



# VERZIONIRANJE IZVORNOG KODA



# U slučaju požara



- ➊ 1. git commit
- ➋ 2. git push
- ➌ 3. napusti zgradu



[https://neoteric.eu/wp-content/uploads/2016/04/in\\_case\\_of\\_fire.png](https://neoteric.eu/wp-content/uploads/2016/04/in_case_of_fire.png)



# Sustavi za verzioniranje koda

## Definicije

**Skup alata koji imaju sposobnost praćenja različitih verzija izvornog koda**  
Jon Loeliger, Matthew McCullough (2012)

**Kategorija programskih alata koji pomažu razvojnim timovima praćenje promjena na kodu tijekom vremena**

<https://www.atlassian.com/git/tutorials/what-is-version-control>

## Varijacije na temu

**VCS: Version Control System**

**SCM: Source Code Manager**

**RCS: Revision Control System**

**Kalkulator -> Digitron | Sustav za verzioniranje koda -> Git**

Git is an Open Source project covered by the GNU General Public License version 2 (some parts of it are under different licenses, compatible with the GPLv2). It was originally written by Linus Torvalds with help of a group of hackers around the net.

<https://github.com/git/git>

# Povijest

**M.J. Rochkind. “The Source Code Control System”  
IEEE Transactions on Software Engineering 1(4) (1975): 364-370**



**Marc J. Rochkind** was born in Baltimore, Md., on June 12, 1948. He received the B.S.M.E. degree from the University of Maryland, College Park, and the M.S.M.E. degree from Rutgers University, New Brunswick, N.J., in 1970 and 1972, respectively.

Since 1970 he has been a member of the Technical Staff at Bell Laboratories, Murray Hill, N.J. He is currently engaged in the development of software systems for use by Bell Telephone companies.

**Walter F. Tichy. “RCS: A System from Version Control” Software Practice and Experience 15(7) (1985): 637-654**

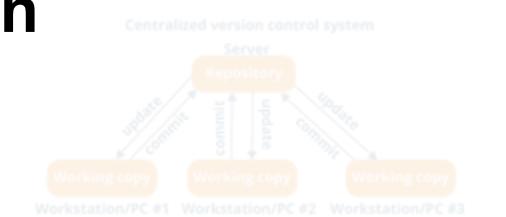
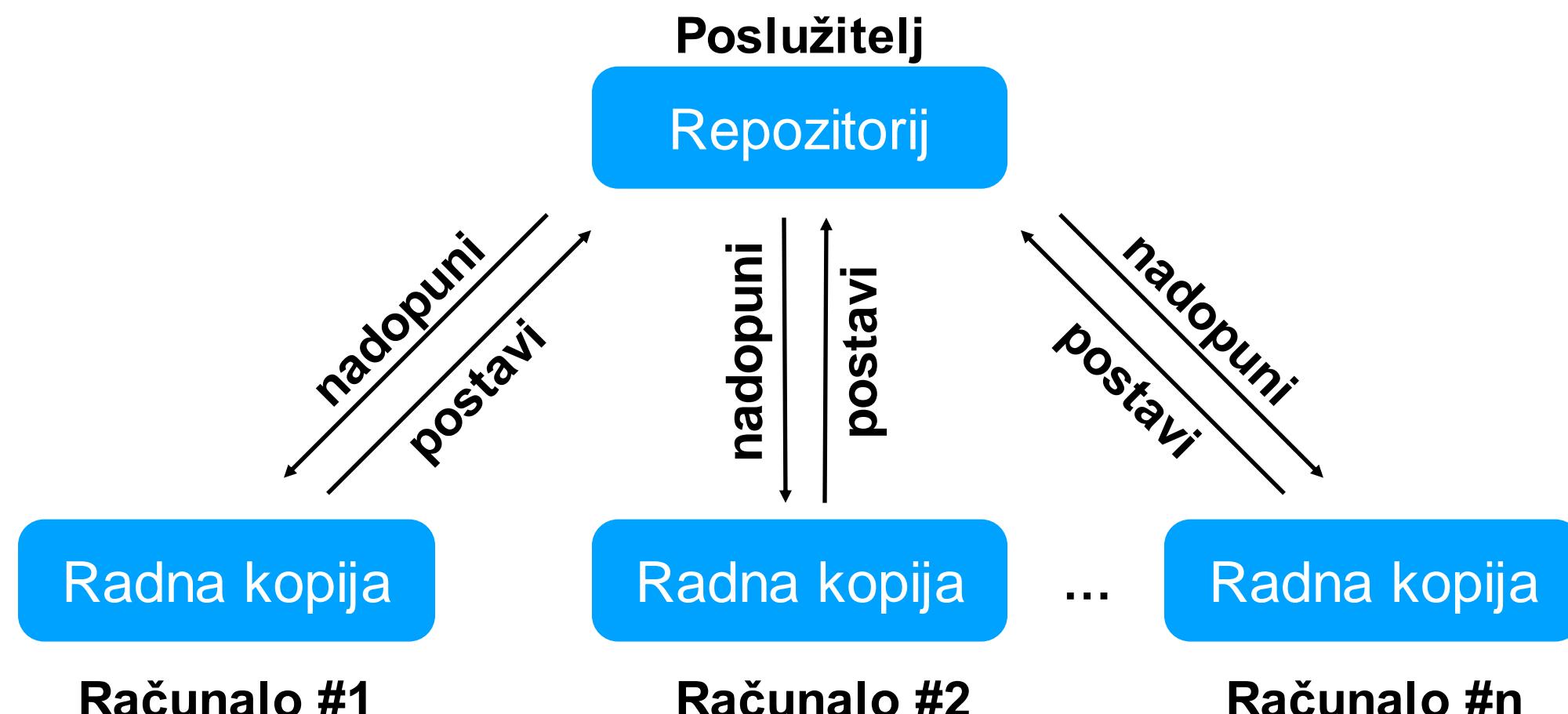
*Walter F. Tichy*

Department of Computer Sciences  
Purdue University  
West Lafayette, Indiana 47907

<http://www-public.imtbs-tsp.eu/~gibson/Teaching/Teaching-ReadingMaterial/Rochkind75.pdf>  
<http://www.gnu.org/software/rcs/tichy-paper.pdf>

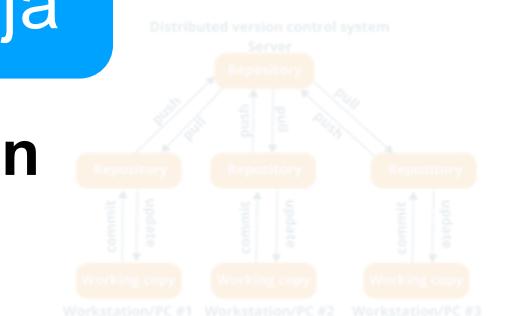
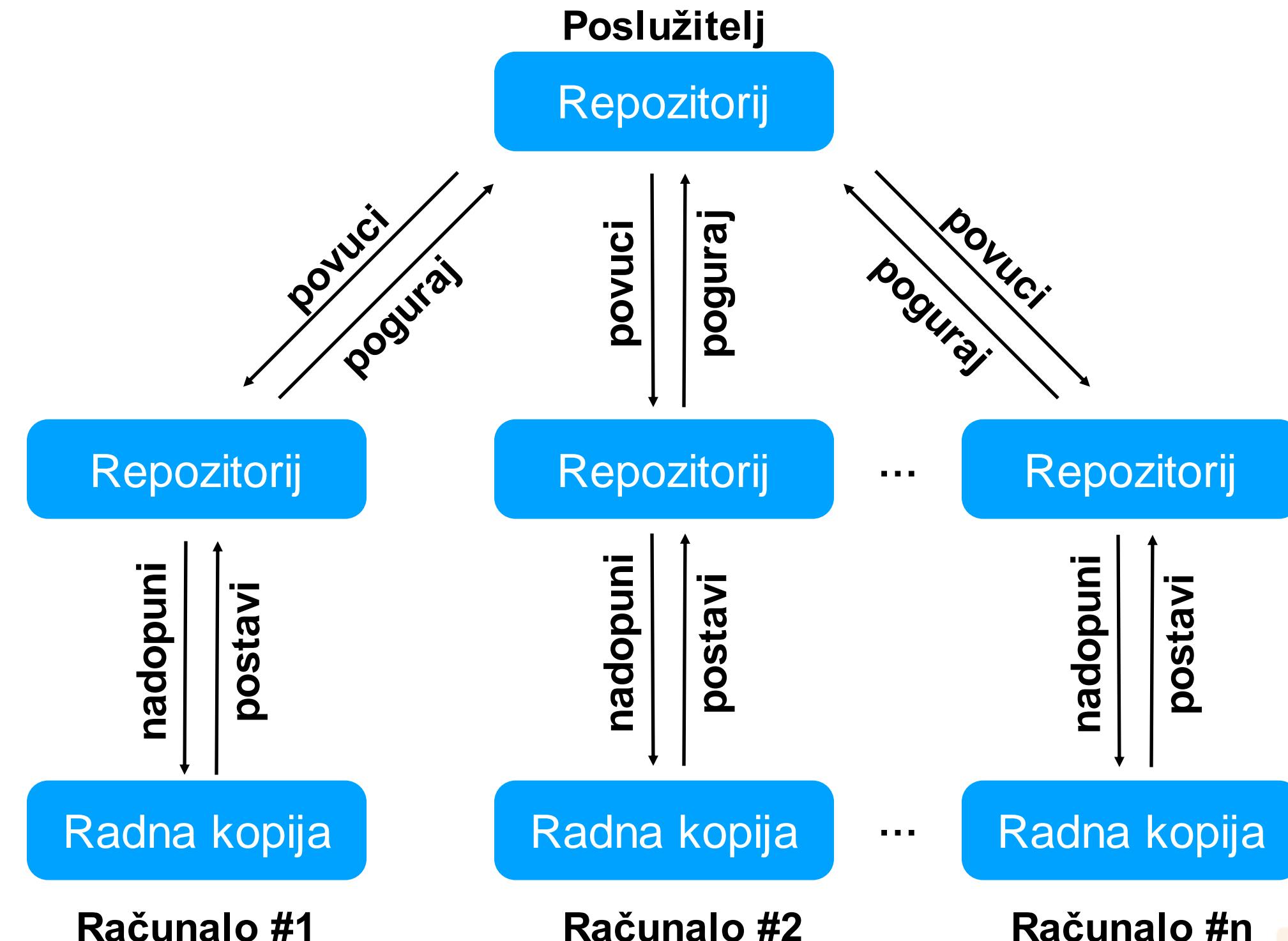
# Vrste sustava za verzioniranje izvornog koda

## Centralizirani sustav



<https://d1jnx9ba8s6j9r.cloudfront.net/blog/wp-content/uploads/2016/11/Centralized-Version-Control-System-Workflow-What-Is-Git-Edureka.png>

# Distribuirani sustav



<https://d1jnx9ba8s6j9r.cloudfront.net/blog/wp-content/uploads/2016/11/Distributed-Version-Control-System-Workflow-What-Is-Git-Edureka-768x508.png>



# Sustavi za verzioniranje koda

- PVCS Version Manager (1985)
- CVS (1986)
- IBM Relational ClearCase (1986)
- SourceSave (1991)
- CMVC (1994)
- Microsoft Delta (1994)
- Borland StarTeam (1995)
- Perforce (1995)
- Sun Workshop TeamWare (1996)
- BitKeeper (1998)
- CVSNT (1998)
- BitKeeper (2000)
- Subversion (2000)
- GNU Arch (2001)
- AcuRev (2002)
- Darcs (2002)
- DCVS (2002)
- Monotone (2003)
- SVK (2003)
- SourceGear Valt (2003)
- mercurial (2005)
- Microsoft TFVC (2005)
- git (2005)
- Fossil (2006)
- Bazaar (2007)

The screenshot shows a list of 20 different source code management tools, each with a small icon, name, developer, rating, and a brief description. The tools listed are: Git, Team Foundation Server, FundView Permits, Apache Subversion, IBM Rational ClearCase, CA Harvest SCM, SourceAnywhere, SourceGear Vault, Mercurial, BitKeeper, Kallithea, Plastic SCM, and RhodeCode.

Tool	Developer	Rating	Description
Git	by Git	★★★★★ (36 reviews)	Distributed source control system that helps software developers to track and manage multiple revisions of the same project. <a href="#">Learn more about Git</a>
Team Foundation Server	by Microsoft	★★★★★ (26 reviews)	Store and share code, capture and track work, and automate CI processes with these collaboration tools for software development teams. <a href="#">Learn more about Team Foundation Server</a>
FundView Permits	by Fund Accounting Solution Technologies	★★★★★ (19 reviews)	FundView Permits streamlines the permitting process with simplified tools. <a href="#">Learn more about FundView Permits</a>
Apache Subversion	by Apache Software Foundation	★★★★★ (2 reviews)	Open-source revision control system that provides interactive conflict resolution, merge tracking, file locking, and more. <a href="#">Learn more about Apache Subversion</a>
IBM Rational ClearCase	by IBM	★★★★★ (2 reviews)	Configuration management solution designed to track changes and control access to enterprise software assets. <a href="#">Learn more about IBM Rational ClearCase</a>
CA Harvest SCM	by CA Technologies	★★★★★ (1 review)	Software change management solution for development teams to simplify change merging and review, source code versioning, and more. <a href="#">Learn more about CA Harvest SCM</a>
SourceAnywhere	by Dynamsoft	★★★★★ (1 review)	This software allows multiple users to work on code from many operating systems. It is simple and secure. <a href="#">Learn more about SourceAnywhere</a>
SourceGear Vault	by SourceGear	★★★★★ (1 review)	Bug tracking and source control software that automates code versioning, build management, work item tracking, and more. <a href="#">Learn more about SourceGear Vault</a>
Mercurial	by Mercurial	★★★★★ (1 review)	Distributed revision control tool with advanced committing, merging, and branching capabilities for software developers. <a href="#">Learn more about Mercurial</a>
BitKeeper	by BitKeeper	★★★★★ (0 reviews)	Distributed SCM system with simple-to-use command line interface and auto-merging capability for projects of any size. <a href="#">Learn more about BitKeeper</a>
Kallithea	by Kallithea	★★★★★ (0 reviews)	Source code management solution that includes web editor, code review, access management, and issue tracking capabilities. <a href="#">Learn more about Kallithea</a>
Plastic SCM	by Codice Software	★★★★★ (0 reviews)	Distributed version control solution that comes with GUI, built-in semantic diffs, branching and merging for big projects. <a href="#">Learn more about Plastic SCM</a>
RhodeCode	by RhodeCode	★★★★★ (0 reviews)	...

<https://www.capterra.com/source-code-management-software/>



# CVS

**“CVS started out as a bunch of shell scripts written by Dick Grune, posted to the newsgroup comp.sources.unix in the volume 6 release of July, 1986.”**

**05. prosinca 2000 via  
web.archive.org**

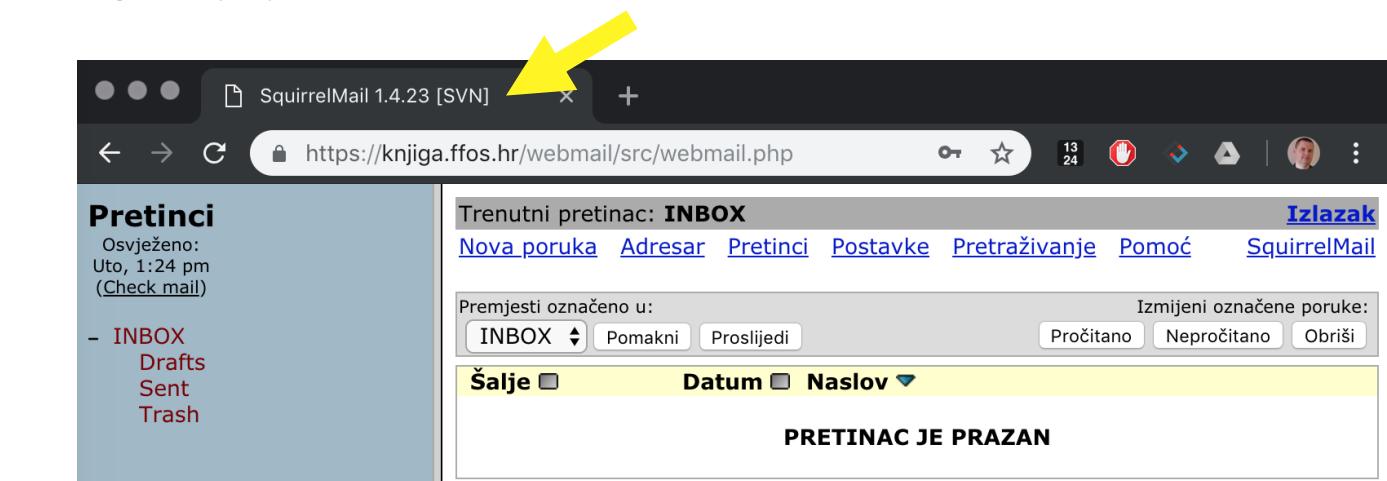
The screenshot shows the CVS homepage with a dark blue header featuring the text "Concurrent Versions System" and "The open standard for version control". Below the header is a navigation bar with links to Home, Docs, Downloads, Development, and Communication. A sidebar on the left contains links for Key Links, CVS Manual, All CVS Platforms (with sub-links for CVS for LINUX and CVS for Windows), CVS Add-Ons, CVS Links, Site Map, and Site Search. The main content area is titled "CVS Home" and describes CVS as an open-source version control system. It highlights its client-server access method, unreserved check-out model, and availability on most platforms. A "Click here if you're new to CVS" button with a CVS logo is present. The footer includes a note about CVShome.org being sponsored by OpenAvenue and a link to the OASIS logo.

**Centralizirani sustav**

# Apache™ Subversion®

**“Subversion is an open source version control system. Founded in 2000 by CollabNet, Inc.”**

<https://subversion.apache.org/>



**Centralizirani sustav**



# mercurial

**“Mercurial is a free, distributed source control management tool.  
It efficiently handles projects of any size and offers an easy and intuitive interface.”**

<https://www.mercurial-scm.org/>

The screenshot shows the official Mercurial website at https://www.mercurial-scm.org/. The header includes the Mercurial logo, navigation links for About, Guide, Download, Extensions, and News/Wiki, and a search bar. The main slogan "Work easier Work faster" is displayed above a description of Mercurial as a free, distributed source control management tool. A prominent blue "Download now" button for "Mercurial 4.8" is visible. Below the download button, there's a section for "Another OS?" with links for Mac OS X, Windows, and other operating systems. The page also features sections for "How you can benefit from Mercurial" (fast and powerful, easy to learn) and "Quick Start" (Clone a project and push changes, Create a project and commit).

## Distribuirani sustav



# git

**“Git is a free and open source distributed version control system designed to handle everything from small to very large projects with speed and efficiency.”**

<https://git-scm.com/>

The screenshot shows the official Git website at <https://git-scm.com/>. The page features a large central image illustrating a distributed version control system with multiple interconnected nodes. Below the image, a prominent callout box highlights the latest source release, "2.19.1". To the left, there are several navigation links: "About" (with a gear icon), "Documentation" (with a book icon), "Downloads" (with a download arrow icon), and "Community" (with a speech bubble icon). At the bottom left, a thumbnail image of the book "Pro Git" by Scott Chacon and Ben Straub is displayed. The footer contains links for "Mac GUIs", "Tarballs", "Windows Build", and "Source Code".

## Distribuirani sustav



## Timeline

With the stage set, a bit of external impetus, and a dire VCS crisis imminent, **Git** sprang to life in April 2005.

**Git** became self-hosted on April 7 with this commit:

```
commit e83c5163316f89bfbde7d9ab23ca2e25604af29
Author: Linus Torvalds <torvalds@ppc970.osdl.org>
Date: Thu Apr 7 15:13:13 2005 -0700
```

Initial revision of "git", the information manager from hell

Shortly thereafter, the first Linux commit was made:

```
commit 1da177e4c3f41524e886b7f1b8a0c1fc7321cac2
Author: Linus Torvalds <torvalds@ppc970.osdl.org>
Date: Sat Apr 16 15:20:36 2005 -0700
```

Linux-2.6.12-rc2

Initial **git** repository build. I'm not bothering with the full history, even though we have it. We can create a separate "historical" **git** archive of that later if we want to, and in the meantime it's about 3.2GB when imported into **git** - space that would just make the early **git** days unnecessarily complicated, when we don't have a lot of good infrastructure for it.

Let it rip!

That one commit introduced the bulk of the entire Linux Kernel into a **Git** repository.<sup>4</sup> It consisted of

17291 files changed, 6718755 insertions(+), 0 deletions(-)

# git

## What's in a Name?

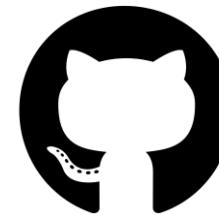
Linus himself rationalizes the name "**Git**" by claiming "I'm an egotistical bastard, and I name all my projects after myself. First Linux, now **git**."<sup>5</sup> Granted, the name "Linux" for the kernel was sort of a hybrid of Linus and Minix. The irony of using a British term for a silly or worthless person was not missed, either.

Since then, others had suggested some alternative and perhaps more palatable interpretations: the Global Information Tracker seems to be the most popular.

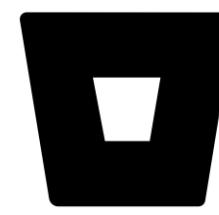
[https://books.google.hr/books?hl=hr&lr=&id=aM7-Oxo3qdQC&oi=fnd&pg=PR3&dq=git+version+control&ots=39xeHJVgpg&sig=i3-cy22axQs1H3u94q8lqWyi8\\_Y&redir\\_esc=y#v=onepage&q=git%20version%20control&f=false](https://books.google.hr/books?hl=hr&lr=&id=aM7-Oxo3qdQC&oi=fnd&pg=PR3&dq=git+version+control&ots=39xeHJVgpg&sig=i3-cy22axQs1H3u94q8lqWyi8_Y&redir_esc=y#v=onepage&q=git%20version%20control&f=false)



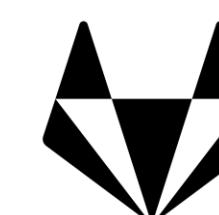
# git repozitoriji i klijenti



github

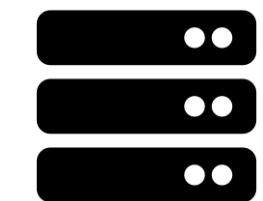


Bitbucket

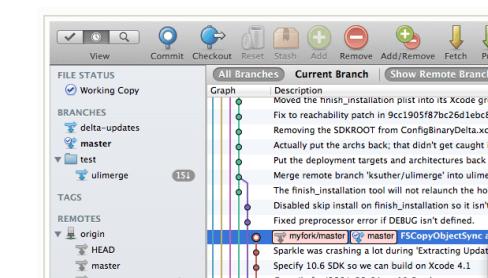
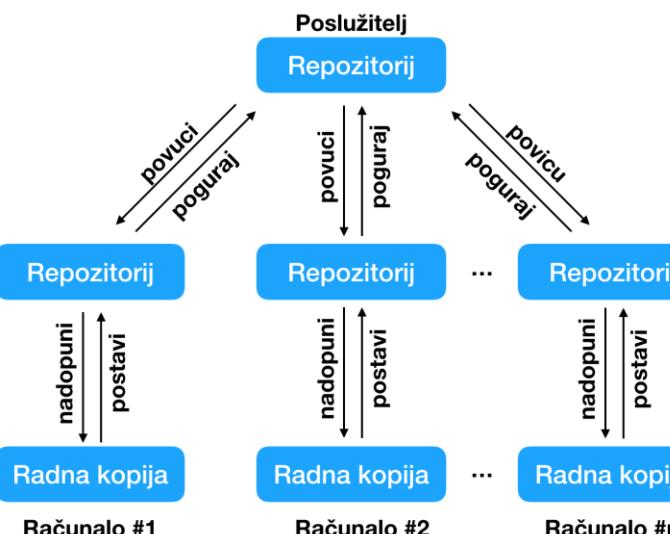


gitlab

...

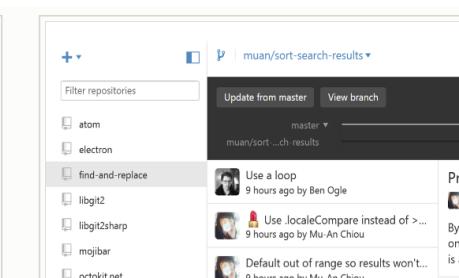


vlastiti repozitorij



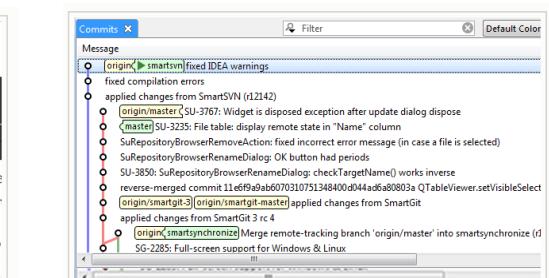
SourceTree

Platforms: Mac, Windows  
Price: Free  
License: Proprietary



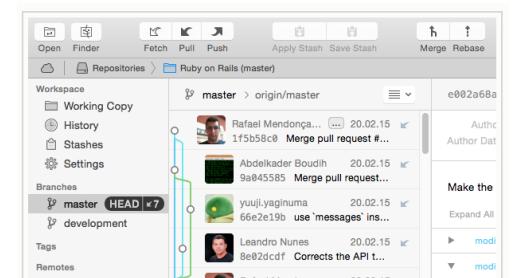
GitHub Desktop

Platforms: Mac, Windows  
Price: Free  
License: MIT



SmartGit

Platforms: Linux, Mac, Windows  
Price: \$79/user / Free for non-commercial use  
License: Proprietary



Tower

Platforms: Mac, Windows  
Price: \$79/user (Free 30 day trial)  
License: Proprietary

<https://git-scm.com/downloads/guis>



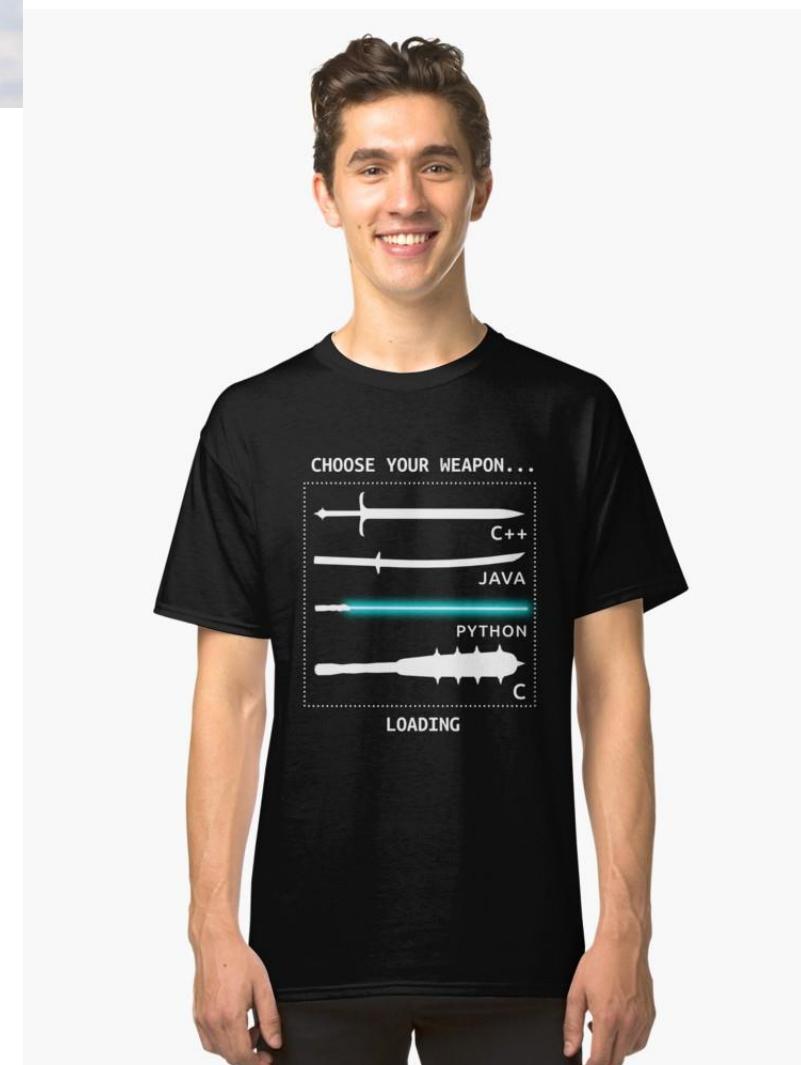
## Scenarij



**Marija**



**Ana**



**Zvonko**

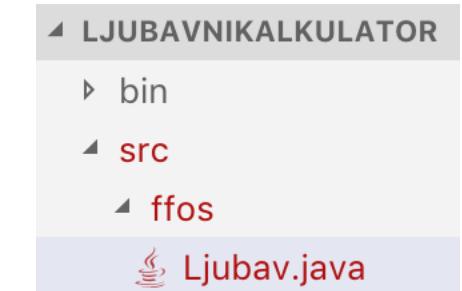


```
package ffos;

/**
 * <h1>Ljubavni kalkulator</h1>
 * Program rešenjem kalkulacija
 * pronađi najbolju osobu za tebe
 * @author Marija Zimska
 * @version 1.0
 * @since 2018-11-21
 */
public class Ljubav {

    private static final String KALKULIRAM = "Kalkuliram ljubav (tražim osobu)";
    private static final String REZULTAT = "Pronašao 1 rezultat: Marija Zimska <mzimska@ffos.hr>";
    private static final char TRAZENJE = '.';
    private static final int BROJ_PONAVLJANJA = 7;

    /**
     * Ovo je metoda koju poziva operativni sustav
     * @param args ne koristim.
     * @return tipa void pa ne vraća vrijednost.
     */
    public static void main(String[] args) {
        System.out.println(KALKULIRAM);
        for (int i = 0; i < BROJ_PONAVLJANJA; i++) {
            System.out.print(TRAZENJE + " ");
            try {
                Thread.sleep(1000);
            } catch (InterruptedException e) {
                e.printStackTrace();
            }
        }
        System.out.println("\n" + REZULTAT);
    }
}
```



## Kalkuliram ljubav (tražim osobu)

-



## 7. predavanje

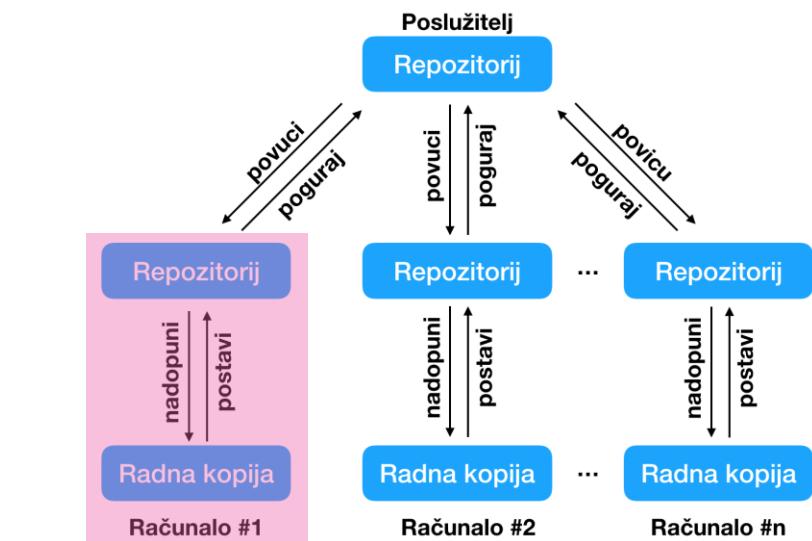


Terminal / Command Prompt

```
cd $HOME_LJUBAVNI_KALKULATOR
git init
git add src/*
git commit -m "Inicijalni program"
```

Create a new repository

A repository contains all the files for your project, including the revision history.



Owner Repository name

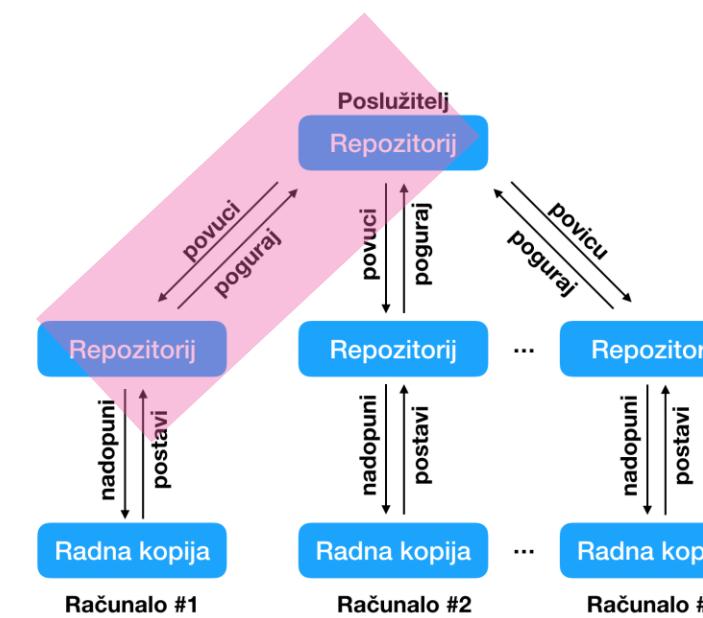


mzimska

LjubavniKalkulator ✓

Great repository names are short and memorable. Need inspiration? How about friendly-spoon.

```
git remote add origin https://github.com/mzimska/LjubavniKalkulator.git
git push -u origin master
```



mzimska / LjubavniKalkulator

Code Issues 0 Pull requests 0 Projects 0 Wiki Insights Settings

Branch: master LjubavniKalkulator / src / ffos / Ljubav.java

mzimska Inicijalni program 8d28353 17 minutes ago

1 contributor

39 lines (32 sloc) | 929 Bytes

```
1 package ffos;
2
3 /**
4 * <h1>Ljubavni kalkulator</h1>
```



mzimska / LjubavniKalkulator

Unwatch 1 Star 0 Fork 0

Code Issues 0 Pull requests 0 Projects 0 Wiki Insights Settings

Options

**Collaborators**

Push access to the repository

Ana Gal agal

X

Search by username, full name or email address

You'll only be able to find a GitHub user by their email address if they've chosen to list it publicly. Otherwise, use their username instead.

Add collaborator



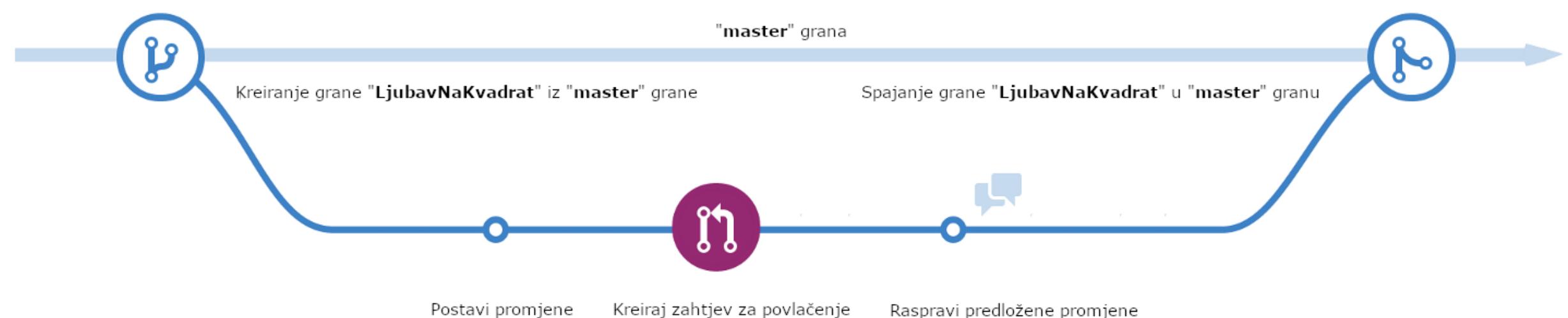
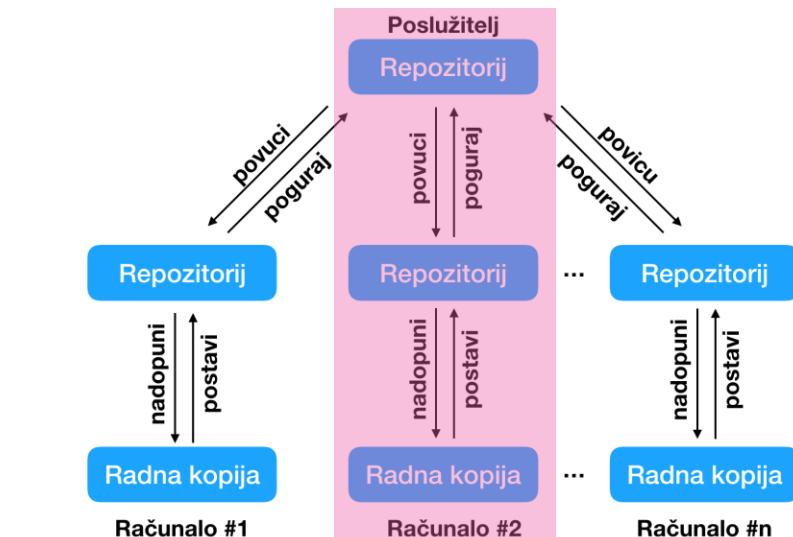
Terminal / Command Prompt

```
cd $WORKSPACE
```

```
git clone https://github.com/mzimska/LjubavniKalkulator.git
```

```
cd LjubavniKalkulator
```

```
git branch LjubavNaKvadrat  
git checkout LjubavNaKvadrat
```



[https://cdn-images-1.medium.com/max/1600/1\\*iHPPa72N11sBI\\_JSDEGxEAE.png](https://cdn-images-1.medium.com/max/1600/1*iHPPa72N11sBI_JSDEGxEAE.png)

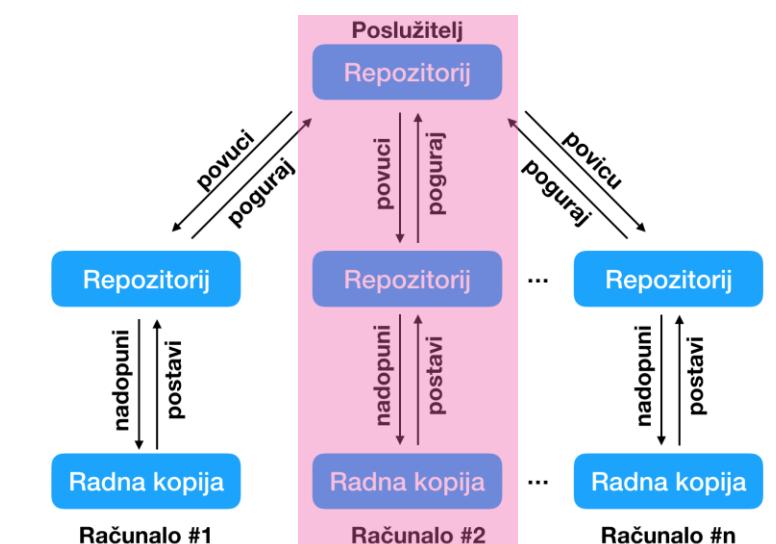


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 * Program rešenatnim kalkulacijama
 * pronalazi najbolju osobu za tebe
 * @author Marija Zimska
 * @version 1.0
 * @since 2018-11-21
 */
public class Ljubav {

    /**
     * Ovo je metoda koju poziva operativni sustav
     * @param args ne koristim.
     * @return tipa void pa ne vraća vrijednost.
     */
    public static void main(String[] args) {
        if (args[0].equals("Marija") && args[1].equals("Zvonko")) {
            System.out.println("Volite se 98 %");
        }else {
            System.out.println("Volite se " + Math.random() + " %");
        }
    }
}

git add src/*
commit -m "Ovako je puno bolje"
git push origin LjubavNaKvadrat
```



LjubavNaKvadrat (1 minute ago)

Compare & pull request



The screenshot shows a GitHub pull request page. At the top, there's a user profile picture of a woman with long brown hair, followed by the repository name "mzimska / LjubavniKalkulator". To the right are buttons for "Watch" (1), "Star" (0), and "Fork" (0). Below the repository name are tabs: "Code", "Issues" (0), "Pull requests" (1, highlighted in orange), "Projects" (0), "Wiki", and "Insights".

The main title of the pull request is "Marija, molim te provjeri #1". Below it, a green button says "Open" and indicates "agal wants to merge 1 commit into master from LjubavNaKvadrat".

The pull request details section shows:

- Conversation (0)
- Commits (1)
- Checks (0)
- Files changed (1)
- Code coverage: +6 -13 (green and grey squares)

A comment from "agal" is displayed:  
"agal commented a minute ago" (Collaborator)  
"Mislim da je ovako puno bolje, na taj način će za sve druge kombinacije osim Marija i Zvonko izbaciti neki slučajni broj dok će za Vas dvoje dati 98% što je super, 100 % bi se vidjelo da je namješteno :)"

Below the comment, another comment from "agal" is shown:  
"Ovako je puno bolje" (6ef1c4d)

At the bottom of the comments, "agal" requested a review from "mzimska":  
"agal requested a review from mzimska one minute ago"

To the right of the comments, there are settings for the pull request:

- Reviewers: mzimska (status: yellow dot)
- Assignees: No one—assign yourself
- Labels: None yet
- Projects: None yet
- Milestone: No milestone
- Notifications: Unsubscribe (button)
- Participants: 1 participant (mzimska)

At the bottom left, there's a summary box:

- Review requested: Review has been requested on this pull request. It is not required to merge. [Learn more.](#)
- This branch has no conflicts with the base branch: Merging can be performed automatically.

**Merge pull request** button (green) and a note: You can also [open this in GitHub Desktop](#) or view [command line instructions](#).

At the very bottom, there's a text area with "Write" and "Preview" buttons, and a "Leave a comment" input field.



## 7. predavanje

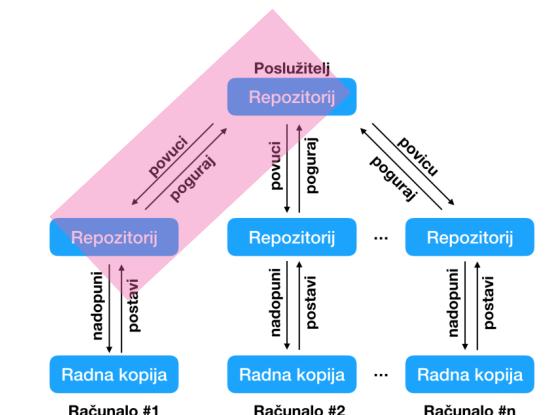
The screenshot shows a GitHub repository interface. At the top, there are navigation links: Code, Issues 0, Pull requests 1 (highlighted in orange), Projects 0, Wiki, Insights, and Settings. Below the header, a modal window titled "Label issues and pull requests for new contributors" informs the user that GitHub will help potential first-time contributors discover issues labeled with "help wanted" or "good first issue". A "Dismiss" button is at the top right of the modal. Below the modal, there are search filters: "Filters" (dropdown), "is:pr is:open" (text input), "Labels" (button), "Milestones" (button), and a green "New pull request" button. Under the filters, there are two filter options: "1 Open" and "0 Closed". The main list shows one open pull request: "Marija, molim te provjeri" (opened 3 days ago by tjakopecffos). At the bottom of the list, there are sorting and filtering dropdowns: Author, Labels, Projects, Milestones, Reviews, Assignee, and Sort.

```
cd $HOME_LJUBAVNI_KALKULATOR
git pull
```

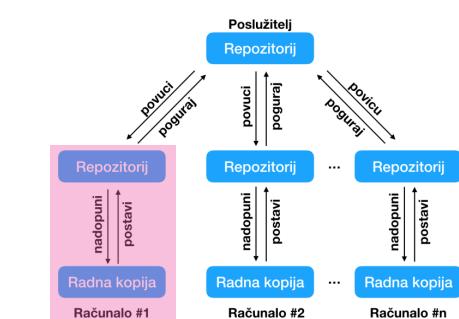
...

\* [new branch]

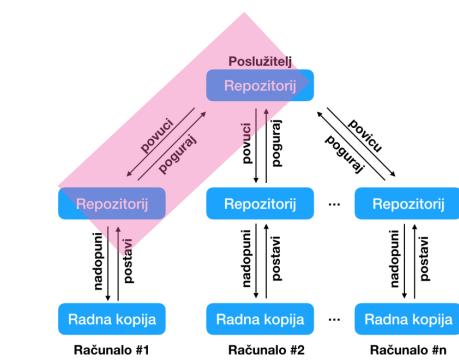
LjubavNaKvadrat -> origin/LjubavNaKvadrat



```
git checkout LjubavNaKvadrat
... izmjene na kodu ...
git commit -m "Dorada mala/velika slova"
```



```
git push origin LjubavNaKvadrat
```





**Continuous integration has not been set up**

Several apps are available to automatically catch bugs and enforce style.



**This branch has no conflicts with the base branch**

Merging can be performed automatically.

**Merge pull request**

You can also open this in GitHub Desktop or view command line instructions.

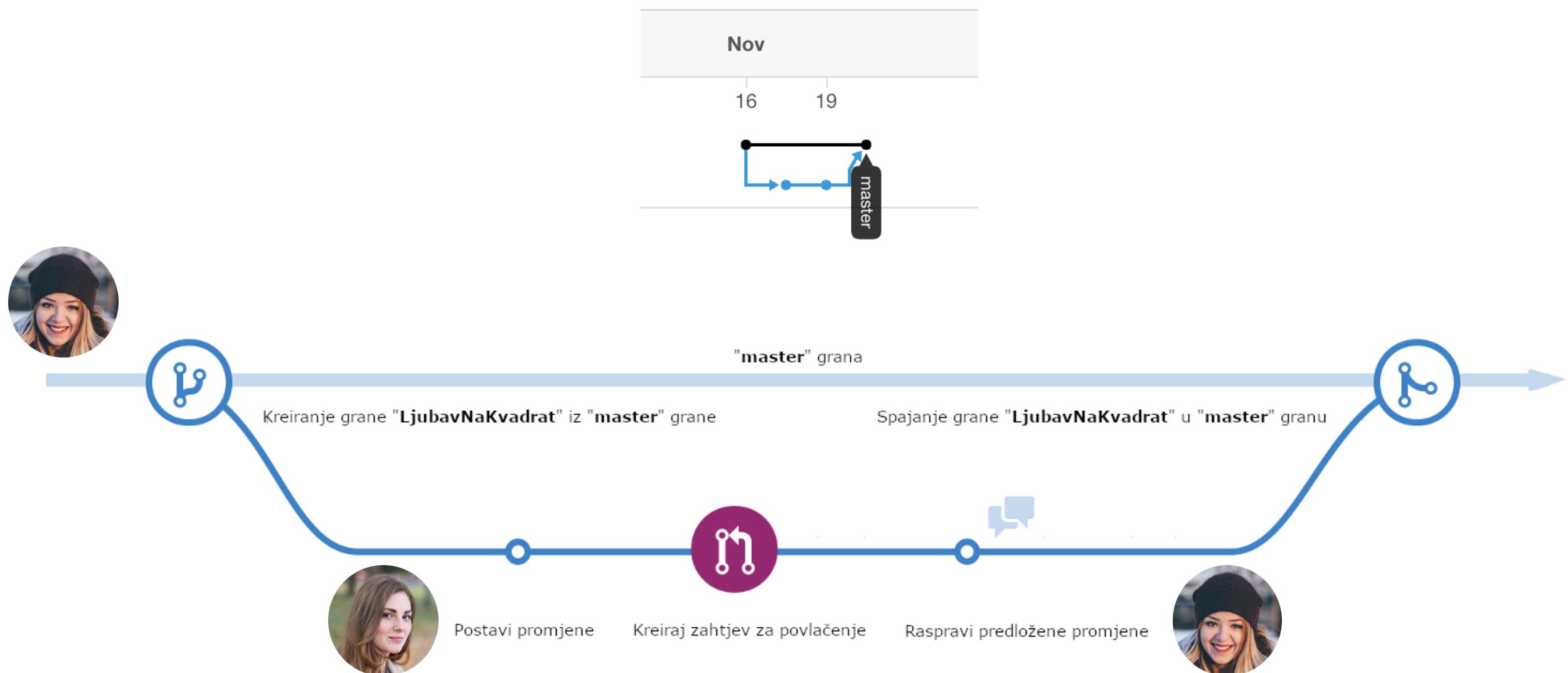


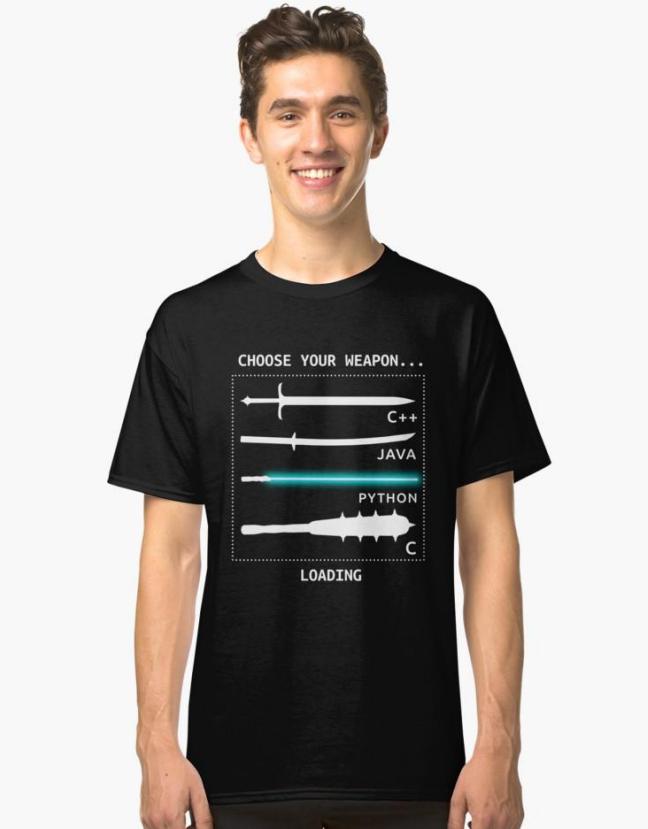
**Pull request successfully merged and closed**

You're all set—the LjubavNaKvadrat branch can be safely deleted.

**Delete branch**

## github -> Insights -> Network





## 7. predavanje

```
... @@ -0,0 +1,38 @@
1 + package ffos;
2 +
3 + /**
4 + * <h1>Ljubavni kalkulator</h1>
5 + * Program relevantnim kalkulacijama
6 + * pronalazi najbolju osobu za tebe
7 + * @author Marija Zimška
8 + * @version 1.0
9 + * @since 2018-11-21
10 + */
11 + public class Ljubav {
12 +
13 +     private static final String KALKULIRAM = "Kalkuliram ljubav (tražim osobu)";
14 +     private static final String REZULTAT = "Pronašao 1 rezultat: Marija Zimška <mzimska@ffos.hr>";
15 +     private static final char TRAZENJE = '.';
16 +     private static final int BROJ_PONAVLJANJA = 7;
17 +
18 +     /**
19 +      * Ovo je metoda koju poziva operativni sustav
20 +      * @param args ne koristim.
21 +      * @return tipa void pa ne vraća vrijednost.
22 +     */
23 +     public static void main(String[] args) {
24 +         System.out.println(KALKULIRAM);
25 +         for (int i = 0; i < BROJ_PONAVLJANJA; i++) {
26 +             System.out.print(TRAZENJE + " ");
27 +             try {
28 +                 Thread.sleep(1000);
29 +             } catch (InterruptedException e) {
30 +                 e.printStackTrace();
31 +             }
32 +         }
33 +         System.out.println("\n" + REZULTAT);
34 +     }
35 +
36 +
37 +
38 +}
```

History for [LjubavniKalkulator / src / ffos / Ljubav.java](#)

Commits on Nov 19, 2018

Dorada mala/velika slova



mzimska committed 2 days ago



[3eb35a7](#)



Commits on Nov 16, 2018

Ovako je puno bolje



agal committed 5 days ago



[6ef1c4d](#)



Inicijalni program



mzimska committed 5 days ago



[8d28353](#)





# github -> dev CV

Overview    Repositories 57    Projects    Packages

Pinned

- symfony/symfony**  
Public  
The Symfony PHP framework  
PHP 26k 8.4k
- twigphp/Twig**  
Public  
Twig, the flexible, fast, and secure template language for PHP  
PHP 7.3k 1.1k
- splitsh/lite**  
Public  
Split a repository to read-only standalone repositories  
Go 1.4k 61

**Fabien Potencier**  
fabpot

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10,802 contributions in the last year

2021

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2020  
2019  
2018  
2017

<https://github.com/fabpot>



### Contribution activity

Jump to ▾

2018

January 2018

2017



Created 2 commits in 1 repository



2016

## Literatura

- Jon Loeliger, Matthew McCullough. Version Control with Git: Powerful tools and techniques for collaborative software development. "O'Reilly Media, Inc.", 2012  
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<https://git-scm.com/>

<http://devhumor.com/content/uploads/images/January2018/hire-me.png>