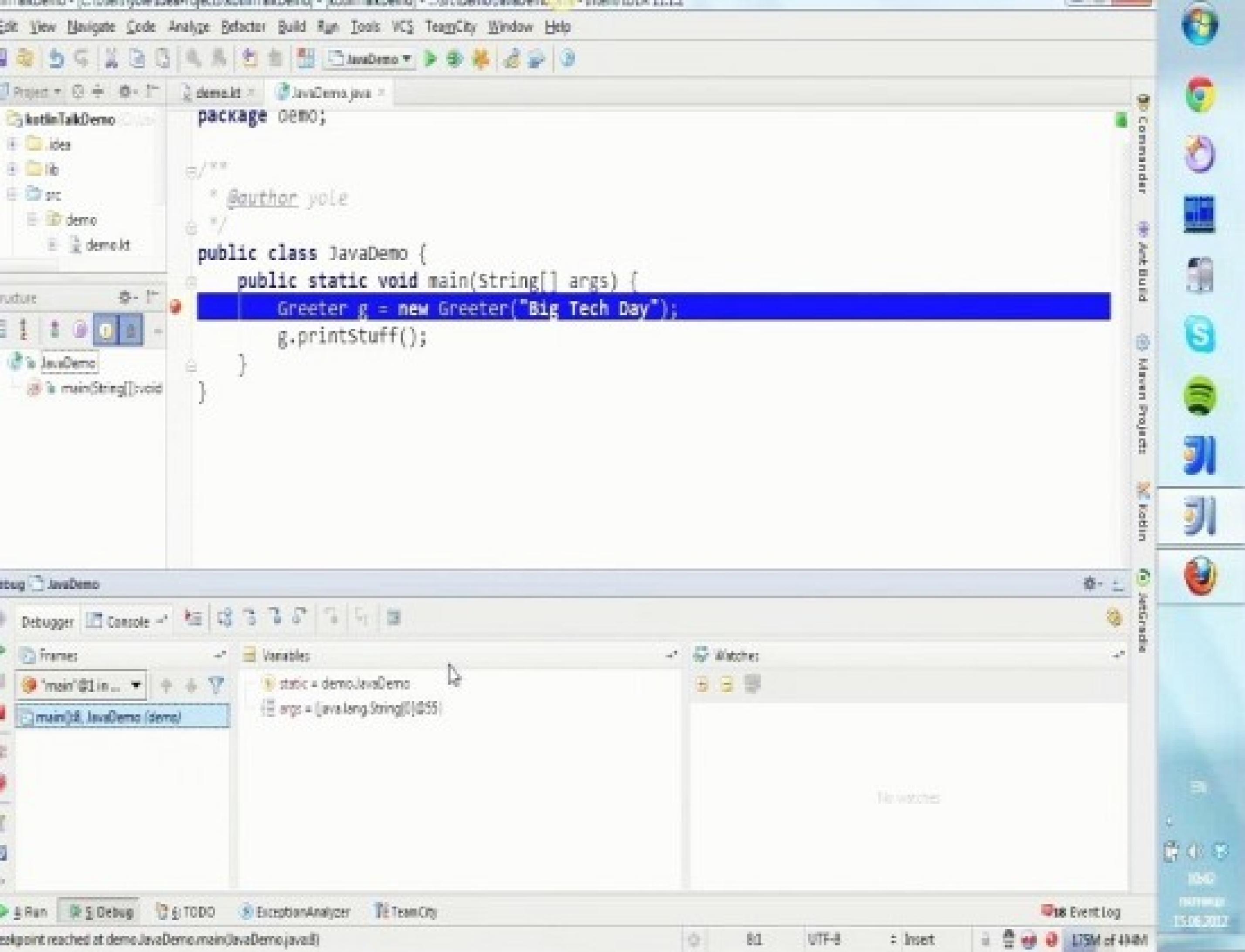
Debugger Console

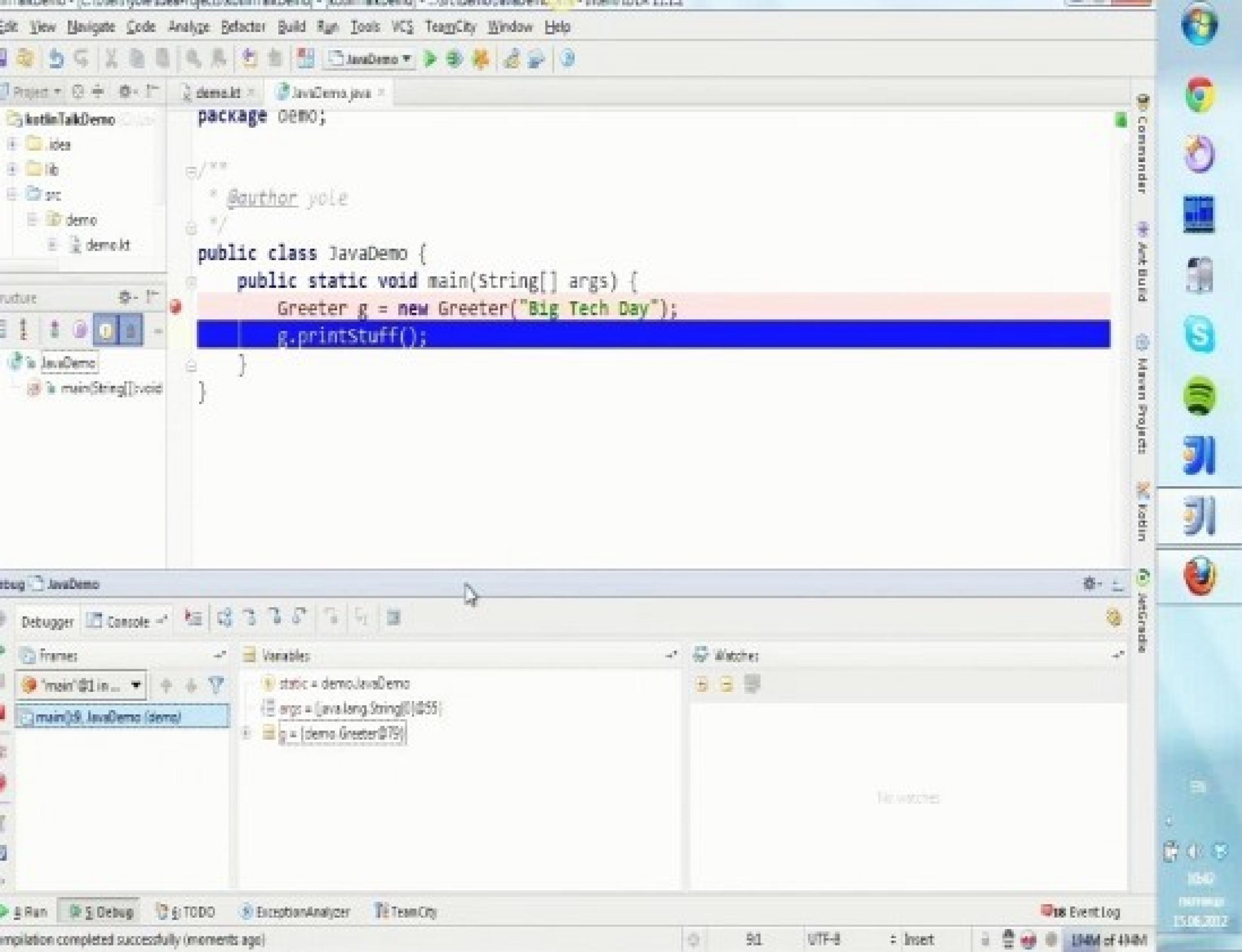
```

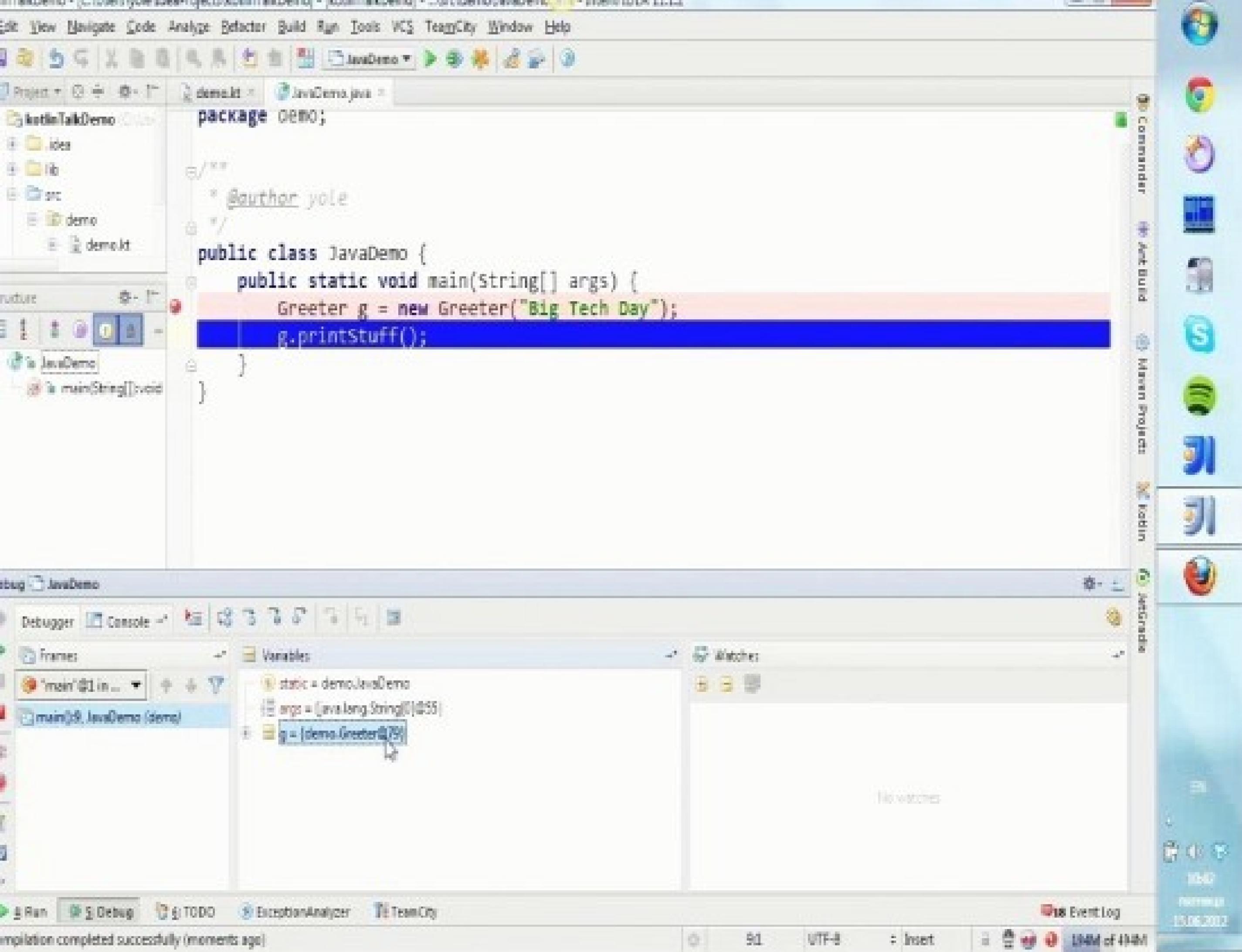
C:\Demo\jdk1.4.0_21\bin\java -agentlib:jdwp=
Connected to the target VM, address: '127.0.0.1:5005',
Ballo World
Disconnected from the target VM, address: '127.0.0.1:5005'
Process finished with exit code 0

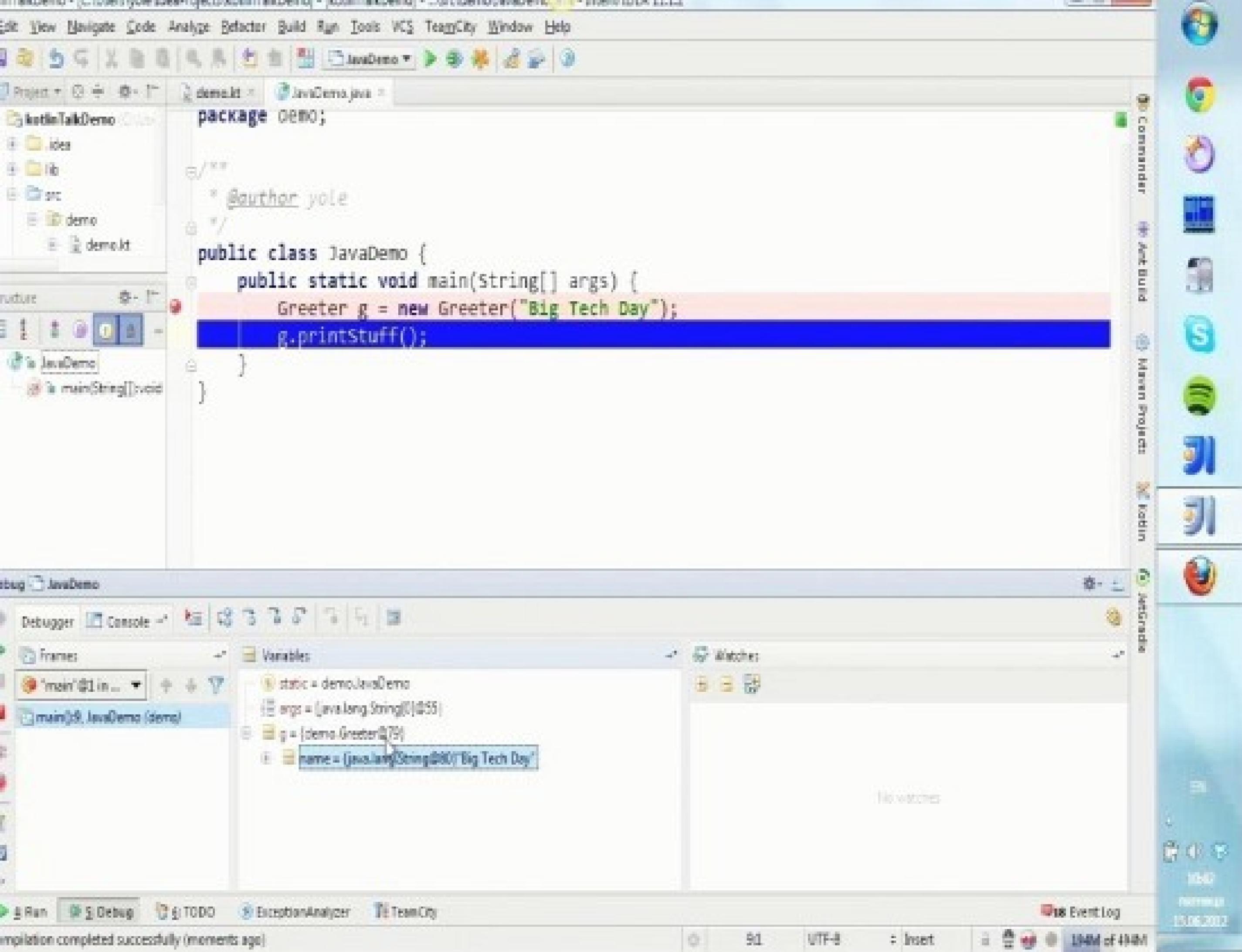
```











```
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS TeamCity Window Help
JavaDemo
kotlinTalkDemo
  .idea
  lib
  src
  demo
  demo.kt
JavaDemo
  main(String[]):void
package demo;

/**
 * @author yole
 */
public class JavaDemo {
    public static void main(String[] args) {
        Greeter g = new Greeter("Big Tech Day");
        g.printStuff();
    }
}
```

Debugger JavaDemo

Debugger Console

Frames

- main()@1 in ...
- main()@0, JavaDemo (demo)

Variables

- static = demo.JavaDemo
- args = (java.lang.String[]@55)
- g = (demo.Greeter@75)
- name = (java.lang.String@80) "Big Tech Day"  
value = (char[L2]@85)  
offset = 0  
count = 12  
hash = 0

Watches

No watches

```
File Edit View Navigate Code Analyze Refactor Build Run Tools VCS TeamCity Window Help
JavaDemo
kotlinTalkDemo
  .idea
  lib
  src
  demo
    demo.kt
JavaDemo
  main(String[]):void
package demo;

/**
 * @author yole
 */
public class JavaDemo {
    public static void main(String[] args) {
        Greeter g = new Greeter("Big Tech Day");
        g.printStuff();
    }
}
```

Debugger JavaDemo

Debugger Console

Frames

- 'main' @1 in ...
- main()@ JavaDemo (demo)

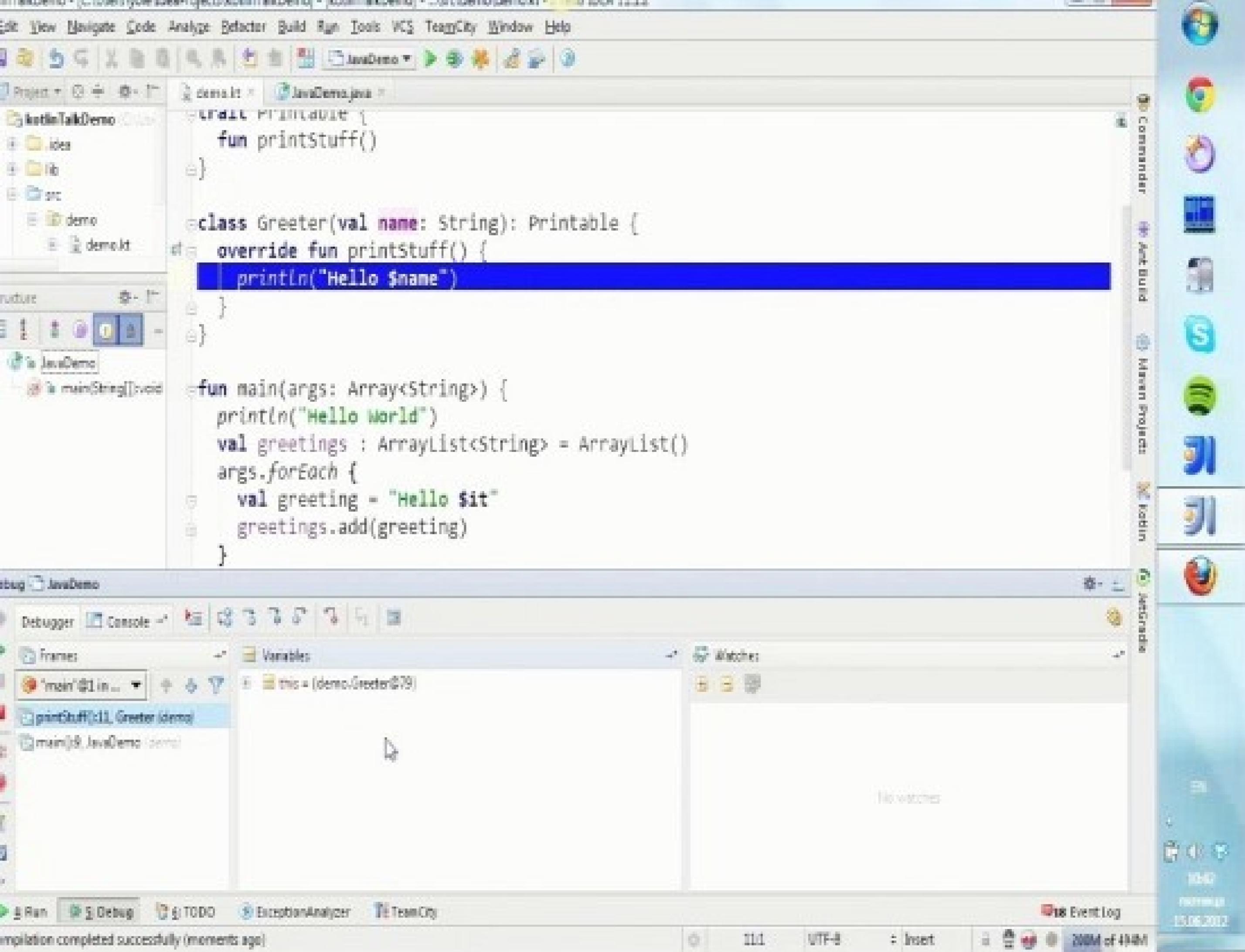
Variables

- static = demo.JavaDemo
- args = [java.lang.String@255]
- g = [demo.Greeter@75]

Watches

No watches





Project: kotlinTalkDemo

- idea
- lib
- src
- demo
- demo.kt

Structure

- JavaDemo
- main[String]:void

```
interface Printable {
    fun printStuff()
}

class Greeter(val name: String): Printable {
    override fun printStuff() {
        println("Hello $name")
    }
}

fun main(args: Array<String>) {
    println("Hello world")
    val greetings : ArrayList<String> = ArrayList()
    args.forEach {
        val greeting = "Hello $it"
        greetings.add(greeting)
    }
}
```

Debugger: JavaDemo

Debugger Console

Frames

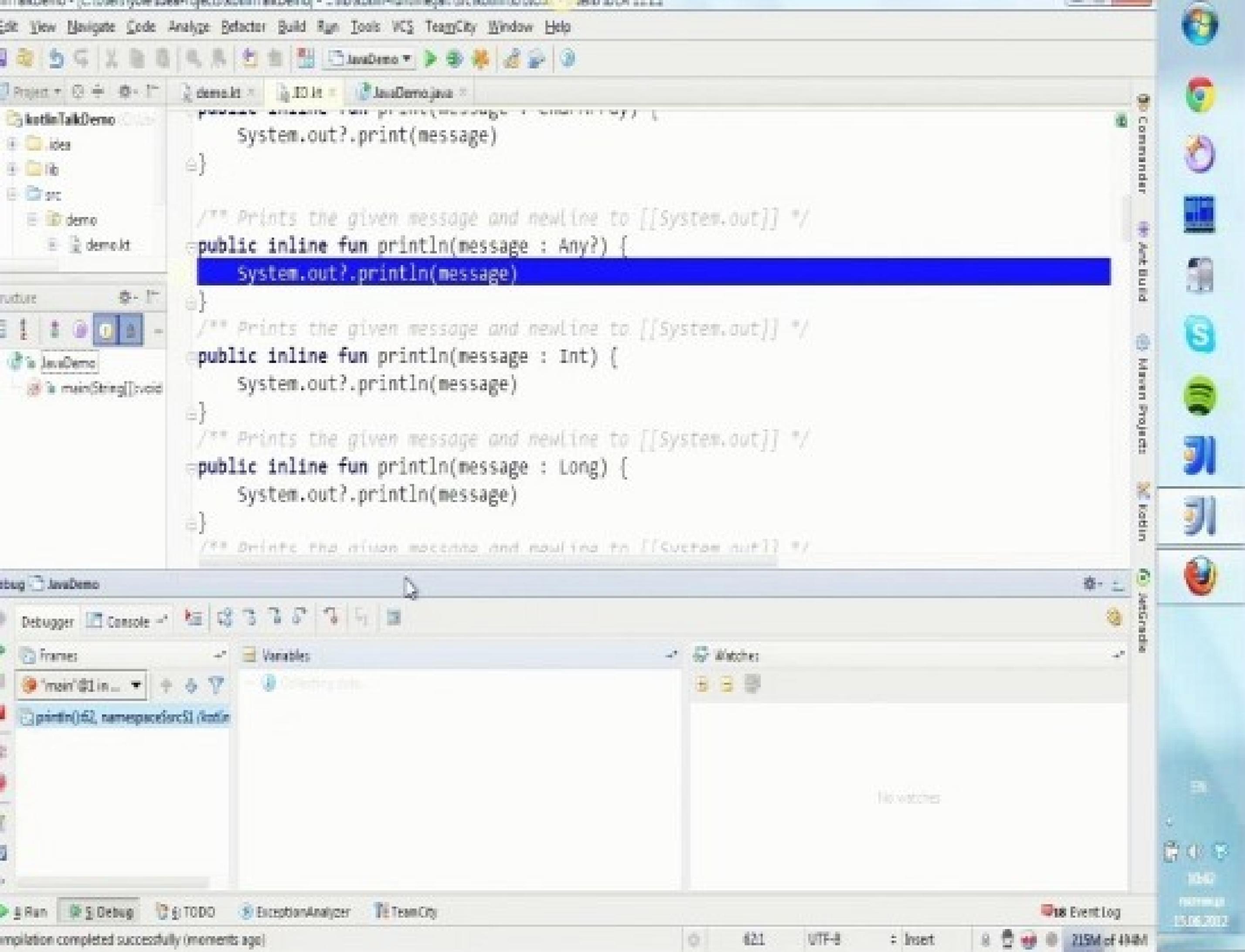
- 'main' @1 in ...
- printStuff():11, Greeter (demo)
- main():9, JavaDemo (demo)

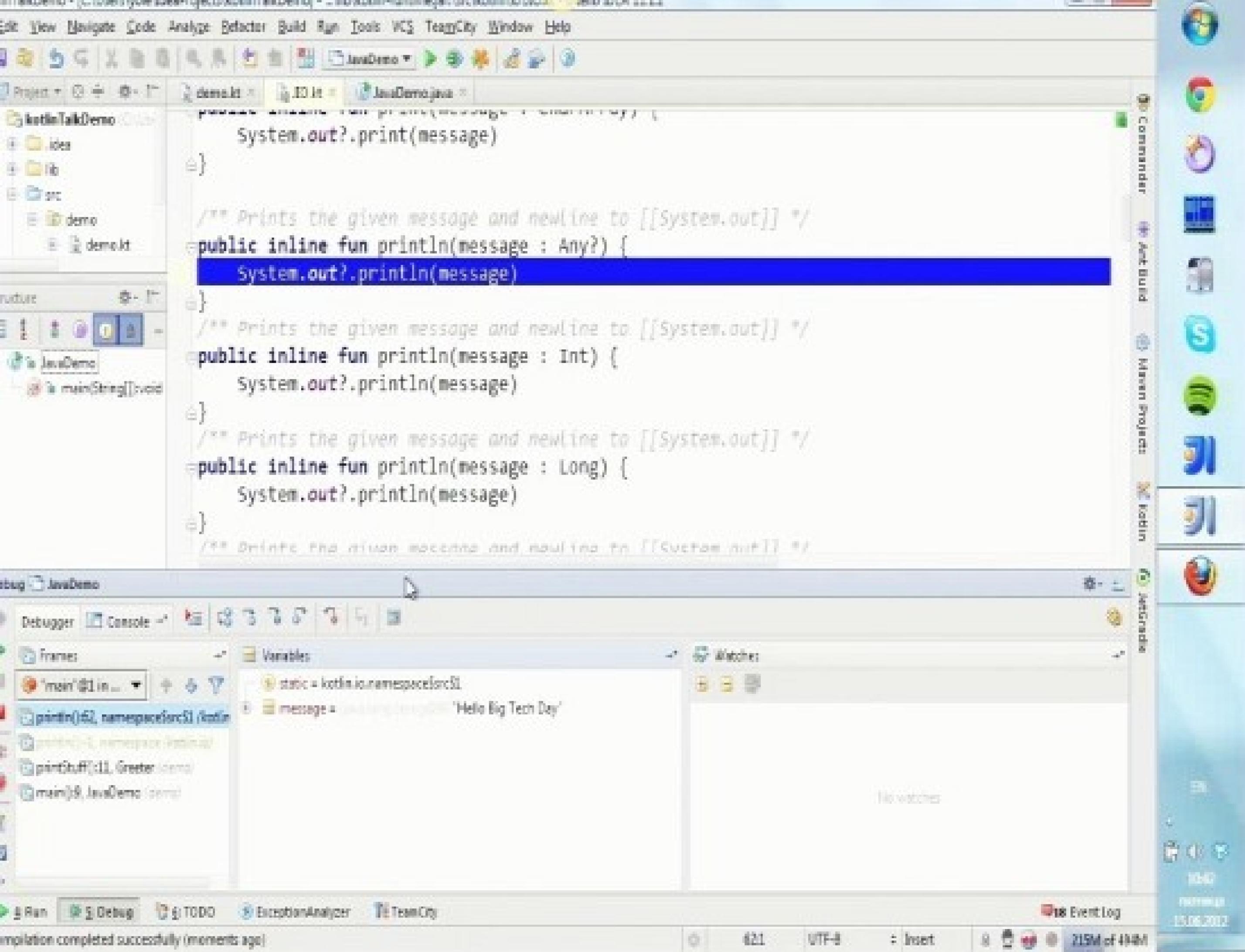
Variables

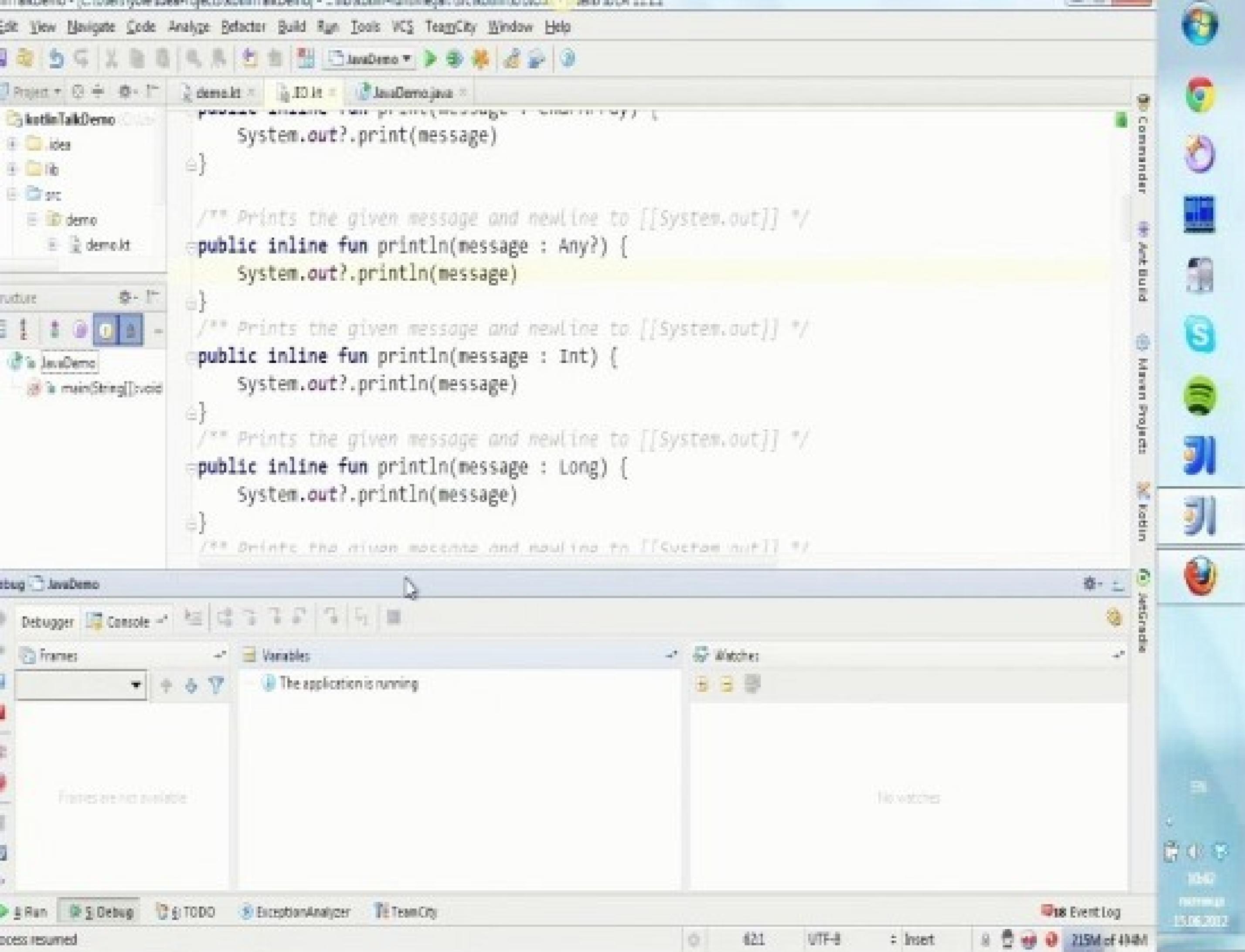
- this = (demo.Greeter@79)

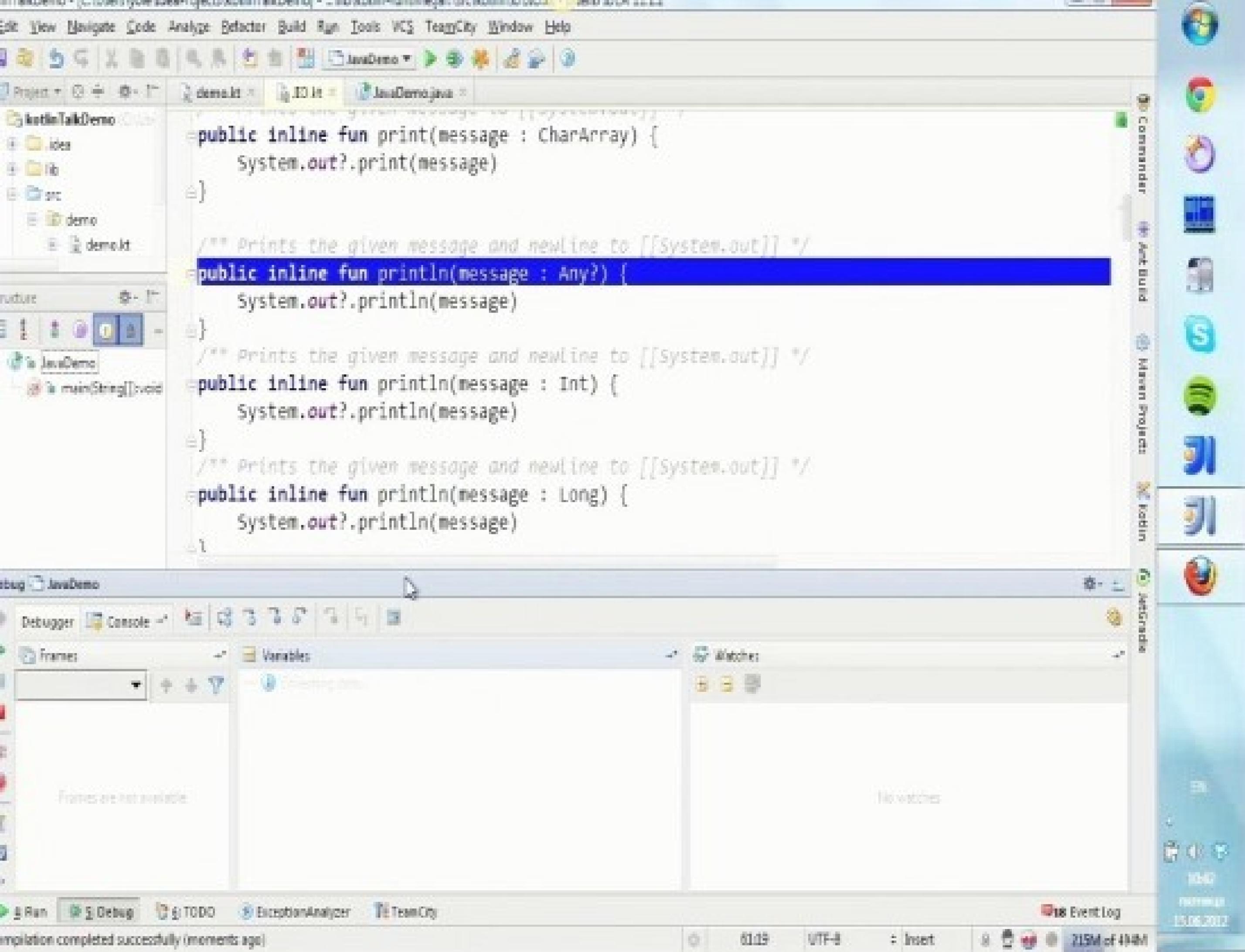
Watches

No watches









```
public inline fun print(message : CharArray) {
    System.out?.print(message)
}

/** Prints the given message and newline to [[System.out]] */
public inline fun println(message : Any?) {
    System.out?.println(message)
}

/** Prints the given message and newline to [[System.out]] */
public inline fun println(message : Int) {
    System.out?.println(message)
}

/** Prints the given message and newline to [[System.out]] */
public inline fun println(message : Long) {
    System.out?.println(message)
}
```

Debugger Console

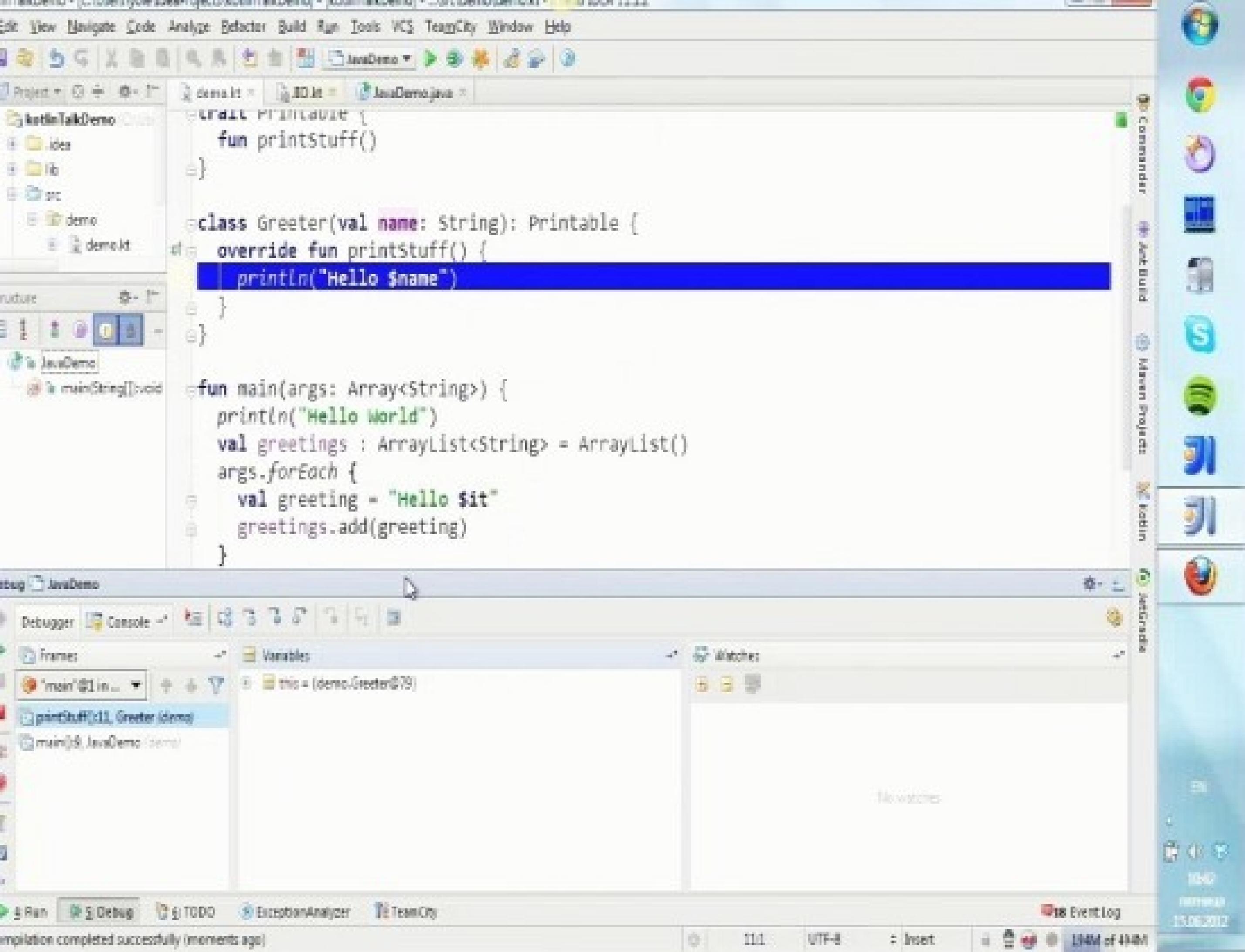
Frames

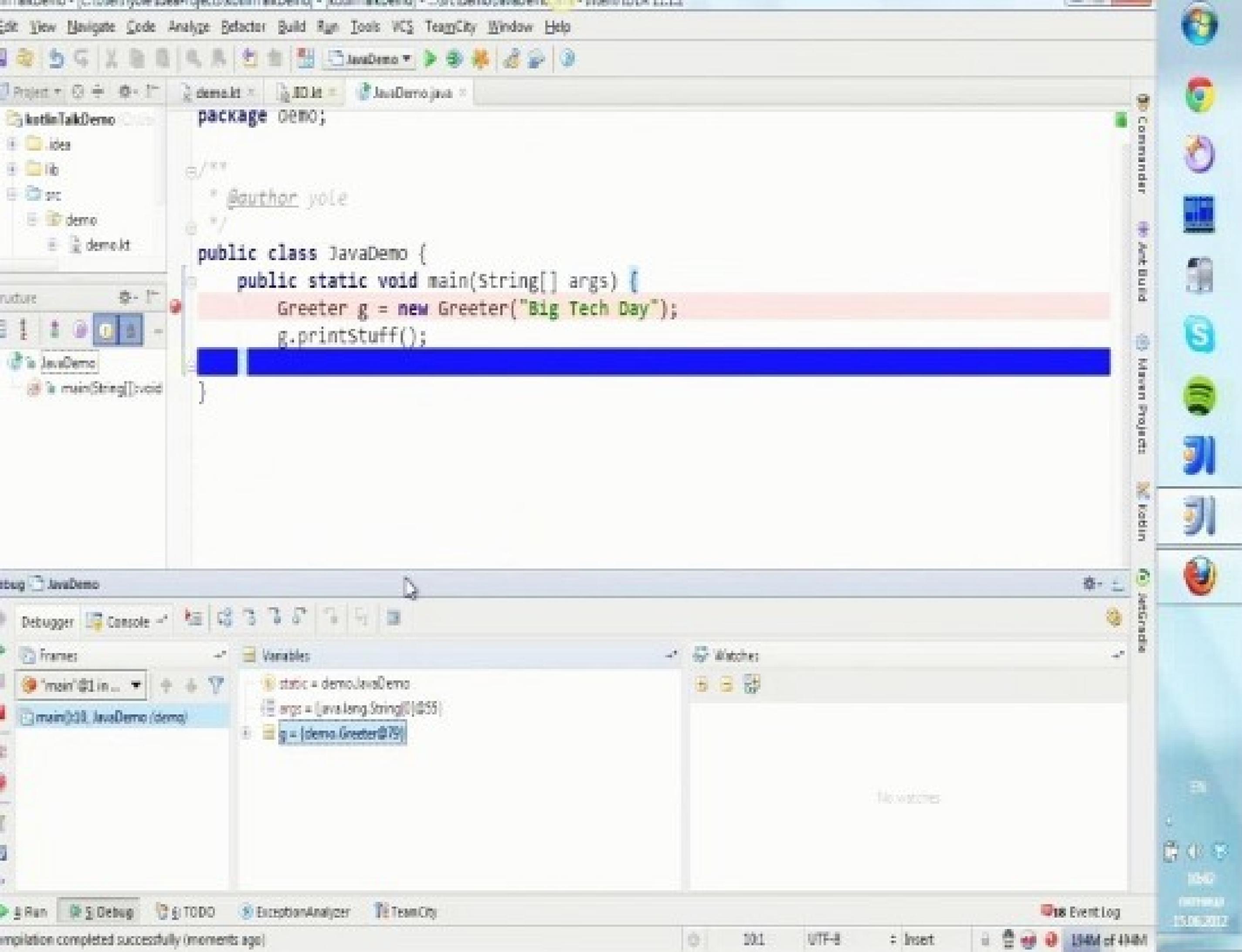
Variables

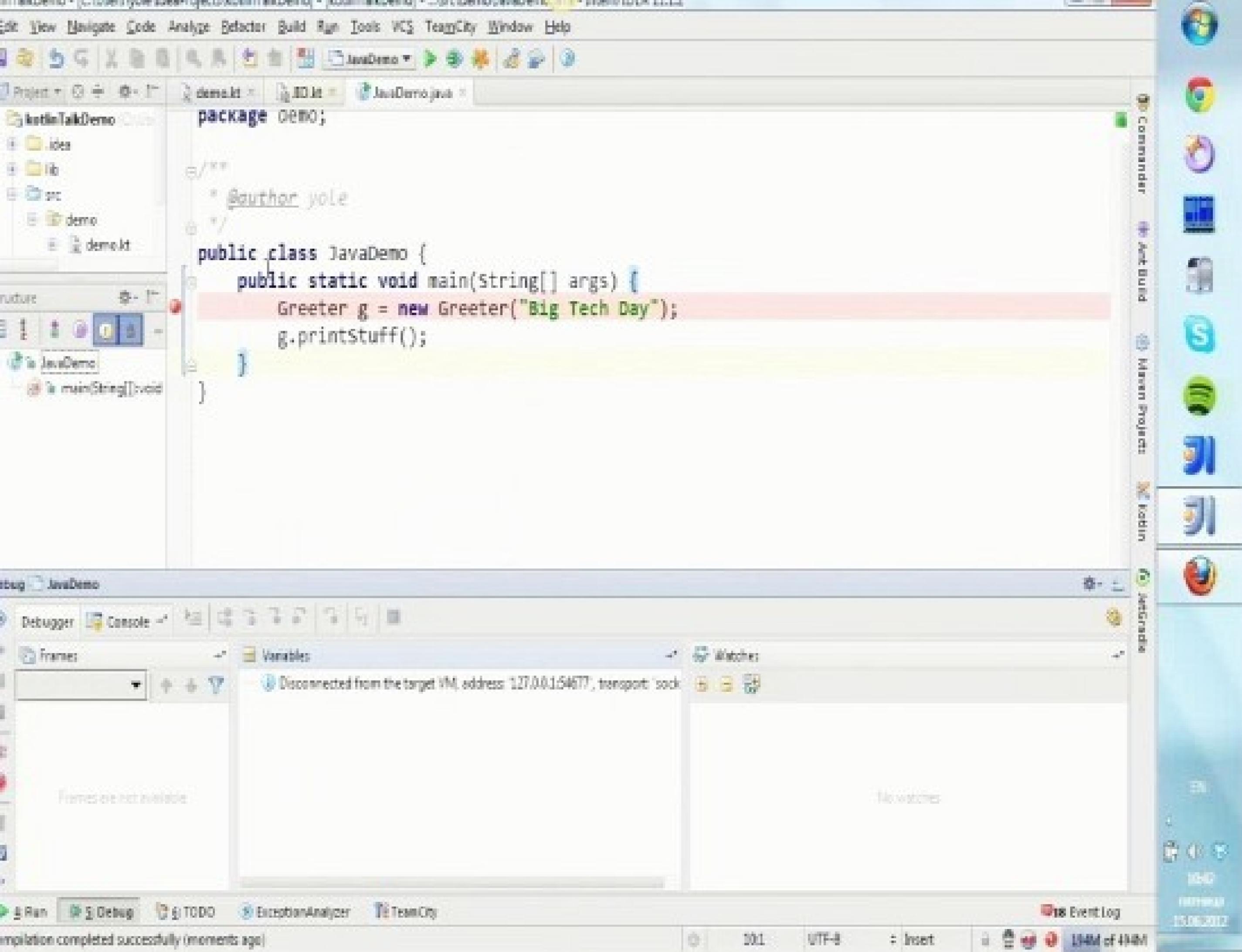
Watches

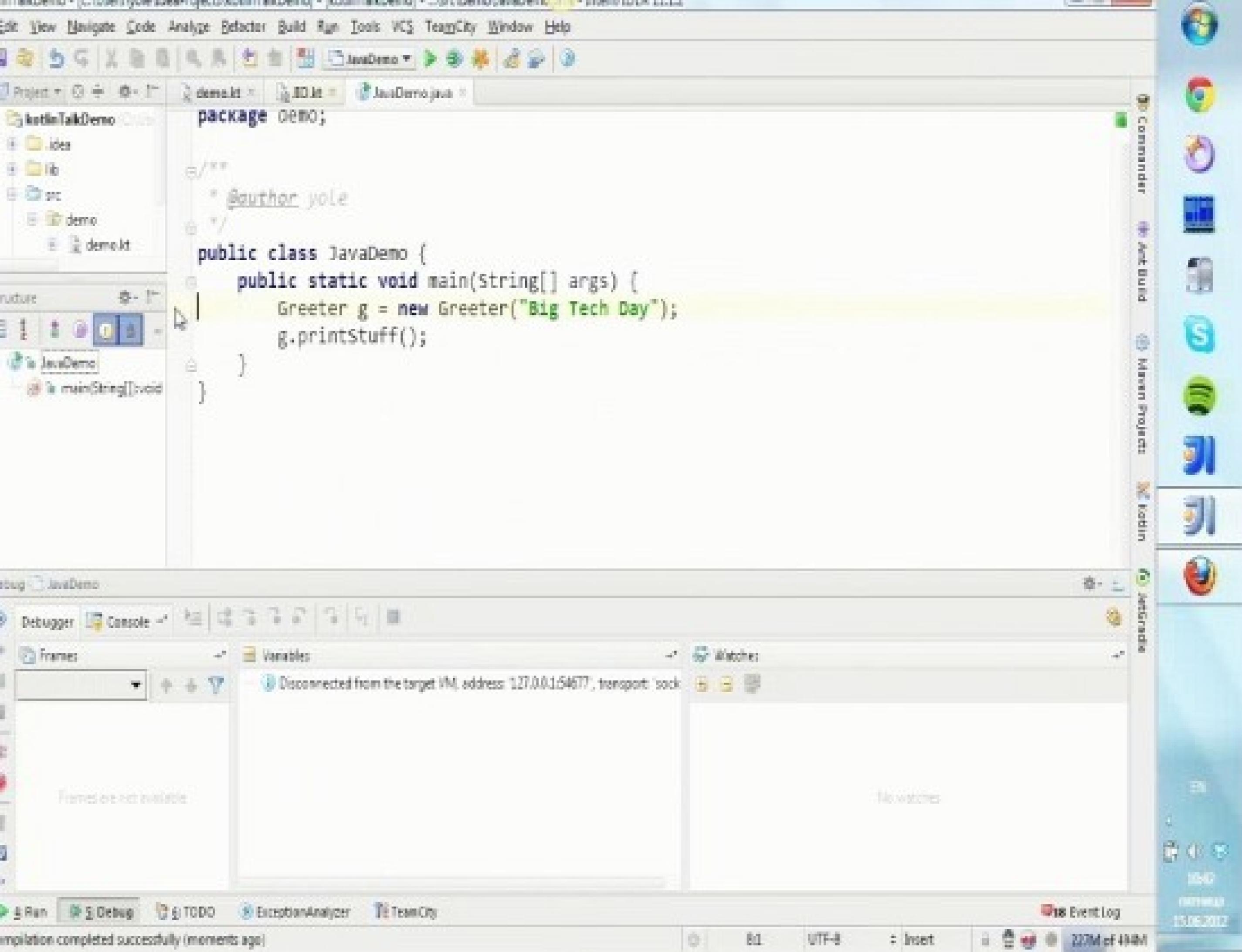
Frames are not available.

No watches









Project Structure: kotlinTalkDemo, .idea, lib, src, demo, demo.kt

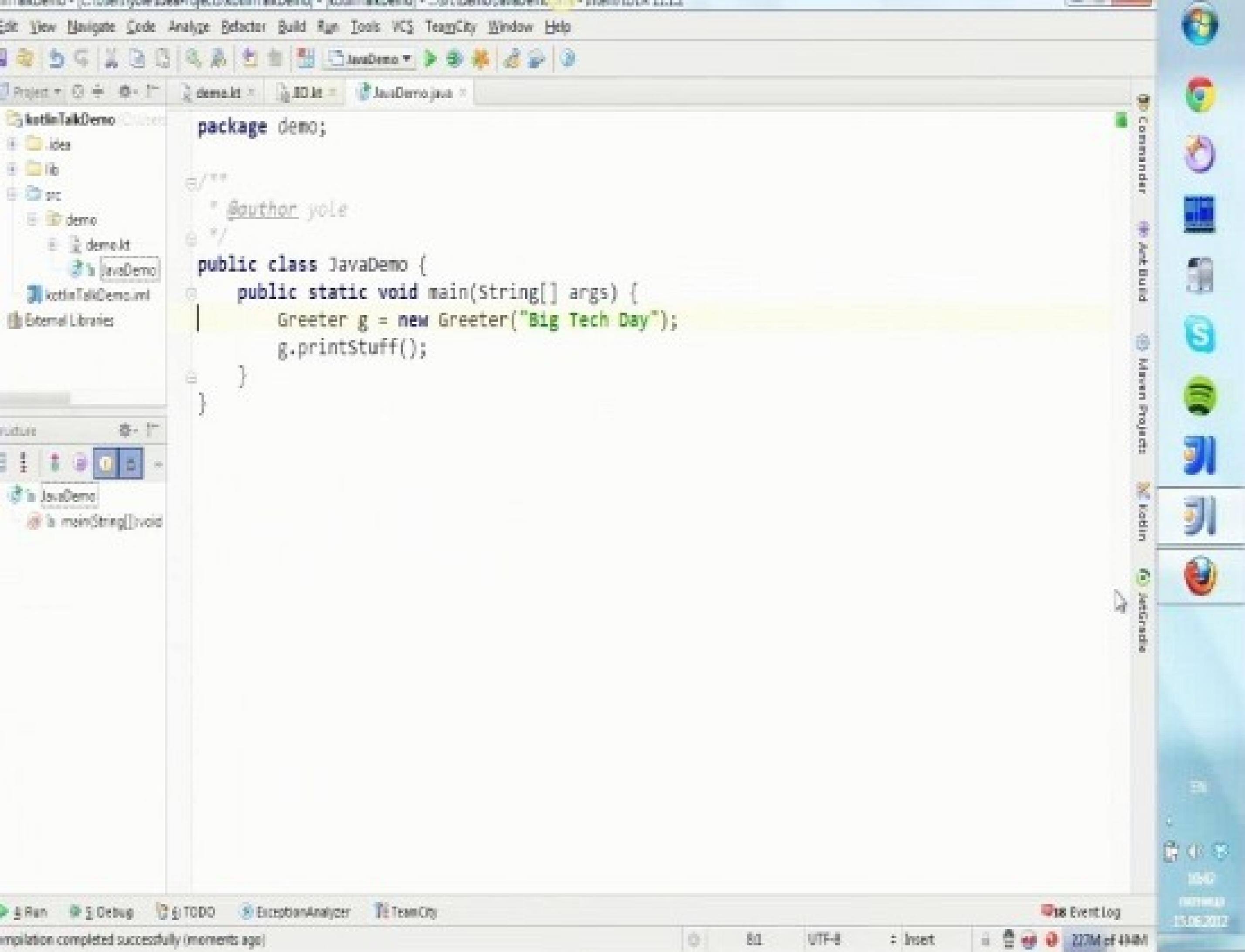
Structure: JavaDemo, main(String[]):void

Disconnected from the target VM, address: '127.0.0.1:54677', transport: 'sock'

Frames are not available

Variables

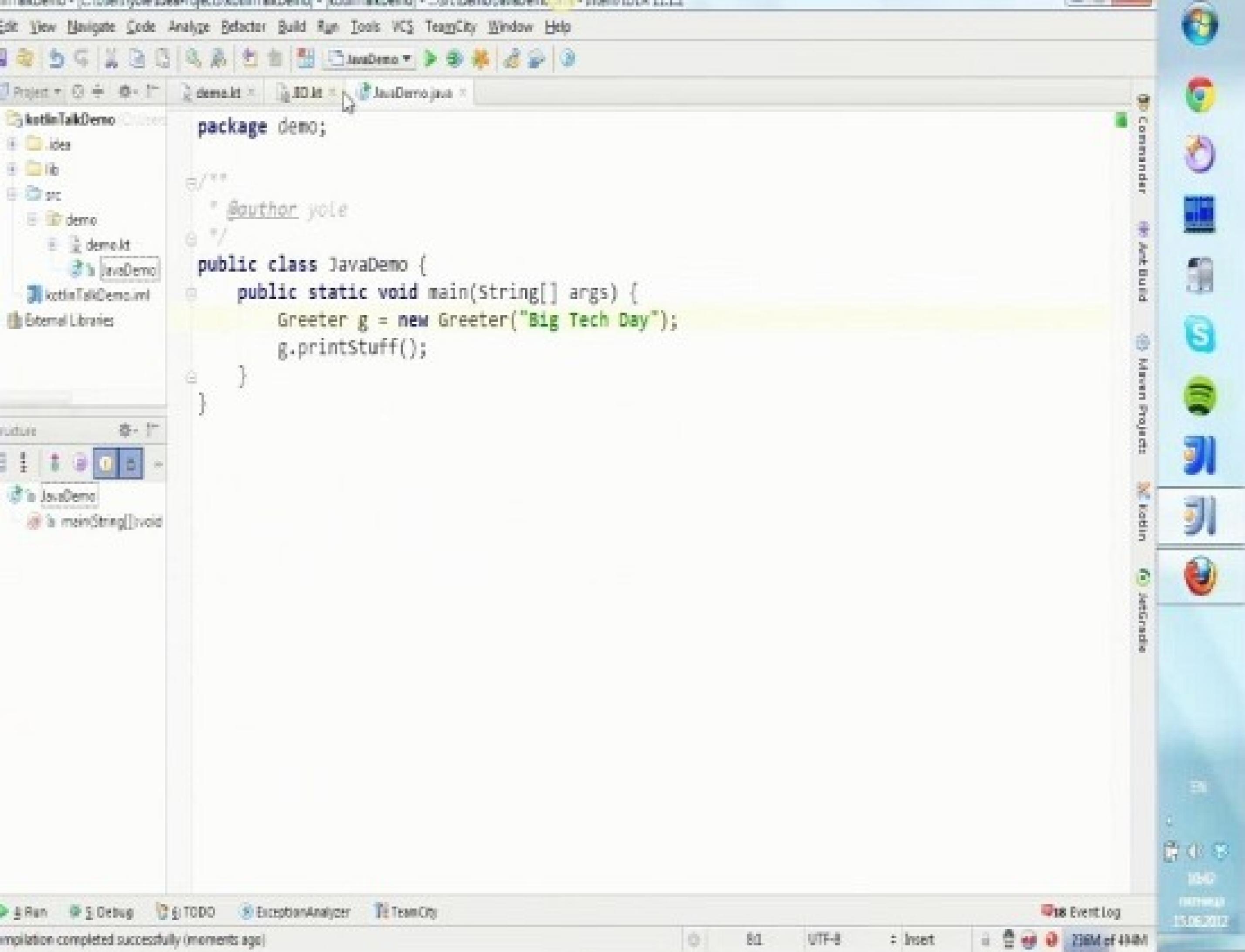
Watches: No watches



package demo;

/\*\*  
 \* @author yole  
 \*/

```
public class JavaDemo {
    public static void main(String[] args) {
        Greeter g = new Greeter("Big Tech Day");
        g.printStuff();
    }
}
```



package demo;

/\*\*  
 \* @author yole  
 \*/

public class JavaDemo {

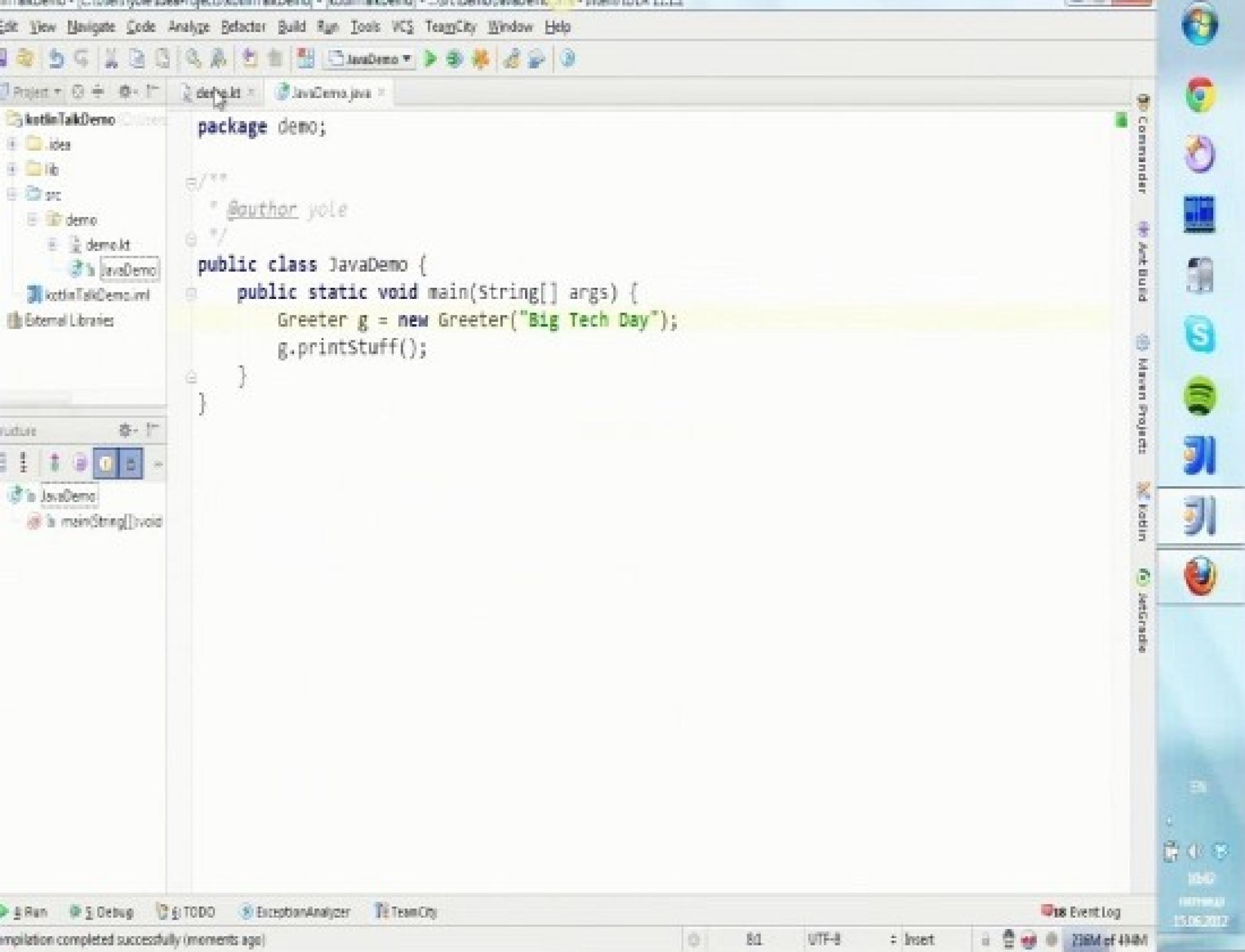
public static void main(String[] args) {

Greeter g = new Greeter("Big Tech Day");

g.printStuff();

}

}



package demo;

/\*\*  
 \* @author yole  
 \*/

public class JavaDemo {

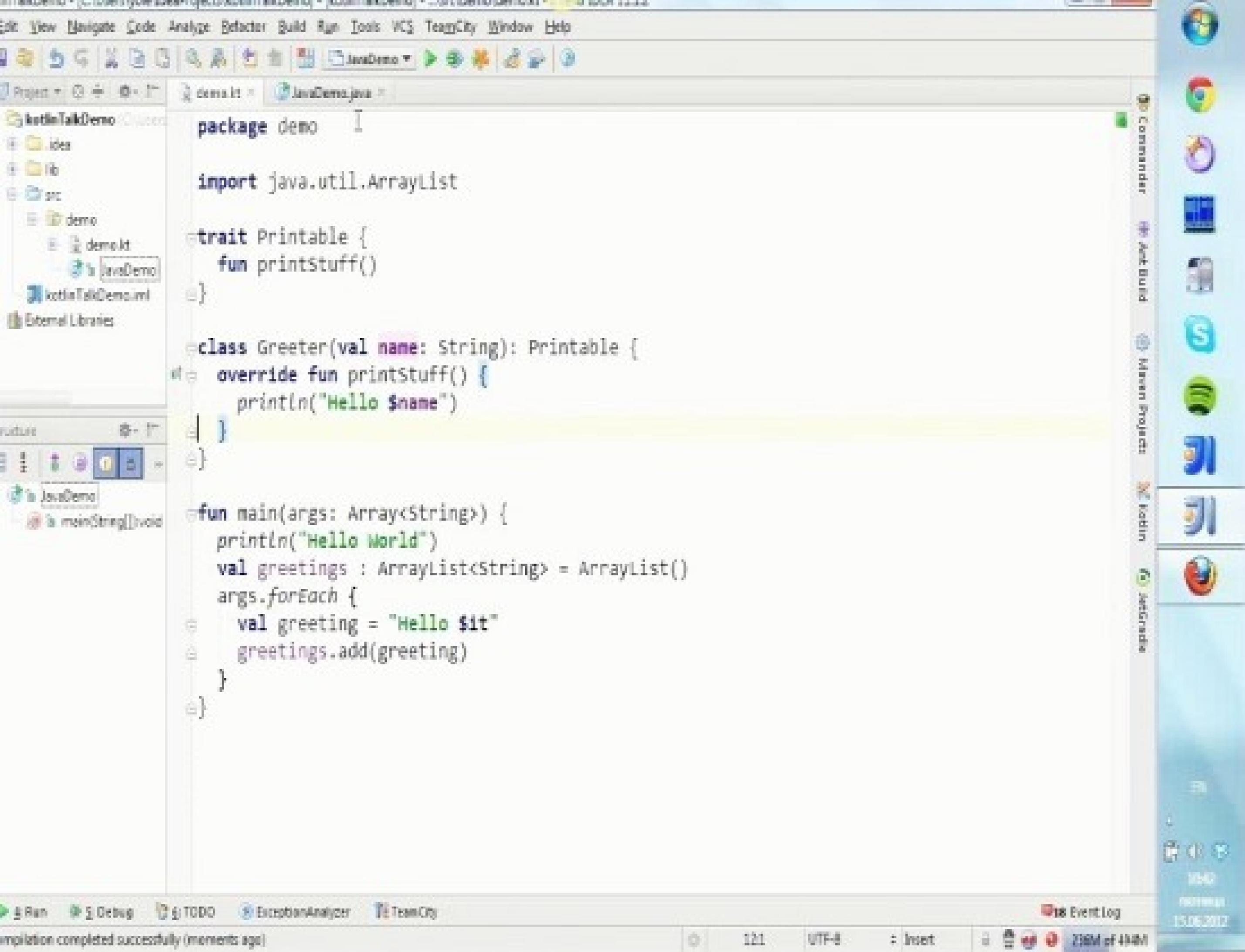
public static void main(String[] args) {

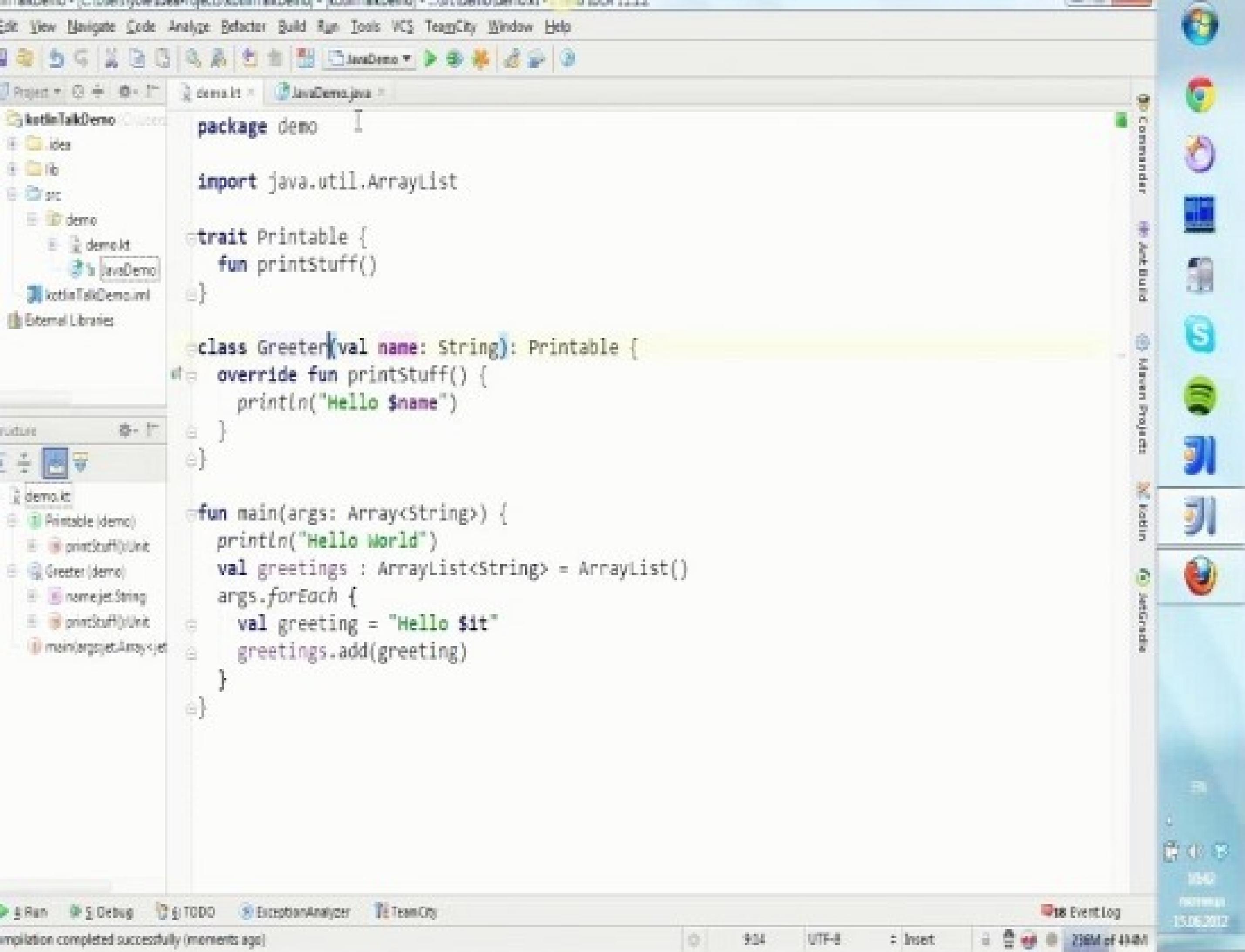
Greeter g = new Greeter("Big Tech Day");

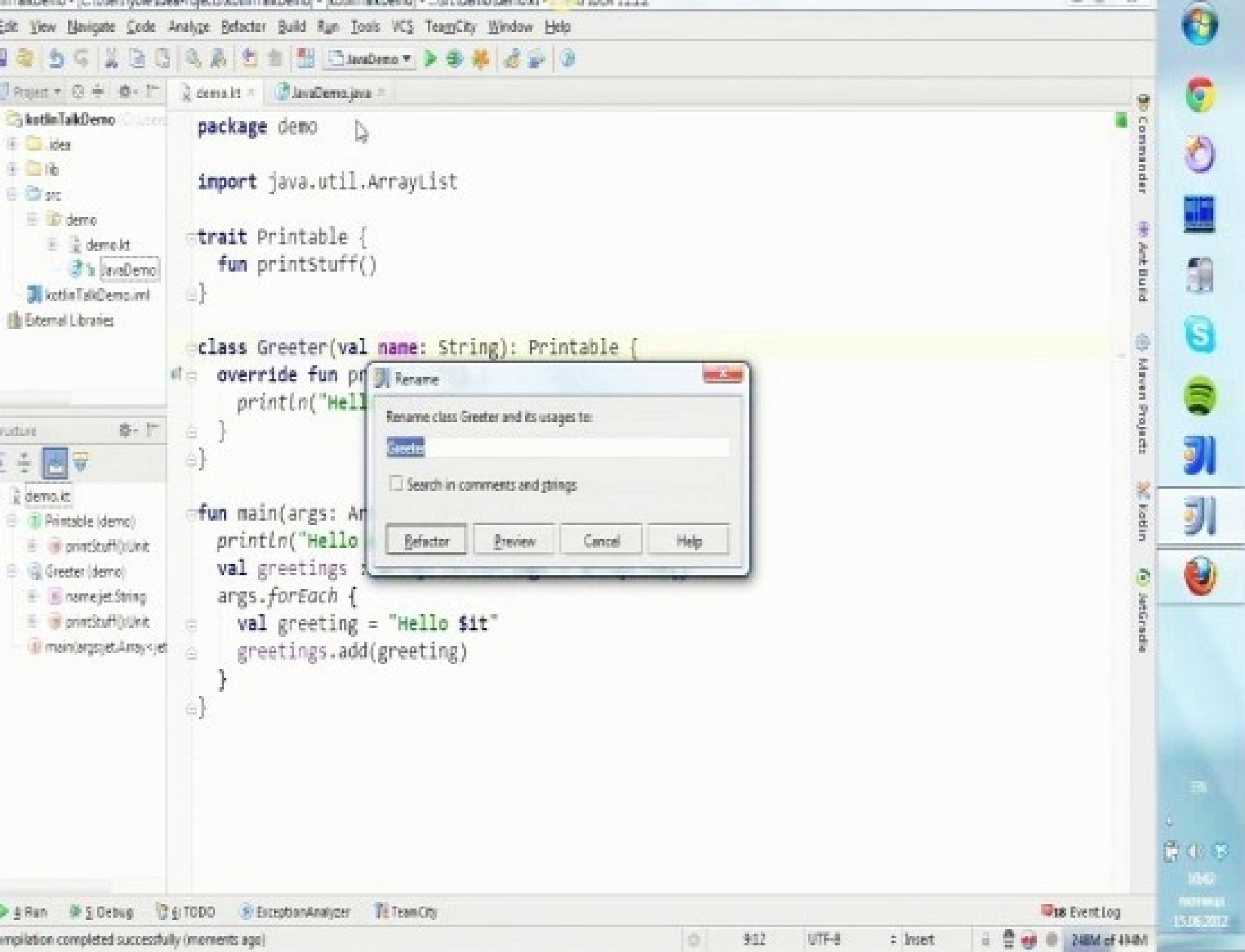
g.printStuff();

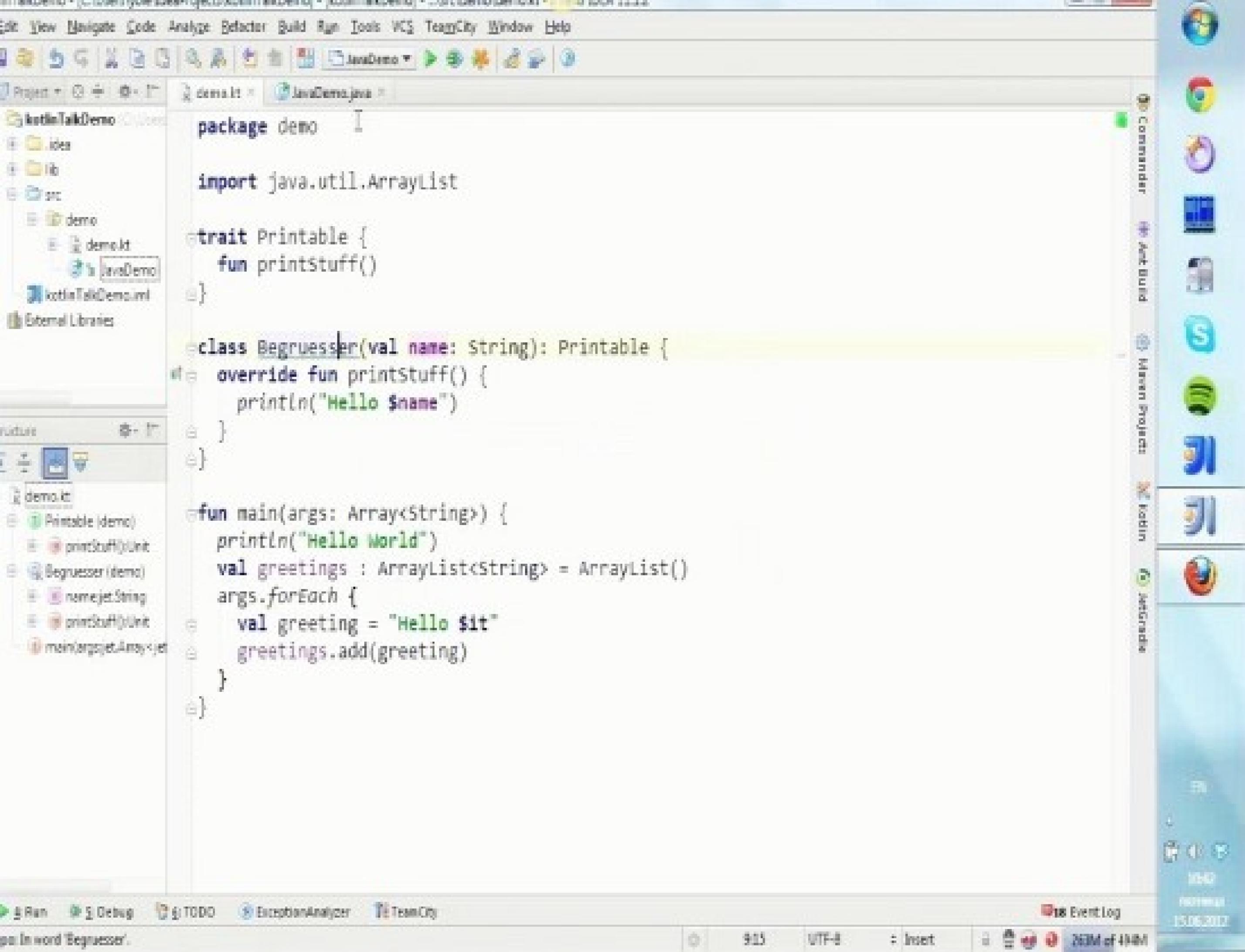
}

}









- Project: kotlinTalkDemo
  - .idea
  - lib
  - src
    - demo
      - demo.kt
      - JavaDemo
- kotlinTalkDemo.iml
- External Libraries

```

package demo

import java.util.ArrayList

trait Printable {
    fun printstuff()
}

class Begruesser(val name: String): Printable {
    override fun printstuff() {
        println("Hello $name")
    }
}

fun main(args: Array<String>) {
    println("Hello World")
    val greetings : ArrayList<String> = ArrayList()
    args.forEach {
        val greeting = "Hello $it"
        greetings.add(greeting)
    }
}

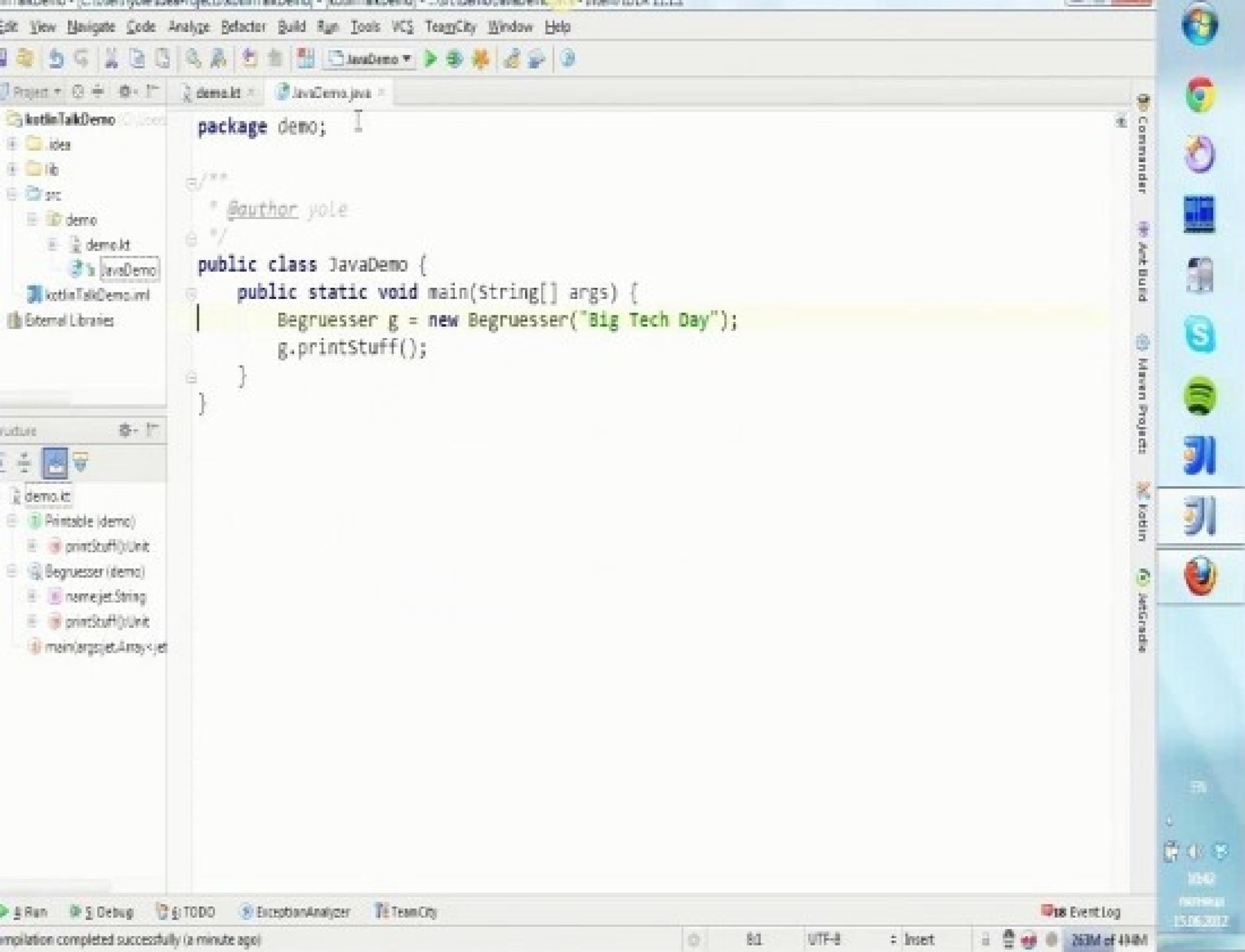
```

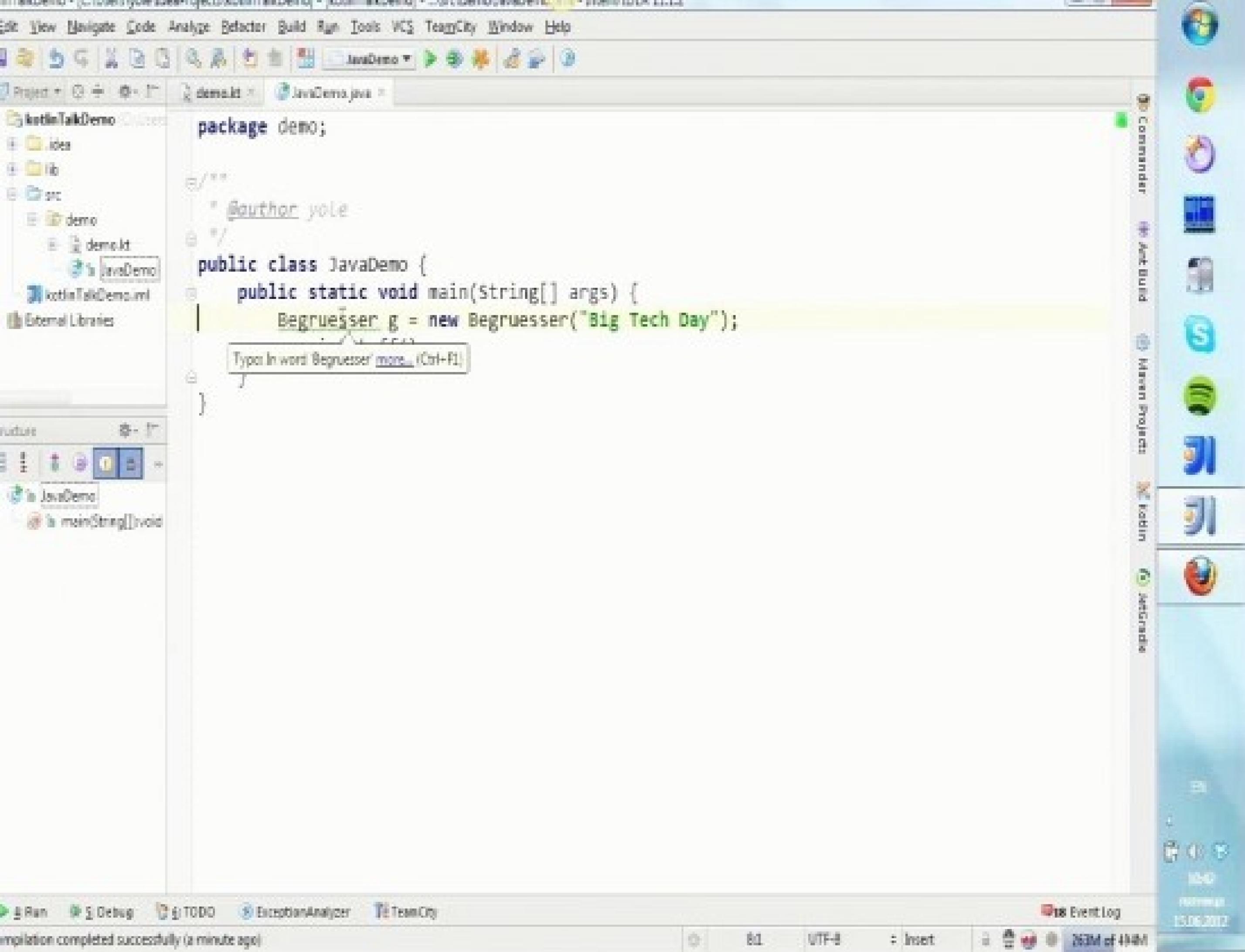
- Commander
- Art Build
- My Project
- Robin
- JetBrains

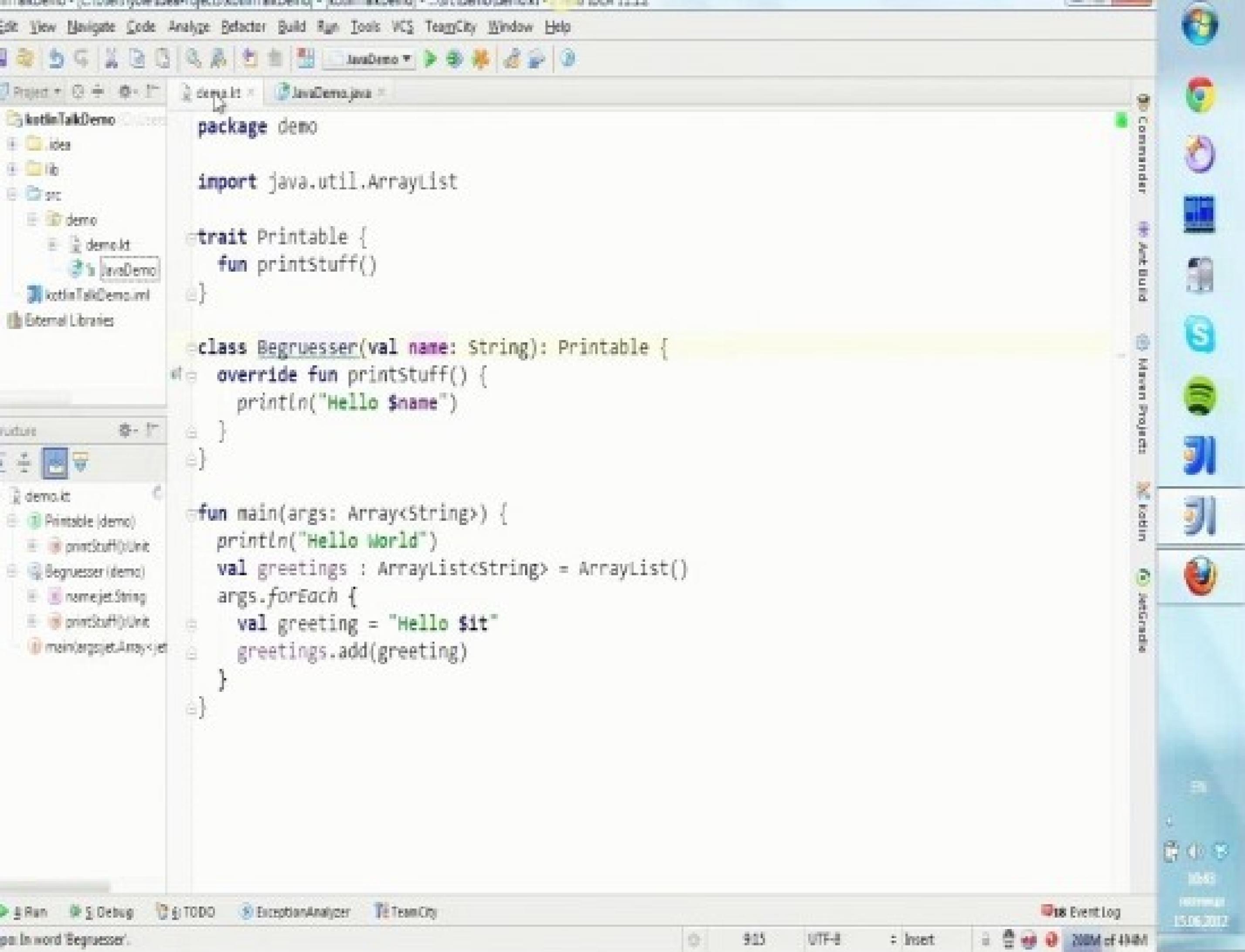
- demo.kt
  - Printable (demo)
  - printstuff() Unit
  - Begruesser (demo)
  - name: jet.String
  - printstuff() Unit
  - main(args: jet.Array<jet

- Printable (demo)
- printstuff() Unit
- Begruesser (demo)
- name: jet.String
- printstuff() Unit
- main(args: jet.Array<jet

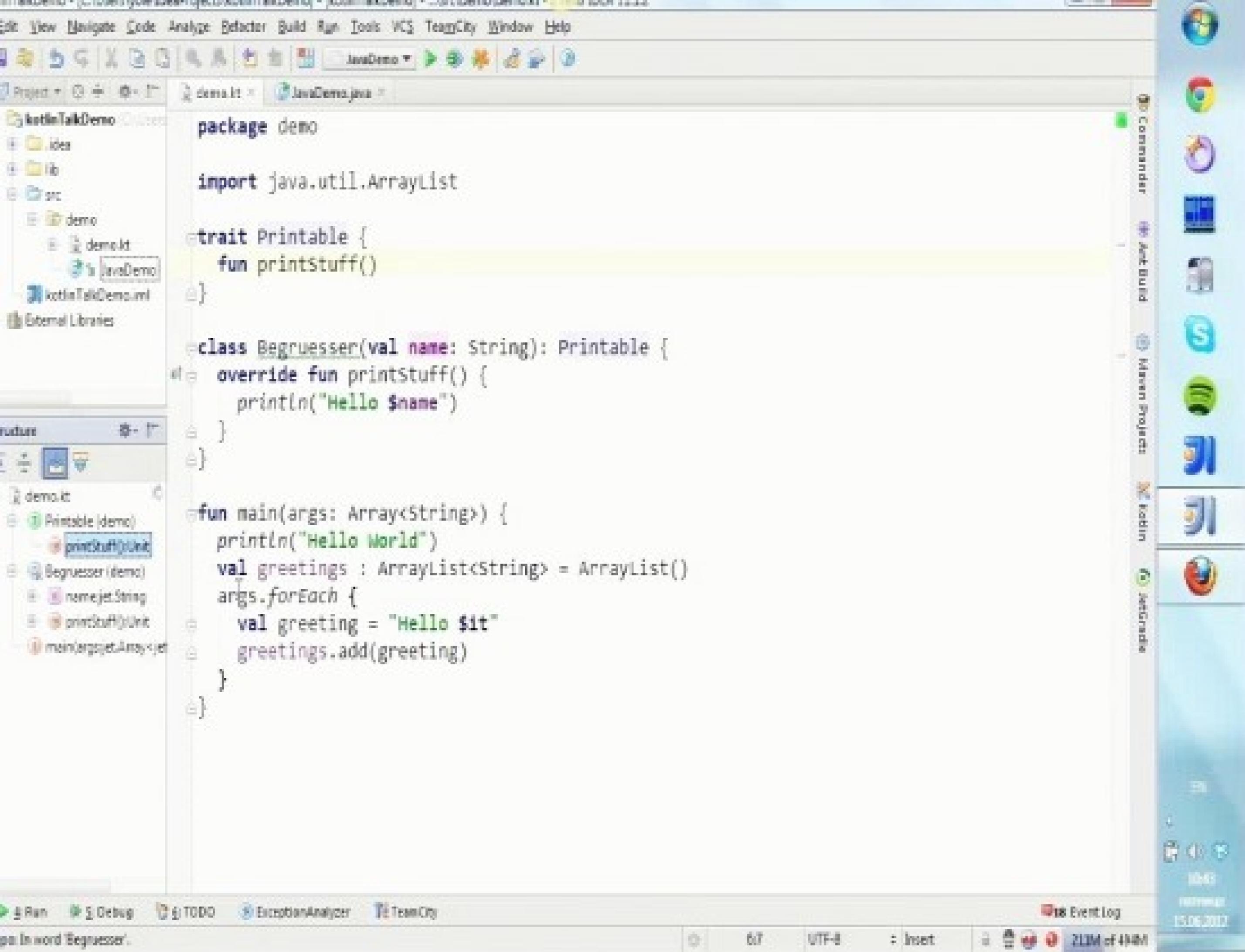
- Windows Taskbar: Start button, icons for Chrome, Firefox, VS Code, IntelliJ, etc.
- System Tray: Network, Volume, System clock (13.06.2017, 15:50)



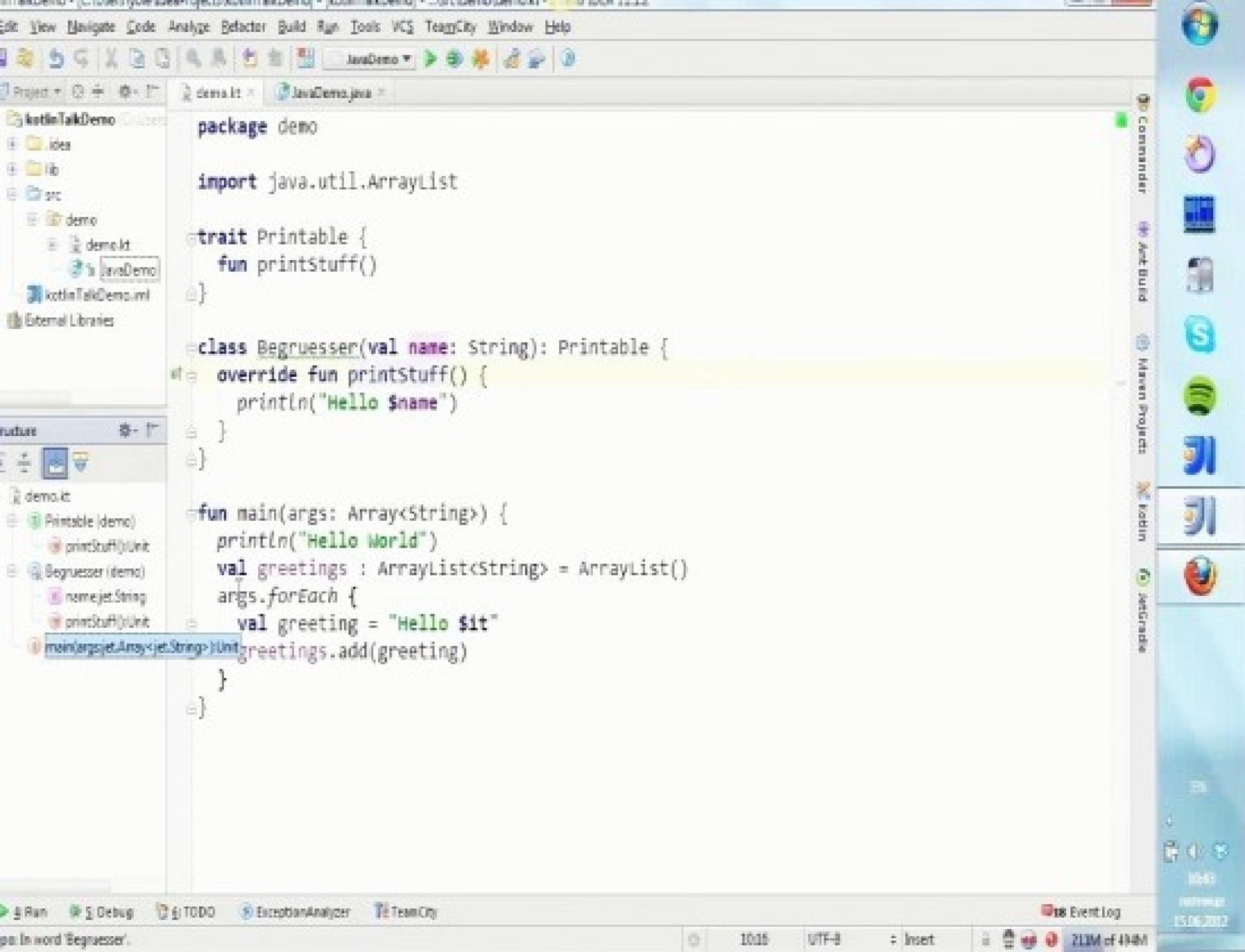


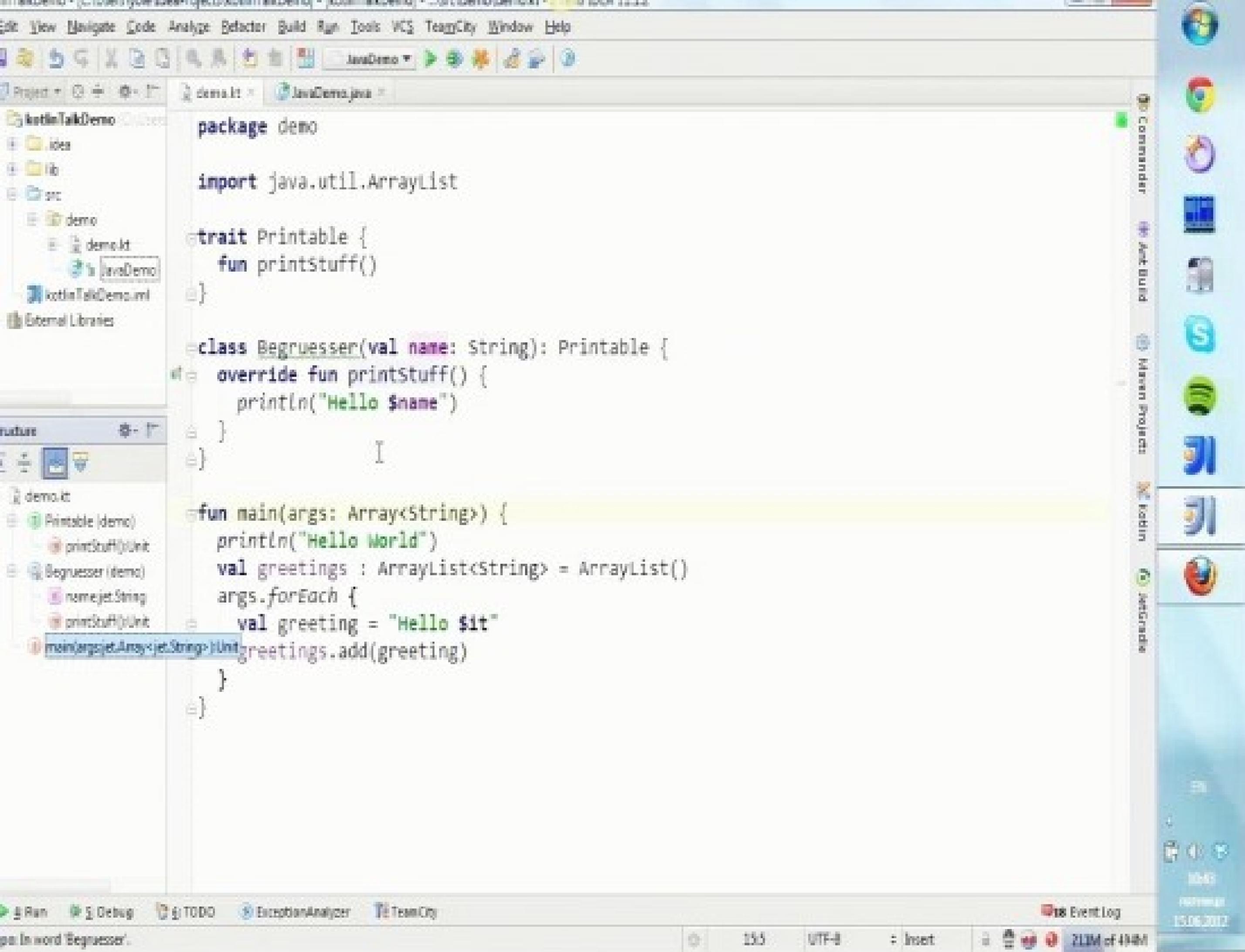


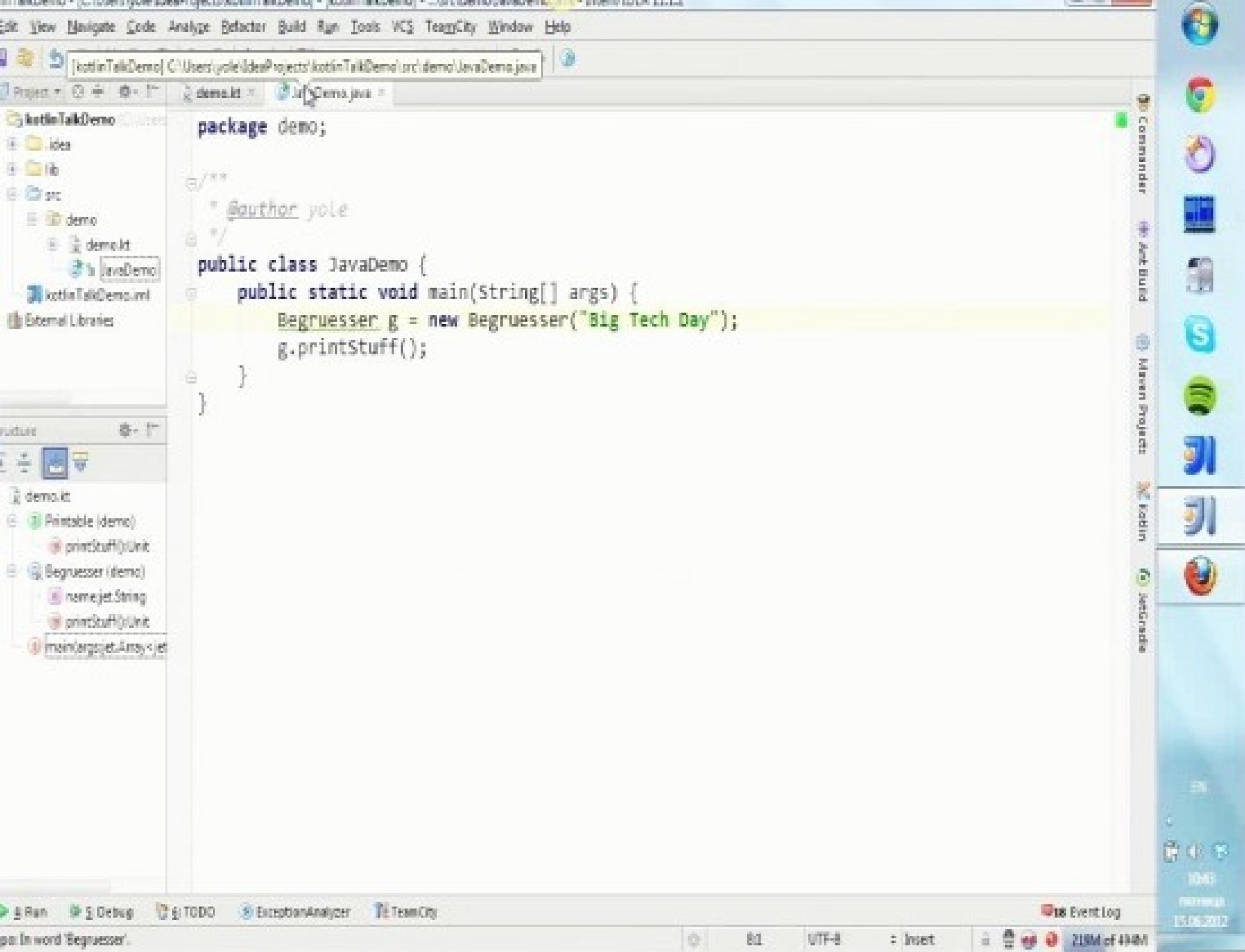












Project Explorer:

- kotlInTalkDemo
  - .idea
  - lib
  - src
    - demo
      - demo.kt
      - JavaDemo
- kotlInTalkDemo.iml
- External Libraries

```

package demo;

/**
 * @author yole
 */
public class JavaDemo {
    public static void main(String[] args) {
        Begruesser g = new Begruesser("Big Tech Day");
        g.printStuff();
    }
}

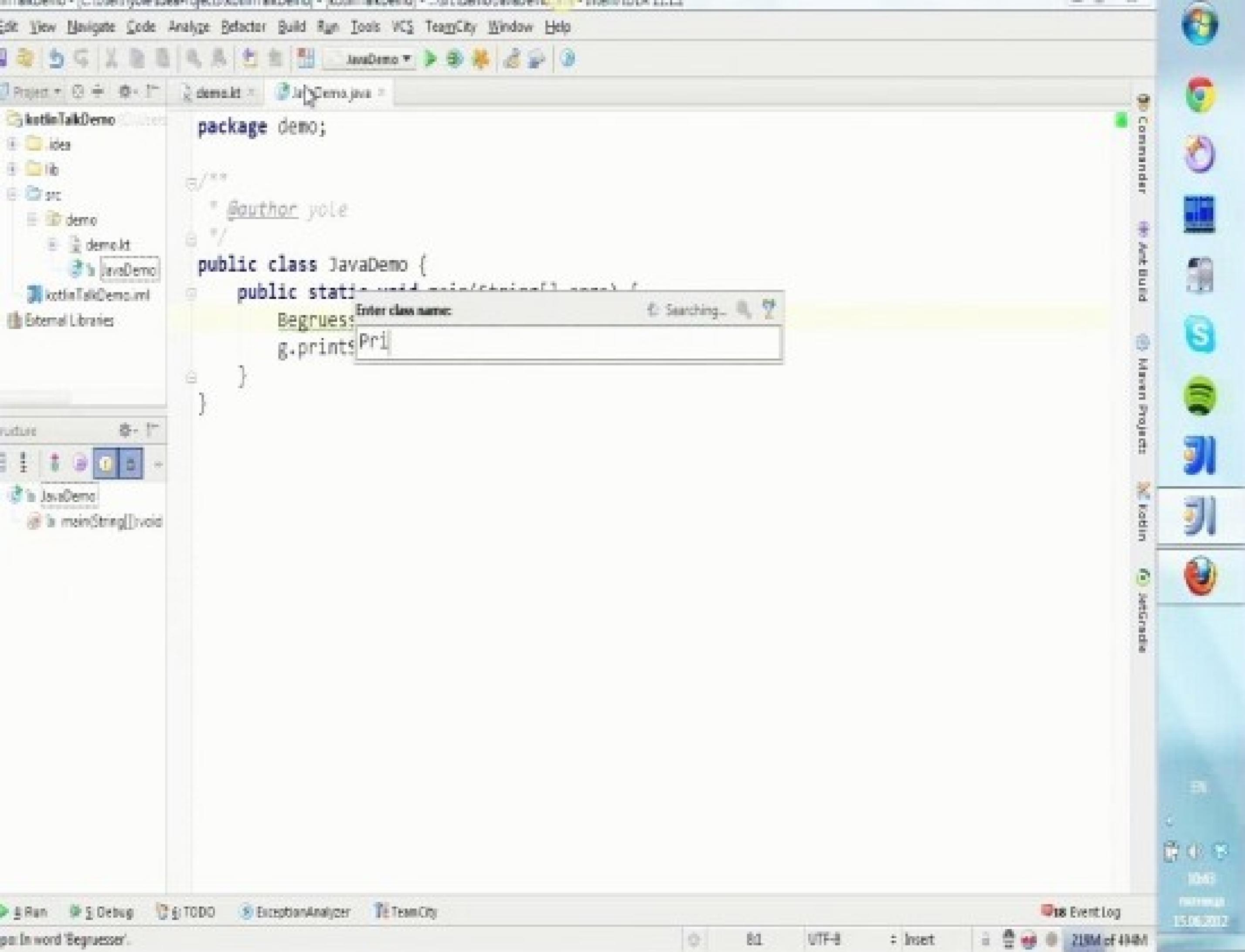
```

Structure:

- demo.kt
  - Printable (demo)
    - printStuff():Unit
  - Begruesser (demo)
    - name:jet.String
    - printStuff():Unit
  - main(args:jet.Array<jet>)

Vertical Toolbar:

- Commander
- Art Build
- Recent Projects
- Roblin
- Search



- kotlinTalkDemo
- idea
- lib
- src
- demo
- demo.kt
- JavaDemo
- kotlinTalkDemo.iml
- External Libraries

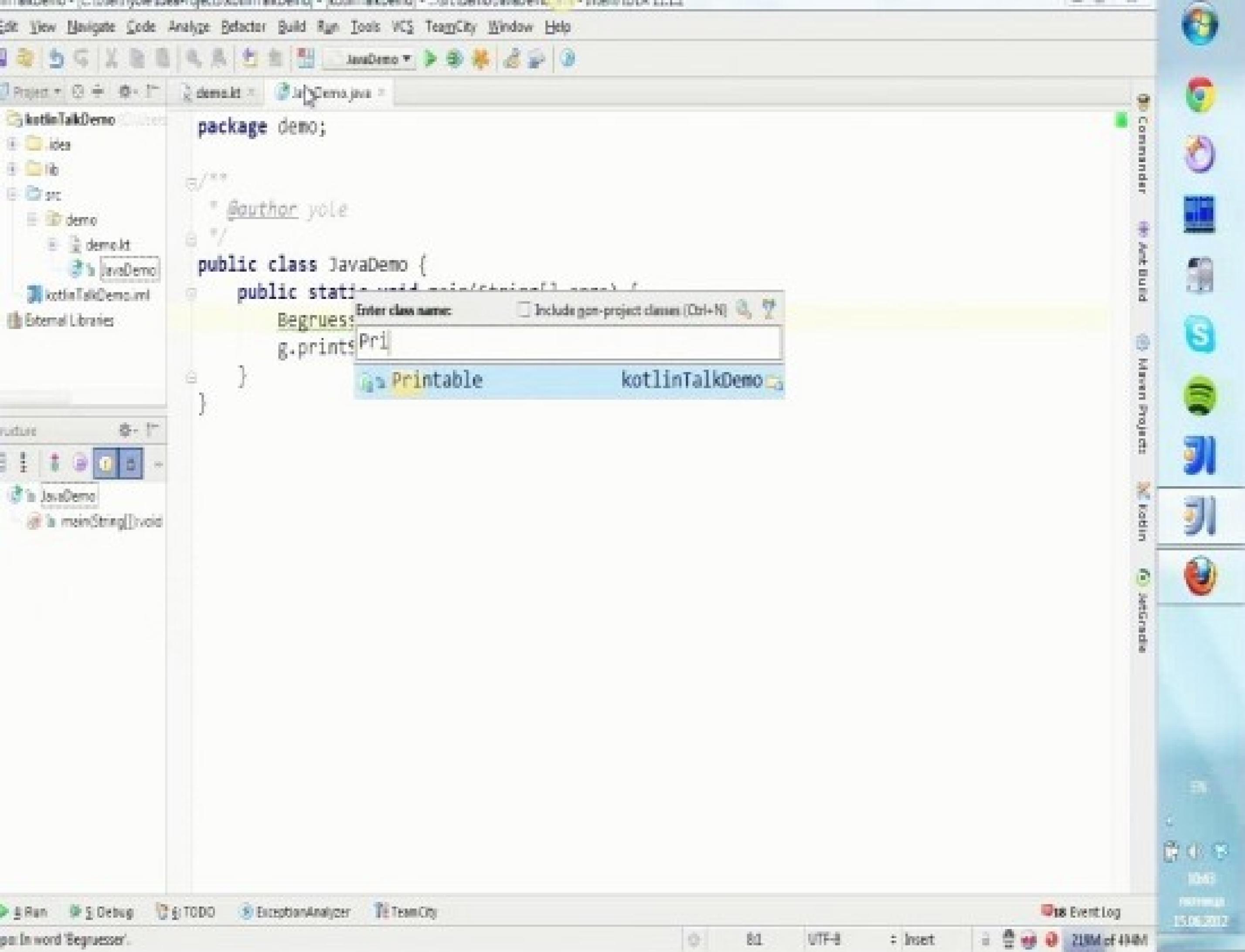
```
package demo;

/**
 * @author yolo
 */
public class JavaDemo {
    public static void main(String[] args) {
        g.prints
    }
}
```

Enter class name: Searching...

Pri

- JavaDemo
- mainString()void



```
package demo;
```

```
/**  
 * @author yole  
 */
```

```
public class JavaDemo {
```

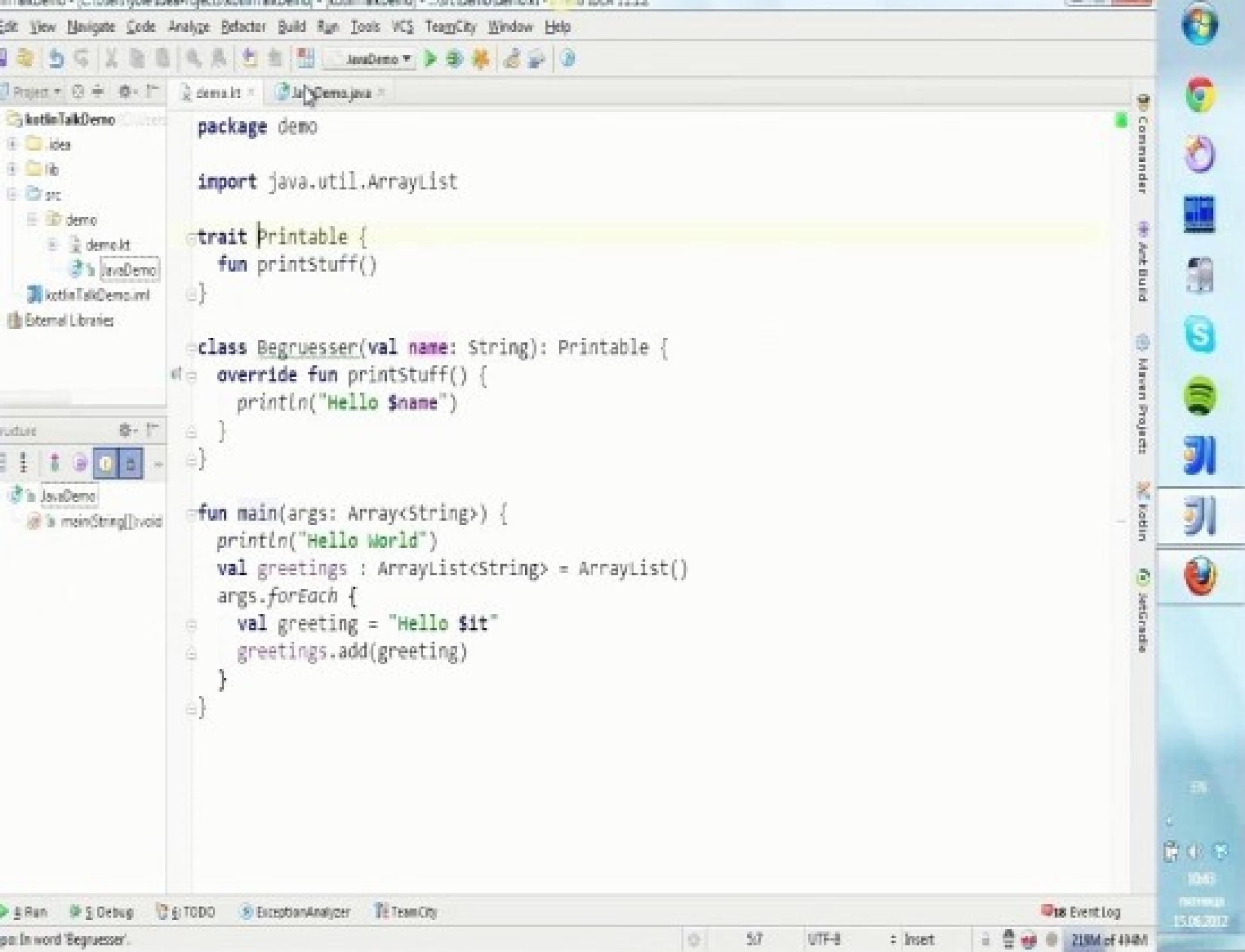
```
    public static void main(String[] args) {
```

```
        g.println("Begrueser");  
    }
```

```
}
```

Enter class name:  Include non-project classes (Ctrl+N)

Printable	kotlinTalkDemo
-----------	----------------



Project: demo.kt, JavaDemo

- kotlinTalkDemo
- idea
- lib
- src
- demo
- demo.kt
- JavaDemo
- kotlinTalkDemo.iml

External Libraries

```
package demo

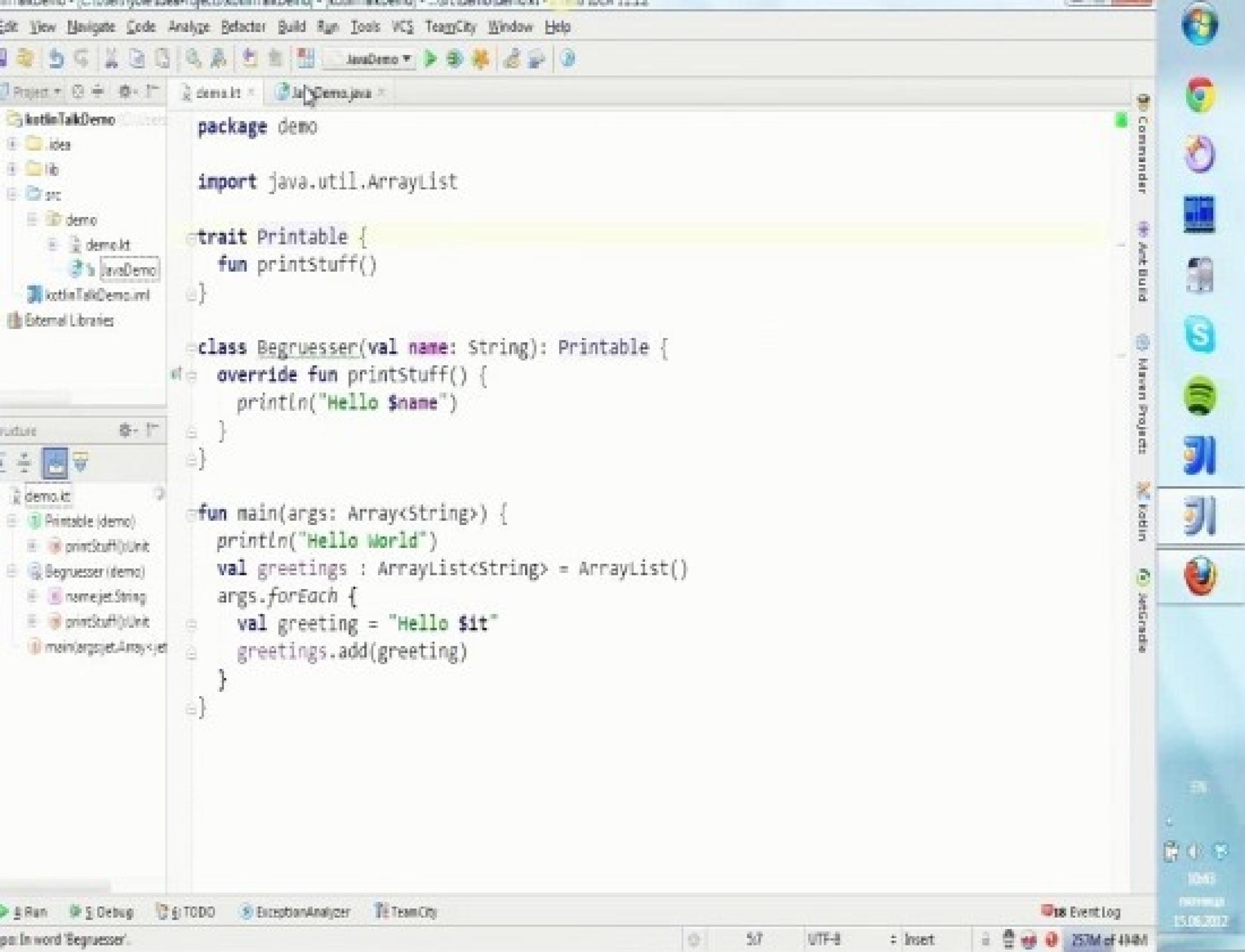
import java.util.ArrayList

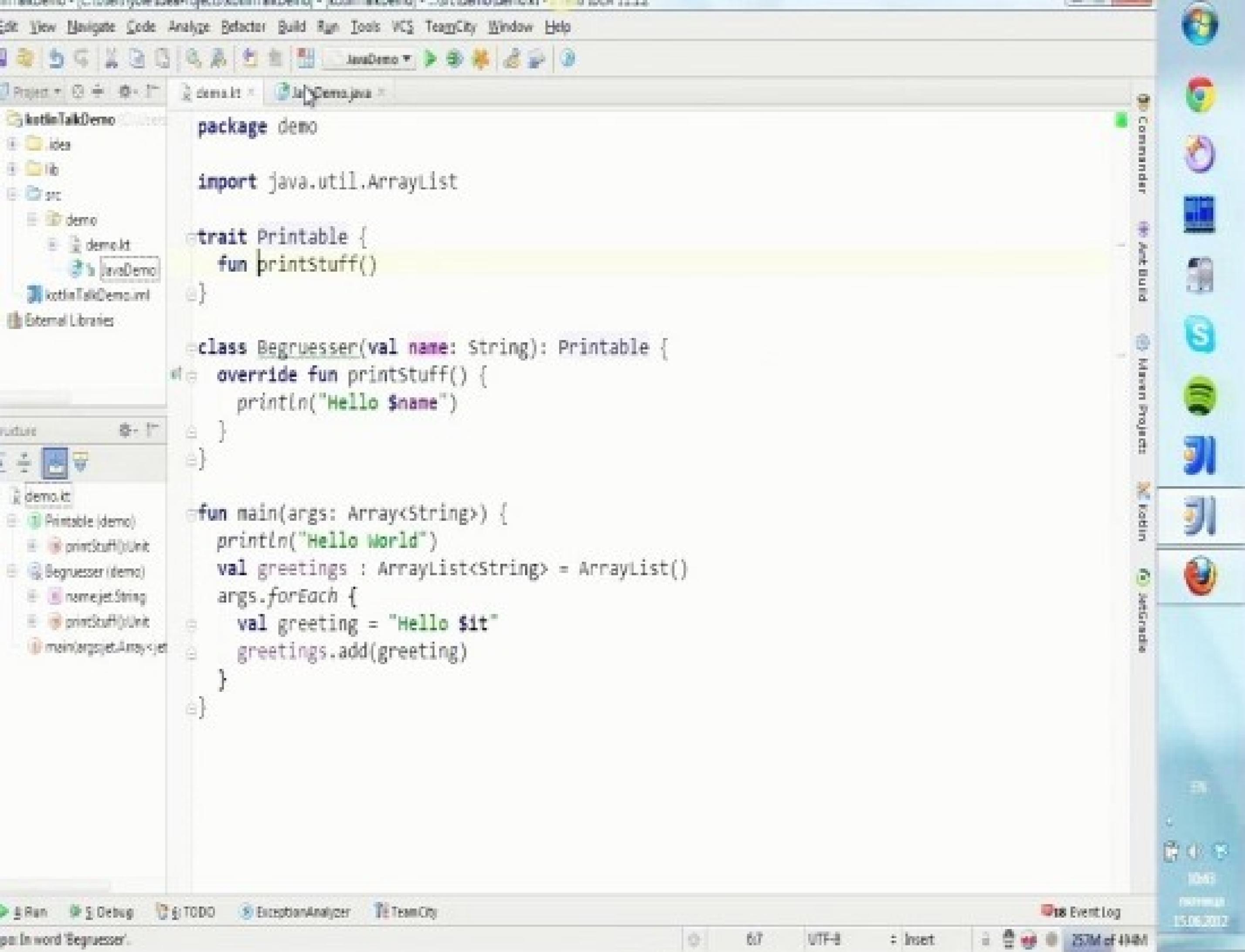
trait Printable {
    fun printstuff()
}

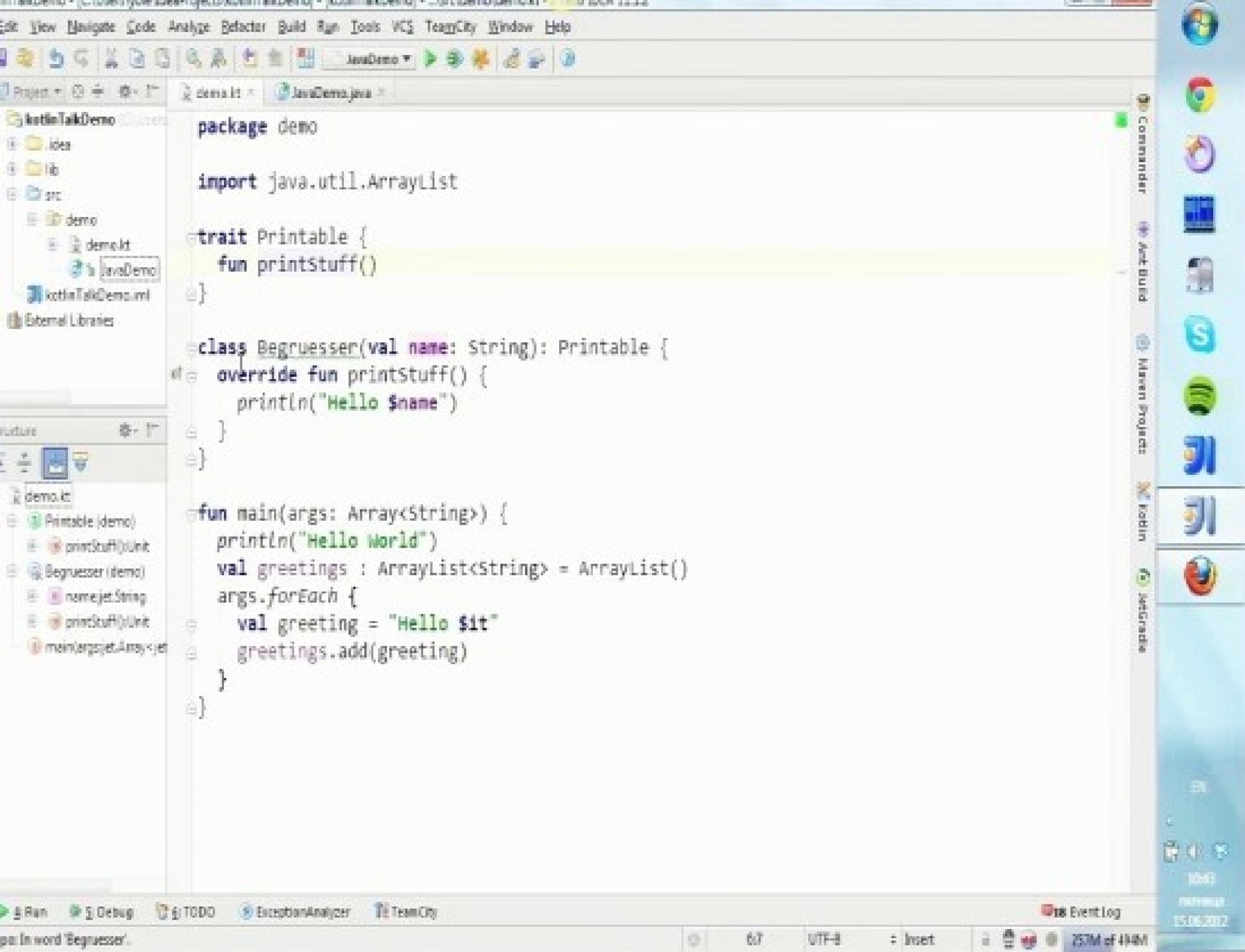
class Begruesser(val name: String): Printable {
    override fun printstuff() {
        println("Hello $name")
    }
}

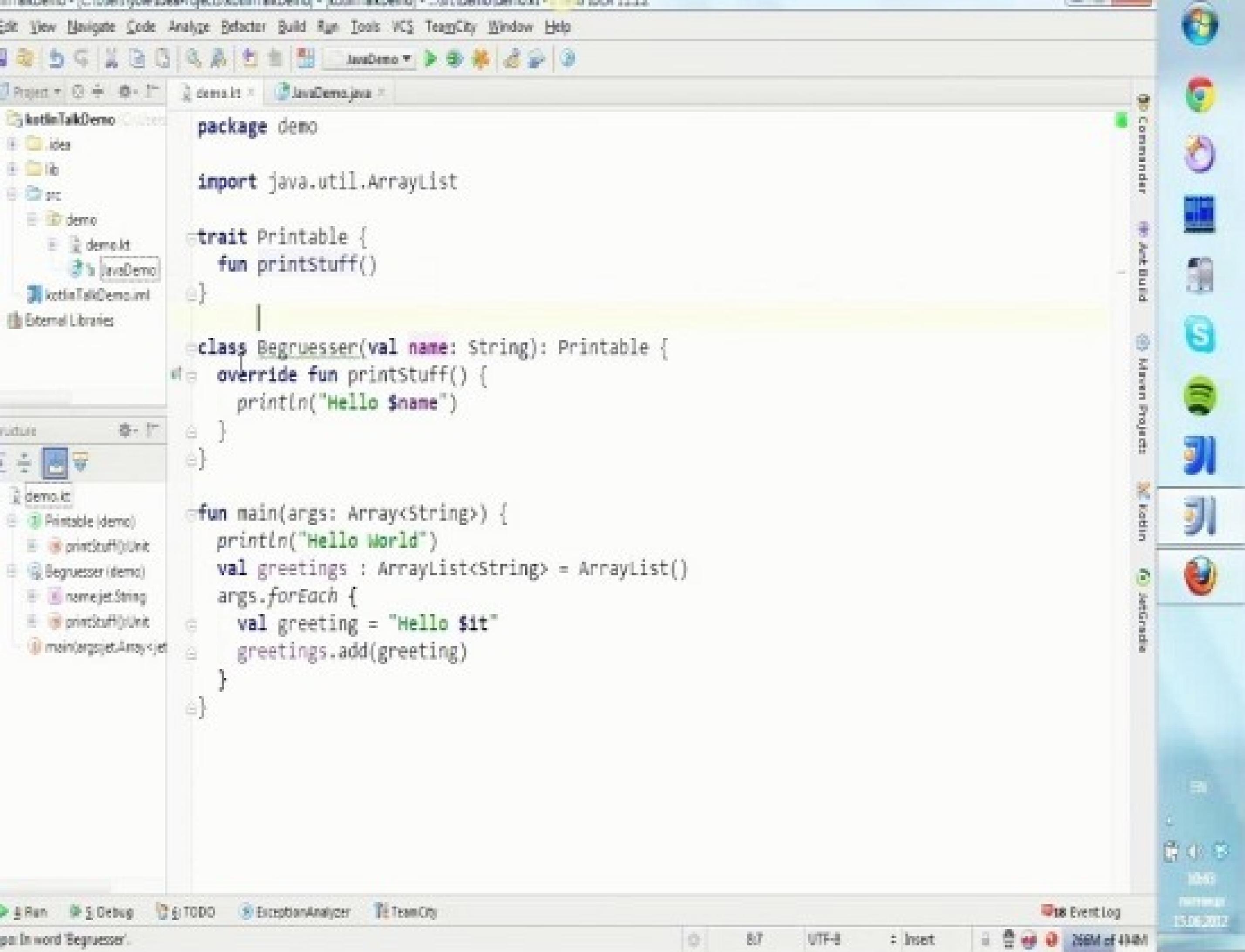
fun main(args: Array<String>) {
    println("Hello world")
    val greetings : ArrayList<String> = ArrayList()
    args.forEach {
        val greeting = "Hello $it"
        greetings.add(greeting)
    }
}
```

Commander  
Art Build  
Maven Project  
M Robin  
Spiral









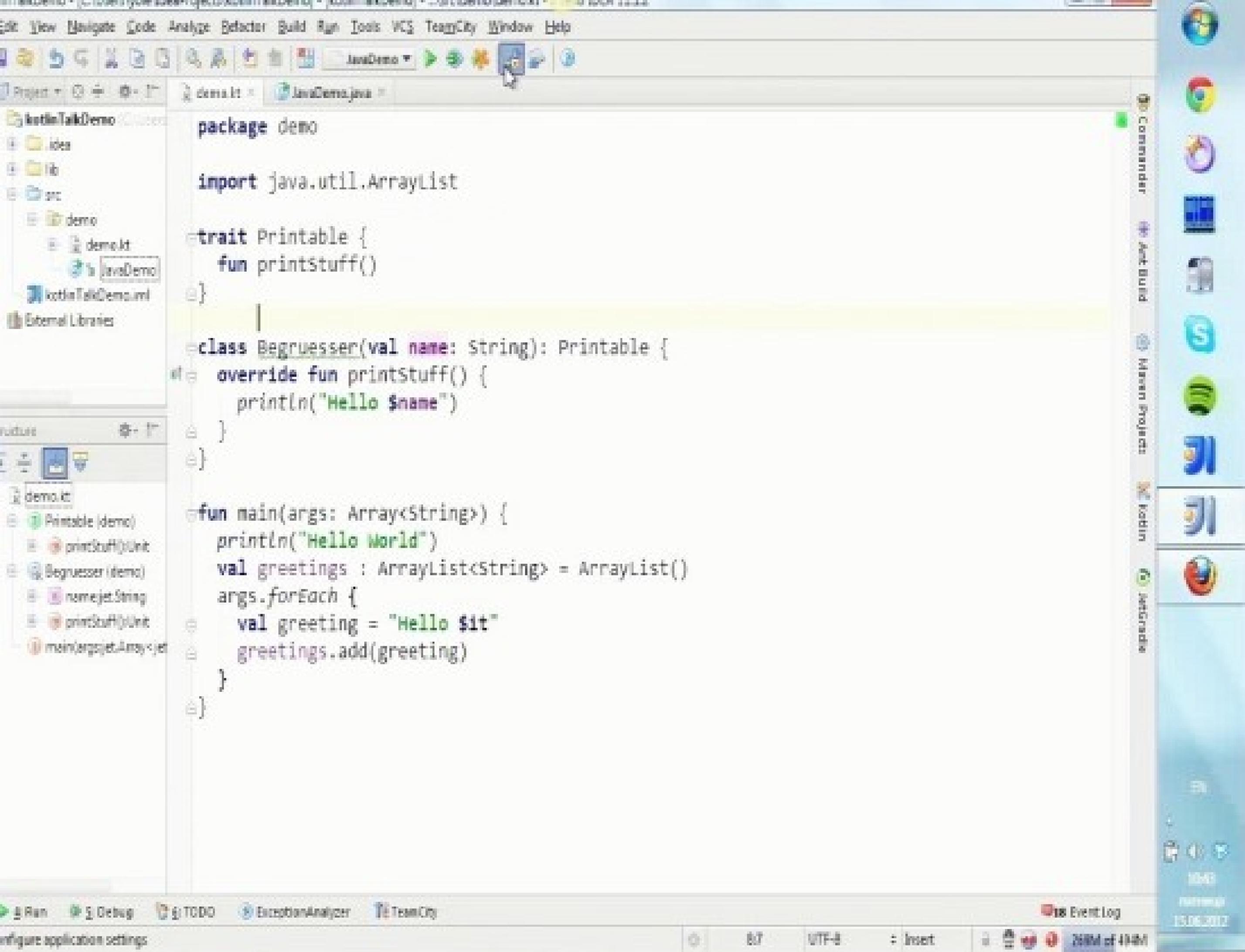
```
package demo

import java.util.ArrayList

trait Printable {
    fun printstuff()
}

class Begruesser(val name: String): Printable {
    override fun printstuff() {
        println("Hello $name")
    }
}

fun main(args: Array<String>) {
    println("Hello World")
    val greetings : ArrayList<String> = ArrayList()
    args.forEach {
        val greeting = "Hello $it"
        greetings.add(greeting)
    }
}
```



### Editor ▾ Colors & Fonts

Scheme name:

- GUI Designer
- Inspections
- Language Injections
- Maven
- Scala
- Schemas and DTDs
- Scopes
- Spelling
- Tasks
- Template Data Languages
- Version Control

#### IDE Settings

- Appearance
- Console Folding
- Copy as HTML
- Debugger
- Editor
  - Smart Keys
  - Appearance
  - Colors & Fonts**
  - Editor Tabs
  - Code Folding
  - Code Completion
  - Auto Import
- Exception Analyzer
- External Diff Tools
- External Tools
- File Templates
- File Types
- General
- GitHub
- HTTP Proxy
- Images
- Intentions
- Keymap
- Live Templates

The taskbar shows several icons: Windows Start button, Internet Explorer, Google Chrome, Firefox, a purple application icon, a blue application icon, a white application icon, a blue application icon, a green application icon, a blue application icon, and another blue application icon. The system tray at the bottom right shows the volume icon, network icon, and system clock displaying 10:03 on 13.06.2012.

- GUI Designer
- Inspections
- Language Injections
- Maven
- Scala
- Schemas and DTDs
- Scopes
- Spelling
- Tasks
- Template Data Languages
- Version Control
- IDE Settings
- Appearance
- Console Folding
- Copy as HTML
- Debugger
- Editor
- Exception Analyzer
- External Diff Tools
- External Tools
- File Templates
- File Types
- General
- GitHub
- HTTP Proxy
- Images
- Intentions
- Keymap
- Live Templates
- Menus and Toolbars
- Notifications
- Passwords
- Path Variables
- Plugins**
- Quick Lists
- TOOD

### Plugins

Show: All plugins

<input checked="" type="checkbox"/>	Android Support	Bundled
<input checked="" type="checkbox"/>	Ant Support	Bundled
<input checked="" type="checkbox"/>	Commander	Bundled
<input checked="" type="checkbox"/>	Copy as HTML	Custom
<input checked="" type="checkbox"/>	Copyright	Bundled
<input checked="" type="checkbox"/>	CVS Integration	Bundled
<input type="checkbox"/>	Eclipse Integration	Bundled
<input checked="" type="checkbox"/>	ExceptionHandler	Custom
<input checked="" type="checkbox"/>	GenerateToString	Bundled
<input checked="" type="checkbox"/>	Git Integration	Bundled
<input checked="" type="checkbox"/>	GitHub	Bundled
<input checked="" type="checkbox"/>	Grails	Bundled
<input checked="" type="checkbox"/>	Groovy	Bundled
<input checked="" type="checkbox"/>	hg4idea	Bundled
<input checked="" type="checkbox"/>	Idm for Java	Bundled
<input checked="" type="checkbox"/>	Inspection Gadgets	Bundled
<input checked="" type="checkbox"/>	IntelliLang	Bundled
<input checked="" type="checkbox"/>	Intention Power Pack	Bundled
<input checked="" type="checkbox"/>	JUnit	Bundled
<input checked="" type="checkbox"/>	<b>Kotlin</b>	<b>Custom</b>
<input checked="" type="checkbox"/>	La Clojure	Custom
<input checked="" type="checkbox"/>	Maven Integration	Bundled
<input checked="" type="checkbox"/>	Plugin DevKit	Bundled
<input checked="" type="checkbox"/>	Properties Support	Bundled
<input checked="" type="checkbox"/>	Scala	Custom
<input checked="" type="checkbox"/>	Subversion Integration	Bundled
<input checked="" type="checkbox"/>	Task Management	Bundled
<input checked="" type="checkbox"/>	TeamCity Integration	Custom
<input checked="" type="checkbox"/>	TestNG-J	Bundled
<input checked="" type="checkbox"/>	UI Designer	Bundled
<input type="checkbox"/>	XPathView + XSLT Support	Bundled

#### Description

Kotlin language support

**Vendor**  
JetBrains Inc.  
<http://www.jetbrains.com>

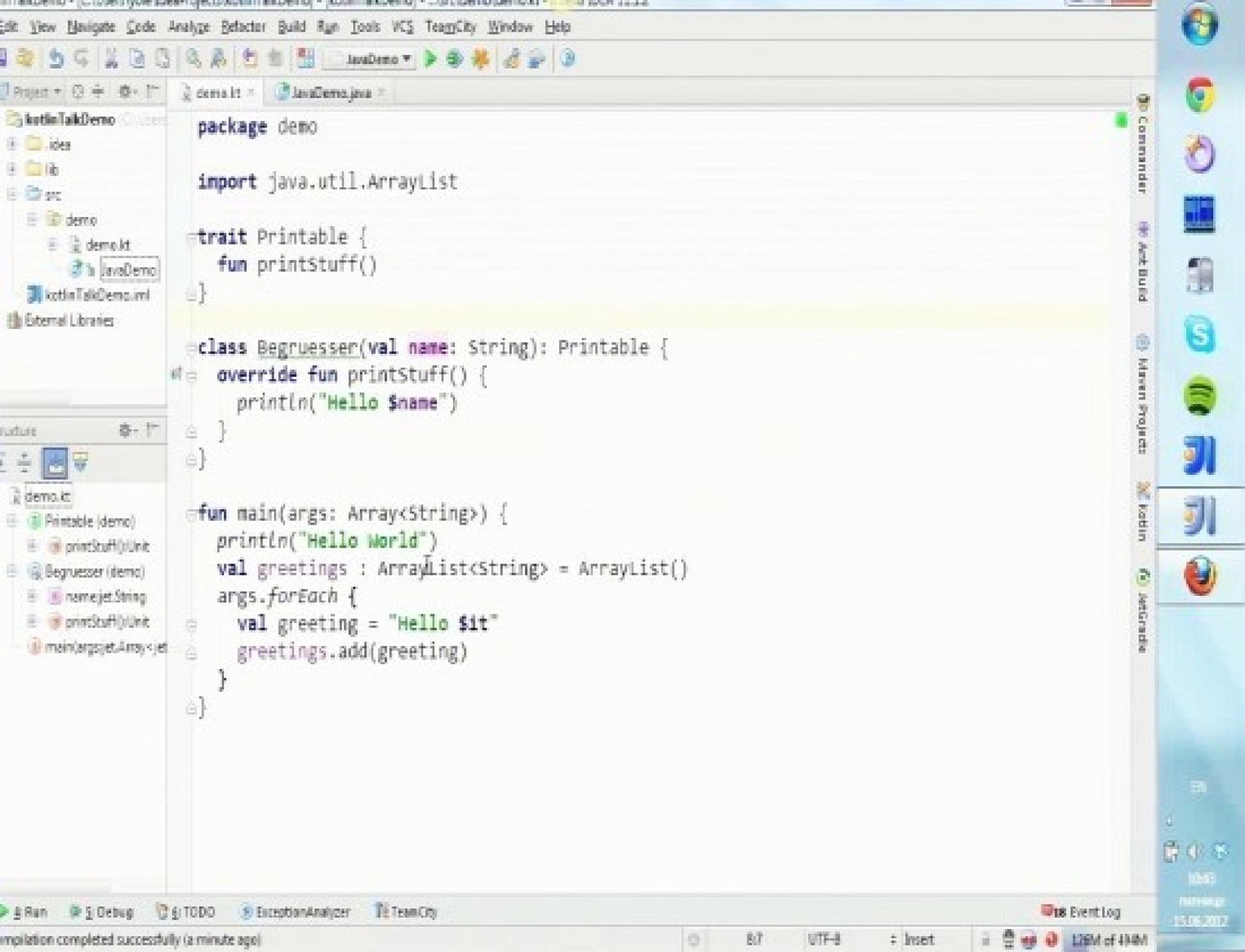
**Plugin homepage**  
<http://kotlin.jetbrains.com>

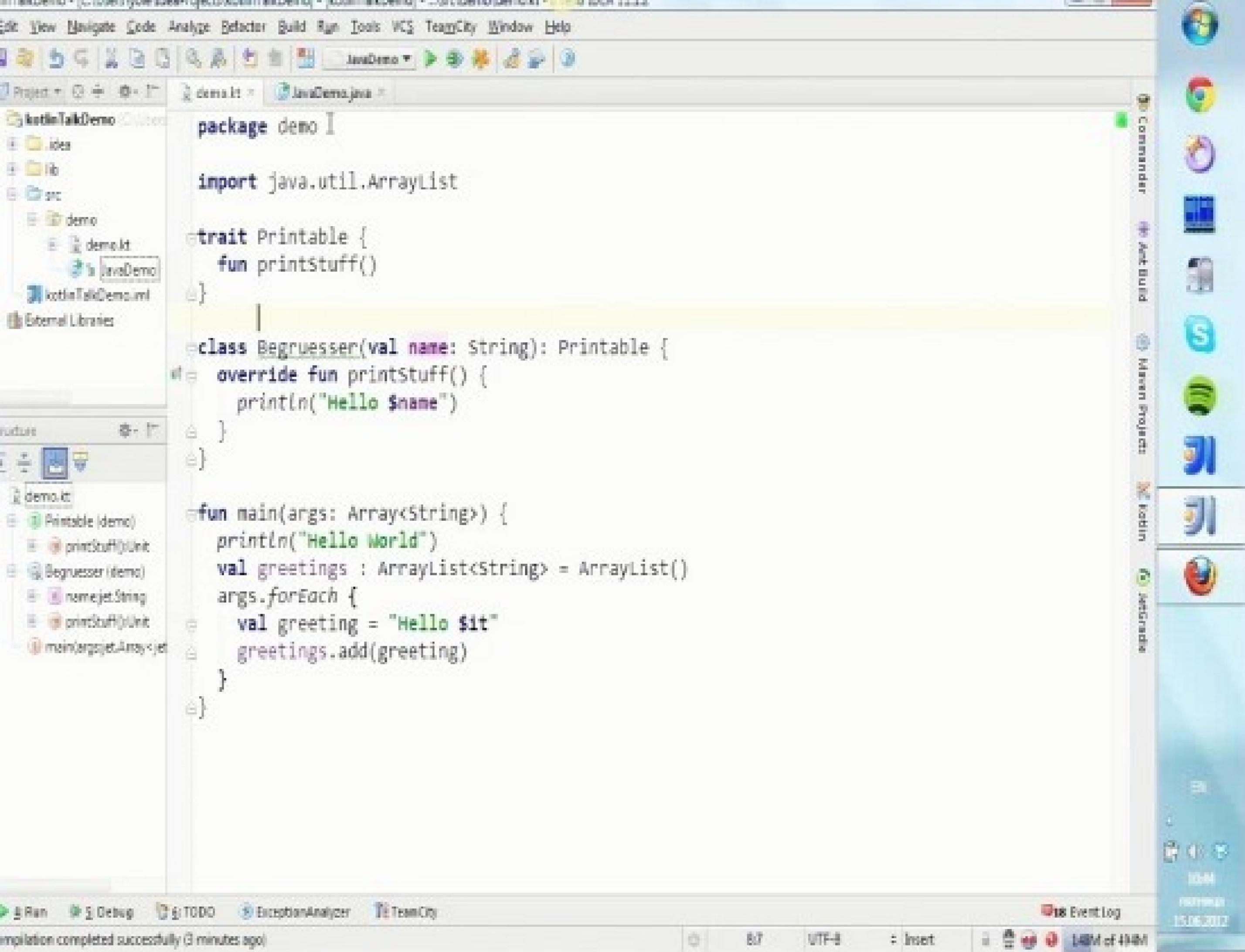
**Version**  
0.1.2530

[Browse repositories...](#) [Install plugin from disk...](#)

OK Cancel Back Help

# IntelliJ IDEA Plugin Demo





Project Explorer

- kotlinTalkDemo
  - .idea
  - lib
  - src
    - demo
      - demo.kt
      - JavaDemo
- kotlinTalkDemo.iml
- External Libraries

```

package demo

import java.util.ArrayList

trait Printable {
    fun printstuff()
}

class Begruesser(val name: String): Printable {
    override fun printstuff() {
        println("Hello $name")
    }
}

fun main(args: Array<String>) {
    println("Hello World")
    val greetings : ArrayList<String> = ArrayList()
    args.forEach {
        val greeting = "Hello $it"
        greetings.add(greeting)
    }
}

```

Commander

Art Build

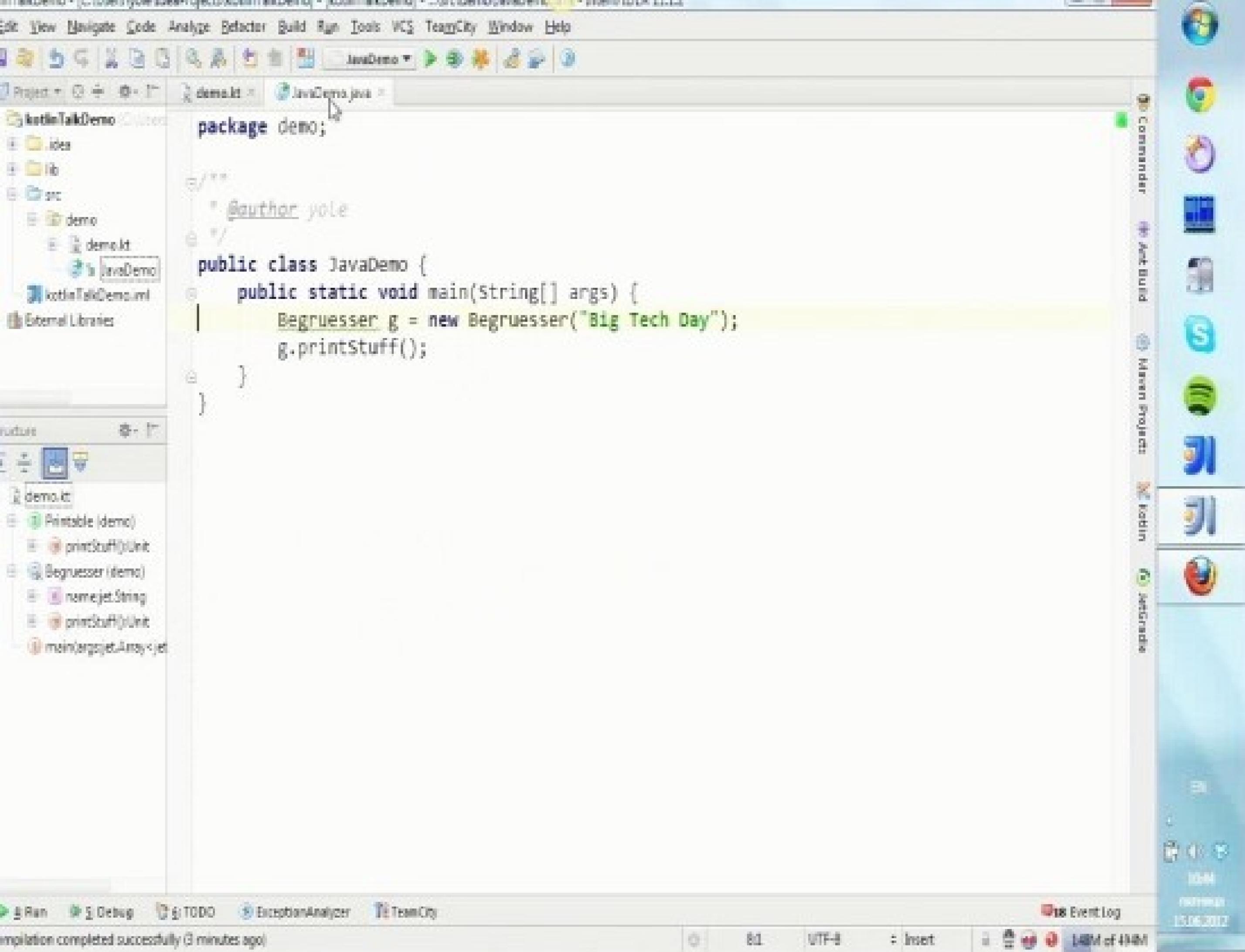
My Project

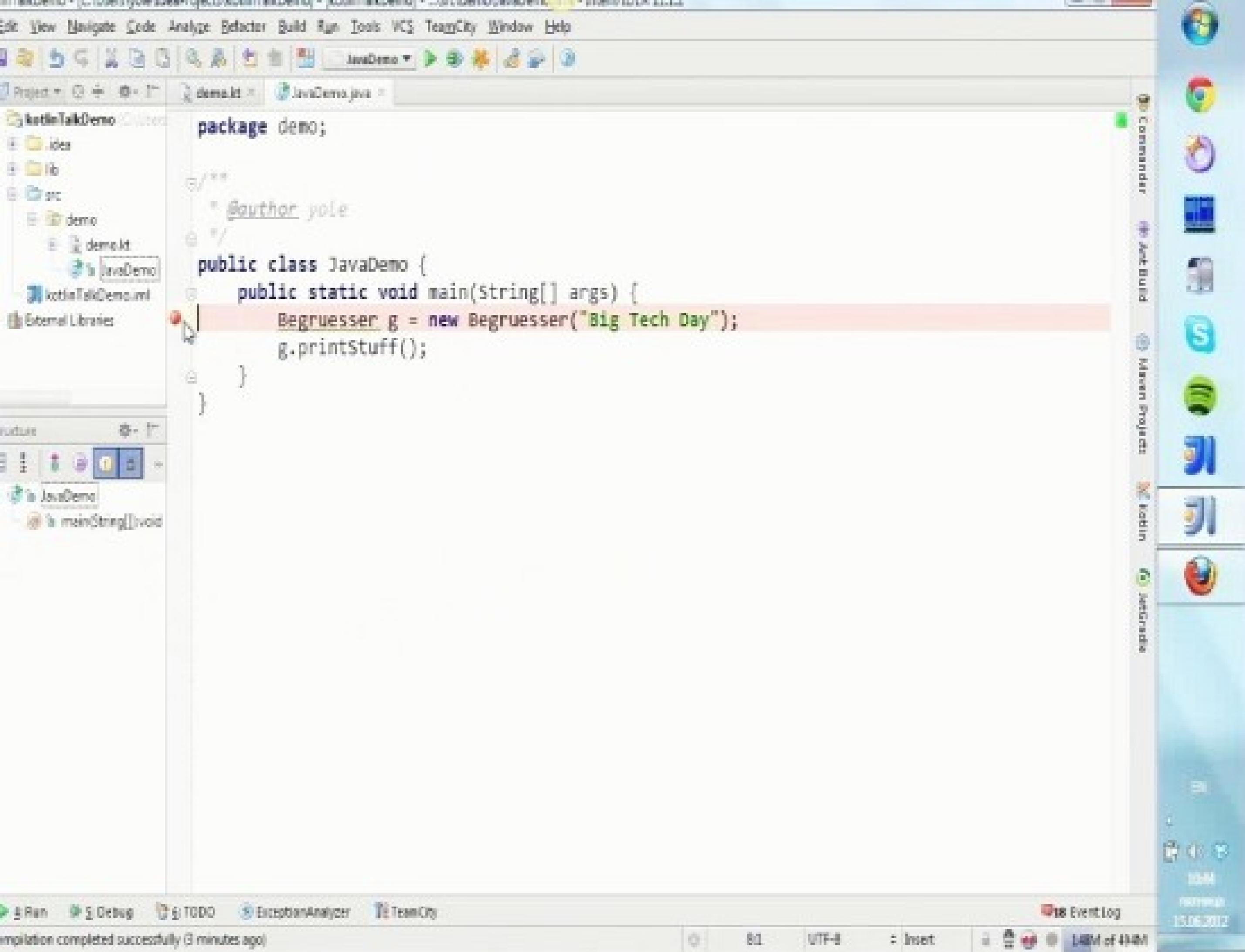
Robin

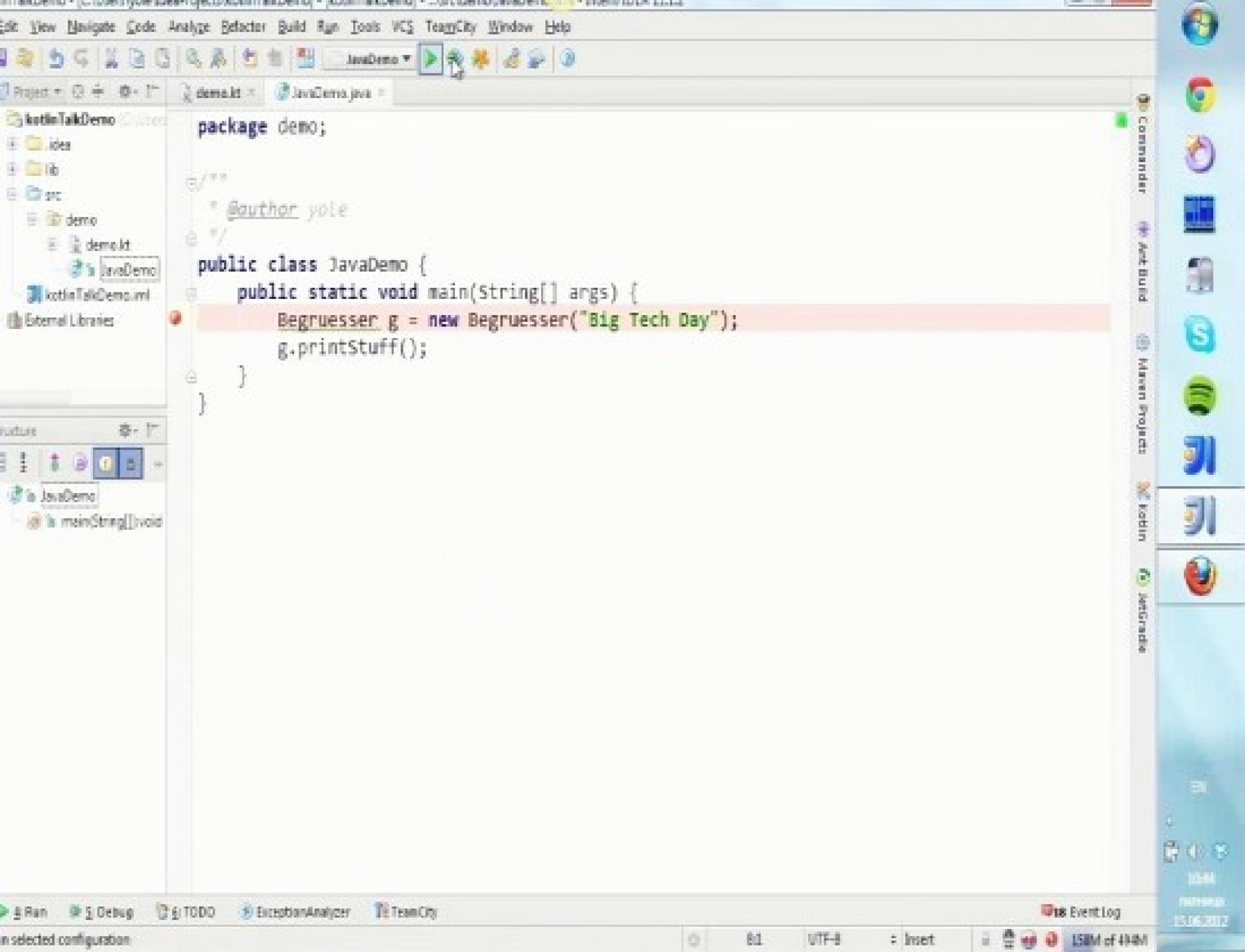
Sevradia

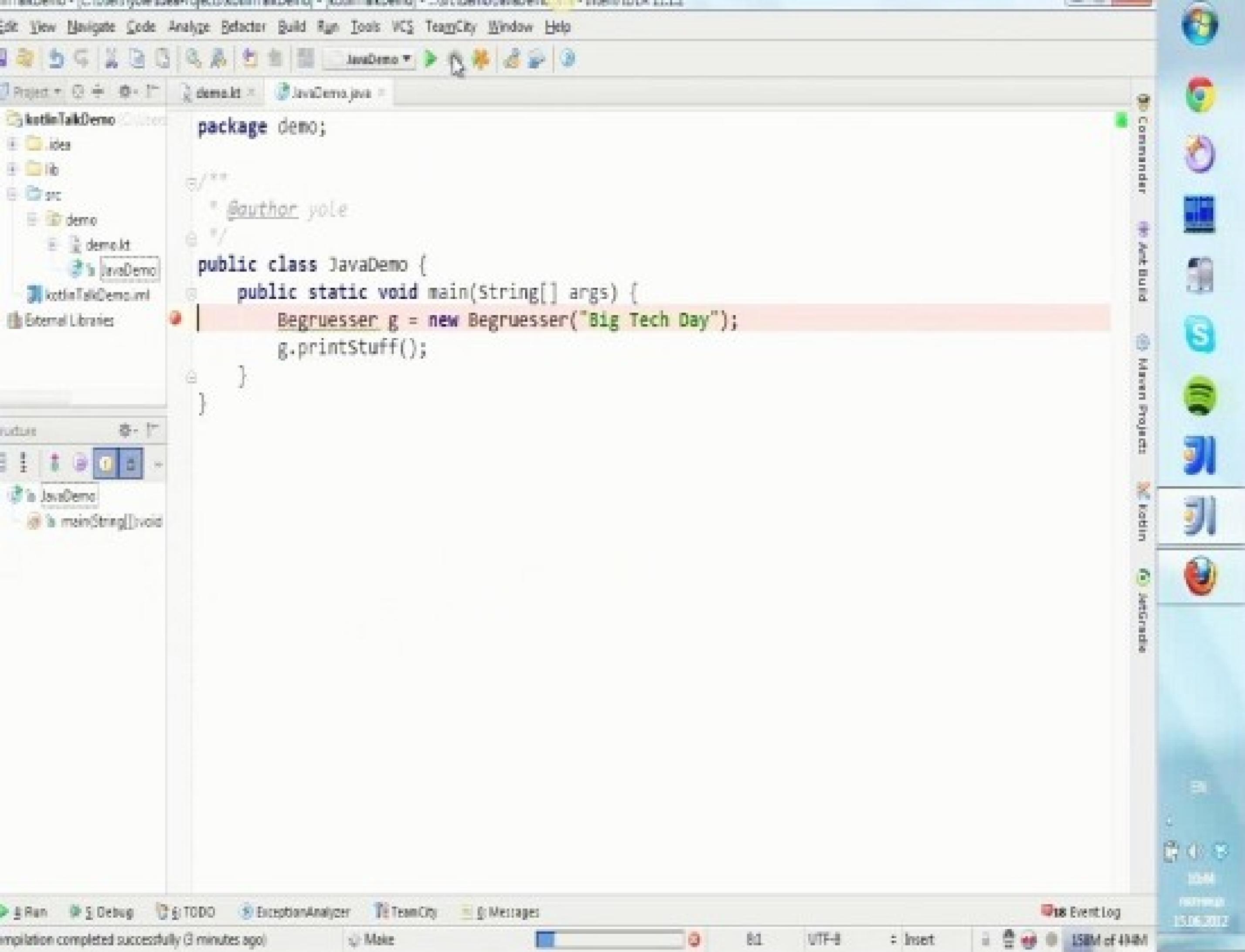
Structure

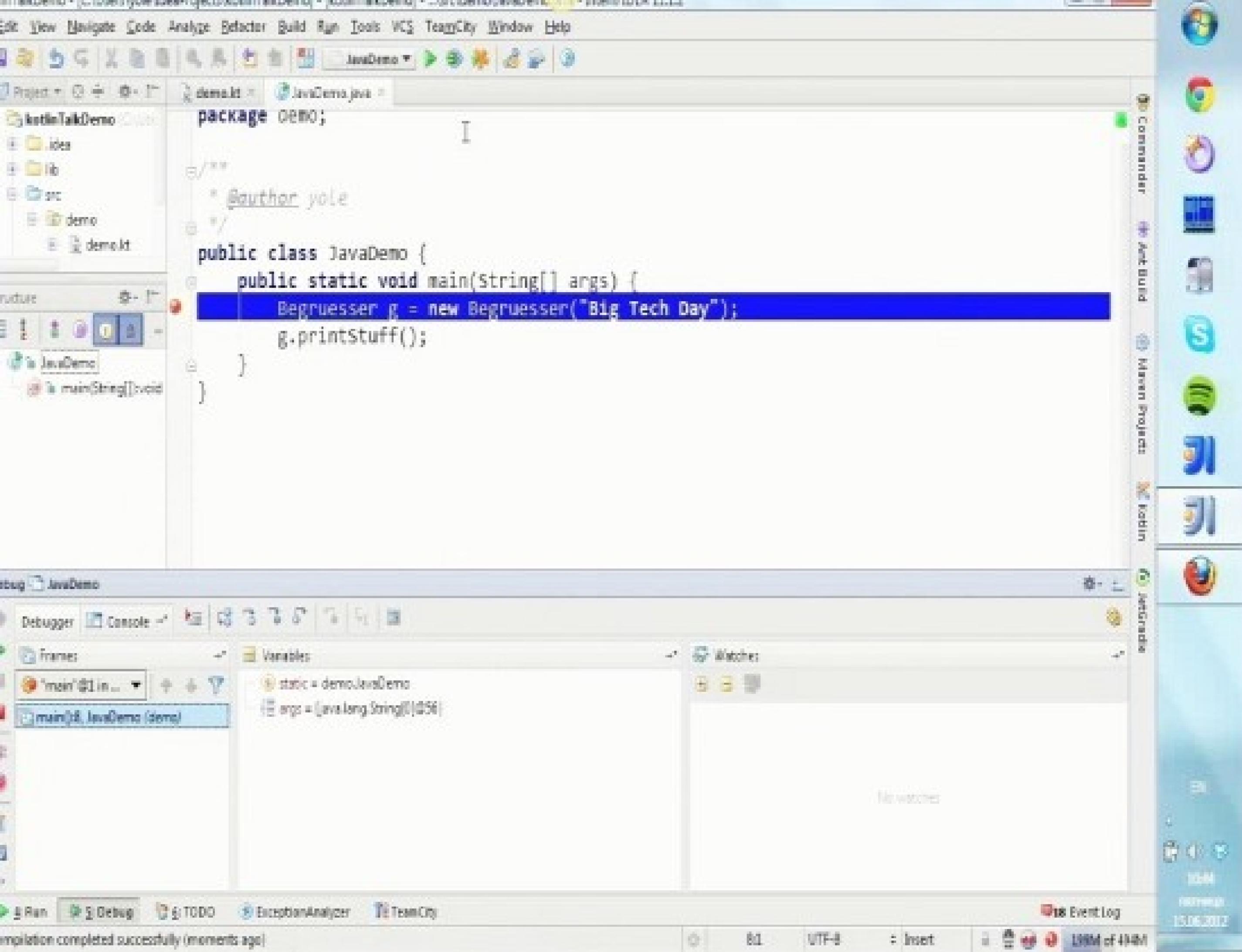
- demo.kt
  - Printable (demo)
  - printstuff() Unit
  - Begruesser (demo)
  - name: jet.String
  - printstuff() Unit
  - main(args: jet.Array<jet

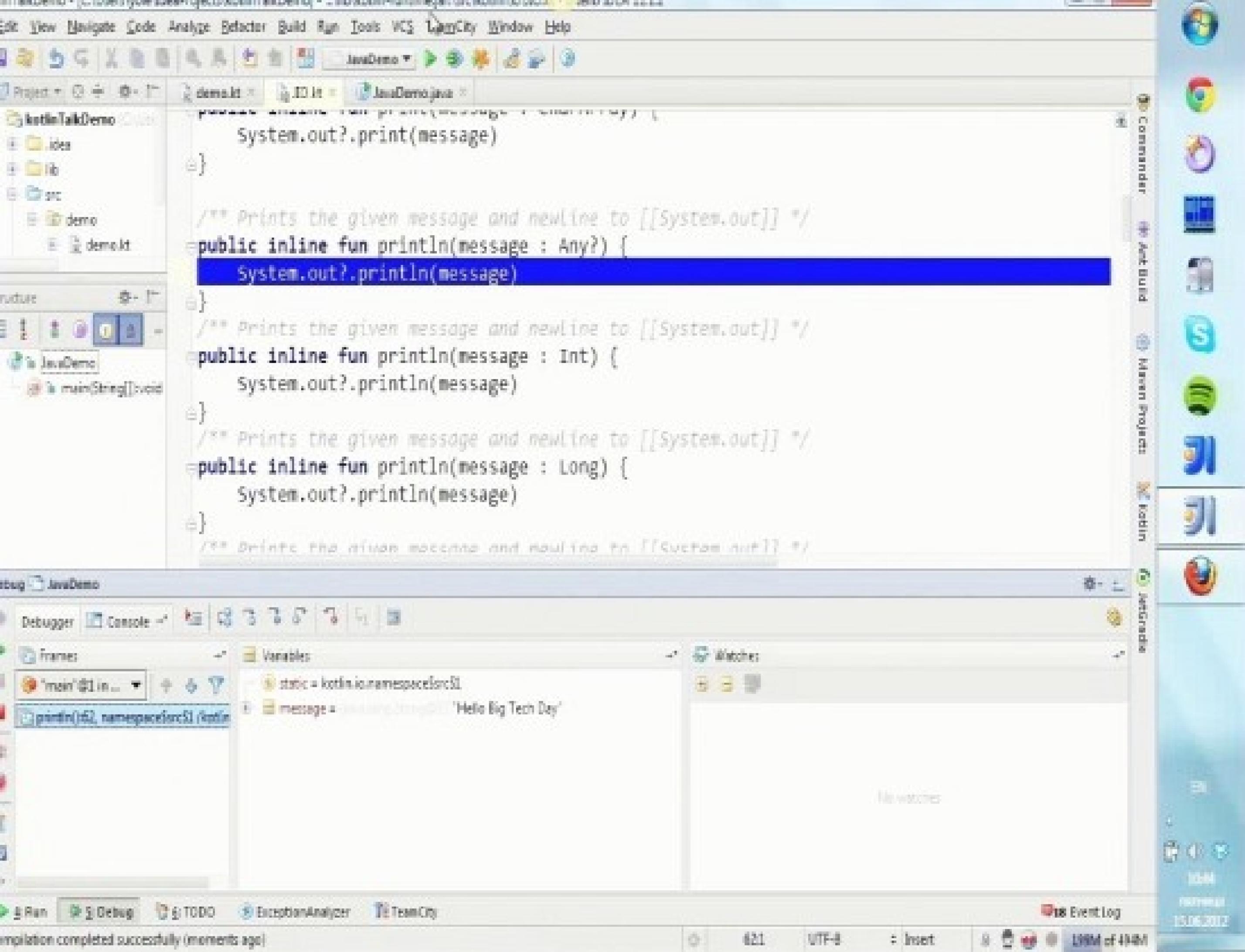












```
System.out?.print(message)
```

```
/** Prints the given message and newline to [[System.out]] */
```

```
public inline fun println(message : Any?) {
```

```
System.out?.println(message)
```

```
/** Prints the given message and newline to [[System.out]] */
```

```
public inline fun println(message : Int) {
```

```
System.out?.println(message)
```

```
/** Prints the given message and newline to [[System.out]] */
```

```
public inline fun println(message : Long) {
```

```
System.out?.println(message)
```

```
/** Prints the given message and newline to [[System.out]] */
```

Debugger

Frames

'main' @1 in ...

println() at namespaceForS1 (Kotlin)

Variables

static = kotlin.io.namespaceForS1

message = kotlin.io.namespaceForS1: 'Hello Big Tech Day'

Watches

No watches

Compilation completed successfully (moments ago)

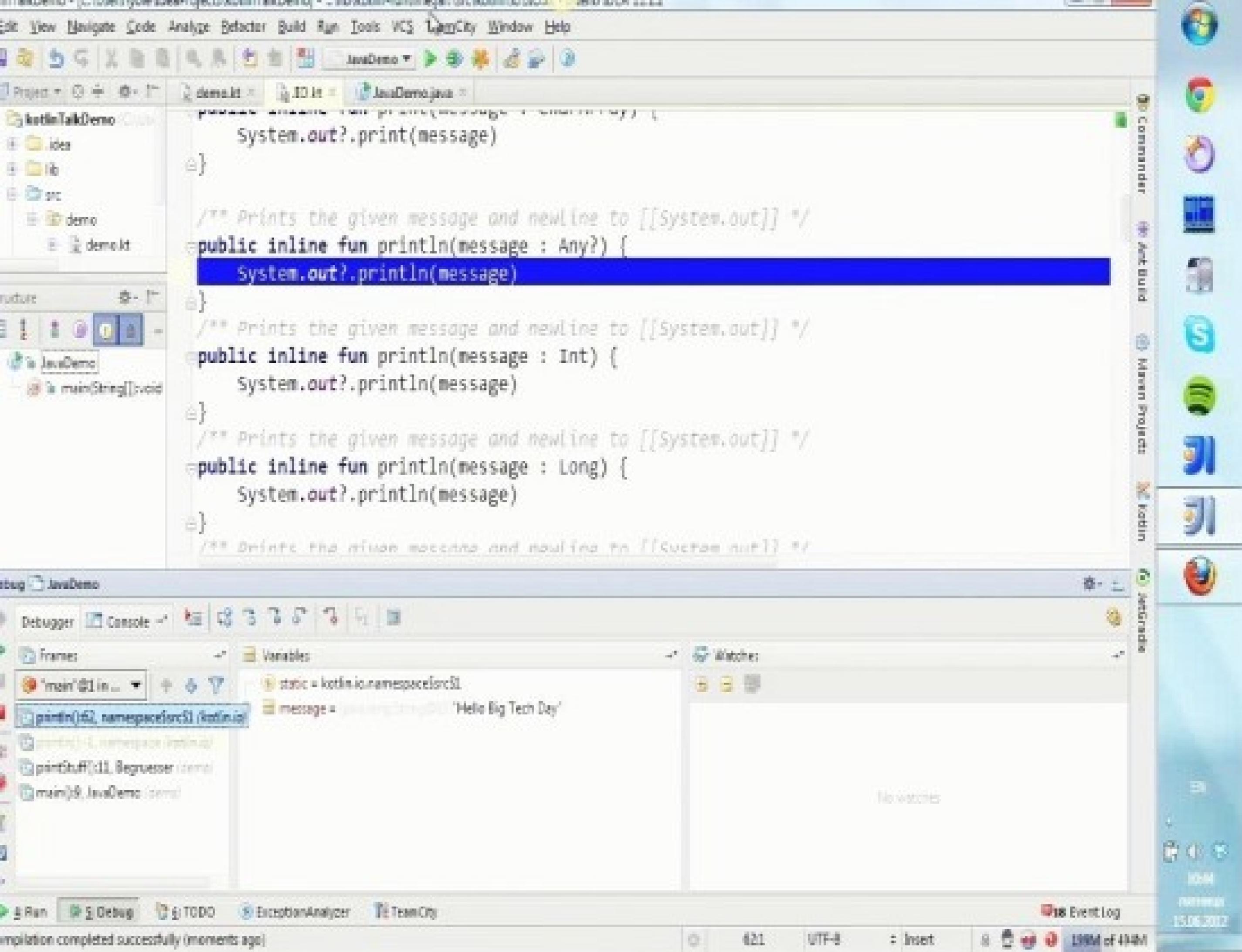
621

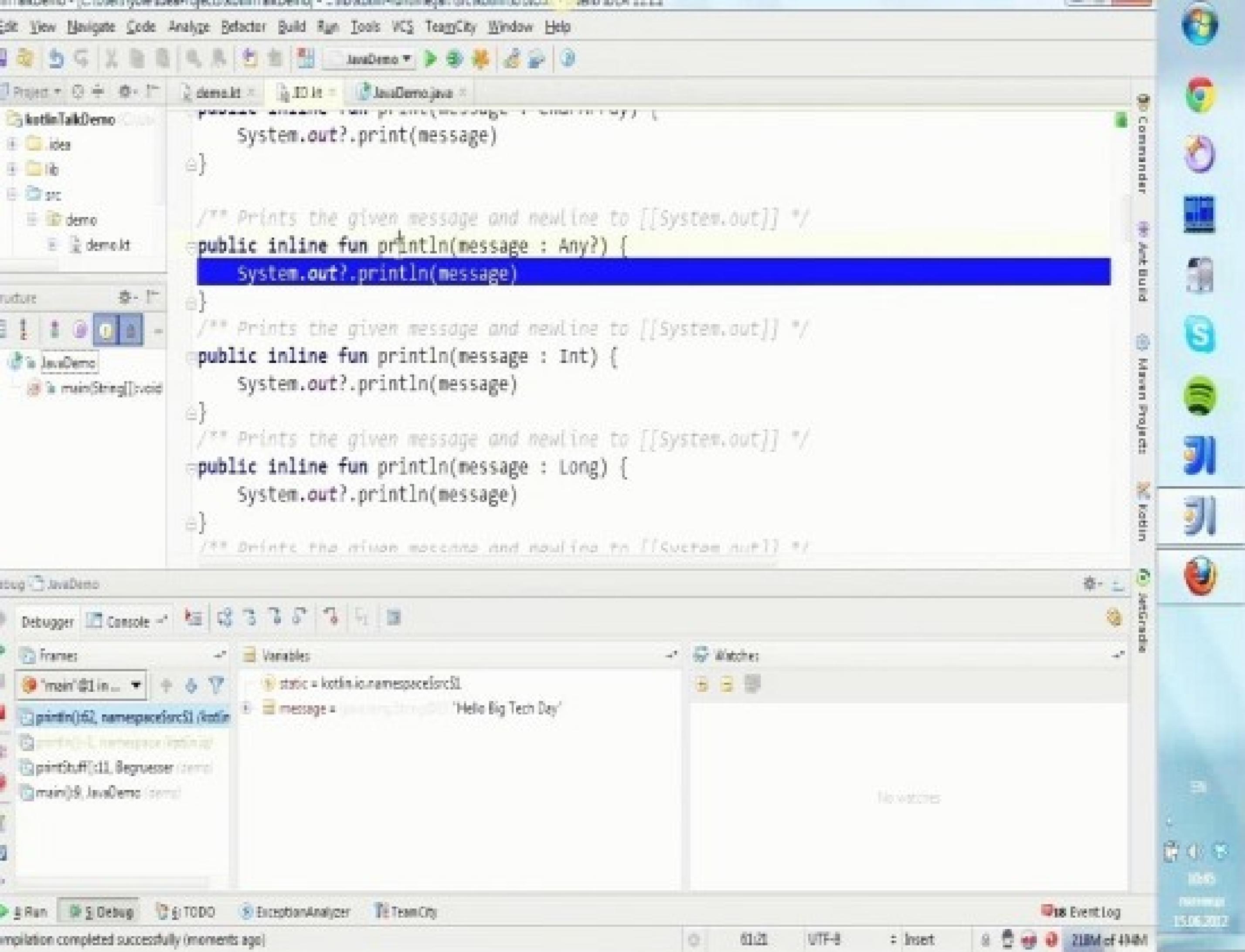
UTF-8

Insert

199M of 494M

13/06/2017





- kotlinTalkDemo
- idea
- lib
- src
- demo
- demo.kt

- JavaDemo
- main(String[]):void

```

    System.out?.print(message)
}

/** Prints the given message and newline to [[System.out]] */
public inline fun println(message : Any?) {
    System.out?.println(message)
}

/** Prints the given message and newline to [[System.out]] */
public inline fun println(message : Int) {
    System.out?.println(message)
}

/** Prints the given message and newline to [[System.out]] */
public inline fun println(message : Long) {
    System.out?.println(message)
}

/** Prints the given message and newline to [[System.out]] */

```

Frames

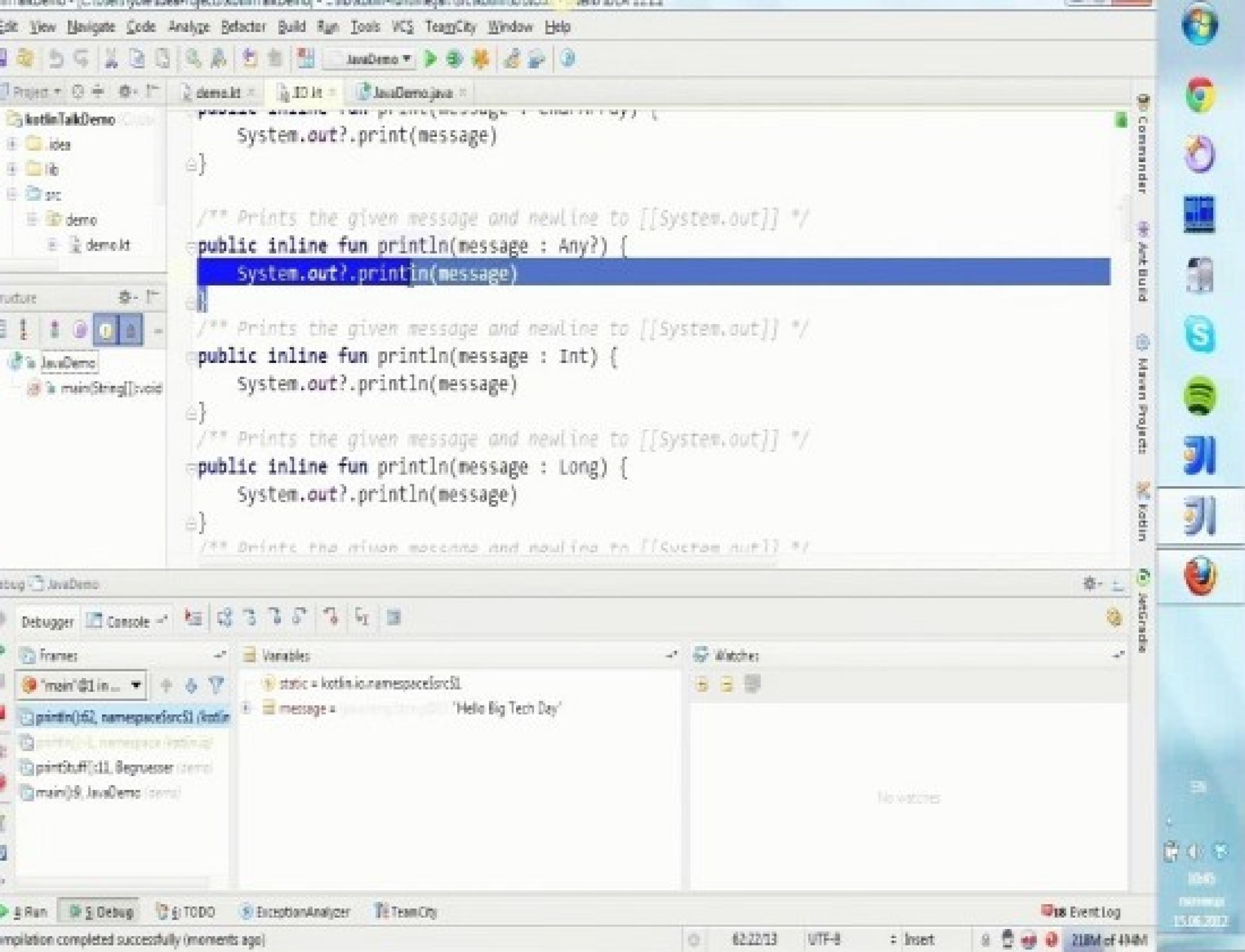
- main()@1 in ...
- println()@1, namespaceFor(S) (kotlin)
- println()@1, namespaceFor(S) (kotlin)
- printStuff()@11, @Debugger (demo)
- main()@8, JavaDemo (demo)

Variables

- static = kotlin.io.namespaceFor(S)
- message = java.lang.String@1 'Hello Big Tech Day'

Watches

No watches



```
System.out?.print(message)
}

/** Prints the given message and newline to [[System.out]] */
public inline fun println(message : Any?) {
    System.out?.println(message)
}

/** Prints the given message and newline to [[System.out]] */
public inline fun println(message : Int) {
    System.out?.println(message)
}

/** Prints the given message and newline to [[System.out]] */
public inline fun println(message : Long) {
    System.out?.println(message)
}

/** Prints the given message and newline to [[System.out]] */
```

Debugger Console

Frames

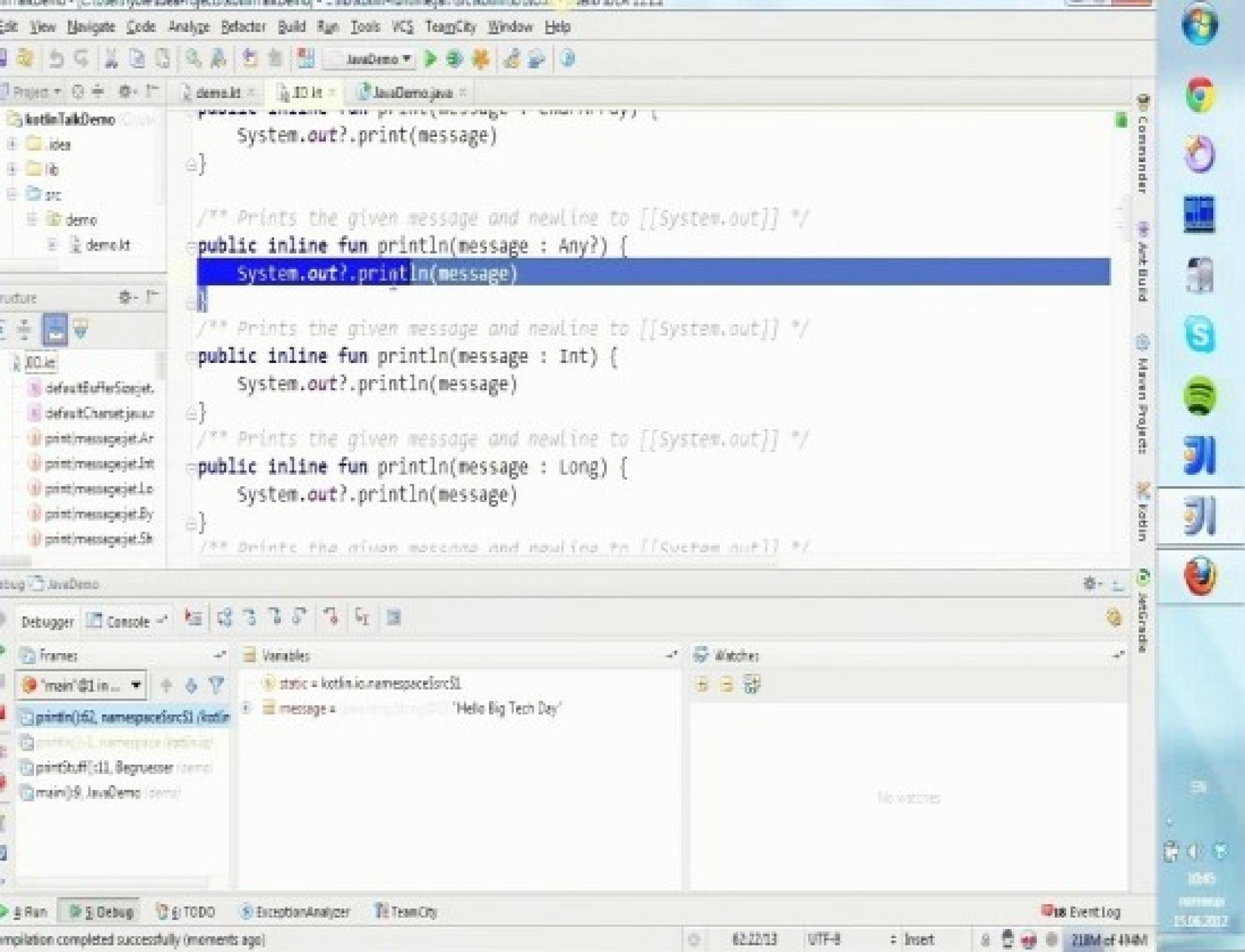
- main()@1 in ...
- println()@52, namespace:kotlin
- println()@1, namespace:kotlin
- printStuff()@11, @Debugger (demo)
- main()@8, JavaDemo (demo)

Variables

- static = kotlin.io.namespaceFor\$1
- message = java.lang.String@1 'Hello Big Tech Day'

Watches

No watches



- kotlinTalkDemo
  - idea
  - lib
  - src
    - demo
      - demo.kt

- defaultBufferSizeJet
- defaultCharsetJet
- print(messageJet.Ar
- print(messageJet.Int
- print(messageJet.Lo
- print(messageJet.By
- print(messageJet.Sh

```

    System.out?.print(message)
}

/** Prints the given message and newline to [[System.out]] */
public inline fun println(message : Any?) {
    System.out?.println(message)
}

/** Prints the given message and newline to [[System.out]] */
public inline fun println(message : Int) {
    System.out?.println(message)
}

/** Prints the given message and newline to [[System.out]] */
public inline fun println(message : Long) {
    System.out?.println(message)
}

/** Prints the given message and newline to [[System.out]] */

```

Frames

- 'main' @1 in ...
- println()@1, namespaceForS1 (kotlin)
- println()@1, namespaceForS1 (kotlin)
- printStuff()@1, @Debugger (demo)
- main()@8, JavaDemo (demo)

Variables

- static = kotlin.io.namespaceForS1
- message = java.lang.String@1 'Hello Big Tech Day'

Watches

No watches

# IntelliJ IDEA Plugin Demo

# Summary

# Summary

- Kotlin is ready for you to try today

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- Kotlin is ready for you to try today
- Kotlin fits nicely into existing projects

# Summary

- Kotlin is ready for you to try today
- Kotlin fits nicely into existing projects
- Kotlin is a pleasure to develop in



# Try Kotlin Now

<http://kotlin-demo.jetbrains.com>

# Get Kotlin

<http://jetbrains.com/kotlin>

# Resources

GitHub: <http://www.github.com/JetBrains/kotlin/>

Blog: <http://blog.jetbrains.com/kotlin/>

Forum: **Kotlin** at <http://devnet.jetbrains.net>

Twitter: [@project\\_kotlin](https://twitter.com/project_kotlin)

Issue tracker: <http://youtrack.jetbrains.com/issues/KT>

**Contributors welcome!**

# Q&A