

## Za početak:

- Razmisli o poenti svake teme i primerima tema u kontekstu:
  - Karijere inženjera softvera
  - Studiranja
  - Građanskog života
- Prodiskutuj početna zapažanja sa kolegama oko sebe

Čas kreće sa opštom diskusijom o temama u bilo kom redosledu.

## *A Pragmatic Philosophy*

- 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!

# Uvod u softversko inženjerstvo

## Integrисано развојно окружење

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The screenshot shows the Microsoft Visual Studio Express 2012 interface. The title bar reads "SolitaireVegas - Microsoft Visual Studio Express 2012 for Windows Desktop". The menu bar includes FILE, EDIT, VIEW, PROJECT, BUILD, DEBUG, TEAM, TOOLS, TEST, WINDOW, and HELP. The toolbar has icons for opening files, saving, and navigating. The Solution Explorer window shows a solution named "SolitaireVegas" containing two projects: "Assembly-CSharp" and "Assembly-CSharp-Editor". The "Assembly-CSharp" project includes assets like Particle System Packs, Fantasy-Colorable, Glow1, NGUI, Solitaire Vegas, GFX, Levels, and Scripts. The Scripts folder contains subfolders Prototype03 and \_Cards, which include files like CardMouseHandler.cs, CardMover.cs, CardObject.cs, CardPlay.cs, CardPlayDestination.cs, CardSelection.cs, \_Deck, \_Easing, \_Filesystem, and Level. The CardMouseHandler.cs file is open in the code editor, showing C# code for handling card movement. The Output window at the bottom shows build logs for both projects.

```
1 using UnityEngine;
2 using System.Collections;
3 using Vectrosity;
4
5 public class CardMouseHandler : CardMover {
6     private Material material;
7
8     private Color freeCellColor = new Color(0.4f, 0.7f, 0.8f,
9     private Color pyramidCellColor = new Color(0.8f, 0.8f, 0.8f);
10    private Color defaultUnselectedColor = new Color(0.8f, 0.8f, 0.8f);
11
12    bool dragIsLegal = false;
13    bool dragging = false;
14    Camera cam;
15    Vector3 originalCardPos;
16    Vector3 originalMousePos;
17    Vector3 velocity = Vector3.zero;
18
19    VectorLine line = null, debugLine = null;
20
21    CardSelection selection;
22
23    /// <summary>
24    /// OnMouseDown is called when the user has pressed the mouse button
25    /// </summary>
26    void OnMouseDown() {
27        dragging = false;
28        originalCardPos = transform.position;
29        originalMousePos = Input.mousePosition;
30        selection = deck_controller.GetAnalyzedPlays((CardObject)this);
31        if(selection != null) {
32            dbg("Legal drag plays: "+selection+" - "+System.DateTime.Now);
33            dragIsLegal = true;
34            line = new VectorLine("MyLine", new Vector3[2] , Color.cyan, 2);
35
36            debugLine = new VectorLine("Debug", new Vector3[2] , Color.yellow, 2);
37        }
38    }
39
40    void OnMouseUp() {
41        dragging = false;
42        originalCardPos = transform.position;
43        originalMousePos = Input.mousePosition;
44        selection = null;
45    }
46
47    void OnMouseDrag() {
48        dragging = true;
49        if(dragIsLegal) {
50            Vector3 mousePos = Input.mousePosition;
51            Vector3 cardPos = transform.position;
52            Vector3 diff = mousePos - cardPos;
53            Vector3 moveDir = Vector3.Normalize(diff);
54            float distance = Vector3.Distance(mousePos, cardPos);
55            Vector3 targetPos = cardPos + moveDir * distance;
56            transform.position = targetPos;
57        }
58    }
59
60    void Update() {
61        if(dragging) {
62            OnMouseDrag();
63        }
64    }
65
66    void OnGUI() {
67        if(dragging) {
68            Vector3 mousePos = Input.mousePosition;
69            Vector3 cardPos = transform.position;
70            Vector3 diff = mousePos - cardPos;
71            Vector3 moveDir = Vector3.Normalize(diff);
72            float distance = Vector3.Distance(mousePos, cardPos);
73            Vector3 targetPos = cardPos + moveDir * distance;
74            transform.position = targetPos;
75        }
76    }
77}
```

Integrисано  
развојно окружење

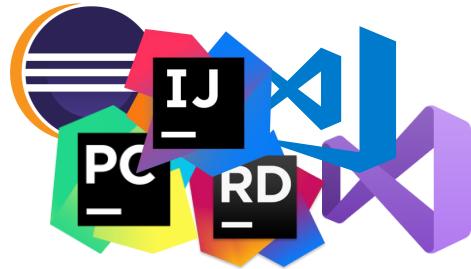
Editor koda

Dibager

*Case Study: Visual Studio*

*Debugging tehnike*

# Alati amplifikuju tvoju veštinu



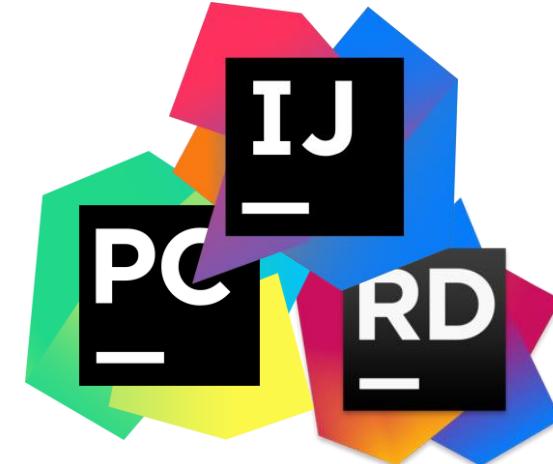
# *Integrated Development Environment*



Aplikacija koja nudi zajednički interfejs raznim alatima za razvoj softvera

Cilj – Povećati produktivnost razvoja

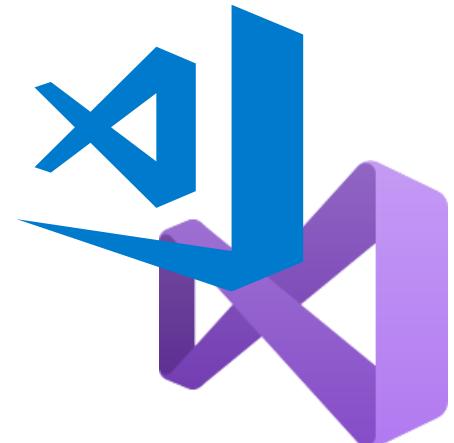
- ❖ Skup iskonfigurisanih alata
- ❖ Skup integrisanih alata
- ❖ Podrška za proširivanje skupa alata



Editor koda

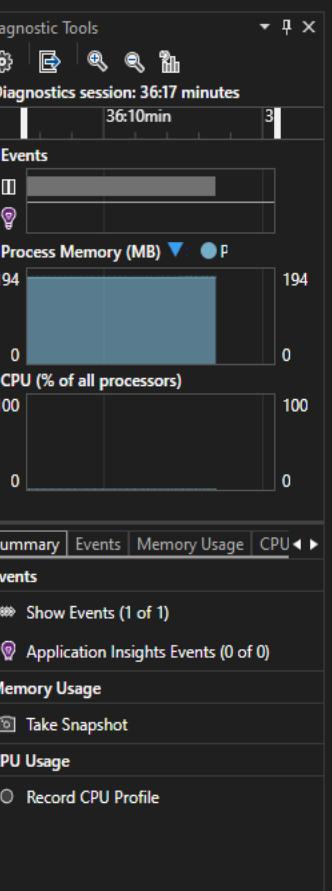
*Debugger*

Vankoderske aktivnosti



```
KnowledgeProfile.cs  InstructionController.cs  x
Tutor.Web.Controllers.Instructors.Authoring.InstructionController  GetForKc(int kcId)
25
26     [HttpGet]
27     public ActionResult<List<InstructionalItemDto>> GetForKc(int kcId)  kcId = -99
28     {
29         var result = _instructionService.GetForKc(kcId, User.InstructorId());
30         if (result.IsFailed) return _CreateErrorResponse(result.Errors);
31         return _Ok(result.Value.Select(_mapper.Map<InstructionalItemDto>).ToList());
32     }
33
34     [HttpPost]
35     public ActionResult<InstructionalItemDto> Create([FromBody] InstructionalItemDto instructionalItem)
36     {
37         var result = _instructionService.Create(instruction: _mapper.Map<InstructionalItem>(instructionalItem), User.InstructorId());
38         if (result.IsFailed) return _CreateErrorResponse(result.Errors);
39         return _Ok(_mapper.Map<InstructionalItemDto>(result.Value));
40     }
41
42     [HttpPut(template: "{id:int}")]
43     public ActionResult<InstructionalItemDto> Update([FromBody] InstructionalItemDto instructionalItem)
44     {
45         var result = _instructionService.Update(instruction: _mapper.Map<InstructionalItem>(instructionalItem), User.InstructorId());
46         if (result.IsFailed) return _CreateErrorResponse(result.Errors);
47         return _Ok(_mapper.Map<InstructionalItemDto>(result.Value));
48     }

```



Autos			
Search		Search Depth:	3
Name	Value	Type	
User	[System.Security.Claims.ClaimsPrincipal]	System.Security.Clai...	
_instructionService	{Tutor.Core.UseCases.Management.Knowledge.InstructionService}	Tutor.Core.UseCases....	
kcld	-99	int	
result	{Result: IsSuccess='True', Value='System.Collections.Generic.List`1[Tutu...}	FluentResults.Result...	
result.IsFailed	false	bool	
this	{Tutor.Web.Controllers.Instructors.Authoring.InstructionController}	Tutor.Web.Controller...	

```
Developer PowerShell -> git pull https://github.com/Clean-CaDET/tutor.git
  % Total    % Compressed   Delta Compression using up to 16 threads
  0          0             0
  100       100           100
  compressing objects: 100% (74/74), done.
  writing objects: 100% (76/76), 12.99 KiB | 1.18 MiB/s, done.
  total 76 (delta 45), reused 0 (delta 0), pack-reused 0
  note: Resolving deltas: 100% (45/45), completed with 27 local objects.
  https://github.com/Clean-CaDET/tutor.git
  fef8ce2..cb11327 redesign/services -> redesign/services
  C:\Users\lubur\Documents\Fakultet\!PROJEKTI\2020-2022 Clean CaDET\PLATFORM\tutor> git pull
  origin https://github.com/Clean-CaDET/tutor
  fef8ce2..cb11327 redesign/services -> origin/redesign/services
  ready up to date.
  C:\Users\lubur\Documents\Fakultet\!PROJEKTI\2020-2022 Clean CaDET\PLATFORM\tutor>
```

# Editor koda

šta se vidi u  
odnosu na  
notepad?

*syntax  
highlighting*

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

*error:  
not defined*

*warning:  
not read*

*warning:  
not needed*

*warning:  
misspelling*

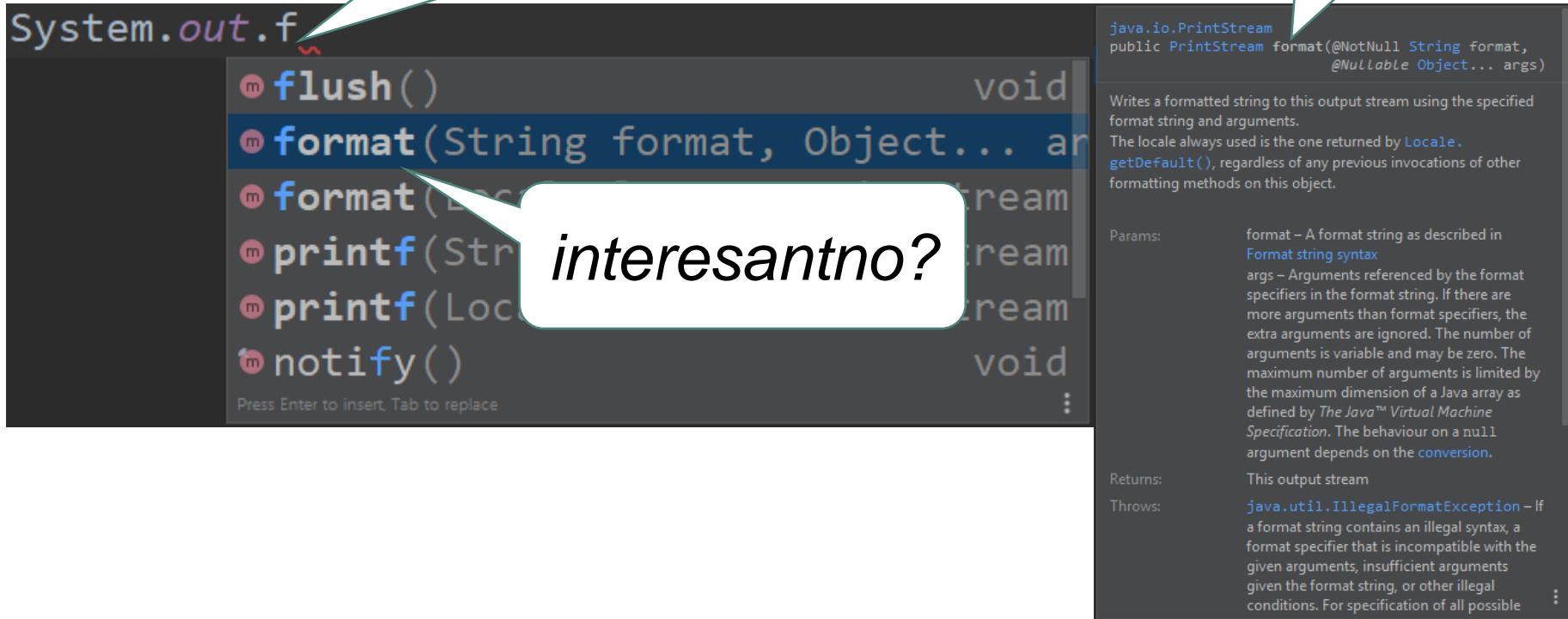
*parameter  
name hints*

***Alt+Enter*** kod problema

# Editor koda

radi i na selektovan  
element u kodu

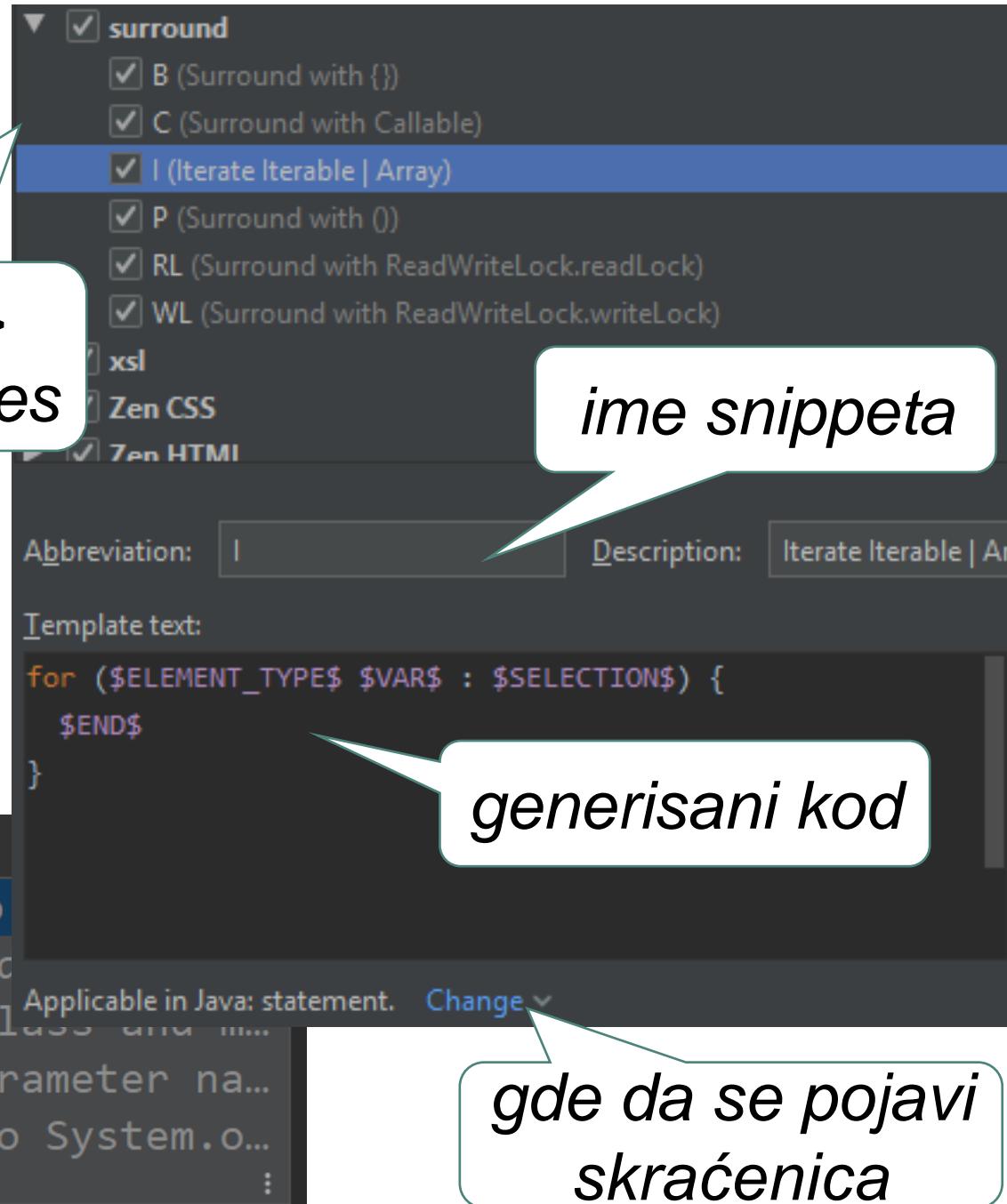
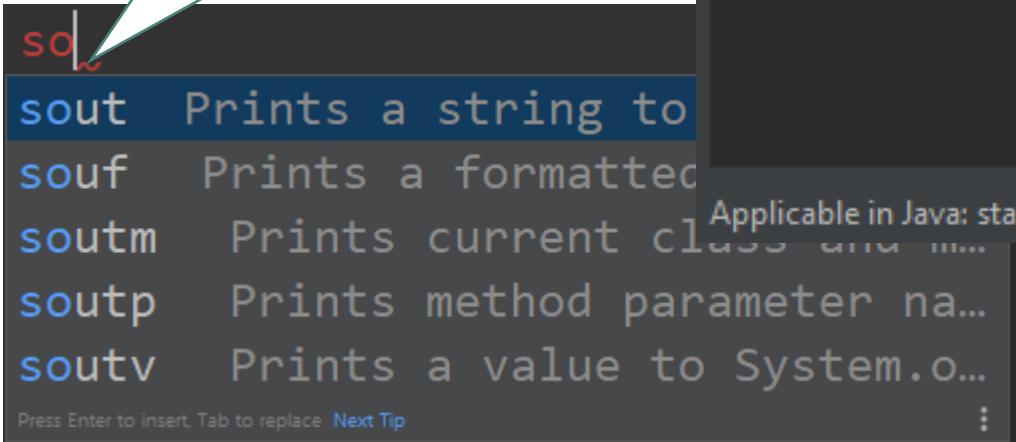
**Ctrl+Space**  
*code completion*



# Editor koda

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

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



*generisani kod  
gde da se pojavi  
skraćenica*

# Editor koda

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

```
OrderPriceCalculator.java
import java.util.List;
public class OrderPriceCalculator {
    public Double calculateTotalOrderPrice(List<OrderItem> orders) {
        Double sum = 0.0;
        for (OrderItem o : orders) {
            sum += calculateOrderItemPrice(o);
        }
        sum = applyDiscount(sum);
        return sum;
    }
    private Double applyDiscount(Double sum) {
        if(sum > 1000) {
            sum *= 0.9;
        }
    }
}
Test.java
```

```
OrderItem.java
public class OrderItem {
    String name;
    String quantityType;
    Double quantityAmount;
    public OrderItem(String name, String quantityType, Double quantityAmount) {
        this.name = name;
        this.quantityType = quantityType;
        this.quantityAmount = quantityAmount;
    }
}
```

**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?

The screenshot shows a code editor with a search dialog open at the top. The search term 'est' is entered in the search field. Below the search bar, there are several filter options: 'Match case', 'Words', 'Regex?', 'File mask: \*.java', and a dropdown menu for 'Scope'. The dropdown menu is currently set to 'Anywhere' (which is highlighted in blue). Other options in the dropdown include 'In Comments', 'In String Literals', 'Except Comments', 'Except String Literals', and 'Except Comments and String Literals'. The main code editor area displays a Java file named 'Test.java' with the following content:

```
public class Test{  
    System.out.println("1. Test 1");  
    System.out.println("2. Test 2");  
    System.out.println("3. Test 3");  
    System.out.println("4. Test 4");  
  
    Test.java src  
    1 import java.util.ArrayList;  
    2 import java.util.List;  
    3 import java.util.Scanner;  
    4  
    5 public class Test {  
    6     public static void main(String[] args) {  
    7         List<OrderItem> orders = createOrders();  
    8         OrderPriceCalculator opc = new OrderPriceCalculator();  
    9         Double totalPrice = opc.calculateTotalOrderPrice(orders);  
   10         System.out.printf("The total price is: %s", totalPrice);  
   11     }  
   12 }
```

At the bottom of the search dialog, there are two buttons: 'Ctrl+Enter' and 'Open in Find Window'.



# Postani vešt sa svojim IDE-om

Domaći: Nauči da vršiš sledeće akcije bez miša:

Move and make selections by word, line, paragraph

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

Comment and uncomment blocks of code with a single command

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

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

*programiraj 7  
dana bez miša*

*zar ne dolazi  
vremenom?*

Reindent code following changes; Undo and redo changes

Navigate to a particular line number; Sort selected lines

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

9/9

0800 Antran started  
 1000 stopped - antran ✓  
 1300 (03) MP-MC 2.130476415 (03) 4.615925059 (-)  
 033 PRO-2 2.130476415  
 const 2.130476415  
 Relays 6-2 on 033 failed special speed test  
 in relay 10.000 test.  
 Relays changed

1100 Started Cosine Tape (Sine check)  
1525 Started Multi Adder Test.

1545

Relay #70 Panel F  
(motor) in relay.

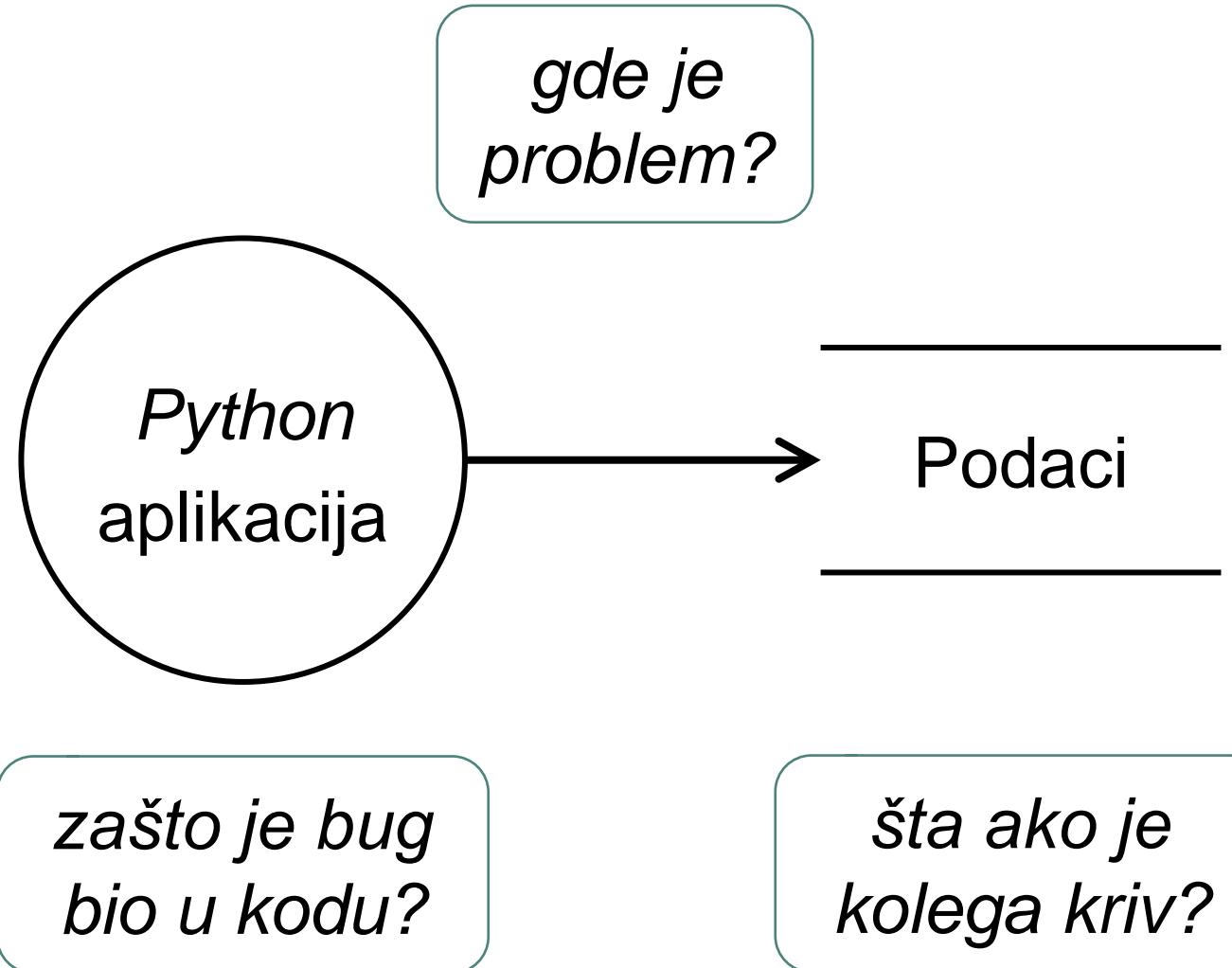
First actual case of bug being found.  
~~163~~ Two antennal stalks.

163/60 instant started.

1700 closed down.

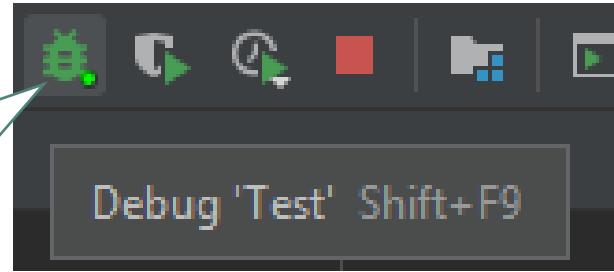
0830	Started main Registration
11:15	Started M.
1245	Started 6
1300	Stopped on Second Adder trouble (coincidental?) in column n failed occas a flow trouble Can't d head Stopped on Sum d
14.35	Sum d 2 instead of adder from t Cont o.k.
1630	Trouble at 5-6. Below shim. Repl

# Rešavanje *bug-a* je puzla



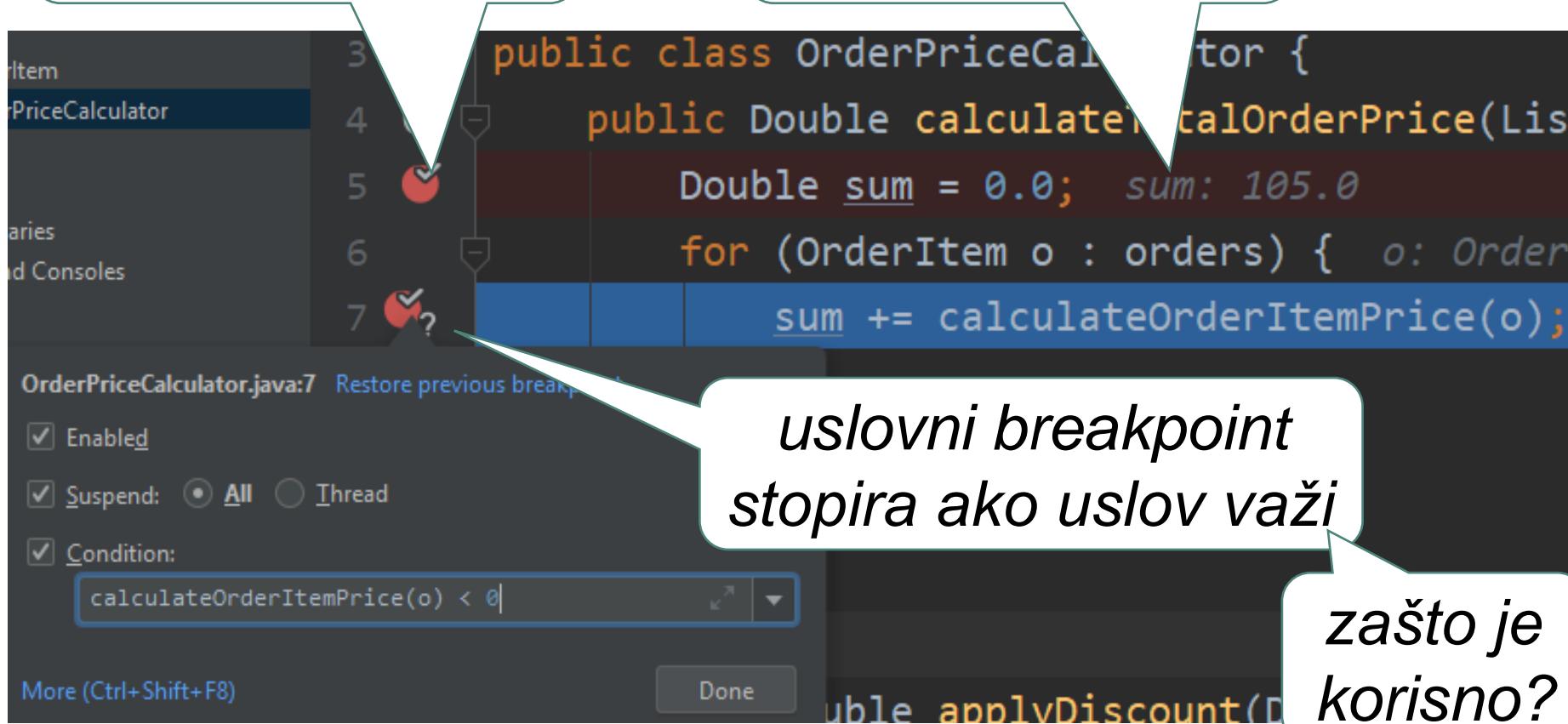
# Debugger

*vrši program u  
debag režimu*



*debag zastaje na  
breakpoint-ima*

*debag prikazuje  
aktivne vrednosti*



OrderItem  
OrderPriceCalculator  
OrderCalculator  
OrderCalculator

```
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);  
        }  
        return sum;  
    }  
}
```

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

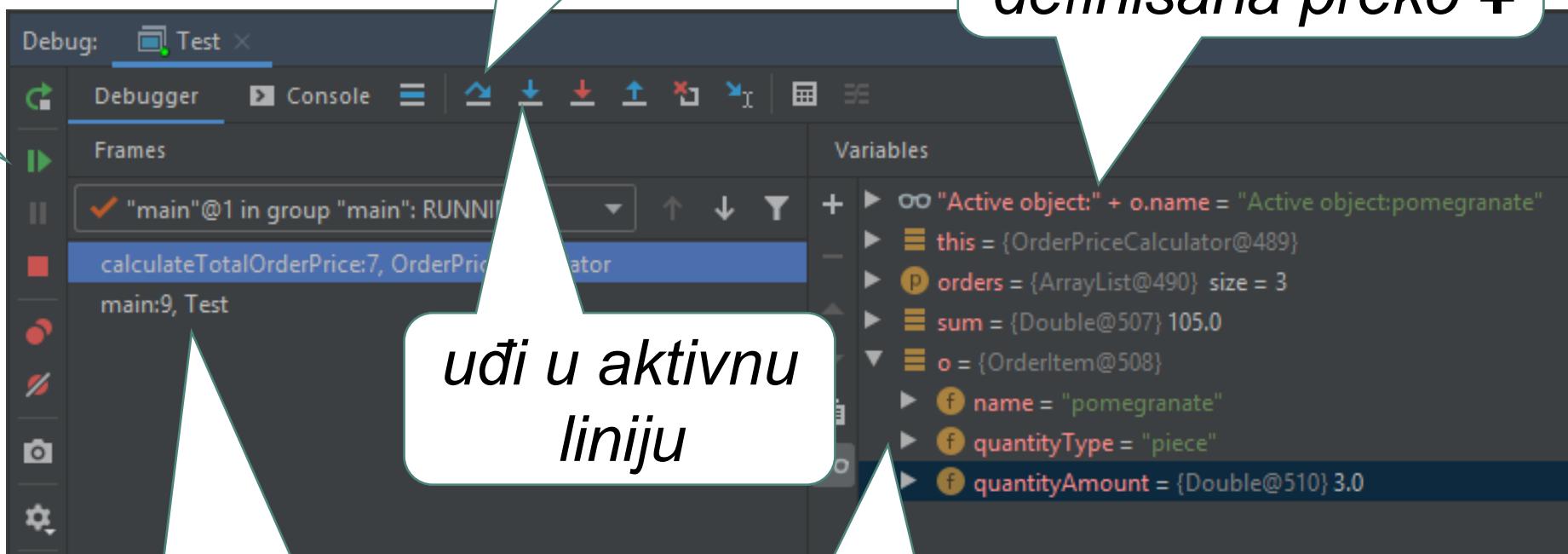
skoči na  
narednu liniju

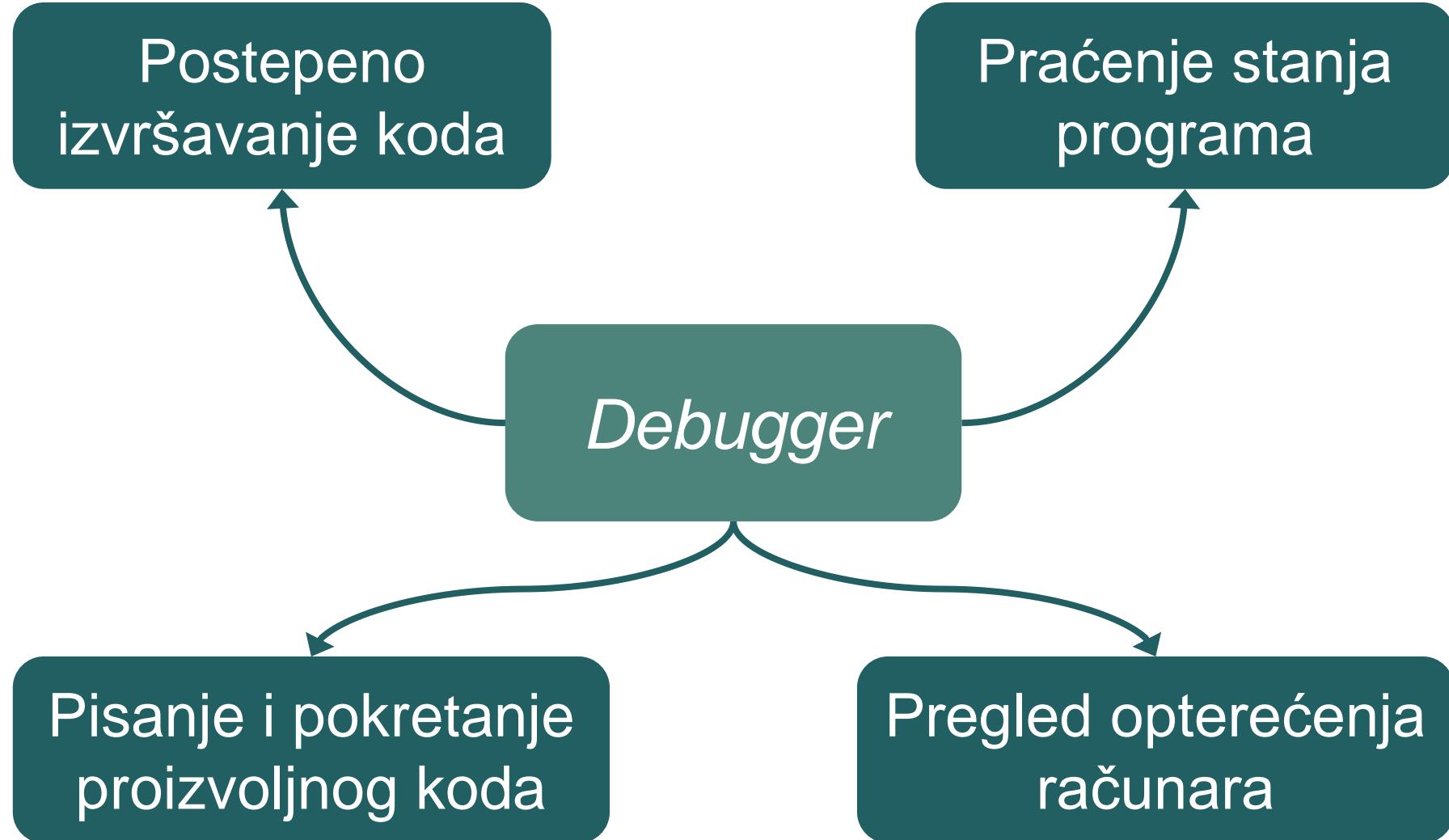
promenljiva  
definisana preko +

uđi u aktivnu  
liniju

stanje funkcija koje  
su pozvale aktuelnu

aktivne vrednosti  
u promenljivama





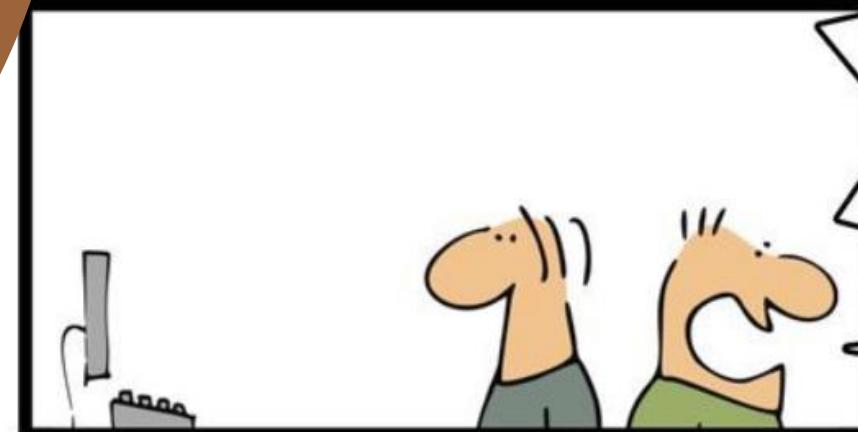
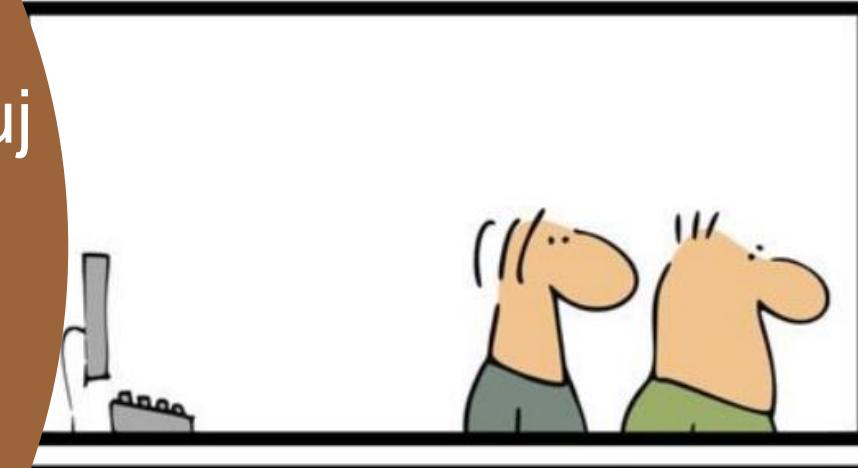
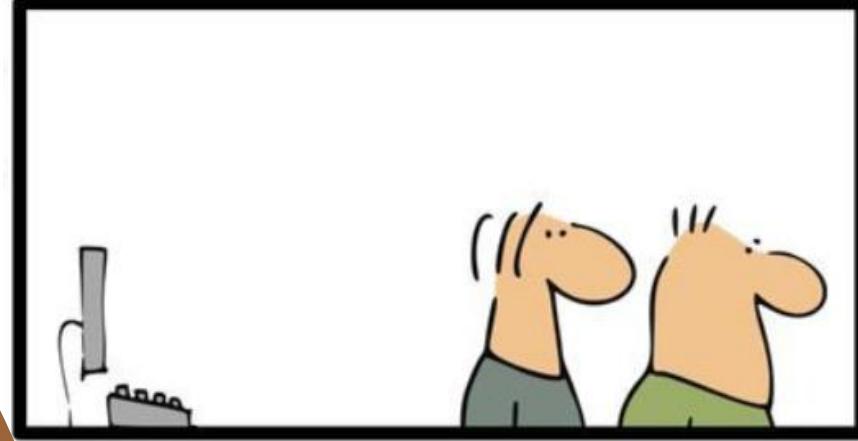
# Debugging

tehnike

Reprodukuj  
bug

Čitaj poruku  
greške

Upotrebi  
debugger

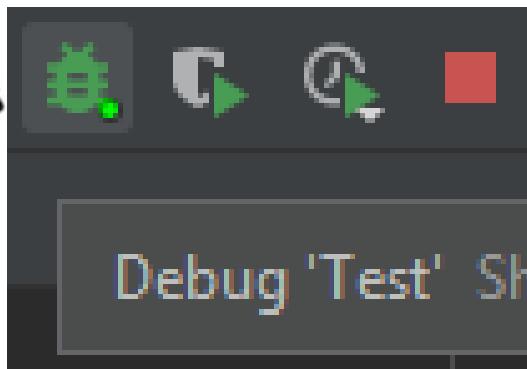


HOW TO DEBUG HEISENBUGS

Stack Trace Explorer

Stack Trace X Stack Trace X

```
at
Microsoft.CodeAnalysis.CSharp.CSharpCompilation.GetSemanticModel(SyntaxTree syntaxTree, Boolean ignoreAccessibility)
at
Microsoft.CodeAnalysis.CSharp.CSharpCompilation.CommonGetSemanticModel(SyntaxTree syntaxTree, Boolean ignoreAccessibility)
at CodeNav.Mappers.SyntaxMapper.MapDocument(Document document) in C:\projects\codenav\CodeNav\Mappers\SyntaxMapper.cs:line 142
at CodeNav.Mappers.SyntaxMapper.MapDocument(Document activeDocument, CodeViewUserControl control, VisualStudioWorkspace workspace) in C:\projects\codenav\CodeNav\Mappers\SyntaxMapper.cs:line 78
```



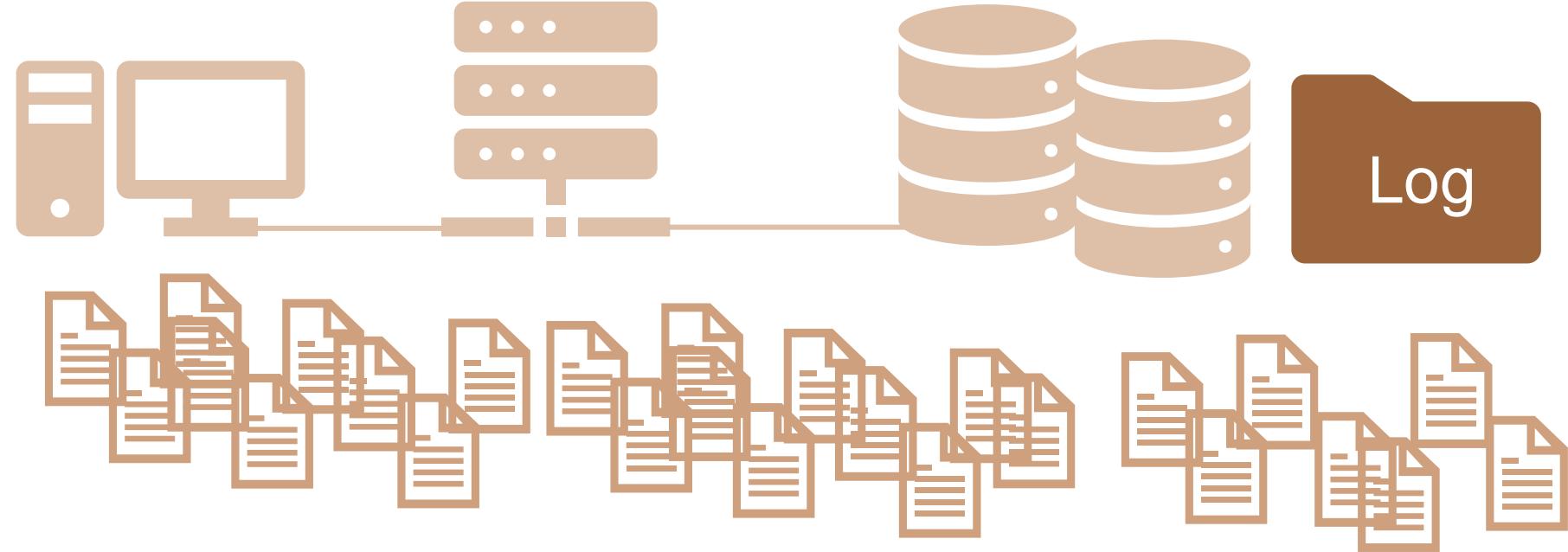
*Debugging*

tehnike

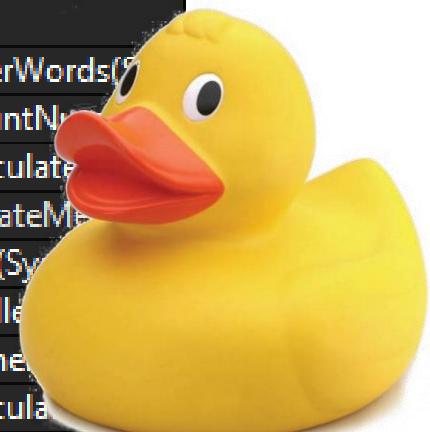
Loguj stanje

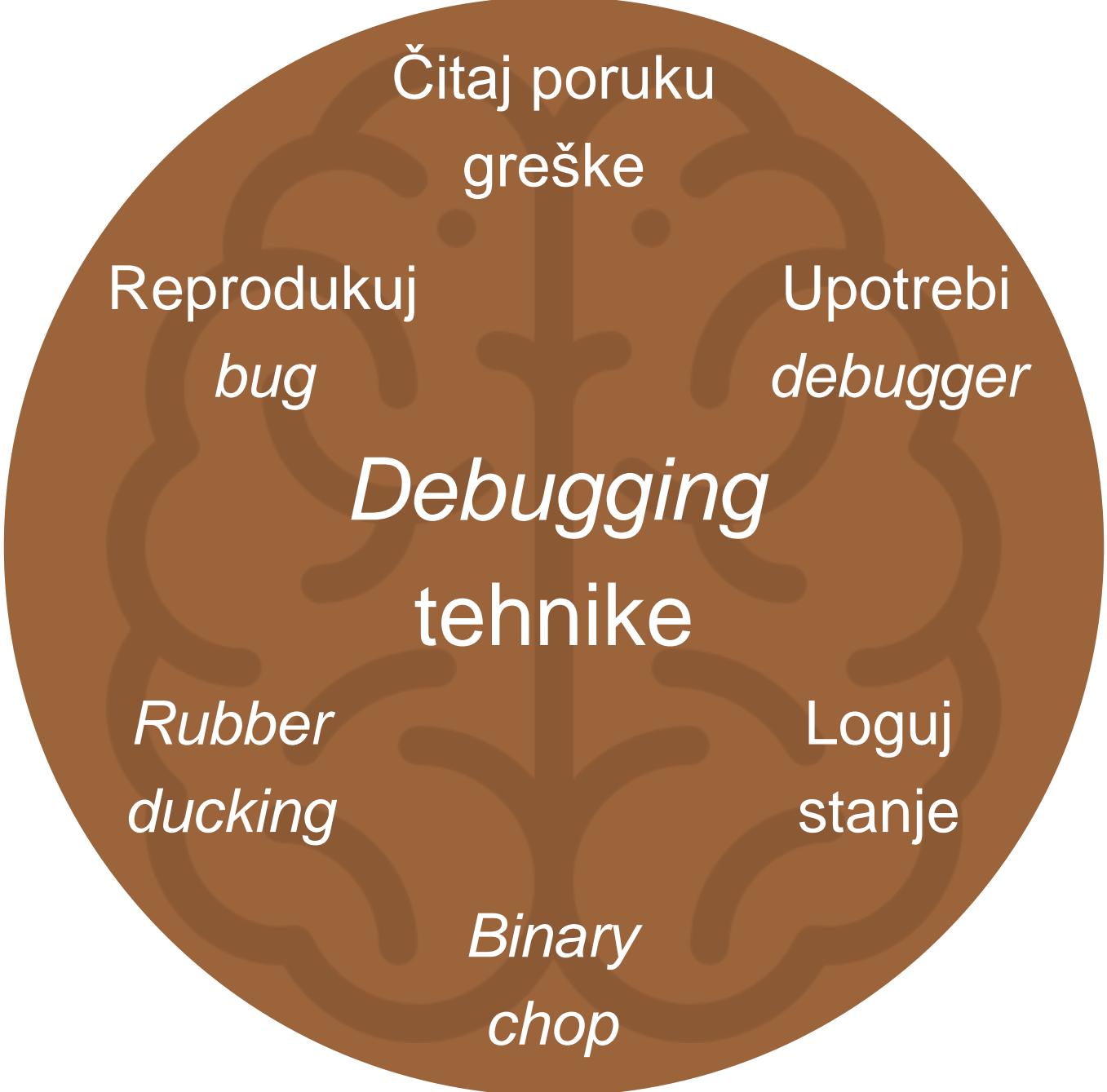
*Binary chop*

*Rubber ducking*



Call Stack	
	Name
➡	CodeModel.dll!CodeModel.CodeParsers.CSharp.CaDETMemberMetricCalculator.GetKeywords()
	CodeModel.dll!CodeModel.CodeParsers.CSharp.CaDETMemberMetricCalculator.FilterWords(A...)
	[External Code]
	CodeModel.dll!CodeModel.CodeParsers.CSharp.CaDETMemberMetricCalculator.FilterWords(7)
	CodeModel.dll!CodeModel.CodeParsers.CSharp.CaDETMemberMetricCalculator.CountNoun()
	CodeModel.dll!CodeModel.CodeParsers.CSharp.CaDETMemberMetricCalculator.CalculateMe...
➡	CodeModel.dll!CodeModel.CodeParsers.CSharp.CSharpCaDETMemberBuilder.CalculateMetrics()
	CodeModel.dll!CodeModel.CodeParsers.CSharp.CSharpCodeParser.CalculateMetrics(Sy...)
	CodeModel.dll!CodeModel.CodeParsers.CSharp.CSharpCodeParser.Parse(System.Collections...
	CodeModel.dll!CodeModel.CodeModelFactory.CreateProject(System.Collections.Genera...
	CodeModel.Tests.dll!CodeModel.Tests.Unit.CaDETMetrics.MetricCalculationTests.Calcul...
	[External Code]





Čitaj poruku  
greške

Reprodukuj  
*bug*

Upotrebi  
*debugger*

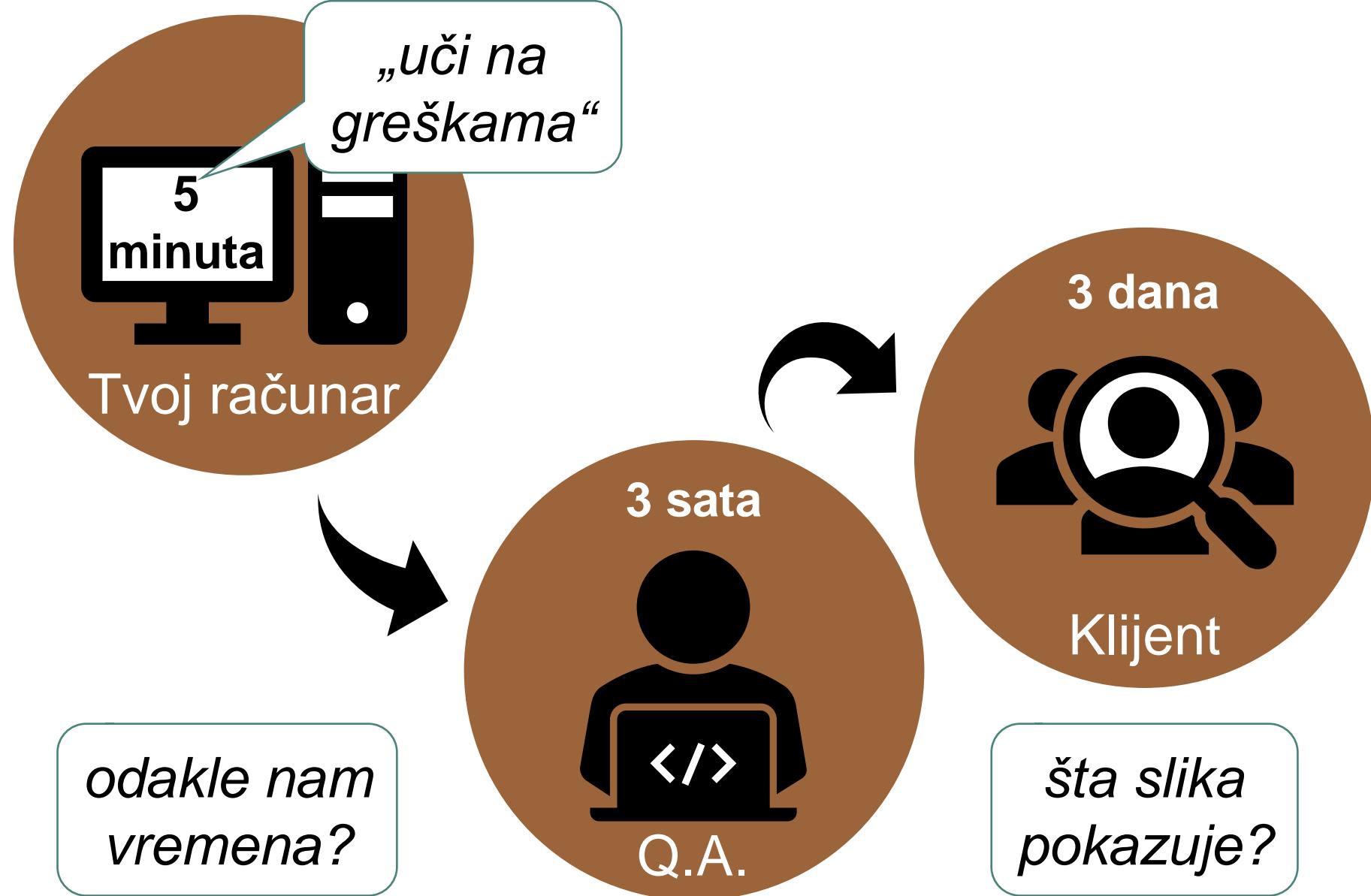
*Debugging*  
tehnike

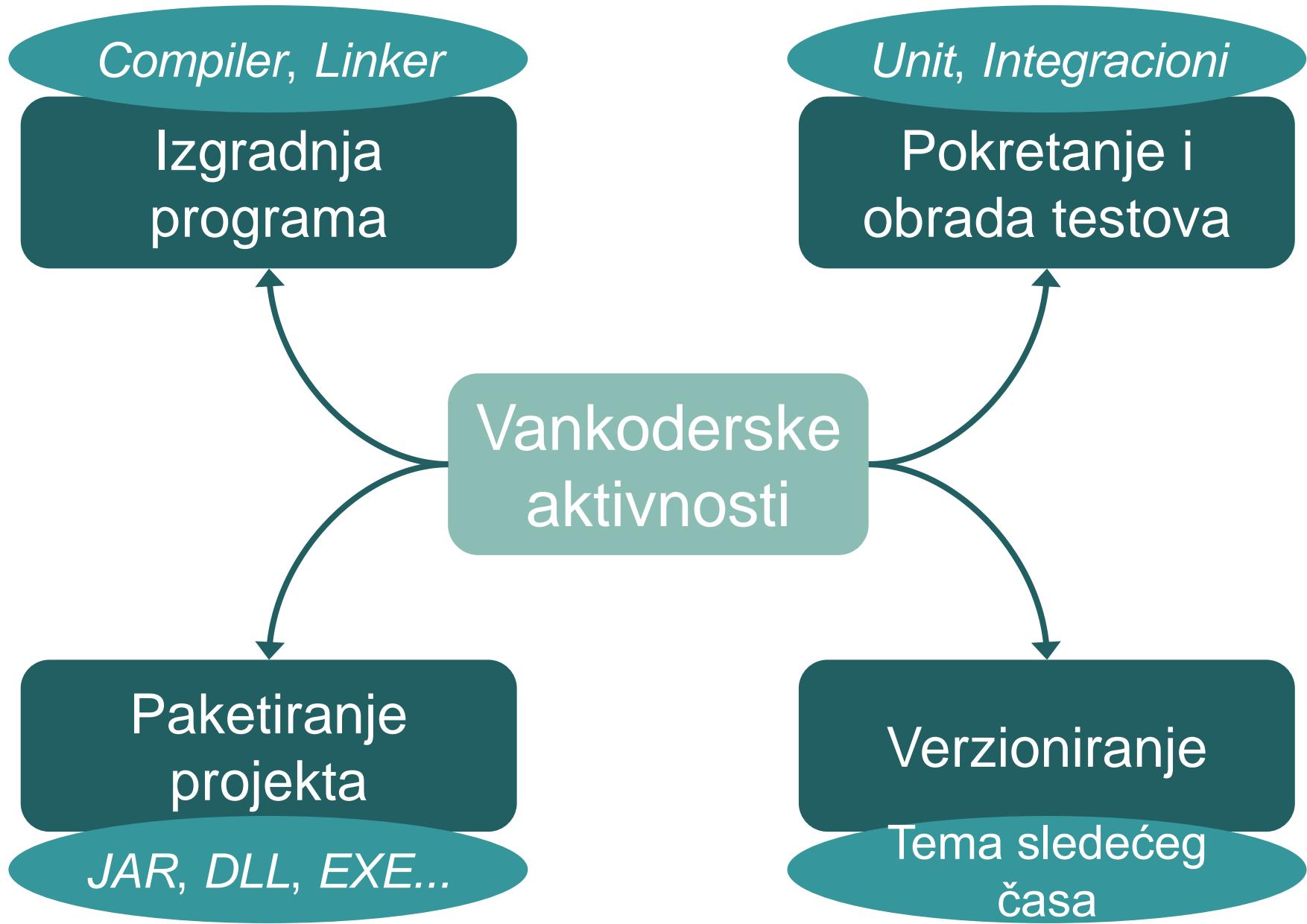
*Rubber  
ducking*

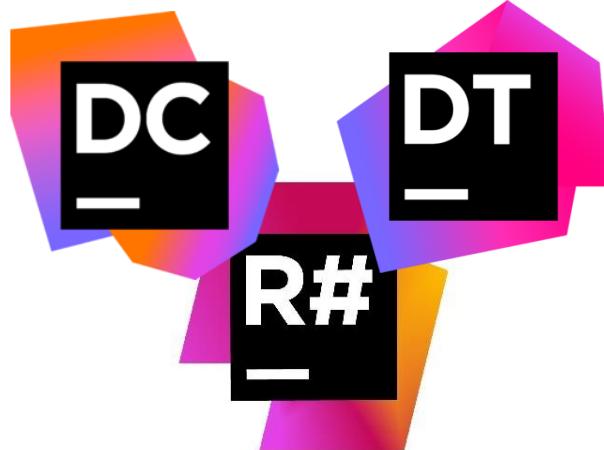
Loguj  
stanje

*Binary  
chop*

# Vreme rešavanja *bug-a* spram mesta pronađaska







Tema i sadržaj  
menija

Prikaz i  
položaj  
prozora

Prečice

## Personalizacija

Podrška za  
modifikaciju

Proširivanje

*Plugins*

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

Alati  
amplifikuju  
tvoju veštinu

*Pragmatic  
Programmer  
The Basic Tools*

