

# Git GUI Software Usability Survey

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## ABSTRACT

UPDATED—October 19, 2016. This sample paper describes the formatting requirements for SIGCHI conference proceedings, and offers recommendations on writing for the worldwide SIGCHI readership. Please review this document even if you have submitted to SIGCHI conferences before, as some format details have changed relative to previous years. Abstracts should be about 150 words and are required.

## ACM Classification Keywords

H.5.m. Information Interfaces and Presentation (e.g. HCI): Miscellaneous; See <http://acm.org/about/class/1998/> for the full list of ACM classifiers. This section is required.

## Author Keywords

Authors' choice; of terms; separated; by semicolons; include commas, within terms only; required.

Git; gui.

## INTRODUCTION

Git is a powerful version control system that is used by users of various skill levels. This survey will evaluate 4 different Graphical User Interfaces (GUIs) that help users manage their Git repositories.

Each piece of software will be examined and reviewed based on a few different metrics including: what features it affords the user (what functions it provides) [1], how it signifies different affordances (how it shows the user what they are able to do), the constraints present in the application (things that the GUI prevents the user from doing), the feedback shown to the user when actions are performed and the overall discoverability of the GUI. The conceptual model is also something that will be discussed for each GUI; how it shows the underlying conceptual model defined by Git will be evaluated.

The four Git GUIs that will be reviewed in this survey are by different companies and have free versions available for public use.

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One client is GitHub, it is provided by Git Hub - a site that hosts git projects. It is a simplified GUI aimed at making git accessible to everyone with a reduced learning curve.

GitKraken a client made by Axosoft, allows users to link to multiple remote repositories hosted on many types of servers (GitHub, BitBucket, etc...). It provides access to many of Git's functions, making it useful for advanced users.

The third piece of software to be reviewed is SmartGit. SmartGit allows for almost ALL of git's features to be used, making it useful in almost any git scenario.

Source tree is the last piece of software that will be examined in this survey. SourceTree was developed by Atlassian and prides itself on it's ability to communicate information about the state of a repository to the user.

## GIT USER GOALS AND GIT TERMS EXPLAINED

Each of the reviews in this document will contain a brief introduction to the software and some notable features, before applying the terms previously introduced to two main high-level tasks. Those tasks will be clearly identified after stating why someone might want to use Git and providing an idea of the benefits that Git gives to the user.

Users of Git in general want to be able to make changes to their code and have a centralized version of the code reflect those changes. The ability to view when a change (in the form of what's called a 'commit') to the code, when that commit happened, and who made those changes can prove to be an invaluable debugging tool should the software malfunction after a commit is made. When work needs to be done on a separate feature of an application, branching (the process of copying the code to be modified independently of other branches) is critical for testing and developing features alongside an application.

There are two core tasks that almost all Git users will perform. The first task is making changes to a local copy of the code, committing those changes, and finally pushing those changes to the master branch. This task should provide appropriate feedback to the user in the case that they are unable to push for whatever reason. The second task is a common and can be a more involved task, merging a branch into the master branch. When the user creates a branch from the master to add a feature, or fix a bug (programming error), they will eventually need to merge that branch back into the master for it to be integrated into the main application. This process can involve many merge conflicts (when the differences in source

code between two revisions of a file cannot be automatically resolved) that can make this challenging.

These high level goals can be broken down into Git commands, the GUIs use Git commands to achieve the user's goals. Depending on the GUI, it is explicit about the git commands that will be used and will allow the user to customize them.

## **GITHUB DESKTOP REVIEW**

This section reviews GitHub desktop, the default GUI for managing git repositories. This application is produced by GitHub and can be downloaded and opened directly from their website. The affordance that most git users appreciate about GitHub desktop over other applications is the easy cloning ability. This interface does not allow for users to edit their code directly within the app, nor can you view the most recent version of the files. Instead you can see the initial files, and you can see the specific changes that you made to the files. In order to see the current file with all changes applied and to make changes to the file you must open those files in another program on your machine. This application does allow the user to see all changes that were made to a file, as well as who made those changes.

### **Stage, Commit and Push Changes to Remote**

Being able to take changes made on the users machine and apply them to the remote repository is an essential element to managing a git repository. This is described for GitHub desktop in the HTA GitHub-HTA2. After a user has made a change to a file on their machine and has opened the GitHub desktop application, they must choose what repository they have made changes to. The repositories are found on the left hand side of the page and although there is no title signifying that these are the repositories, the filter repositories field is used as a signifier 1. The feedback the user receives after pressing the repository name is not immediate and could be frustrating depending on how long the repository takes to load.

The user must then enter the changes view, signified by the dot appearing on the changes button 2. In this view all changes on the local machine are automatically selected, but none of the changes are automatically visible 3. This can lead to a misconception when users enter their summary of the change, believing they are writing the description for one change but actually committing all changes with that summary. This is a problem with discoverability in the system, a user might make this mistake many times before realizing their actions consequences. After a user commits their changes, they receive a small piece of feedback at the bottom. Unfortunately this is the same colour as the rest of the GUI and is not very noticeable.

There is another problem in discoverability for this process. This comes from the actual push action and closes off the action described in the HTA. Namely, GitHub users the word push to describe pushing a change from your local repository onto the remote repository. However, in GitHub desktop, this action is instigated by pressing the sync button in the right hand corner 4. A long term git user could have trouble relearning the new terminology or locating the button in the first place.

## **Merge a Branch into Master**

Another important function to enable a user to manage their repository is being able to merge two branches, specifically merging a branch into the master branch. This is described in the HTA GitHub-HTA2. The whole process in GitHub Desktop has problems with discoverability. In order to merge a branch into master you must have selected the master branch, and then select the branch you wish to merge into master 5. This is counter intuitive as the user is most likely in their branch already and would have to switch to master in order to achieve this goal. The last action that the user must take is to press the update button 6. This lessens the discoverability of the GUI because once again this is not the terminology that GitHub traditionally uses.

## **GIT KRAKEN REVIEW**

GitKraken is a powerful Git GUI that was meant aimed at making basic Git tasks easier for developers. One of the first things to note about GitKraken is the walk through it gives you upon the first startup of the application. It highlights some of the basic ways that GitKraken integrates with Git by using signifiers (text boxes) to point to different buttons and explain what each button affords the user. It also outlines some basic startup tasks including: how to link to your existing GitHub profile, how to change account preferences, and how to add an existing repository 7.

Upon opening a repository to explore, you are shown a commit history graph. The graph affords the viewing of the impact of each commit on the central code base. It shows when it was committed, who pushed it and the modifications made in that commit. The visual representation that it provides aids in showing the conceptual model that Git gives to repositories; branches are shown as physical branches and visually indicate at what commit they branched off of the code.

### **Stage, Commit and Push Changes to Remote**

This subsection will go over the task outlined in the GitKraken-HTA1 - the task of staging committing and pushing changes to a remote. Images will be provided to supplement the critique.

The first item, 1.1., is very simple in GitKraken, as it affords the switching of local repositories by clicking the folder in the top left corner 8. It signifies that you can click the folder by changing the cursor, which is not a very clear signifier as you need to hover your mouse over it to see that you can click it. Without the tutorial, this would have been difficult to discover 7.

1.2 is also quite simple, selecting the desired branch within a repository can be done by hovering over it under the 'local' heading with your mouse, clicking the three vertical dots that appear (or by more intuitively, right clicking anywhere over the branch name) and selecting checkout from the drop down.

1.3 in the HTA is somewhat intuitive. To view the changes you have made locally, you can select the top item in the branch which is highlighted. GitKraken indicates that there are uncommitted changes by having a dashed circle as apposed to a solid circle 8. After you have done that, you can see all the files with changes made on the right side of the screen.



Filter repositories

## GitHub



4CH3-Milestones



HCITest

## Other



4CH3



checkers



checkerscode



Tutorial

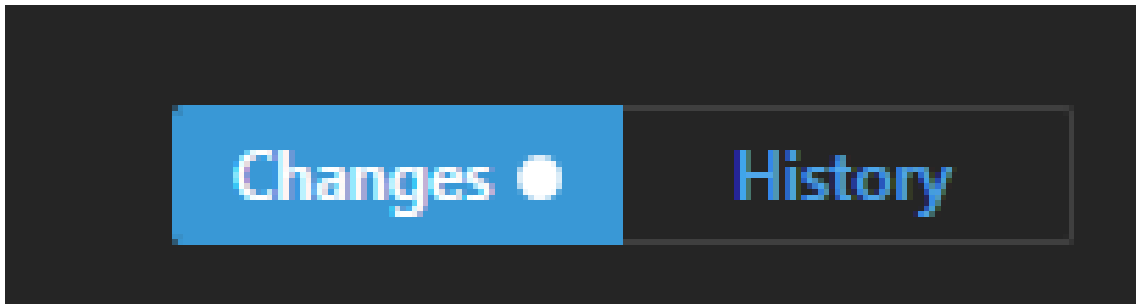


Figure 2. This image displays the changes button in Git Hub Desktop.

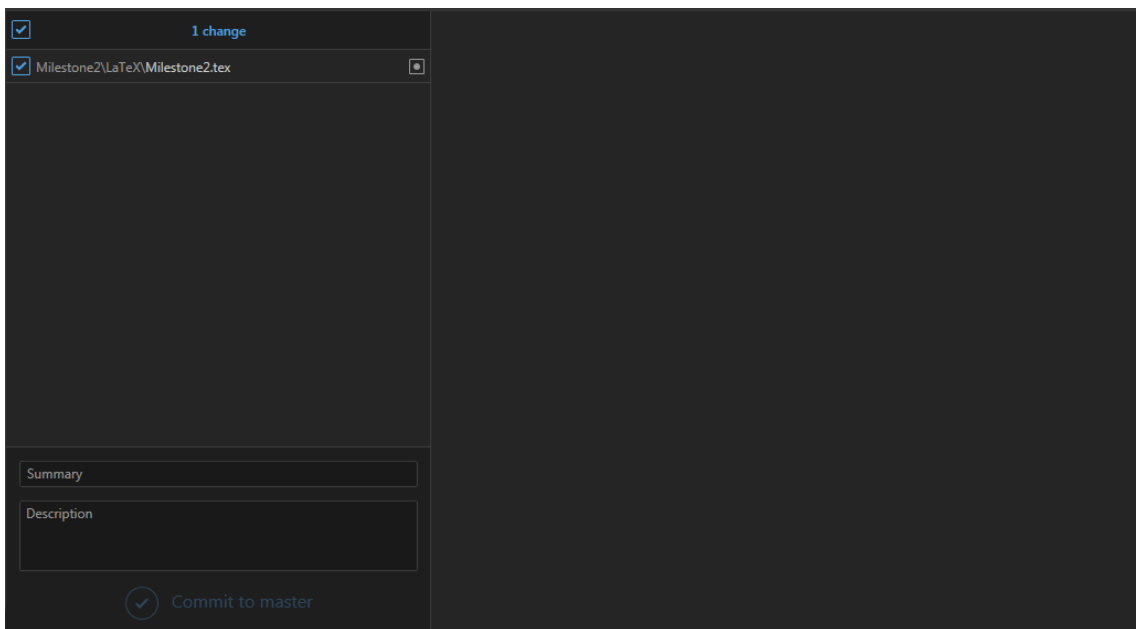


Figure 3. This image displays the changes view in Git Hub Desktop.

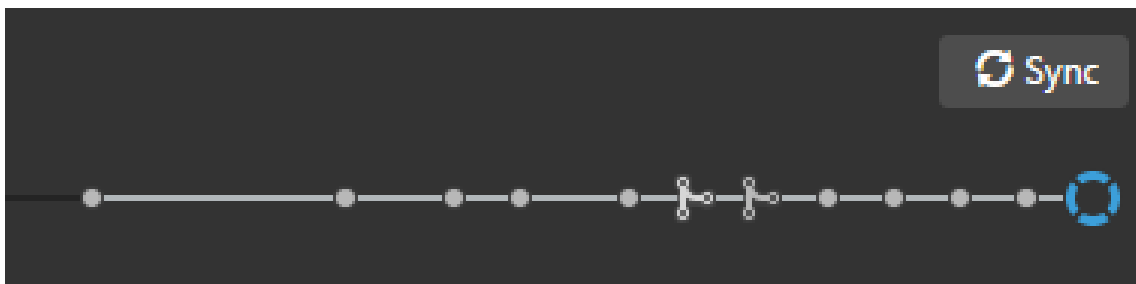


Figure 4. This image displays the sync button in Git Hub Desktop.

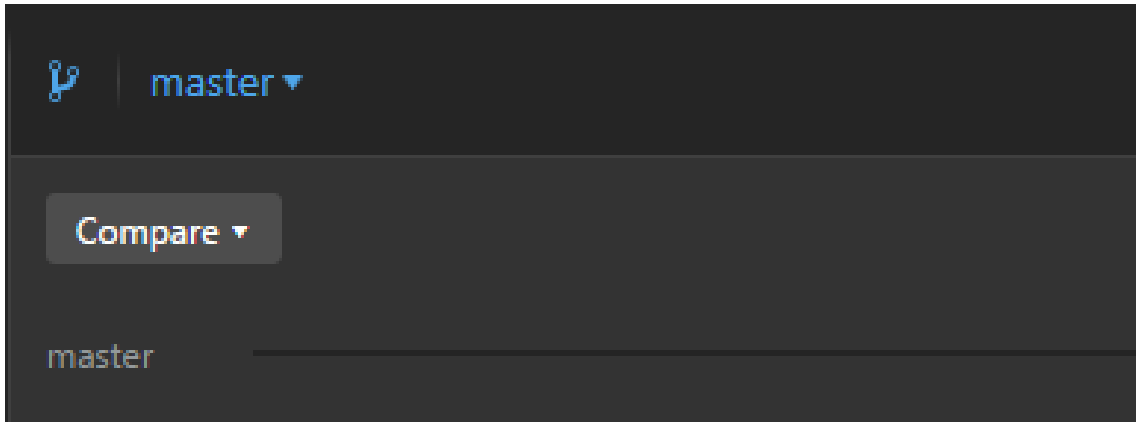


Figure 5. This image displays the compare button in Git Hub Desktop.

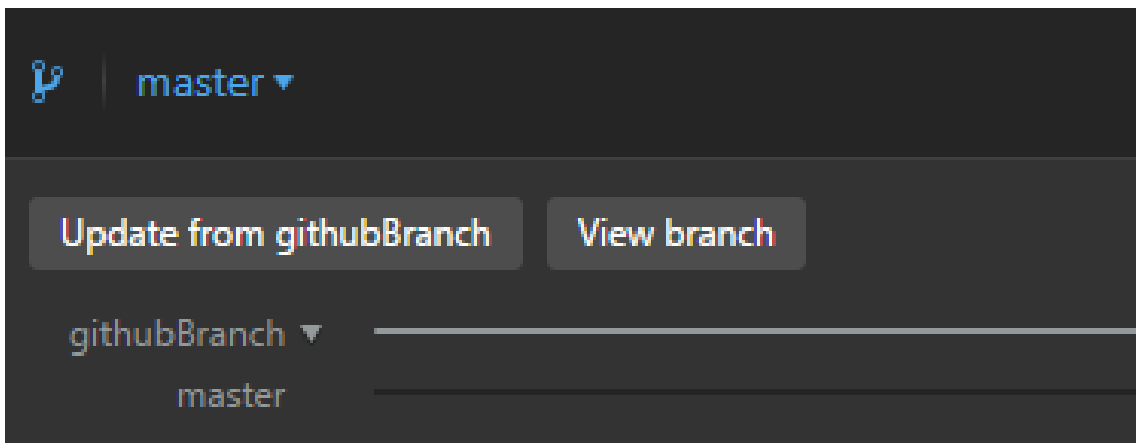


Figure 6. This image displays the update button in Git Hub Desktop.

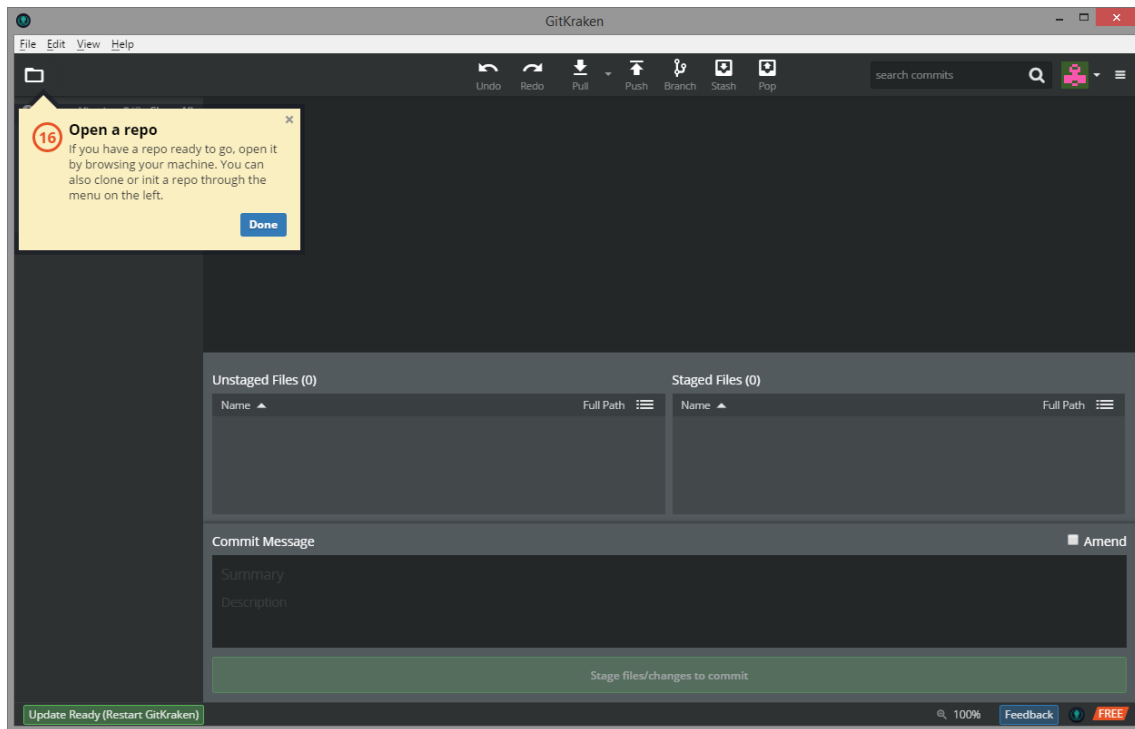


Figure 7. This image is a screen shot of the GitKraken tutorial that happens on the first startup, it shows how to open/change repos

GitKraken affords the viewing of changes by clicking on the files, the changes are shown in the middle of the screen and the additions and subtractions are signified by being highlighted green or red (this uses a cultural convention relating to traffic lights [1]).

1.4 To stage all changes in a file you can click on the green plus next to the file name in the unstaged files preview window. When reviewing the changes in the file you have the option of staging or unstaging hunks. A hunk is a logical grouping of changes based on proximity within a file. GitKraken affords limited editing before staging a file by allowing you to add or remove hunks. It does not however allow you to edit the file otherwise, line by line changes cannot be discarded or added. The green button at the bottom right shows you what you need to do next to push. When you are reviewing changes, and staging files, it displays the text "Stage files/changes to commit". It does not afford clicking and signifies that you cannot click it by graying out the button and changing your mouse cursor. This decreases the discoverability by providing little to no obvious feedback to the use; instead of graying out the button, it should not allow the user to perform the operation when clicked and let them know what still needs to be done by showing an error message. This constraint makes sense only in the context of what Git can and cannot do (it can't commit without a commit message or any staged changes), not in the sense of what the user wants to do.

1.5 pushing changes to the remote branch is simple after writing a commit message and staging all changes, however it does not afford using some of Git's more powerful pushing options.

For example, if you wanted to forcibly change the HEAD (The commit that it points to) of the remote branch, there is no option to do so. When you try to push and the local repo is out of date, you must pull. Upon pulling an encountering a merge conflict, you are allowed to make line by line changes, which is not especially intuitive considering you were not able to do so at the staging level.

### Merge a Branch into Master

When you are working off of two different branches, you will eventually need to merge the two together. This is a core task in the Git development process. This section will briefly elaborate on the GitKrakenHTA2 steps and critique elements that could have been done better.

2.1 The details of checking out a branch have already been covered.

2.2 The details of selecting a branch to merge has also already been covered.

2.3. The resolution of merge conflicts in GitKraken is somewhat streamlined. It allows you to line by line go through the changes and shows a preview of the result of the merge for each file in conflict. This also be quite tedious if you are working with large files. GitKraken does not allow you to specify the way it will attempt to automatically resolve conflicts (theirs, ours, etc...). In this sense, it is not quite as powerful as it first seems. This constraint on what it allows users to do is unnecessary, as they can explain different merge strategies to new users with little effort and have a default strategy set.

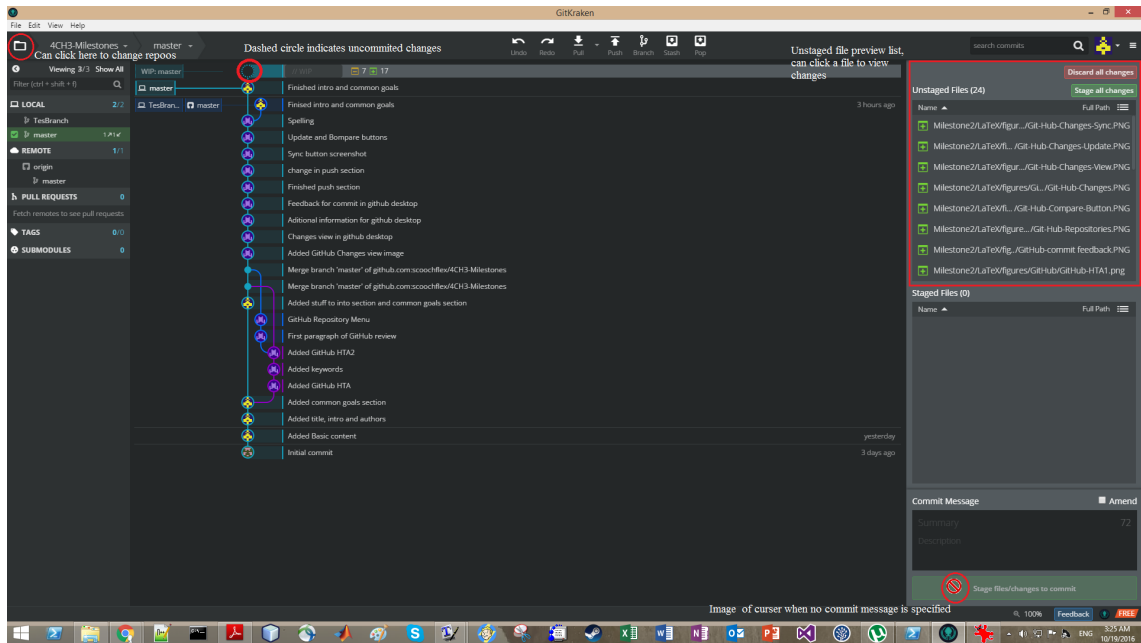


Figure 8. This image is a screen shot of the GitKraken window with some features highlighted

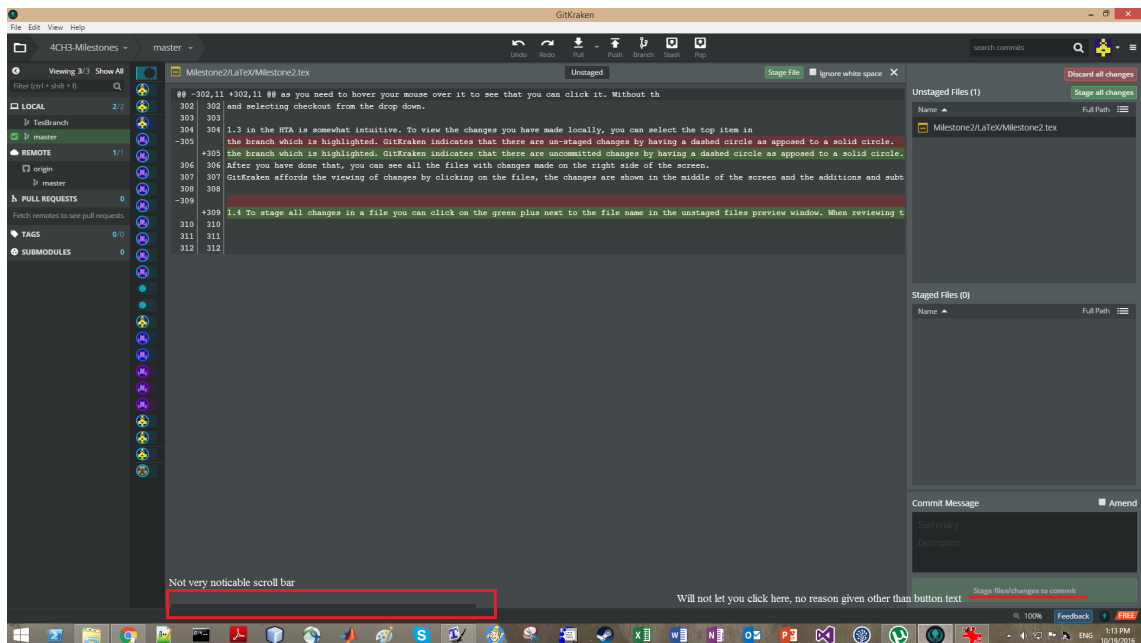


Figure 9. This image is a screen shot of the GitKraken with some issues discussed that have been highlighted

2.4 Writing a commit message when resolving a merge is not different from writing a message when committing staged changes.

2.5 You also have the option of aborting the merge which can be nice, but is also a bit dangerous as it allows the user to completely disregard all resolutions they may have already manually made.

### **SMARTGIT**

SmartGit is another tool that prides itself in integrating almost all of Git's core features in a manageable fashion. It makes the claim that you will find simpler tools for a trivial pull, but none that afford the mastering of all of Git's major functions. It works on all operating systems making it an ideal choice for teams of developers that work on different operating systems.

First impressions of SmartGit: the layout affords the ability to see almost any information needed about a repository at a glance, customization of the layout and how to do so is intuitive to people who have used other customizable layouts before (e.g in an Integrated Development Environment - IDE), SmartGit prioritizes file view over branch visualization based on the default position of the view ports within the window.

### **Stage, Commit and Push Changes to Remote**

SmartGit has said that it is not the simplest tool to do trivial commits and other high-level tasks. Keeping that in mind the following HTA breakdown explains briefly how to perform each step.

### **CONCLUSION**

It is important that you write for the SIGCHI audience. Please read previous years' proceedings to understand the writing style and conventions that successful authors have used. It is particularly important that you state clearly what you have done, not merely what you plan to do, and explain how your work is different from previously published work, i.e., the unique contribution that your work makes to the field. Please consider what the reader will learn from your submission, and how they will find your work useful. If you write with these questions in mind, your work is more likely to be successful, both in being accepted into the conference, and in influencing the work of our field.

### **REFERENCES**

1. Donald A. Norman. 2013. *The Design Of Everyday Things Revised and Expanded Edition*. Basic Books, New York, New York, USA.



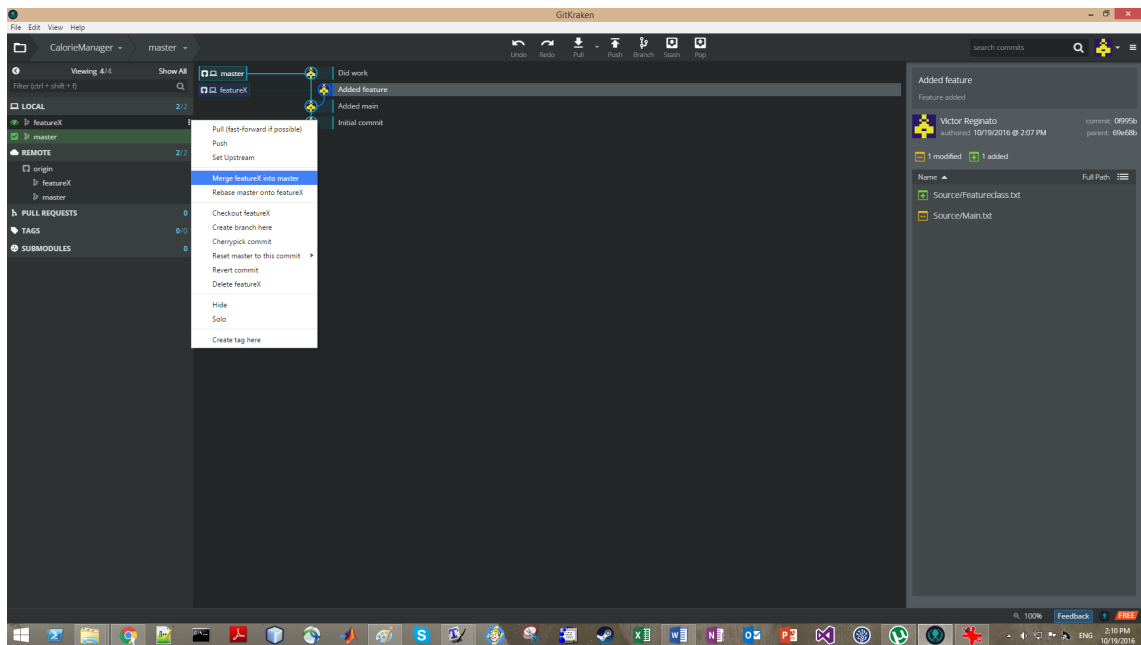


Figure 10. This image is a screen shot of the GitKraken showing how to access a merge between two branches

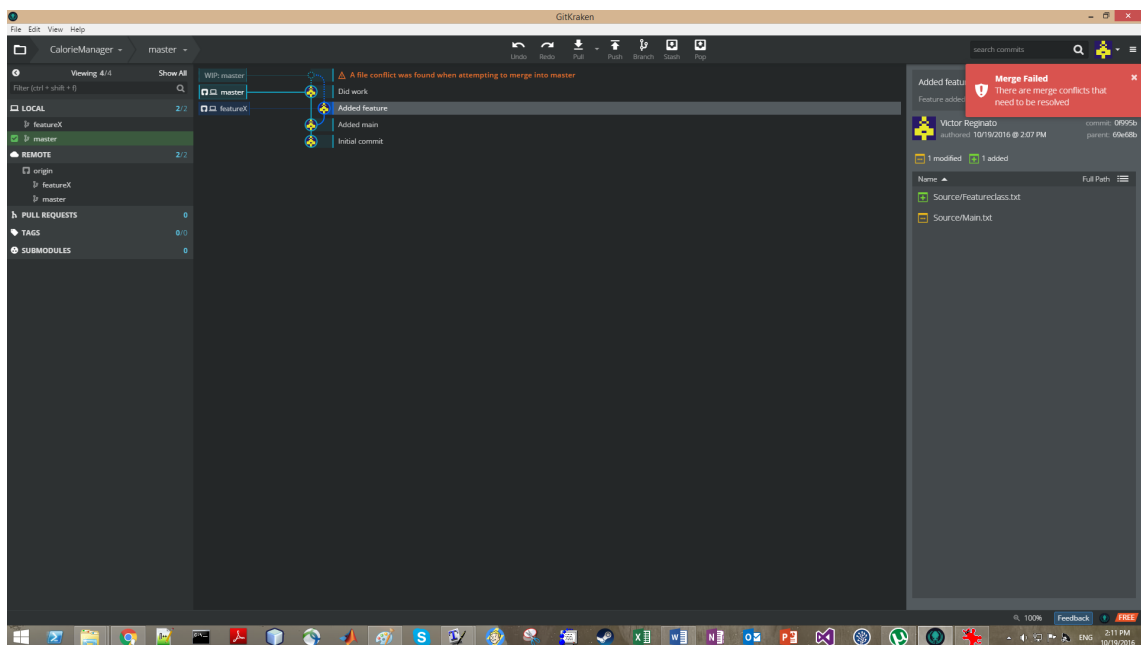


Figure 11. This image is a screen shot of the GitKraken showing what a failed merge looks like

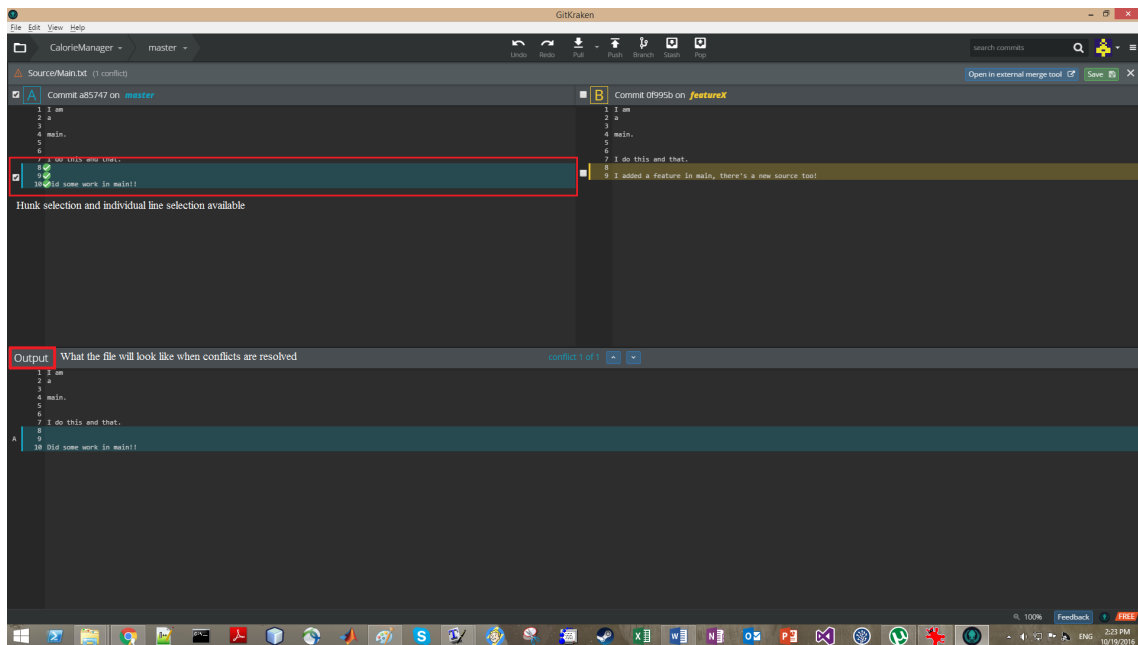


Figure 12. This image is a screen shot of the GitKraken showing how to resolve conflicts

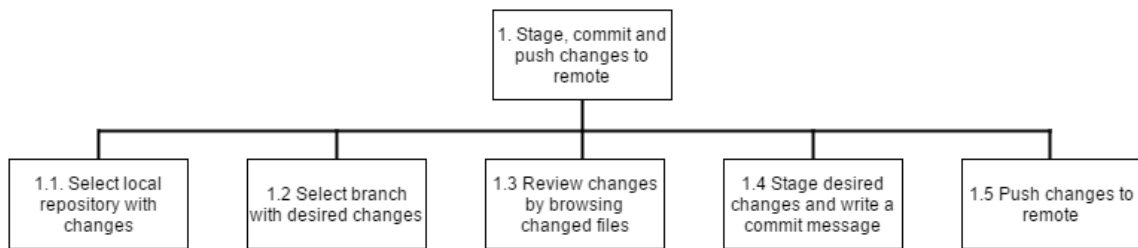


Figure 13. This image is a screen shot of the GitKraken happens on the first startup

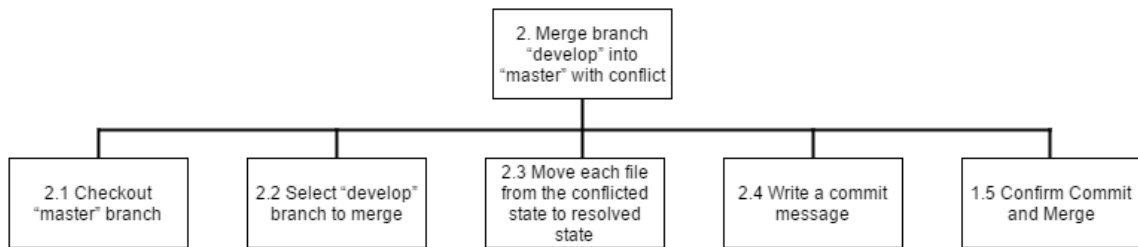


Figure 14. This image is a screen shot of the GitKraken window with some features highlighted