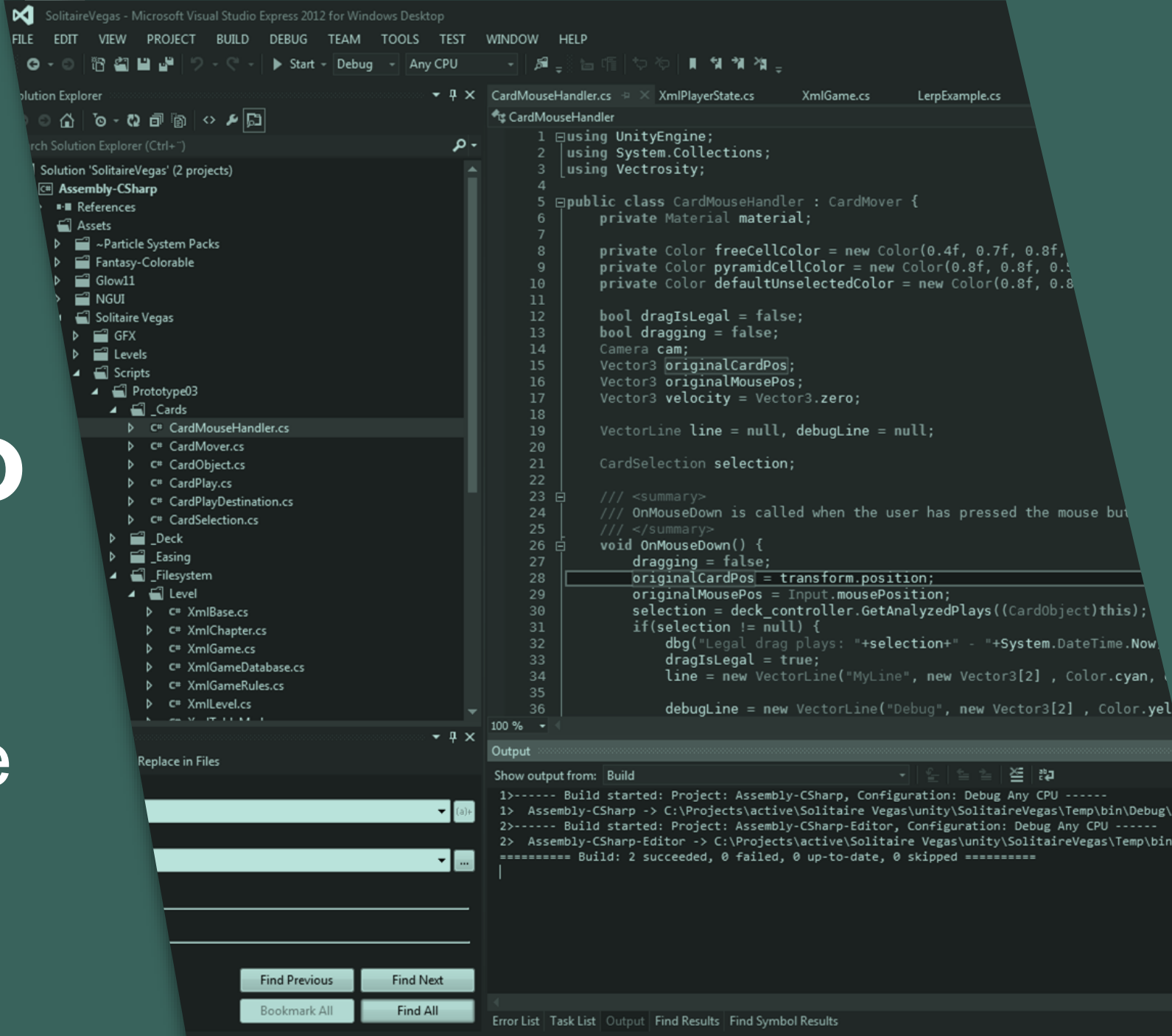


# Uvod u softversko inženjerstvo

Integrisano  
razvojno okruženje

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Editor koda

Dibager

*Case Study: Clean CaDET*

*Debugging* tehnike

Integrirano  
razvojno okruženje

Šta čini  
profesionalnog  
softver inženjera?

- 1 It's Your Life
- 2 The Cat Ate My Source Code
- 3 Software Entropy
- 4 Stone Soup and Boiled Frogs
- 5 Good-Enough Software
- 6 Your Knowledge Portfolio
- 7 Communicate!

Razvoj kompetencije

*zar ne dolazi  
veština  
vremenom?*

# Alati amplifikuju tvoju veštinu

*uticaj  
tastature  
na razvoj?*

*zavisnost  
vremena i  
veštine?*

4

6

7

8

Posle

—●— Alisa —●— Mark —●— Bob



# *Integrated Development Environment*

Aplikacija koja nudi zajednički interfejs  
raznim alatima za razvoj softvera

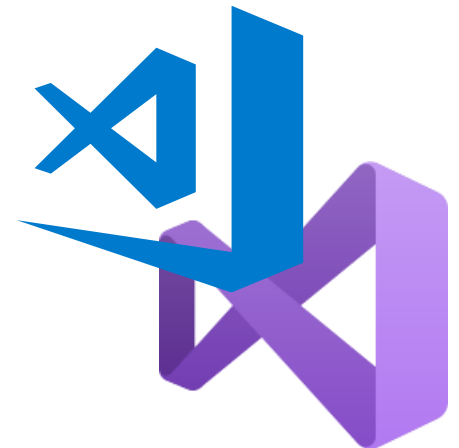
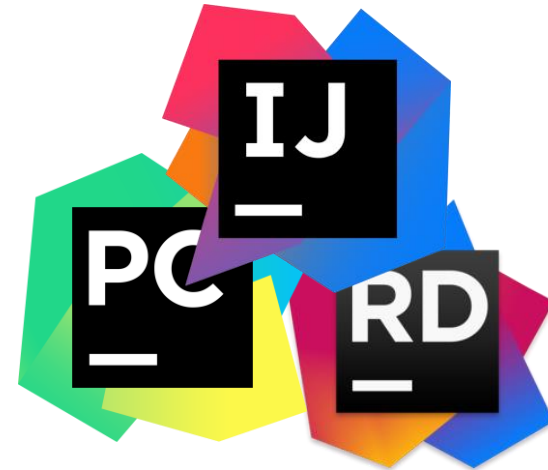
Cilj – Povećati produktivnost razvoja

- ❖ Skup iskonfigurisanih alata
- ❖ Skup integrisanih alata
- ❖ Podrška za proširivanje skupa alata

Editor koda

*Debugger*

Vankoderske  
aktivnosti



## Editor koda

*syntax  
highlighting*

*warning:  
not read*

*šta se vidi u  
odnosu na  
notepad?*

*warning:  
not needed*

```
private static List<OrderItem> createOrders() {  
    List<OrderItem> retVal = new ArrayList<OrderItem>();  
    retVal.add(new OrderItem( name: "appel", quantityType: "kg", quantityAmount: 2.0));  
    retVal.add(new OrderItem( name: "orange", quantityType: "kg", quantityAmount: 1.0));  
    return retVal;  
}
```

*error:  
not defined*

*warning:  
misspelling*

*parameter  
name hints*

***Alt+Enter*** kod problema

# Editor koda

*radi i na selektovan  
element u kodu*

**Ctrl+Space**  
*code completion*

**Ctrl+Q**

The screenshot shows an IDE with a code editor on the left and a documentation panel on the right. In the code editor, the text `System.out.f` is partially visible. A dropdown menu for code completion is open, listing several methods: `flush()`, `format(String format, Object... args)`, `format(Locale locale, String format, Object... args)`, `printf(String format, Object... args)`, `printf(Locale locale, String format, Object... args)`, and `notify()`. The `format(String format, Object... args)` method is highlighted. A speech bubble points to this method with the text *interesantno?*. The documentation panel on the right shows the signature `java.io.PrintStream format(@NotNull String format, @Nullable Object... args)` and a description: "Writes a formatted string to this output stream using the specified format string and arguments. The locale always used is the one returned by `Locale.getDefault()`, regardless of any previous invocations of other formatting methods on this object." It also lists parameters: `format` (A format string as described in [Format string syntax](#)) and `args` (Arguments referenced by the format specifiers in the format string). The `Returns` section says "This output stream". The `Throws` section lists `java.util.IllegalFormatException` with a description: "If a format string contains an illegal syntax, a format specifier that is incompatible with the given arguments, insufficient arguments given the format string, or other illegal conditions. For specification of all possible".

`System.out.f`

- `flush()`
- `format(String format, Object... args)`
- `format(Locale locale, String format, Object... args)`
- `printf(String format, Object... args)`
- `printf(Locale locale, String format, Object... args)`
- `notify()`

*interesantno?*

**java.io.PrintStream**  
`public PrintStream format(@NotNull String format, @Nullable Object... args)`

Writes a formatted string to this output stream using the specified format string and arguments. The locale always used is the one returned by `Locale.getDefault()`, regardless of any previous invocations of other formatting methods on this object.

Params:

- `format` – A format string as described in [Format string syntax](#)
- `args` – Arguments referenced by the format specifiers in the format string. If there are more arguments than format specifiers, the extra arguments are ignored. The number of arguments is variable and may be zero. The maximum number of arguments is limited by the maximum dimension of a Java array as defined by *The Java™ Virtual Machine Specification*. The behaviour on a null argument depends on the [conversion](#).

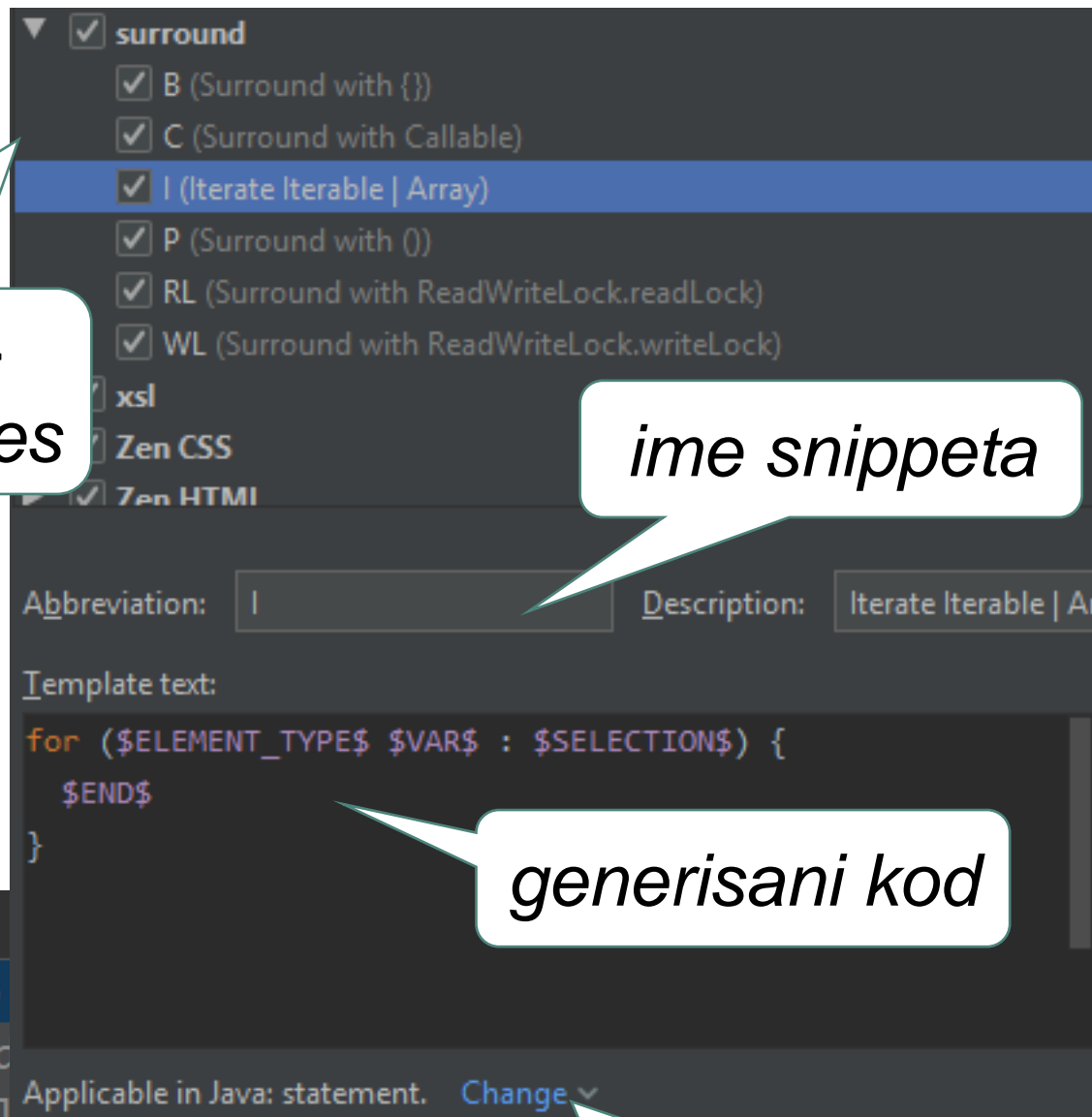
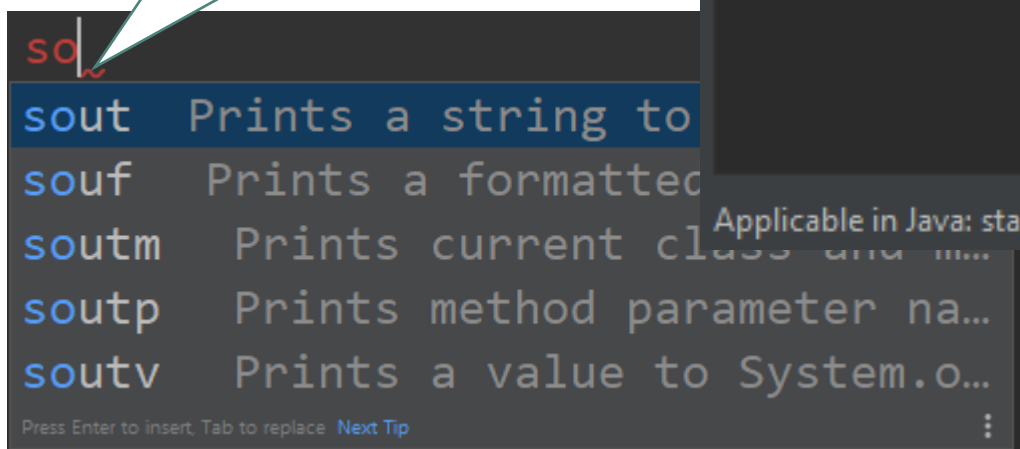
Returns: This output stream

Throws: `java.util.IllegalFormatException` – If a format string contains an illegal syntax, a format specifier that is incompatible with the given arguments, insufficient arguments given the format string, or other illegal conditions. For specification of all possible

## Editor koda

*File -> Settings ->  
Editor/Live Templates*

**Ctrl+J/Space**  
*code snippets  
(live templates)*



*ime snippeta*

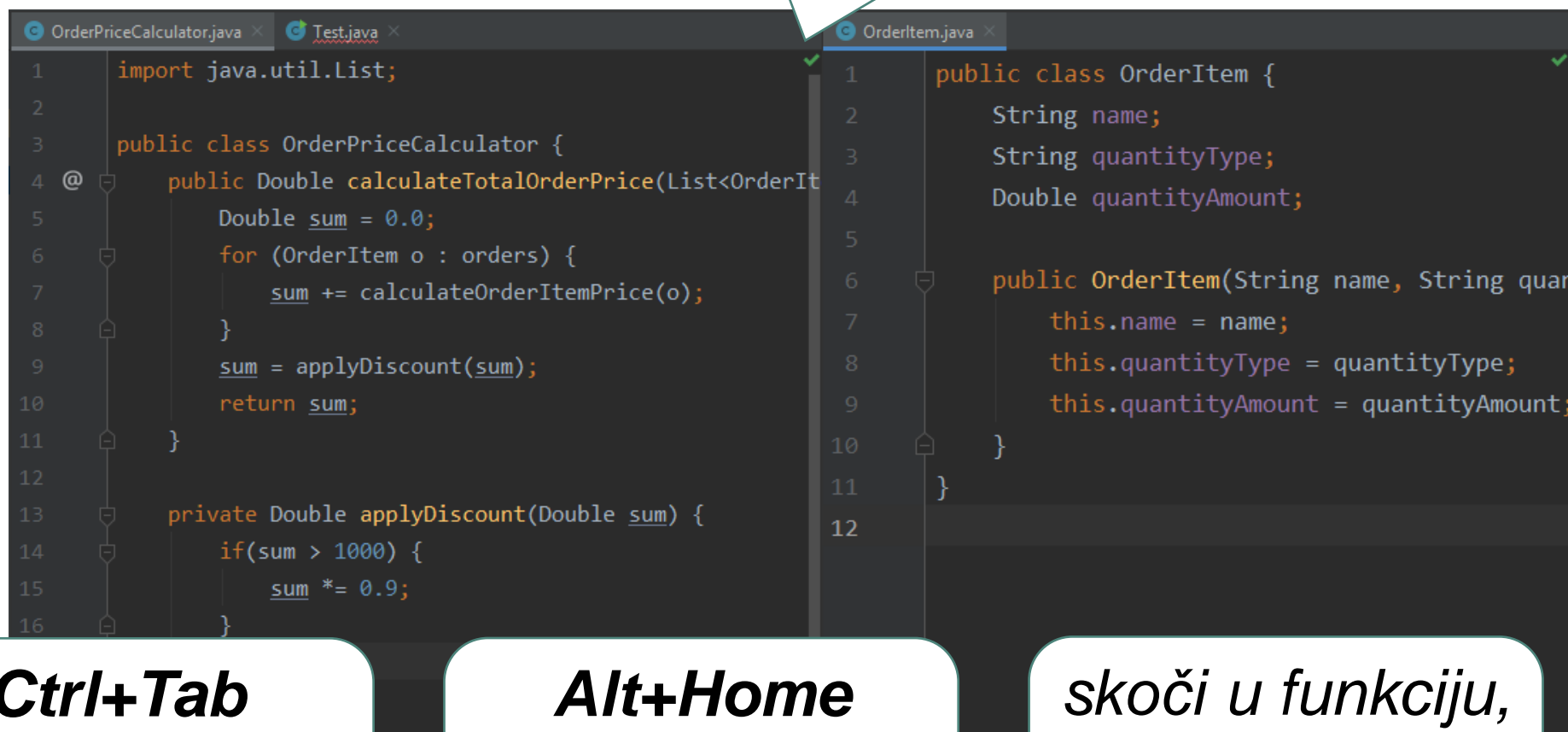
*generisani kod*

*gde da se pojavi  
skraćenica*



## Editor koda

*Window -> Editor Tabs ->  
Split Vertically/Horizontally*



```
OrderPriceCalculator.java
1  import java.util.List;
2
3  public class OrderPriceCalculator {
4  @ public Double calculateTotalOrderPrice(List<OrderItem> orders) {
5      Double sum = 0.0;
6      for (OrderItem o : orders) {
7          sum += calculateOrderItemPrice(o);
8      }
9      sum = applyDiscount(sum);
10     return sum;
11 }
12
13 private Double applyDiscount(Double sum) {
14     if(sum > 1000) {
15         sum *= 0.9;
16     }
17 }

OrderItem.java
1  public class OrderItem {
2      String name;
3      String quantityType;
4      Double quantityAmount;
5
6      public OrderItem(String name, String quantityType, Double quantityAmount) {
7          this.name = name;
8          this.quantityType = quantityType;
9          this.quantityAmount = quantityAmount;
10     }
11 }
12
```

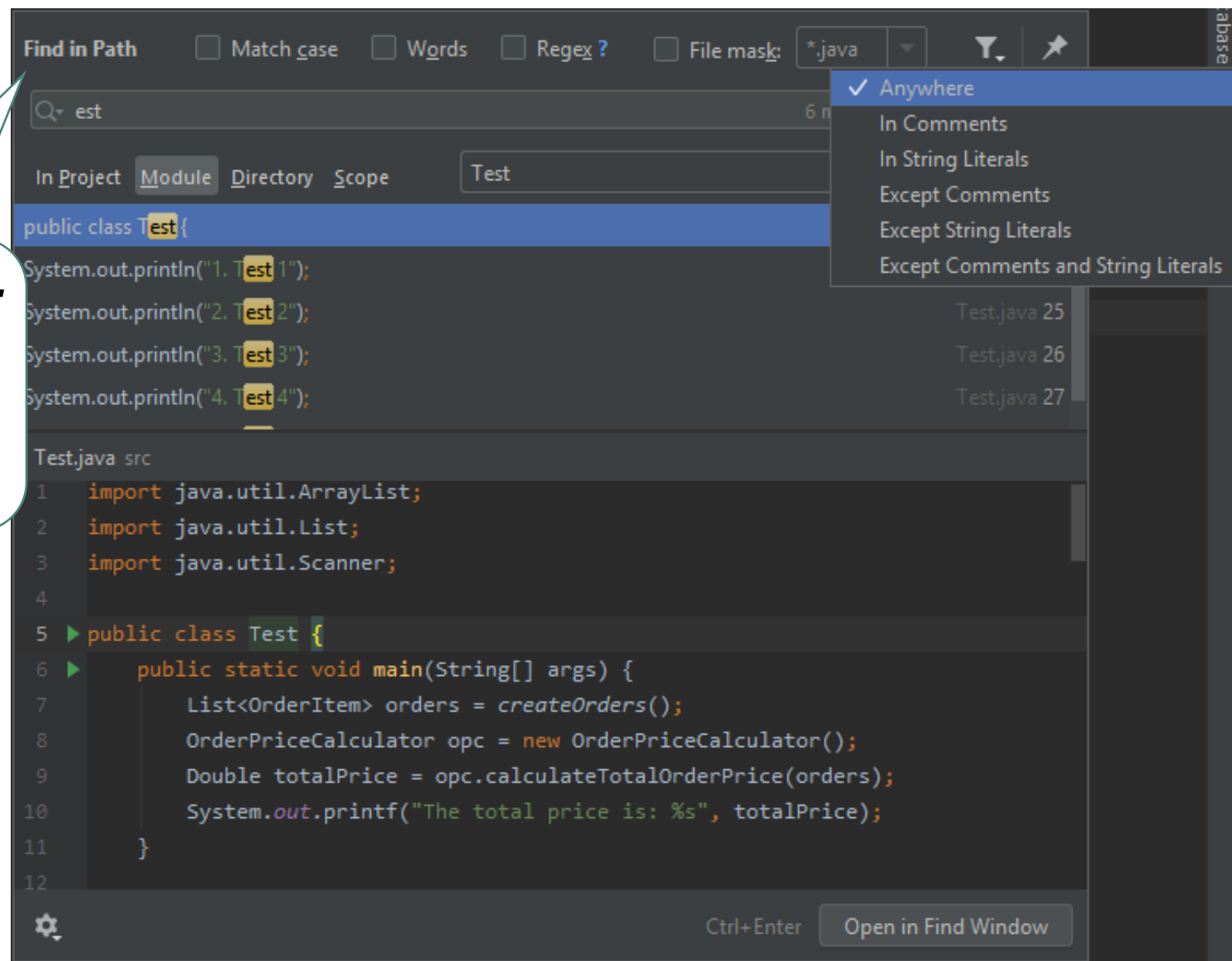
***Ctrl+Tab***  
*kretanje kroz  
otvorene fajlove*

***Alt+Home***  
*kretanje kroz  
projekat*

*skoči u funkciju,  
pronađi gde se  
koristi funkcija...*

# Editor koda

***Ctrl+Shift+F***  
koje su sve  
opcije?





# Postani vešt sa svojim IDE-om

Domaći: Nauči da vršiš sledeće akcije bez miša:

*nedelja  
programiranja  
bez miša*

Move and make selections by word, line, paragraph

Move by various syntactic units (matching delimiters, functions, modules...)

Reindent code following changes; Undo and redo changes

Comment and uncomment blocks of code with a single command

Split the editor window into multiple panels, and navigate between them

Navigate to a particular line number; Sort selected lines

Search for both strings and regular expressions, and repeat previous searches

Create multiple cursors based on a selection or on a pattern match, and edit the text at each in parallel

Display compilation errors in the current project; Run the current project's tests

9/9

0800

Archan started

1000

stopped - archan ✓

1300 (034) MP - MC

034 PRO 2

conv. t

Relays 6-2 in 034 failed special spot test  
in relay

Relays changed

1100

Started Cosine Tape (Sine check)

1525

Started Multi-Adder Test.

1545

Relay #70 Panel F  
(moth) in relay.

1630

Archan started.

1700

closed down.

{ 1.2700

9.067 847 025

9.067 846 995 conv. t

~~1.2700~~

2.130476415

2.130476415

2.130676415

2.130676415

2.130676415

2.130676415

2.130676415

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2.130676415

2.130676415

2.130676415

2.130676415

0830

Started machine

Registration

11.15

Started Machine

1245

Started Machine

1300

Stopped Machine

Second

Adder trouble

(coincidental?)

in column n

failed occas

allow trouble

Cont d head

14.25

Stopped on

Sum d

2 instead of

adder from t

Cont o.k.

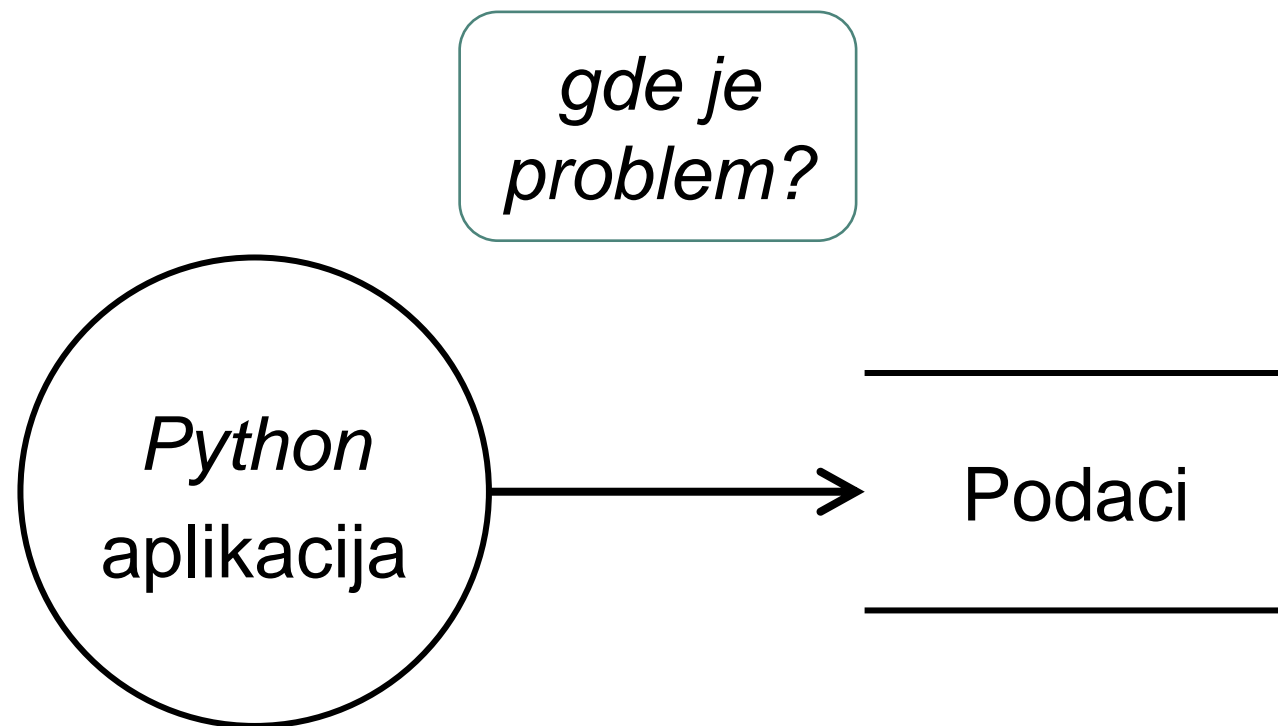
1630

Trouble d

5-6. Relay

shim. Repl

# Rešavanje *bug*-a je puzla

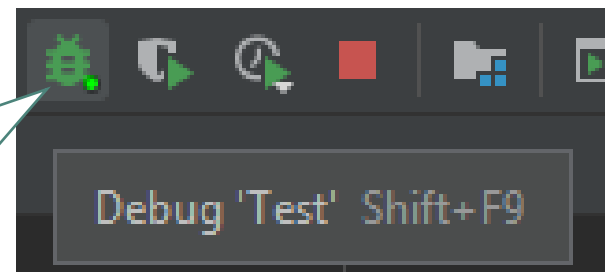


*zašto je bug  
bio u kodu?*

*šta ako je  
kolega kriv?*

# Debugger

vrši program u  
debug režimu



debug zastaje na  
breakpoint-ima

debug prikazuje  
aktivne vrednosti

```
public class OrderPriceCalculator {  
    public Double calculateOrderPrice(List<OrderItem> orders) {  
        Double sum = 0.0; sum: 105.0  
        for (OrderItem o : orders) { o: OrderItem  
            sum += calculateOrderItemPrice(o);  
        }  
    }  
}
```

OrderPriceCalculator.java:7 Restore previous breakpoint

☒ Enabled

☒ Suspend: ☒ All ☐ Thread

☒ Condition:  
calculateOrderItemPrice(o) < 0

More (Ctrl+Shift+F8) Done

uslovni breakpoint  
stopira ako uslov važi

zašto je  
korisno?

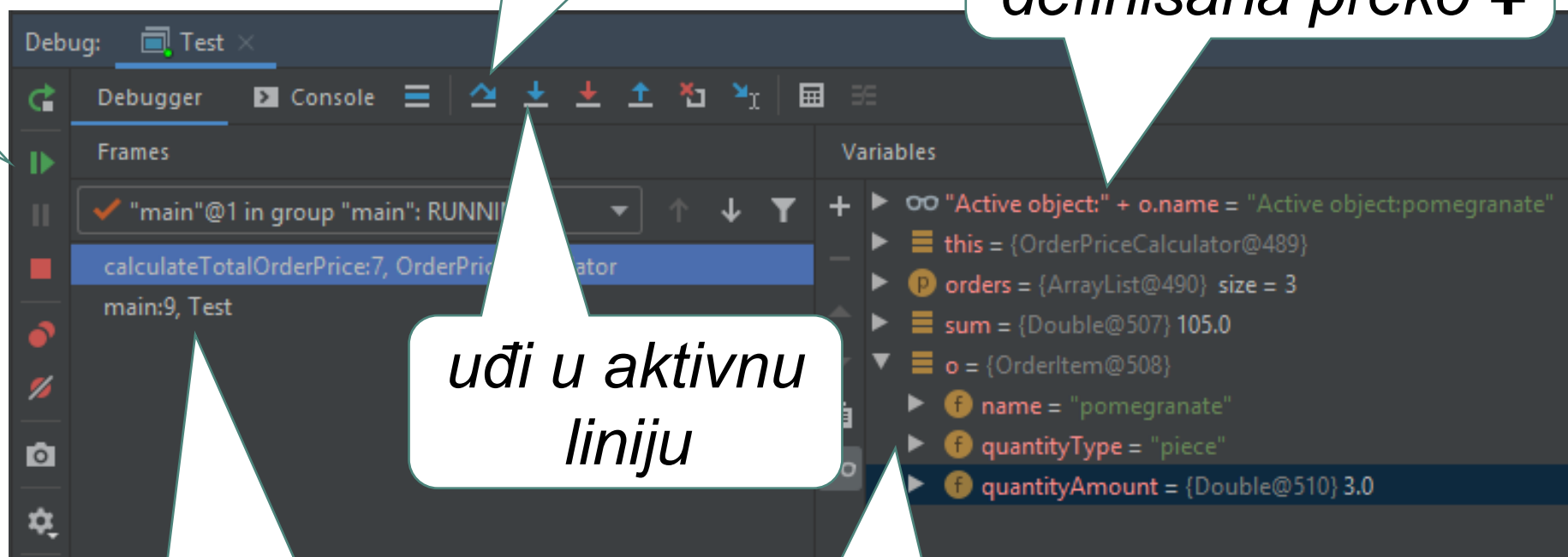


# Debugger

*naredni  
breakpoint*

*skoči na  
narednu liniju*

*promenljiva  
definisana preko +*

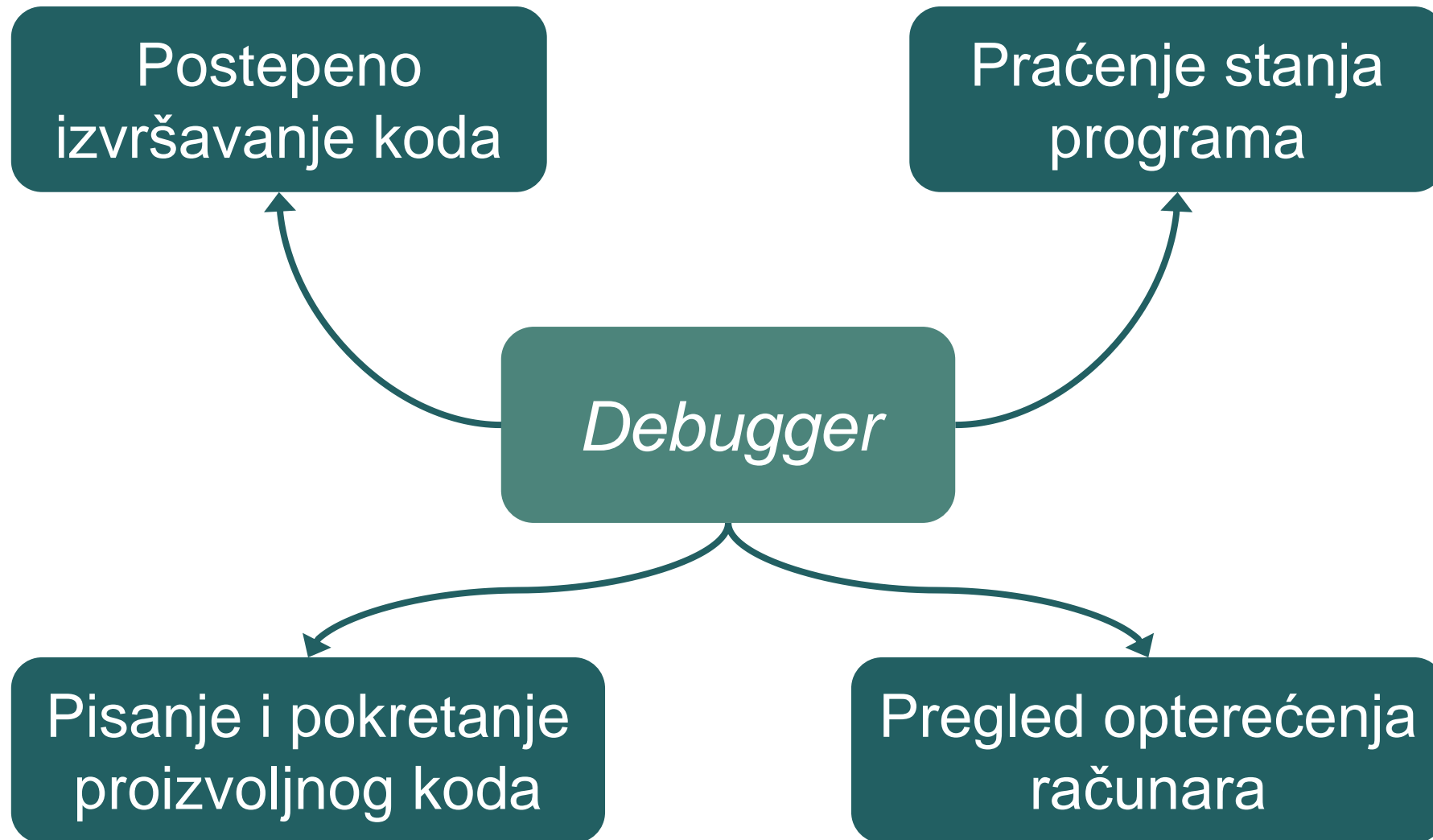


*uđi u aktivnu  
liniju*

*stanje funkcija koje  
su pozvale aktuelnu*

*aktivne vrednosti  
u promenljivama*



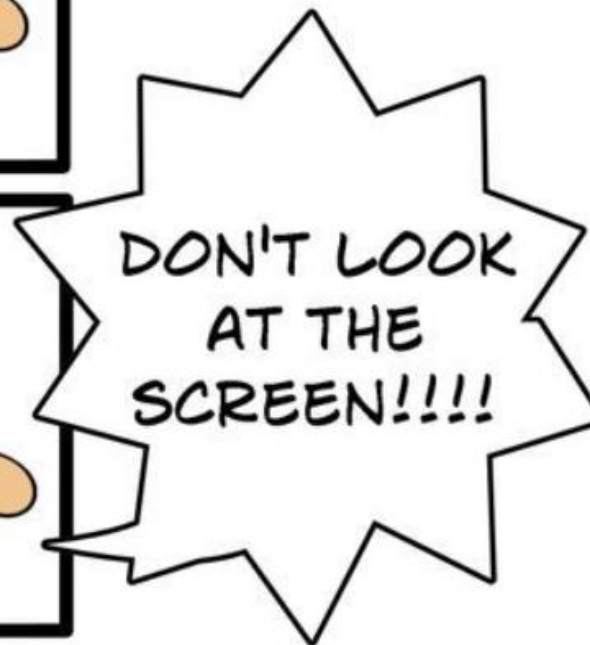
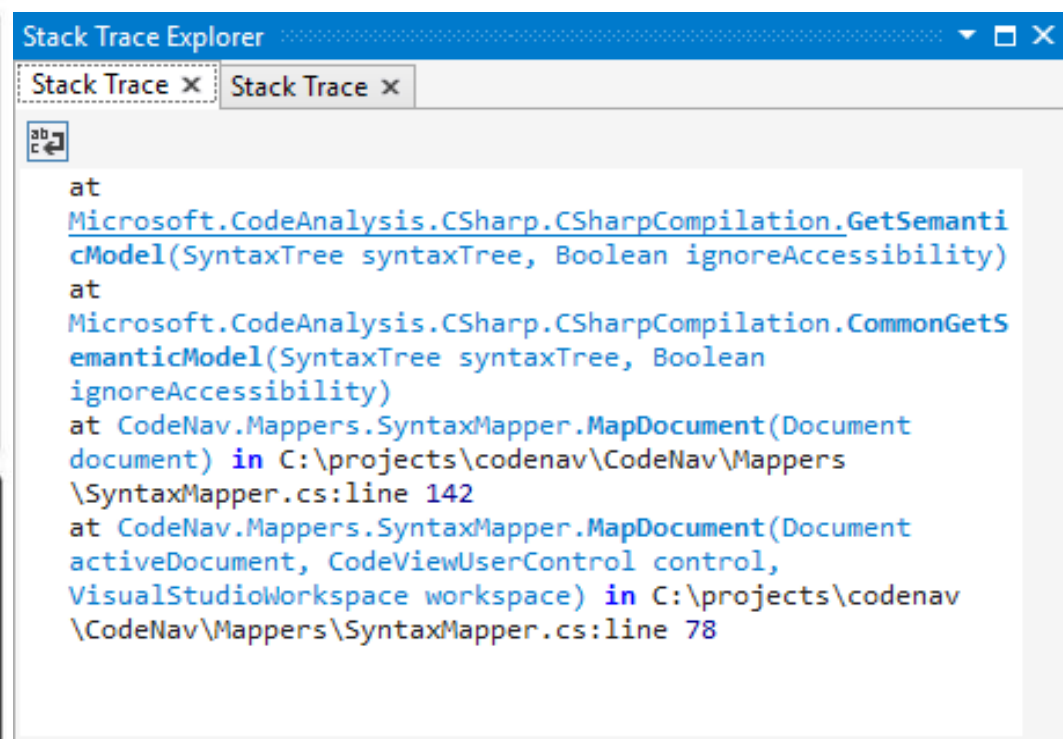
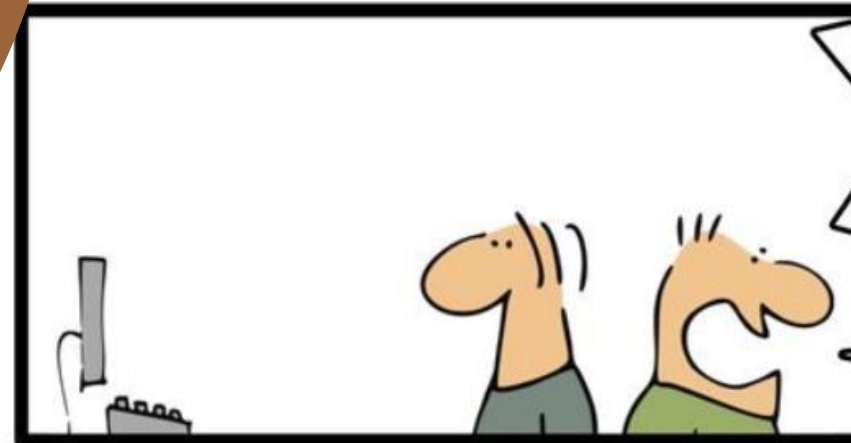
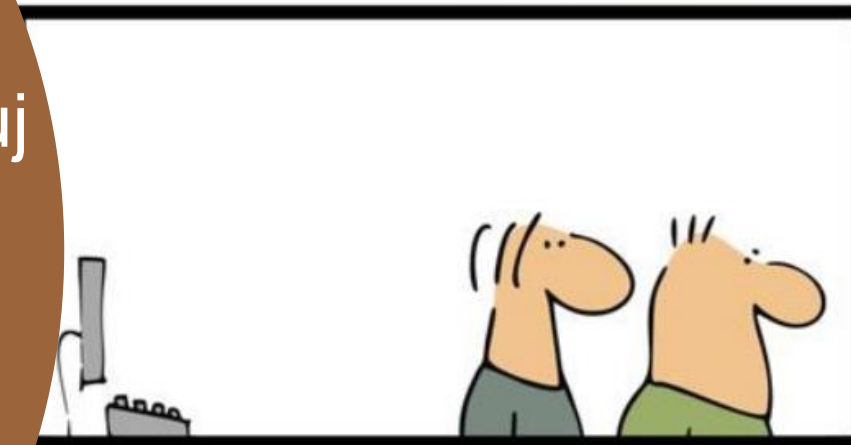
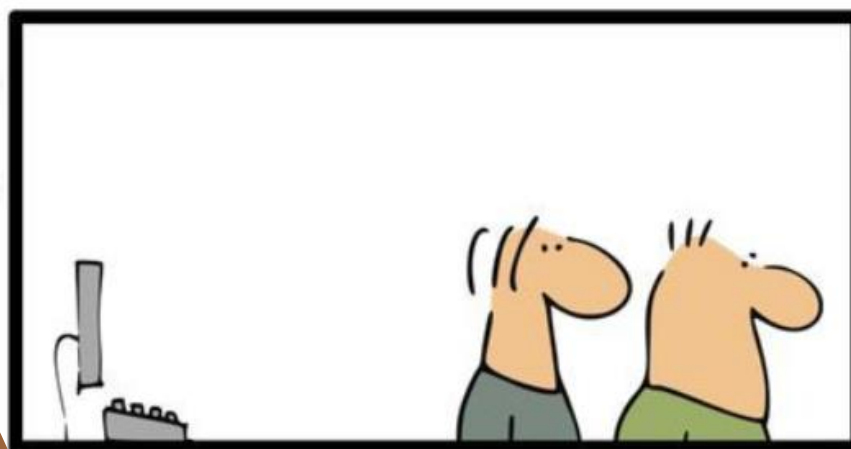


# Debugging tehnike

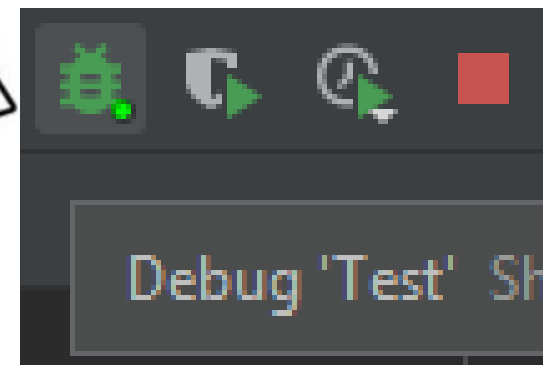
Reprodukuj  
*bug*

Čitaj poruku  
greške

Upotrebi  
*debugger*



HOW TO DEBUG HEISENBUGS

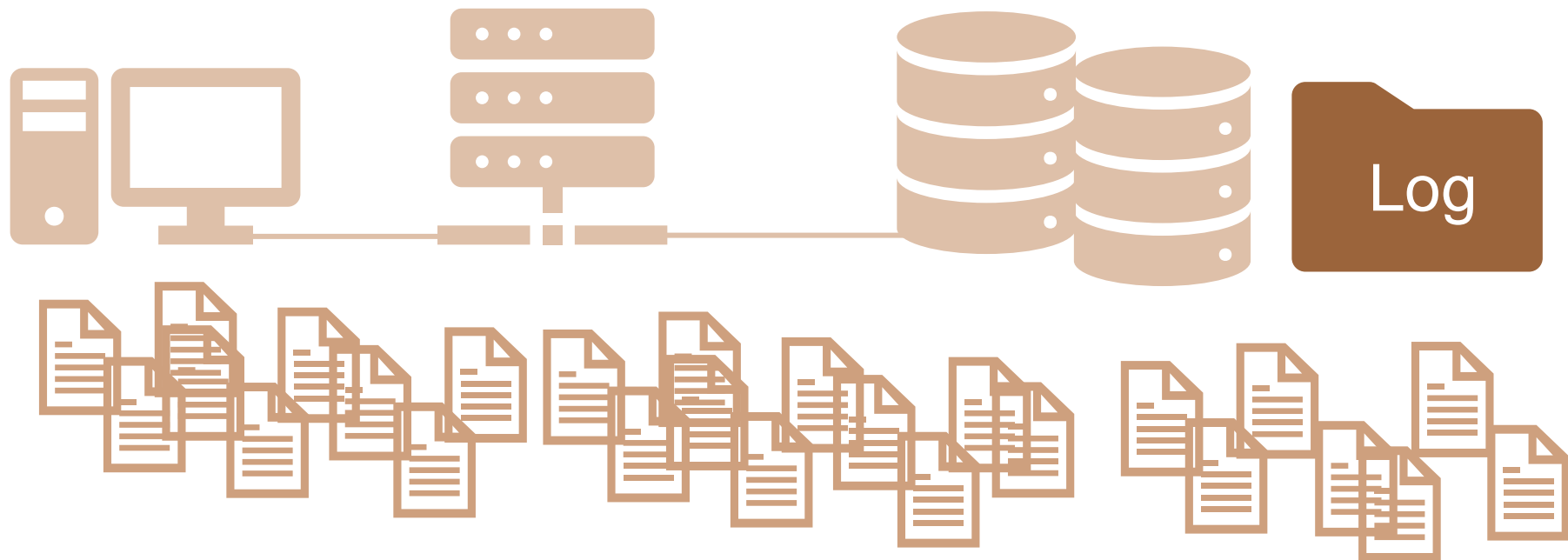


*Debugging  
tehnike*

Loguj  
stanje

*Binary  
chop*

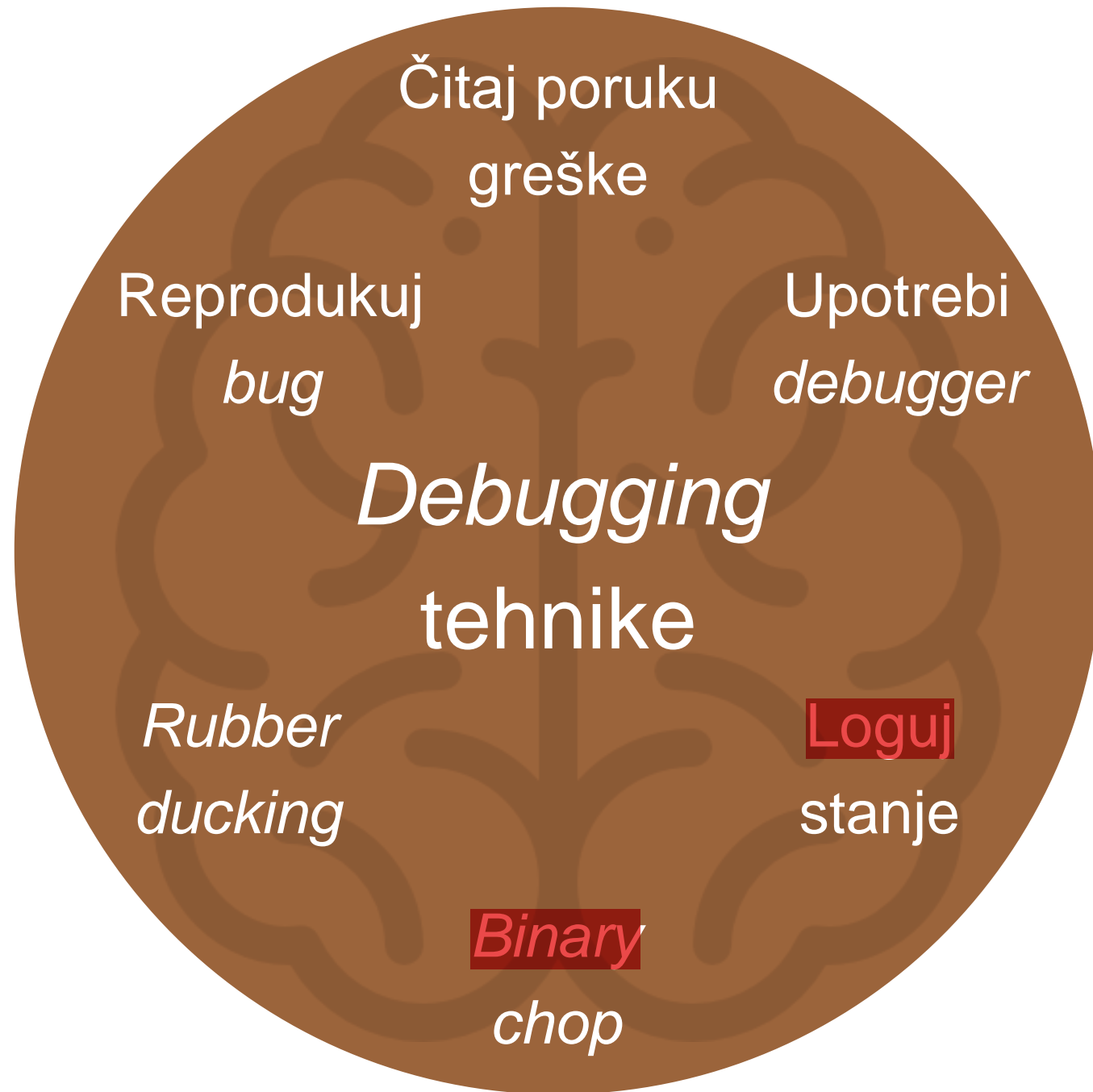
*Rubber  
ducking*



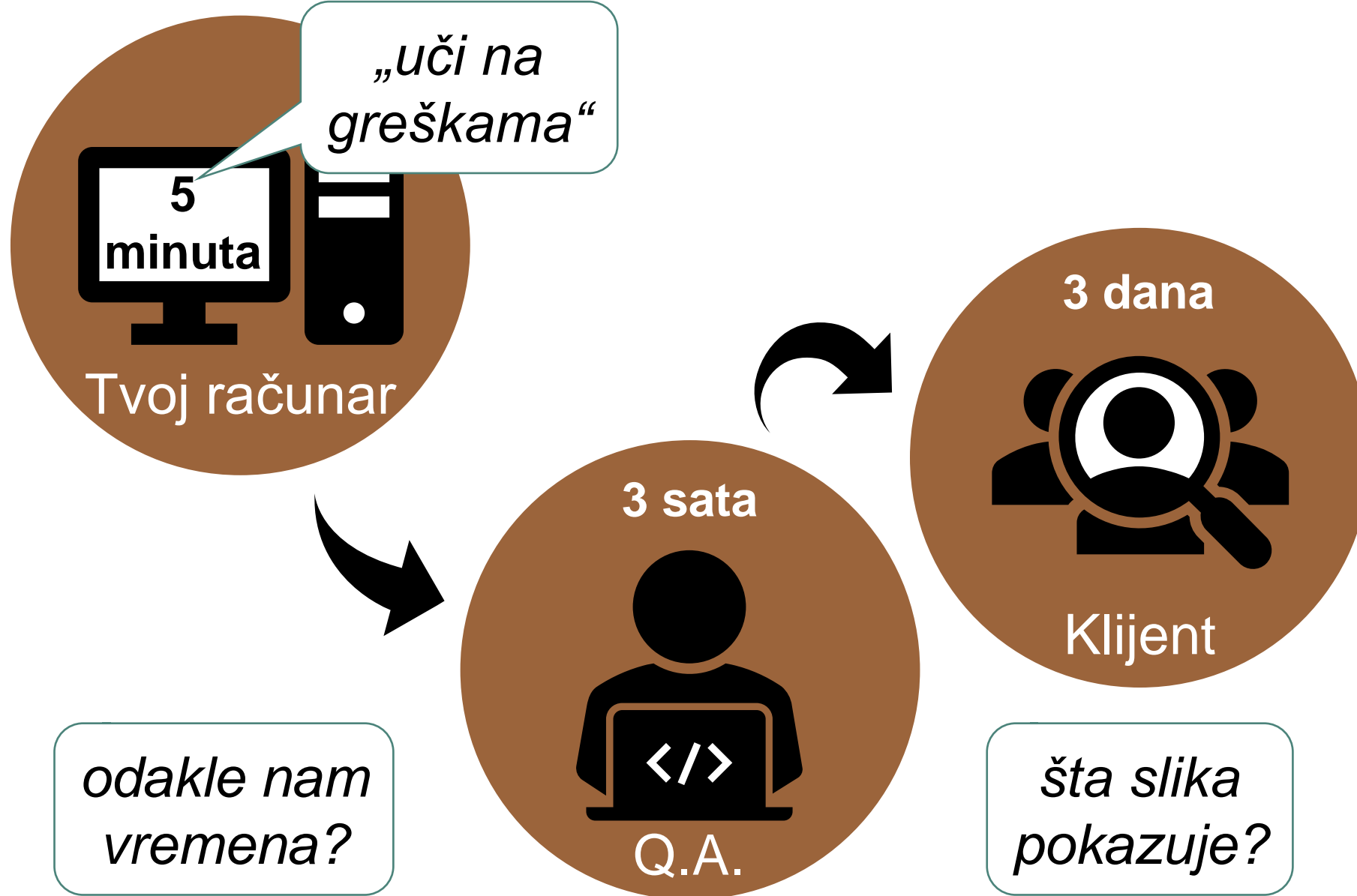
#### Call Stack

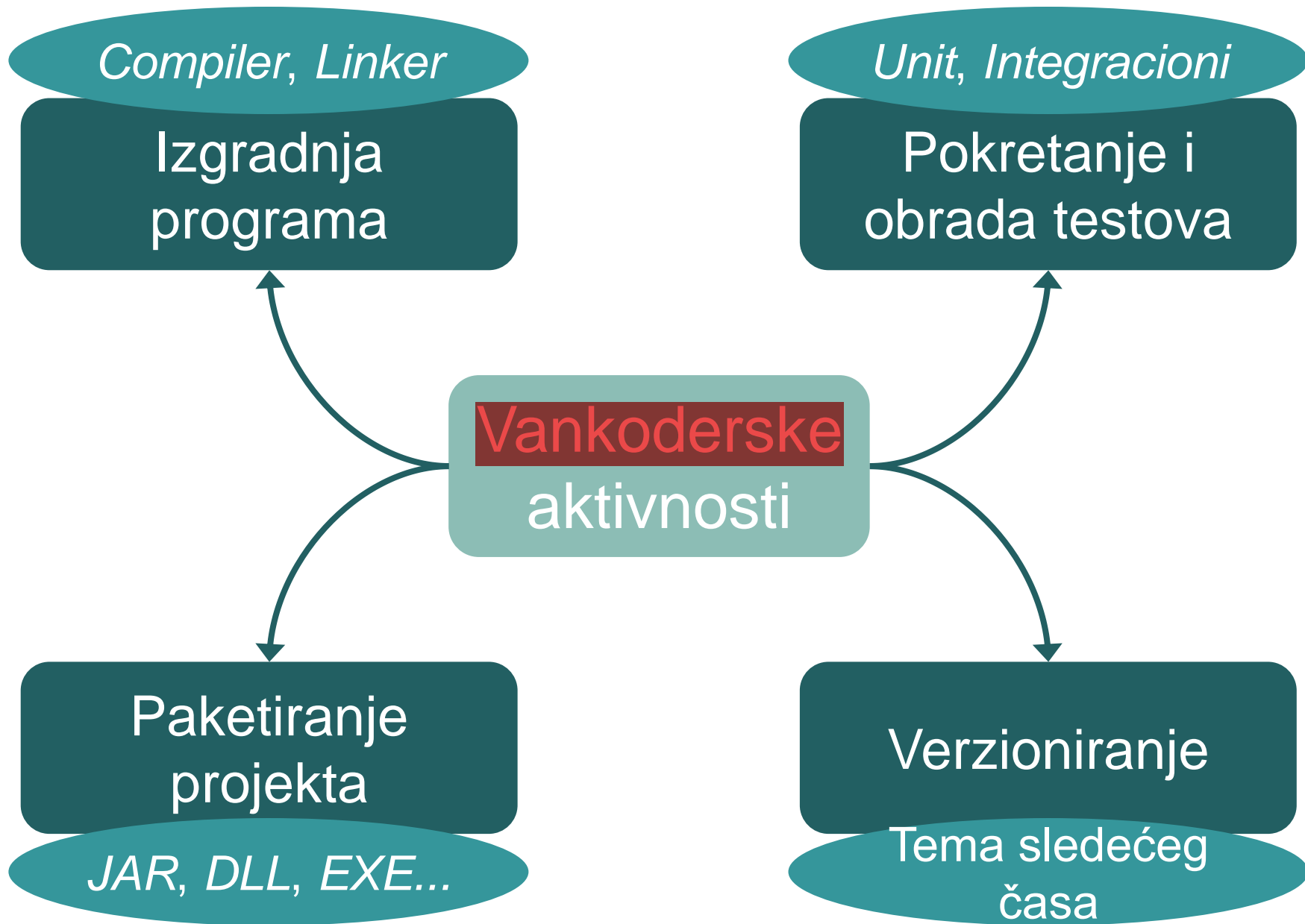
	Name
➡	CodeModel.dll!CodeModel.CodeParsers.CSharp.CaDETMetricCalculator.GetKeywords()...
	CodeModel.dll!CodeModel.CodeParsers.CSharp.CaDETMetricCalculator.FilterWords.A...
	[External Code]
	CodeModel.dll!CodeModel.CodeParsers.CSharp.CaDETMetricCalculator.FilterWords(?)
	CodeModel.dll!CodeModel.CodeParsers.CSharp.CaDETMetricCalculator.CountN...
	CodeModel.dll!CodeModel.CodeParsers.CSharp.CaDETMetricCalculator.Calculate...
➡	CodeModel.dll!CodeModel.CodeParsers.CSharp.CSharpCaDETMetricBuilder.CalculateM...
	CodeModel.dll!CodeModel.CodeParsers.CSharp.CSharpCodeParser.CalculateMetrics(Sy...
	CodeModel.dll!CodeModel.CodeParsers.CSharp.CSharpCodeParser.Parse(System.Colle...
	CodeModel.dll!CodeModel.CodeModelFactory.CreateProject(System.Collections.Gene...
	CodeModel.Tests.dll!CodeModel.Tests.Unit.CaDETMetrics.MetricCalculationTests.Calcula...
	[External Code]

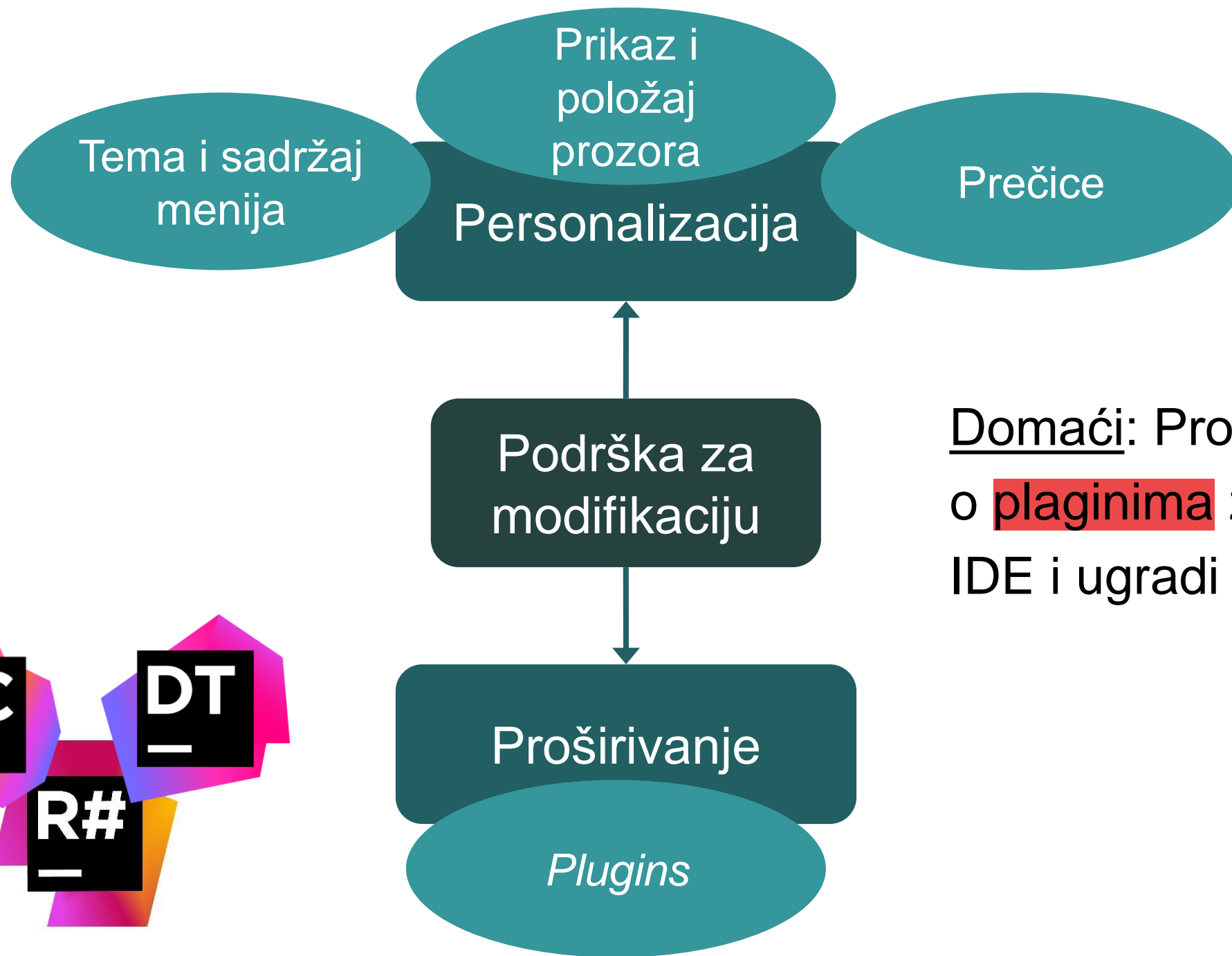
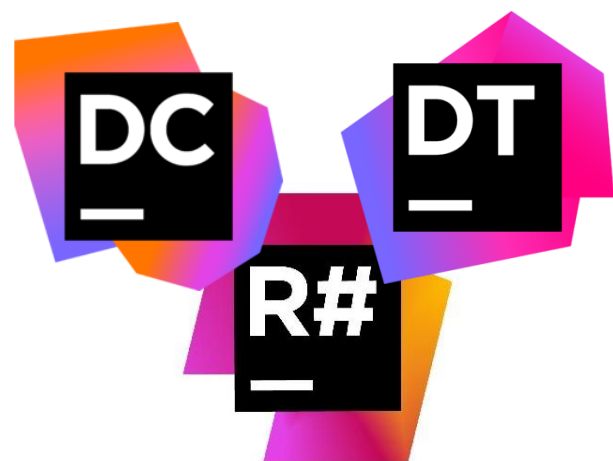




# Vreme rešavanja *bug*-a spram pronalaska







Domaći: Prođi članke o **pluginima** za tvoj IDE i ugradi bar jedan

Alati  
amplifikuju  
tvoju veštinu



## *The Basic Tools*

