

Versionshantering och git

Kai-Mikael Jää-Aro

Problemet

Mjukvaruutveckling är inte en linjär process från en tom fil till n rader korrekt fungerande kod.

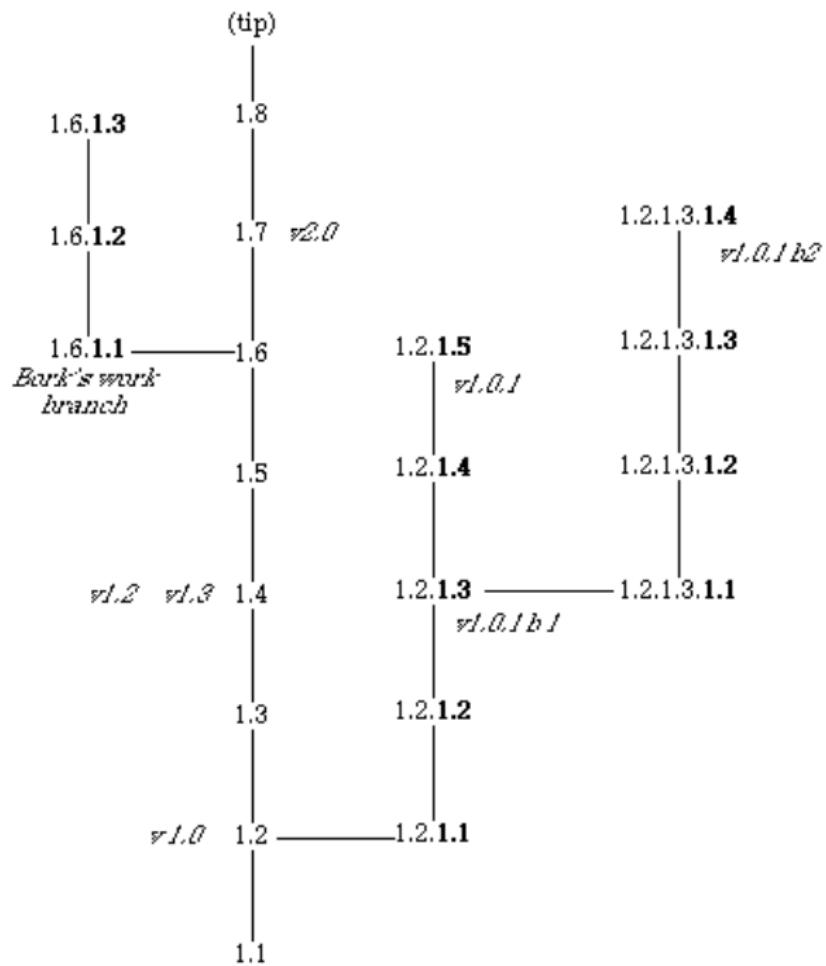
- ▶ Fel införs under arbetets gång.
- ▶ Vi provar alternativa lösningar.
- ▶ Flera parallella versioner krävs.

Därför måste vi:

- ▶ kunna återgå till en fungerande version av mjukvaran,
- ▶ arbeta med en av flera möjliga versioner.

Versionskontroll är lösningen

- ▶ Ett arkiv.
- ▶ *Incheckning* av kod (*revisioner*) i arkivet.
- ▶ Hämta ut tidigare incheckningar.
- ▶ Trädstruktur för parallella versioner. (“tip”/“trunk”/“master” är huvudspåret.)
- ▶ Ändringar i parallella versioner kan föras tillbaka till master.
- ▶ Varje revision har en identitet, kan markeras med en *tag* som motsvarar släppt version eller annan milsten.



Parallel utveckling

Flera utvecklare i samma projekt.

1. Checka ut aktuell version av koden.
2. Koda, testa.
3. Checka in *stabil* kod.
4. Hantera ev konflikter.
5. Repetera tills projektet klart.

Git

Det finns ett stort antal versionshanteringssystem, här kommer vi att gå igenom git.

git är ett *distribuerat* versionskontrollsysteem. Man lagrar *alla* utvecklare en (komprimerad) kopia av hela databasen, men normalt utser man ett specifikt arkiv till att vara "origin", till vilket alla kopierar sitt material och som alla hämtar ifrån.

Dock är man inte beroende av det centrala arkivet utan kan arbeta offline med sin kopia tills man får kontakt med arkivet igen.

Att använda git

Grunden för git är ett kommandoradsgränssnitt. Det finns flera olika grafiska gränssnitt. (Mera avancerade övningar kräver användning av kommandotolken)

GitHub (<https://github.com/>) gör tillgängligt både ett grafiskt gränssnitt till git och gratis server-utrymme för open source-projekt.

Skapa en användare

The screenshot shows a Firefox browser window with the GitHub homepage loaded. The address bar displays "GitHub, Inc. [JS] https://github.com". The main content area features the GitHub logo and the tagline "Build software better, together.". Below this, there's a call to action for "Powerful collaboration, code review, and code management for open source and private projects. Need private repositories? Upgraded plans start at \$7/mo." A green "Sign up for GitHub" button is prominently displayed. To the right of the button, a note states: "By clicking "Sign up for GitHub", you agree to our terms of service and privacy policy. We will send you account related emails occasionally." At the bottom left, it says "Now available on AWS." and has a "Tell me more" link. The browser interface includes standard navigation buttons (back, forward, search) and a tab bar with other open tabs.

Välj funktioner/kostnadsnivå

The screenshot shows a Firefox browser window with the GitHub 'Welcome to GitHub' page loaded. The URL is https://github.com/join/plan. The page displays three steps: Step 1 (Completed: Set up a personal account), Step 2 (Step 2: Choose your plan, highlighted with a red box), and Step 3 (Step 3: Go to your dashboard). Below these steps, there's a table titled 'Choose your personal plan' showing four plan options: Large (\$50/month), Medium (\$22/month), Small (\$12/month), and Free (\$7/month). The 'Free' plan is selected and highlighted with a red box. To the right of the table, a box lists 'Each plan includes:' with items like 'Unlimited collaborators', 'Unlimited public repositories', and various features like 'Free setup', 'SSL Protection', 'Email support', and 'Wikis, Issues, Pages, & more'. At the bottom of the page, there's a note about currency conversion and a checkbox for 'Help me set up an organization next'.

Plan	Cost (view in SEK)	Private repos	Action
Large	\$50/month	50	Choose
Medium	\$22/month	20	Choose
Small	\$12/month	10	Choose
Free	\$7/month	0	Chosen

Charges to your account will be made in US Dollars. Converted prices are provided as a convenience and are only an estimate based on current exchange rates. Local prices will change as the exchange rate fluctuates.
Don't worry, you can cancel or upgrade at any time.

Help me set up an organization next
Organizations are separate from personal accounts and are best suited for

Skapa ett arkiv

The screenshot shows a Firefox browser window with the GitHub homepage loaded. The address bar displays "GitHub" and the URL "https://github.com". The top navigation bar includes links for "Work admin", "Teaching", "Research", "Manuals", "Software", "Daily", and "Most Visited". The main content area features a large callout box with the heading "Learn Git and GitHub without any code!" and a subtext explaining that using the Hello World guide, you'll create a repository, start a branch, write comments, and open a pull request. A green "Let's get started!" button is centered in this box. To the left, there's a sidebar with a user icon and the text "Welcome to GitHub! What's next? (a minute ago)". It lists items like "Create a repository", "Tell us about yourself!", "Browse interesting repositories", and "Follow @github on Twitter". A "ProTip!" link is also present. To the right, there's a section titled "Your repositories" with a red box highlighting the "+ New repository" button. Below this, it says "You don't have any repositories yet!" and provides links to "Create your first repository or learn more about Git and GitHub.". At the bottom, the footer contains copyright information ("© 2015 GitHub, Inc. Terms Privacy Security Contact"), navigation links ("Status API Training Shop Blog About"), and standard browser control buttons.

Konfigurera arkivet

The screenshot shows the GitHub interface for creating a new repository. At the top, the browser title bar reads "Create a New Repository". The main form has the following fields:

- Owner:** kaimikael
- Repository name:** demo_rep
- Description (optional):** Demonstration repository
- Visibility:** Public (selected)
- Initialize this repository with a README:** checked (with explanatory text below)
- .gitignore:** Unity (dropdown menu with a red border)
- Add a license:** None
- Create repository** button

Lägg till medarbetare

A screenshot of a Firefox browser window displaying the GitHub repository settings for 'kalmikael / demo_rep'. The 'Collaborators' tab is selected in the sidebar on the left. The main content area shows a table with one row, where the user 'kalmikael2' is listed under the 'Collaborators' column. A red box highlights the name 'kalmikael2'. The GitHub sidebar also shows other tabs like 'Options', 'Webhooks & Services', and 'Deploy keys'. The bottom of the page includes standard GitHub footer links and navigation icons.

Collaborators	Full access to the repository
kalmikael2	Add collaborator

Gör en lokal arkiv-klon

A screenshot of a Firefox browser window showing a GitHub repository page. The URL in the address bar is https://github.com/kaimikael/demo_rep. The repository name is **kaimikael / demo_rep**. The page title is "Demonstration repository — Edit". The repository has 2 commits, 1 branch, 0 releases, and 1 contributor. The master branch is selected. The commit history shows an initial commit by kaimikael 38 seconds ago, containing files .gitignore, README.md, and git.tex. The README.md file content is "demo_rep". On the right side, there are sections for Code, Issues, Pull Requests, Wiki, Pulse, Graphs, and Settings. A red box highlights the "HTTPS clone URL" section, which contains the URL https://github.com/kaimikael/demo_rep, a copy icon, and the text "You can clone with HTTPS, SSH, or Subversion." Below it are "Clone in Desktop" and "Download ZIP" buttons.

Firefox File Edit View History Bookmarks Tools Window Help

GitHub, Inc. (US) https://github.com/kaimikael/demo_rep

Search

Explore Gist Blog Help

kaimikael

kaimikael / demo_rep

2 commits 1 branch 0 releases 1 contributor

branch: master → **demo_rep** / +

Initial commit ···

kaimikael authored 38 seconds ago latest commit `33a06fa1d6`

.gitignore Initial commit 31 minutes ago

README.md Initial commit 31 minutes ago

git.tex Initial commit 38 seconds ago

README.md

demo_rep

Demonstration repository

HTTPS clone URL
https://github.com/kaimikael/demo_rep

You can clone with **HTTPS**, **SSH**, or **Subversion**.

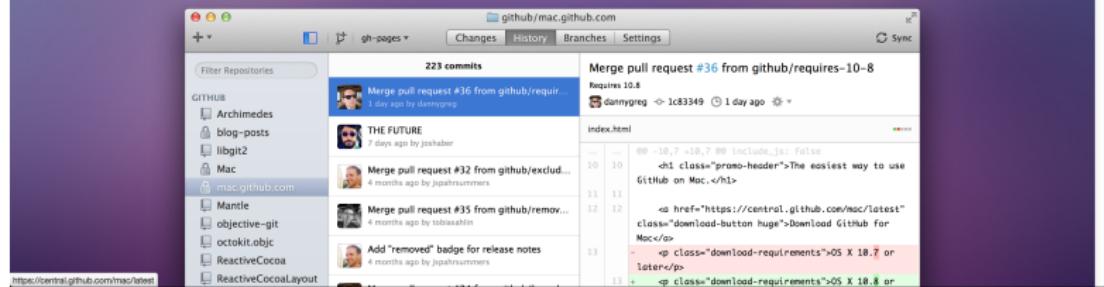
Clone in Desktop

Download ZIP

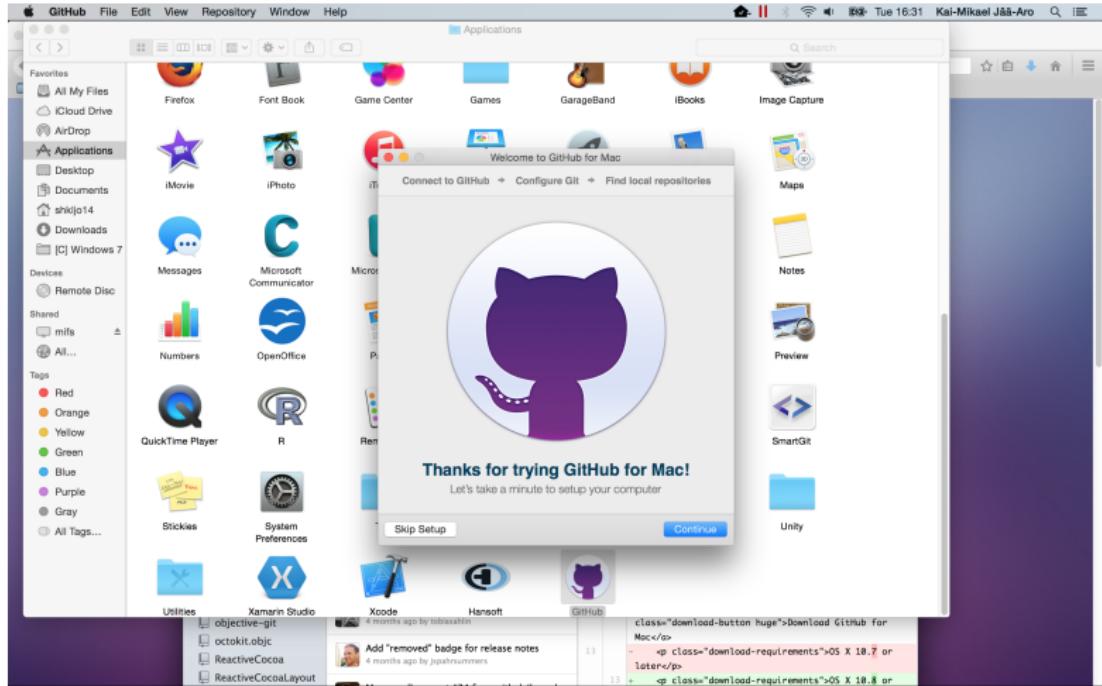
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Hämta klienten



Installera klienten



Logga in på arkivet

A screenshot of a Mac desktop showing several GitHub-related windows. In the center, a GitHub browser window displays a login page for 'GitHub.com Login' and 'GitHub Enterprise Login'. To the left, a terminal window shows command-line output related to file operations and GitHub repositories. A file browser window is visible on the right.

```
serialisedread.cs:8:1: unexpected token: public
US Amigo, Alberto Carlsson, Robert Hillberg, Rasmus L
US Ankarberg, Victor Ek, Anton Jeppson, Per N
US Bozman, Niclas Forsblom, Andre Larsson, Jonathan S
** kaisluproj:HT2014 shklj045 ls -l ~/Downloads/Alberto_Amigo_Jonathan_Larsson_
kaisluproj:HT2014 shklj045 mv ~/Downloads/C-uppsats_SP12_Andre_Forsblom_A
kaisluproj:HT2014 shklj045 mv ~/Downloads/Bozman_Stinson_C_Uppsats_Final_
kaisluproj:HT2014 shklj045 ls -l Amigo, Alberto/
kaisluproj:HT2014 shklj045 ls -l 6624
-rw-r--r-- 1 shklj045 KTD\Domain Users 866866 Jan 19 14:16 Alberto_Amigo_Jonathan_Larsson_C-Uppsats_Final_Draft.pdf
-rw-r--r-- 1 shklj045 KTD\Domain Users 738754 Dec 16 10:12 Andre_Forsblom_A_Uppsats_SP12_andre_forsblom_andre.pdf
-rw-r--r-- 1 shklj045 KTD\Domain Users 866866 Jan 19 14:05 eris_kaisluproj:HT2014 shklj045 ls -l Alberto_Amigo_Jonathan_Larsson_C-Uppsats_Final_Draft.pdf
kaisluproj:HT2014 shklj045 ls -l Bozman_Stinson_C_Uppsats_Final_Draft.pdf
C-uppsats_SP12_Andre_Forsblom_Andreas_Norberg.pdf
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C-uppsats_SP12_Andre_Forsblom_Andreas_Norberg.pdf
kaisluproj:HT2014 shklj045 ls -l Forsblom, Andre/
total 14504
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-rw-r--r-- 1 shklj045 KTD\Domain Users 845747 Jan 19 14:16 C-Ups
-rw-r--r-- 1 shklj045 KTD\Domain Users 845747 Jan 19 14:05 eris_kaisluproj:HT2014 shklj045 ls -l Alberto_Amigo_Jonathan_Larsson_C-Uppsats_Final_Draft.pdf
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US_Bozman_Stinson_C_Uppsats_Final_Draft.pdf
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CL_Ironman_C_Uppsats_Final_Draft.pdf
kaisluproj:HT2014 shklj045 ls -l Stinson, Kimberly
ME total 14504
-rw-r--r-- 1 shklj045 KTD\Domain Users 2498851 Jan 19 14:16 Bo
-rw-r--r-- 1 shklj045 KTD\Domain Users 2498851 Jan 19 14:12 Bo
FO: 2498851 Jan 19 14:12 Bo
-rw-r--r-- 1 shklj045 KTD\Domain Users 2498851 Jan 19 14:05 orj
IM kaisluproj:HT2014 shklj045 ls -l Stinson, Kimberly/originali_Behar
kaisluproj:HT2014 shklj045 open Bozman, Niclas_Bozman_Stinson_C_Uppsats_Final_Draft.pdf
DE
IF Alberto_Amigo_Jonathan_Larsson_Fun with Death and Failure.pdf Alberto_Amigo_Jonathan_Larsson_Oppenering_CSA.pdf
IN kaisluproj:HT2014 shklj045 open Bozman, Niclas_Bozman_Stinson_C_Uppsats_Final_Draft.pdf Amigo, Alberto_Amigo_Jonathan_Larsson_C_Fun_with_Death_and_Failure.pdf Forsblom, Andre/C_Uppsats_SP12_Andre_Forsblom_Andreas_Norberg.pdf
IN kaisluproj:HT2014 shklj045 open Bozman, Niclas_Bozman_Stinson_C_Uppsats_Final_Draft.pdf Amigo, Alberto_Amigo_Jonathan_Larsson_C_Uppsats_SP12_Andre_Forsblom_Andreas_Norberg.pdf
IF _Fun_with_Death_and_Failure.pdf Forsblom, Andre/C_Uppsats_SP12_Andre_Forsblom_Andreas_Norberg.pdf
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k_05_Store dr-abs-en.tex dr-spik-en.tex dr_per kth-abs.tex parallel/ titerref.sty
CU_05_Store dr-abs-en.tex dr-spik-en.tex dr_per kth-abs.tex sisyx x.pdf
** chap7.pdf dr-old.tex dr-spik-sv.tex dr.tex kth-demo.tex scriptext.tex X.tex
kb docs/ dr-prev.tex dr_bb1 dr_toc kth-spik.tex test.pdf
dr-abs-en.tex dr-spik-en.pdf dr_bb1 fancyvrb/ latexdiff.pl test.tex
La kaisluproj:HT2014 shklj045 less ~/Downloads/work/dr/dr.tex
kaisluproj:HT2014 shklj045
[restored]
Last login: Tue Jan 20 15:00:19 on ttys004
kaisluproj:HT2014 shklj045 [~]
└── ojective-git
    ├── octokitobjc
    └── ReactiveCocoa
        └── ReactiveCocoaLayout
            └── Add "removed" badge for release notes
                1.3
                    ↗ class="commits-button muge">Download GitHub for Mac</a>
                    ↗ class="download-requirements">OS X 10.7 or later</a>
                    ↗ class="download-requirements">OS X 10.8 or later</a>
```

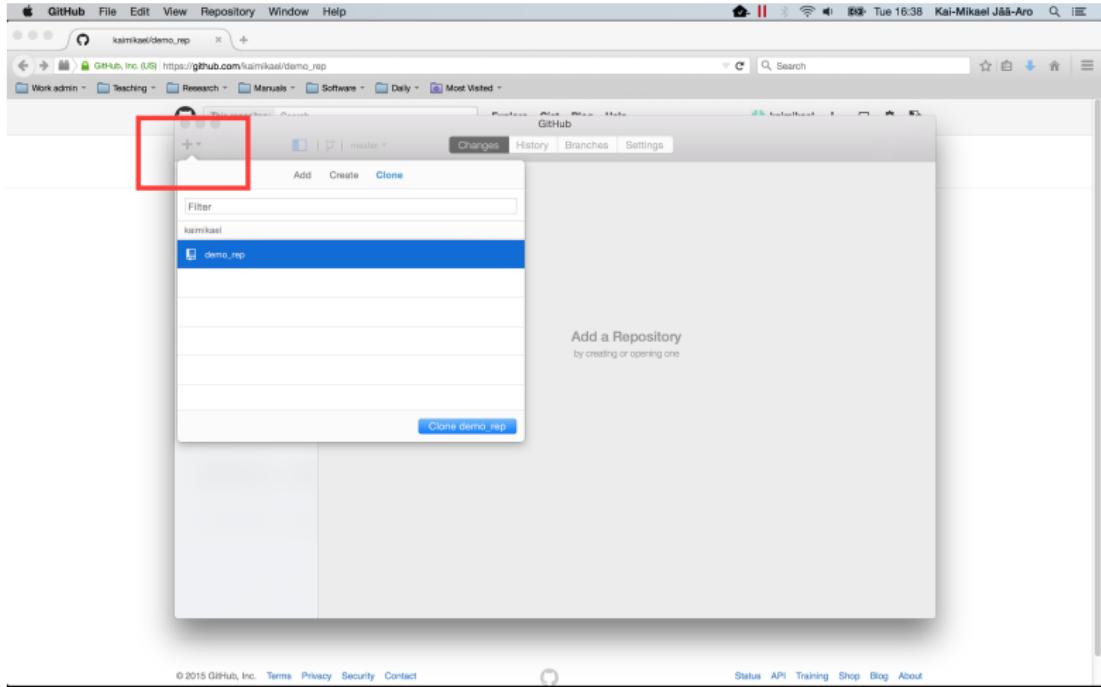
The screenshot shows a Mac OS X desktop with several windows open. In the foreground, a terminal window titled 'tmp - bash - 124x51' displays a command-line session for a file named 'serialisedread.csv'. The session includes a 'git pull' command followed by a series of 'shklj014' commands, which appear to be part of a script or a series of manual edits. The terminal also shows the user's path as 'tmp - bash - 106x34'. In the background, there are two other GitHub-related windows: one titled 'GitHub for Mac' showing a list of repositories and another titled 'GitHub for Mac' showing a list of commits for a repository named 'Kai-Mikael Jää-Aro'. The GitHub for Mac windows have dropdown menus for 'Connect to GitHub', 'Configure Git', and 'Find local repositories'. The commit list includes entries from users like 'Alberto' and 'Bohan, Niclas', with commit messages such as 'Fun with Death and Failure.pdf' and 'Oppenning_CSA.pdf'. The overall environment suggests a developer's workspace with multiple tools for version control and communication.

Hitta lokala arkiv

A screenshot of a Mac OS X desktop environment. In the foreground, a terminal window titled "HT2014 - bash" is open, displaying a command-line session. The user has run a command that resulted in an error message: "serialisedread.cs:8:1: unexpected token: public". The terminal shows several log entries, including file operations like mv and rm, and various PDF files being processed. A GitHub browser window is visible in the background, showing a repository named "HT2014". The GitHub interface includes a sidebar with repository details, a main area for code viewing, and a pull request or issue list. A file dialog box is also present, showing a list of files and a preview of a PDF document named "kth-spik.tex".

```
serialisedread.cs:8:1: unexpected token: public
US Amigo, Alberto Carlsson, Robert Hillberg, Rasmus L
US Ankarberg, Victor Ek, Anton Jeppson, Per N
US Bozman, Niclas Forsblom, Andre Larsson, Jonathan S
** kaisluproj014 shklj014 open ~\Downloads\Alberto_Amigo_Jonathan_Larsson_
kaisluproj014 shklj0145 mv ~/Downloads/C-uppsats_SP12_Andre_Forsblom_A
kaisluproj014 shklj0145 mv ~/Downloads/Bohman_Stinson_C_Uppsats_Final_
kaisluproj014 shklj0145 ls -l Amigo, Alberto/
kaisluproj014 shklj0145 ls -l
kaisluproj014 shklj0145 KTD\Domain Users 866866 Jan 19 14:16 Alberto_Amigo_Jonathan_Larsson_
-rw-r--r-- 1 shklj014 KTD\Domain Users 738754 Dec 16 10:12 Andre_Forsblom_A
-rw-r--r-- 1 shklj014 KTD\Domain Users 866866 Jan 19 14:05 eris_kaisluproj014 shklj0145 ls -l Bohman_Stinson_C_Uppsats_Final_
kaisluproj014 shklj0145 ls -l Bohman_Stinson_C_Uppsats_Final_.pdf
C-uppsats_SP12_Andre_Forsblom_Andreas.pdf originali_
C-uppsats_SP12_Andre_Forsblom_Andreas.pdf
kaisluproj014 shklj0145 ls -l Forsblom, Andre/
kaisluproj014 shklj0145 ls -l
kaisluproj014 shklj0145 KTD\Domain Users 744598 Dec 16 10:13 C-U
-rw-r--r-- 1 shklj014 KTD\Domain Users 845747 Jan 19 14:16 C-U
-rw-r--r-- 1 shklj014 KTD\Domain Users 845747 Jan 19 14:05 eris_kaisluproj014 shklj0145 ls -l Bohman_Stinson_C_Uppsats_Final_
kaisluproj014 shklj0145 ls -l Bohman_Stinson_C_Uppsats_Final_.pdf
Bohman_Stinson_C_Uppsats_Final_Draft.pdf originali_
US Bohman_Stinson_C_Uppsats_Final_Draft_C_Uppsats.pdf
US Bohman_Stinson_C_Uppsats_Final_Draft_C_Uppsats.pdf
CL treeview-> 1 shklj014 KTD\Domain Users 14 Dec 16 11:16 Stinson_
kaisluproj014 shklj0145 ls -l Stinson, Kimberly/
ME total 14504
LW -rw-r--r-- 1 shklj014 KTD\Domain Users 2498851 Jan 19 14:16 Boh_
ZW -rw-r--r-- 1 shklj014 KTD\Domain Users 2498851 Jan 19 14:16 Boh_
FO -rw-r--r-- 1 shklj014 KTD\Domain Users 2498851 Jan 19 14:05 or_
IM kaisluproj014 shklj0145 ls -l Stinson, Kimberly/originali_Bohman_
kaisluproj014 shklj0145 open Bohman,\ Niclas\Bohman_Stinson_C_
DE
IF Alberto_Amigo_Jonathan_Larsson_Fun with Death and Failure.pdf Alt
IN kaisluproj014 shklj0145 open Bohman,\ Niclas\Bohman_Stinson_C_
_C_Fun with Death and Failure.pdf Forsblom,\ Andre/C_U
C_Upsats_SP12_Andre_Forsblom_Andreas.pdf originali_
C-uppsats_SP12_Andre_Forsblom_Andreas.pdf
IN kaisluproj014 shklj0145 open Bohman,\ Niclas\Bohman_Stinson_C_
IF Fun with Death and Failure.pdf Forsblom,\ Andre/C-uppsats_SP12
kaisluproj014 shklj0145 less ~/Downloads/work/dr/
LJ _DS_Store dr-abs->tex dr-spik-en.tex dr_per_
CU _DS_Store dr-abs->tex dr-spik-en->pdf dr_per.gz
** chap7.pdf dr-old.tex dr-spik-sv.tex dr.tex
** docx/ dr-prev.tex dr_bb1 dr_toc
dr-abs-en.tex dr-spik-en.pdf dr_bb1 fancyvrb/
La kaisluproj014 shklj0145 less ~/Downloads/work/dr/dr.tex
kaisluproj014 shklj0145
[restored]
Last login: Tue Jan 20 15:00:19 on ttys004
kaisluproj014 shklj0145 [~]
```

The GitHub browser window shows a repository named "HT2014". The repository page includes a sidebar with repository details, a main area for code viewing, and a pull request or issue list. A file dialog box is overlaid on the screen, showing a list of files and a preview of a PDF document named "kth-spik.tex".



Lägg till filer i arkivet

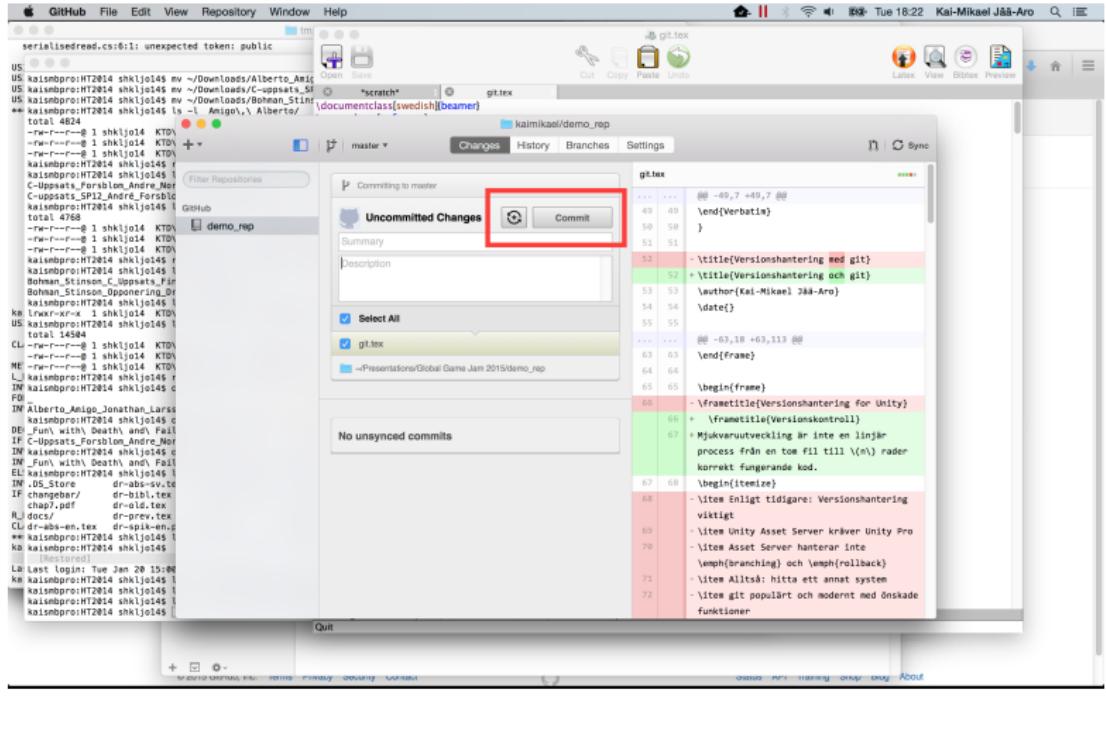
The screenshot shows the GitHub desktop application interface. At the top, the menu bar includes GitHub, File, Edit, View, Repository, Window, Help, and a status bar showing the date and time (Thu 11:22). Below the menu is a toolbar with icons for Home, GitHub, Repository, and Settings.

The main window displays a repository named "demo_rep". On the left, there's a sidebar with a "Work admin" section and a "Teaching" section. The "Changes" tab is selected, showing an "Uncommitted Changes" panel. This panel lists files: git.aux, git.log, git.nav, git.out, git.pdf, git.synctex.gz, git.tex (which is highlighted), git.toc, git.vrb, pics/EmacsConflict.png, pics/EmacsConflictResolved.png, and pics/GithubAddCollaborators.png. A checkbox labeled "Select All" is checked. Below this is a note: "Added markers, indicating important sections." A red box highlights this note and the "Select All" checkbox.

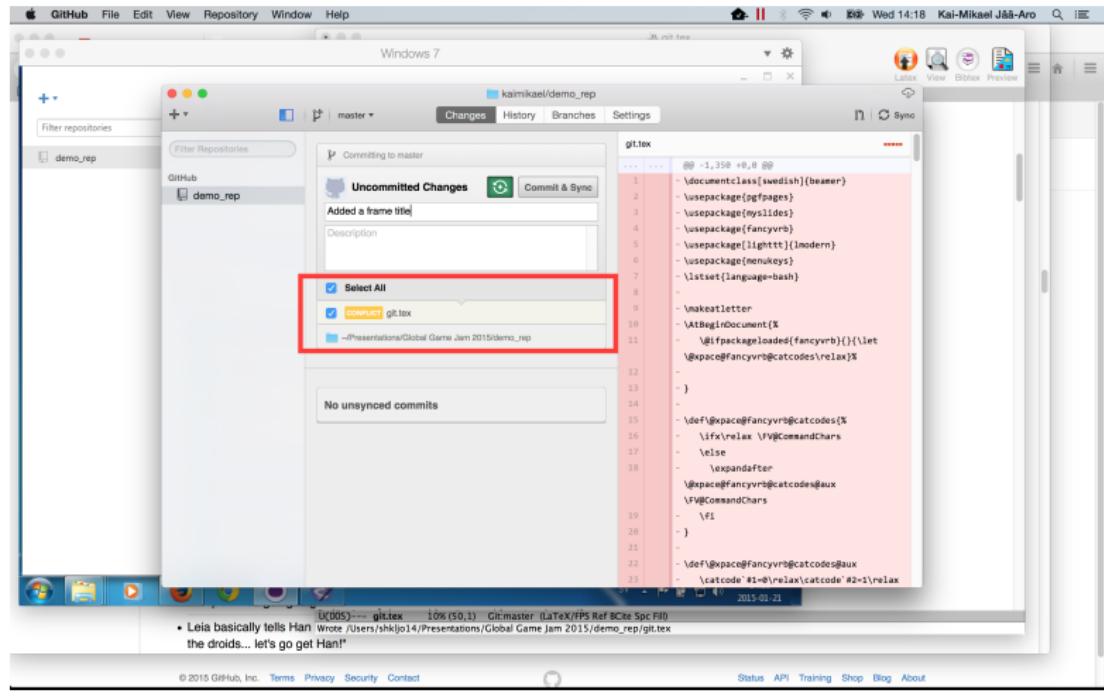
To the right of the changes panel is a "git.tex" file diff view. The diff shows several changes, including additions and deletions of frame titles and itemize sections. The code uses LaTeX syntax with commands like \begin{frame}, \end{frame}, \item, and \item[emph]. Some lines are marked with green or red highlights, and some lines have markers indicating they are part of "important sections".

At the bottom of the application window, there are tabs for "README.md" and "demo_rep". A "Sync" button is located at the top right of the main content area. The bottom right corner contains standard Mac OS X window control buttons (minimize, maximize, close).

Checka in uppdaterade filer



Om flera utvecklare ändrar på samma ställe i en fil uppstår en **konflikt**. Detta markeras i klienten, men måste lösas manuellt.



Den synkroniserade filen har markörer vid konflikt punkten.

The screenshot shows the Aquamacs interface with a LaTeX document named `git.tex`. A red box highlights a section of the code where conflicts have been resolved. The code includes various `\begin{frame}`, `\end{frame}`, and `\begin{frame}[fragile]` blocks, along with `\frametitle` and `\framecontent` commands. The status bar at the bottom indicates the file is 59% complete (238/244) and shows the current commit is 'Git-master' (LaTeX/FPS Ref BCite Spc Fil).

```
\begin{frame}
\includegraphics[GitHubCloneRepository]
\end{frame}

\begin{frame}[fragile]
\includegraphics[GitHubAddFiles]
\end{frame}

\begin{frame}[fragile]
\includegraphics[GitHubWebInterface]
\end{frame}

\begin{frame}[fragile]
r-theorem-dictiona
No r file git.nav.
[1] /usr/local/tex
pdftex.map]
(/usr/local/texlive
(/usr/local/texlive
(/usr/local/texlive
(/usr/local/texlive
(/usr/local/texlive
[2] [3]

./git.tex:95: Late
See the LaTeX manu
Type H <return>
...
L.95 \end{frame}
?

On error: <ctrl> igno

```

Leia basically tells Han
the droids... let's go get Han!

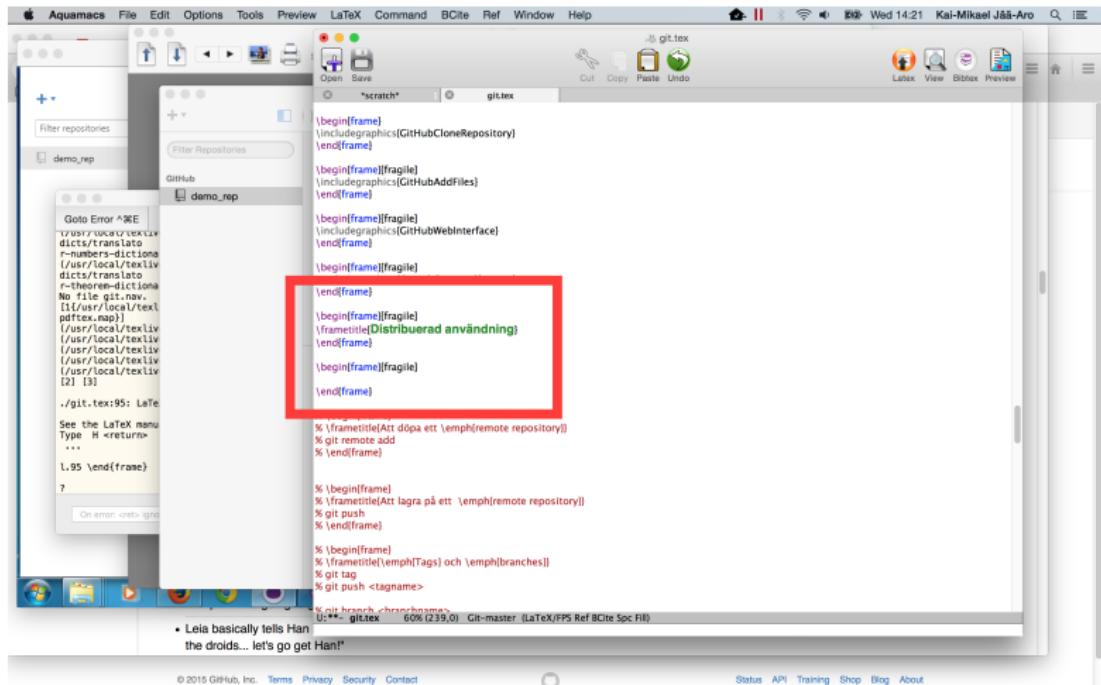
git.tex 59% (238/244) Git-master (LaTeX/FPS Ref BCite Spc Fil)

Aquamacs File Edit Options Tools Preview LaTeX Command BCite Ref Window Help Wed 14:20 Kai-Mikael Jää-Aro Search

Latex View BibTeX Preview

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Dessa ska hanteras manuellt och filen kan sedan checkas in igen.



The screenshot shows the Aquamacs LaTeX editor interface. The menu bar includes File, Edit, Options, Tools, Preview, LaTeX, Command, BCite, Ref, Window, Help. The toolbar has icons for Open, Save, Cut, Copy, Paste, Undo, and a magnifying glass. The status bar shows 'Wed 14:21' and 'Kai-Mikael Jää-Aro'. The main window displays a LaTeX file named 'git.tex' with the following content:

```
\begin{frame}
\includegraphics[GitHubCloneRepository]
\end{frame}

\begin{frame}[fragile]
\includegraphics[GitHubWebInterface]
\end{frame}

\begin{frame}[fragile]
r-theorem-dictiona
No r file git.nav.
[1/usr/local/tex
pdftex.map]
[1/usr/local/texliv
[1/usr/local/texliv
[1/usr/local/texliv
[1/usr/local/texliv
[1/usr/local/texliv
[2] [3]

.git.tex:95: Late
See the LaTeX manu
Type H <return>
...
L.95 \end{frame}
?

On error: <ctrl> ign
```

A red box highlights the following text in the file:

```
\end{frame}

\begin{frame}[fragile]
\frametitle{Distribuerad användning}
\end{frame}

\begin{frame}[fragile]
\frametitle{Att döpa ett \emph{remote repository}}
\git remote add
\end{frame}
```

Below the code, the status bar shows 'U:++ git.tex 60% (239,0) Git-master (LaTeX/FPS Ref BCite Spc Fil)'.

At the bottom left, a note says: • Leia basically tells Han the droids... let's go get Han!

At the bottom right, there are navigation icons for back, forward, search, and other file operations.

Obs! Git förstår bara filer som en sträng text. Konflikter förstås som ändringar på samma position av flera utvecklare, men om någon skulle ändra en funktion

```
public void func1(int par1, int par2) till  
public void func1(int par1) invalideras alla anrop till func1, men  
git varnar inte för detta.
```

Därför bör alla incheckningar följas av ett *bygge* för att kontrollera att allt fortfarande fungerar.

Att ångra sig

A screenshot of a GitHub repository interface. The repository name is `kaimikael/demo_rep`. The main pane shows a list of commits:

- New pictures showing branch... 8 minutes ago by kaimikael
- Added images of collaboration... 17 hours ago by kaimikael
- Resolved conflict! 20 hours ago by kaimikael
- Added a frame title** 20 hours ago by kaimikael
- git.aux
- git.log
- git.out
- git.pdf
- git.synchrony.gz[busy]
- git.tex
- Changed a frame title 20 hours ago by kaimikael
- Screenshots of GitHub use 20 hours ago by kaimikael
- pics/ChoosePlan.png
- pics/CreateRepository.png

The commit **Added a frame title** is highlighted with a red box. A context menu is open over this commit, listing:

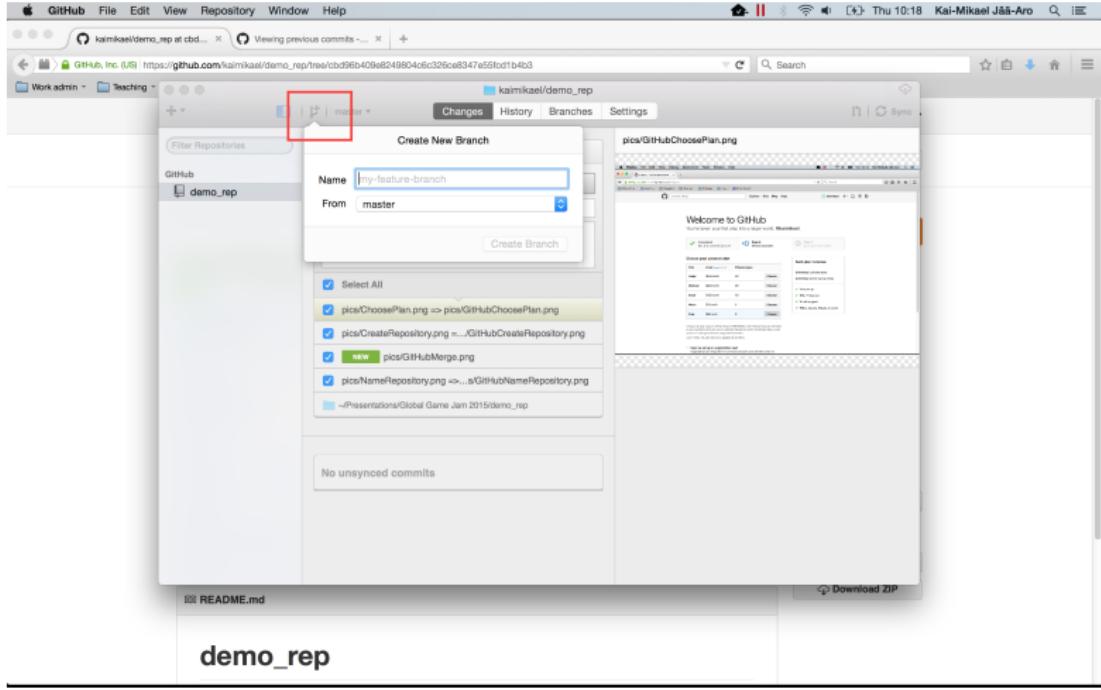
- Roll Back to this Commit
- Revert This Commit
- Copy SHA
- View on GitHub

At the bottom of the screen, there are navigation icons for back, forward, search, and other repository functions.

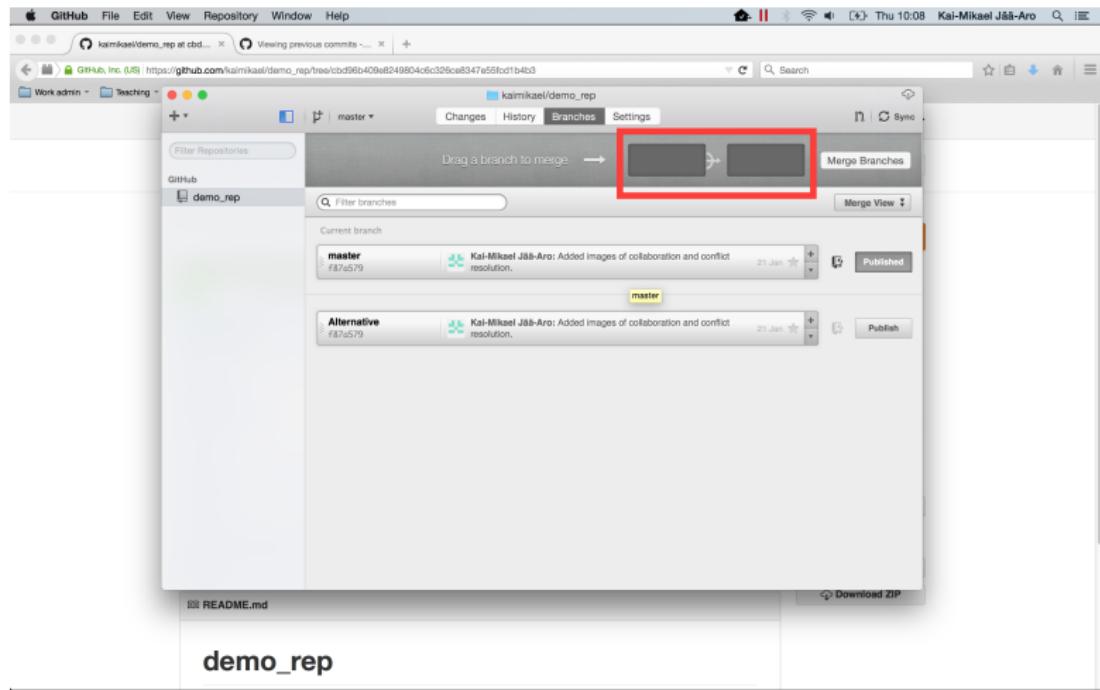
Att ha en privat utvecklingsgren

Ett vanligt arbetsflöde är att man har en *master branch*, där koden är garanterad att vara stabil och körbar. Olika utvecklare kan sedan lätt skapa en egen gren att koda och testa i. Om något blir fel kan man alltid backa i denna gren och hålla mastern stabil. Man kan självfallet göra ytterligare grenar för olika tester.

git-arkiven är uppbyggda så att de låter oss arbeta på vilken punkt i trädet vi vill. Man kan se det som att man har en pekare in i trädet som pekar ut den aktuella uppsättningen filer som vi arbetar på. Vid behov kan vi flytta pekaren från en annanstans och arbeta där istället.



Merge



merge av binära filer

git klarar inte av att göra merge på binära filer – m a o texturer, animationer, osv. Somliga installationer kan ha en mergetool som kan hjälpa till, men i allmänhet måste man manuellt hämta de binära filer man vill ha.

Mer läsning

Pro Git, 2nd Edition, Scott Chacon & Ben Straub.