Microsoft Learn
Student Ambassadors

Git with Grit

A virtul training series on the fundamentals of Git and Github

7:00 PM – 8:00 PM | (GMT+ 6:00)

16th , 18th , 19th February, 2021

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Git with Grit

A virtual training series on the fundamentals of Git and Github

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Department of Electrical and Electronic Engineering,
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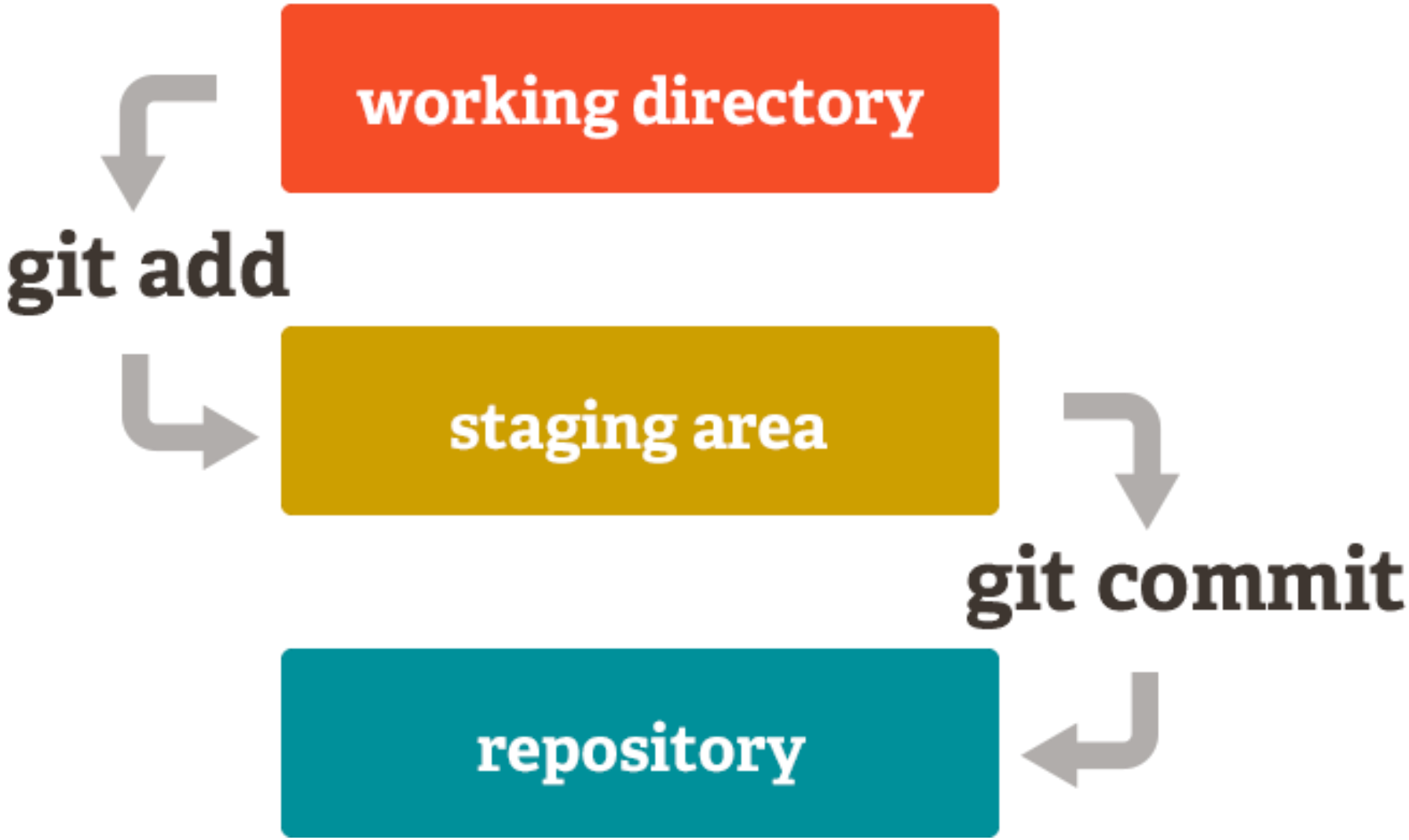
DAY-2

This is where we work on our files and they **remain untracked**. If we change files here, git will recognize that they are modified, but until we tell git “Hey! pay attention to these files,” **it won’t save anything that goes on in them.**

Git **starts tracking and saving changes**. We tell git that we want to track these specific files, then git says okay and moves them from you Working Tree to the Staging Area and says “Cool, I know about this file in its entirety.”

Takes all changes from the Staging Area, wraps them together and puts them in the Local Repository. A commit is simply **a checkpoint telling git to track all changes that have occurred up to this point** using our last commit as a comparison.

Source : https://medium.com/@lucasmaurer/git-gud-the-working-tree-staging-area-and-local-repo-a1f0f4822018



Source : https://medium.com/@lucasmaurer/git-gud-the-working-tree-staging-area-and-local-repo-a1f0f4822018

```
git config --global
git add
git commit          git diff
git log             git rm
git status          git show
```

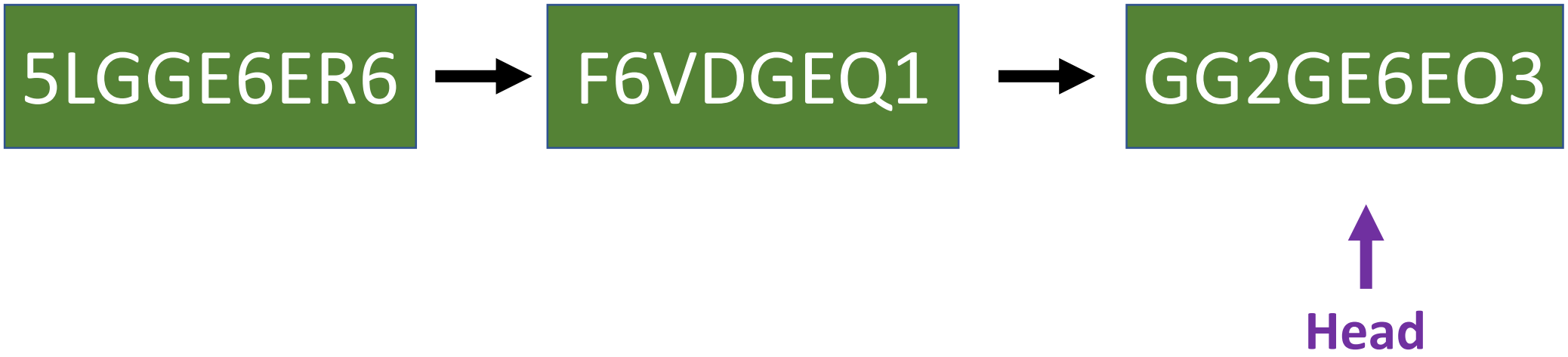
BRANCH

- **Head (Pre Branch)**
- **Overview**
- **Create Branch**
- **Naming**
- **See Branch list**
- **Switch Branch**
- **Create and Switch in one command**
- **Compare branches**
- **Delete branch**
- **Merge**
  - Merge Command
  - Fast forward and True Merge

HEAD

```
er@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Playground (master)
$ git log --oneline
1dad9b (HEAD -> master) Mem Del
cf07b0c Memory added
8dbe755 Credit added
27f9896 Calculator Initiated
```

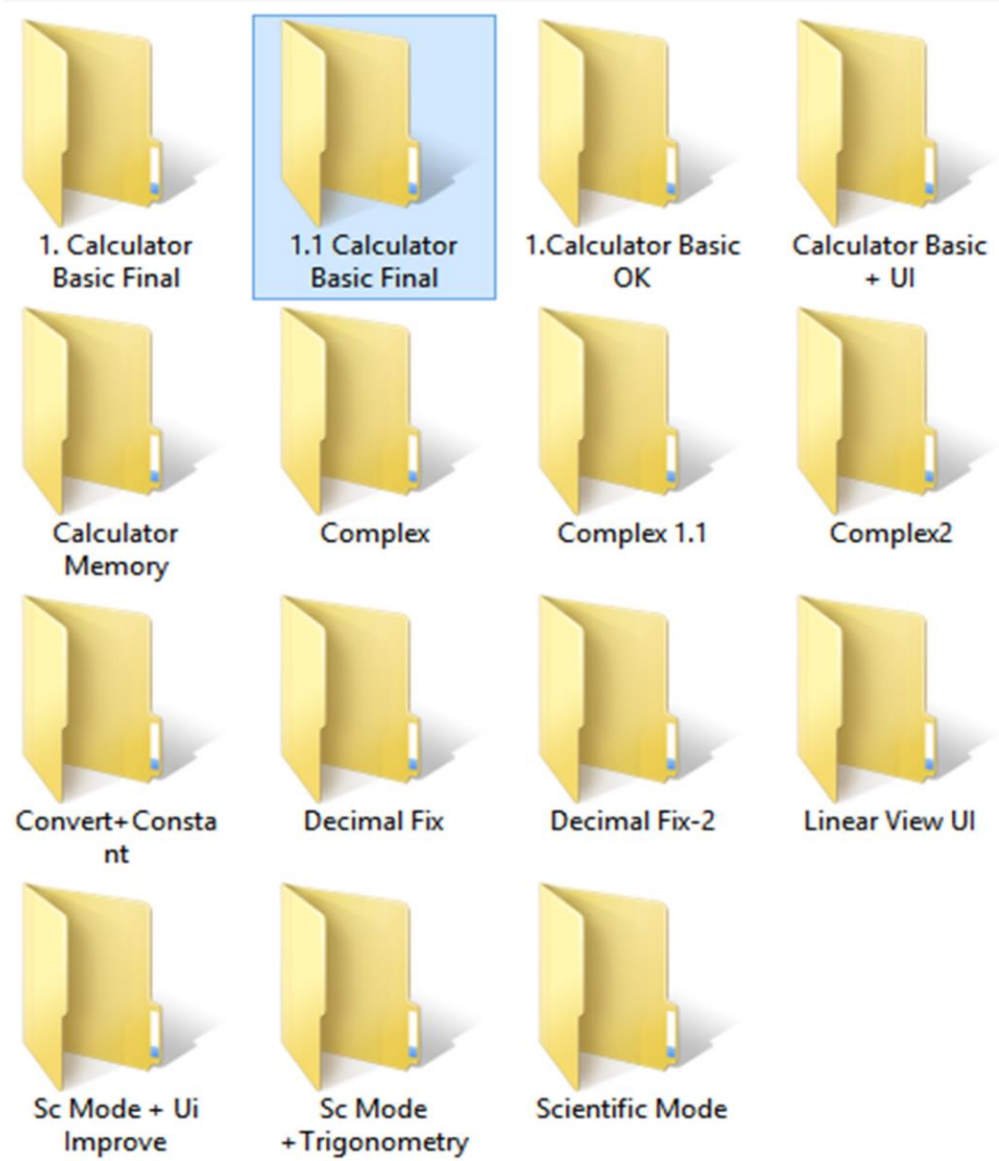
Let’s see this from BASH


5LGGE6ER6
F6VDGEQ1
GG2GE6EO3
Head

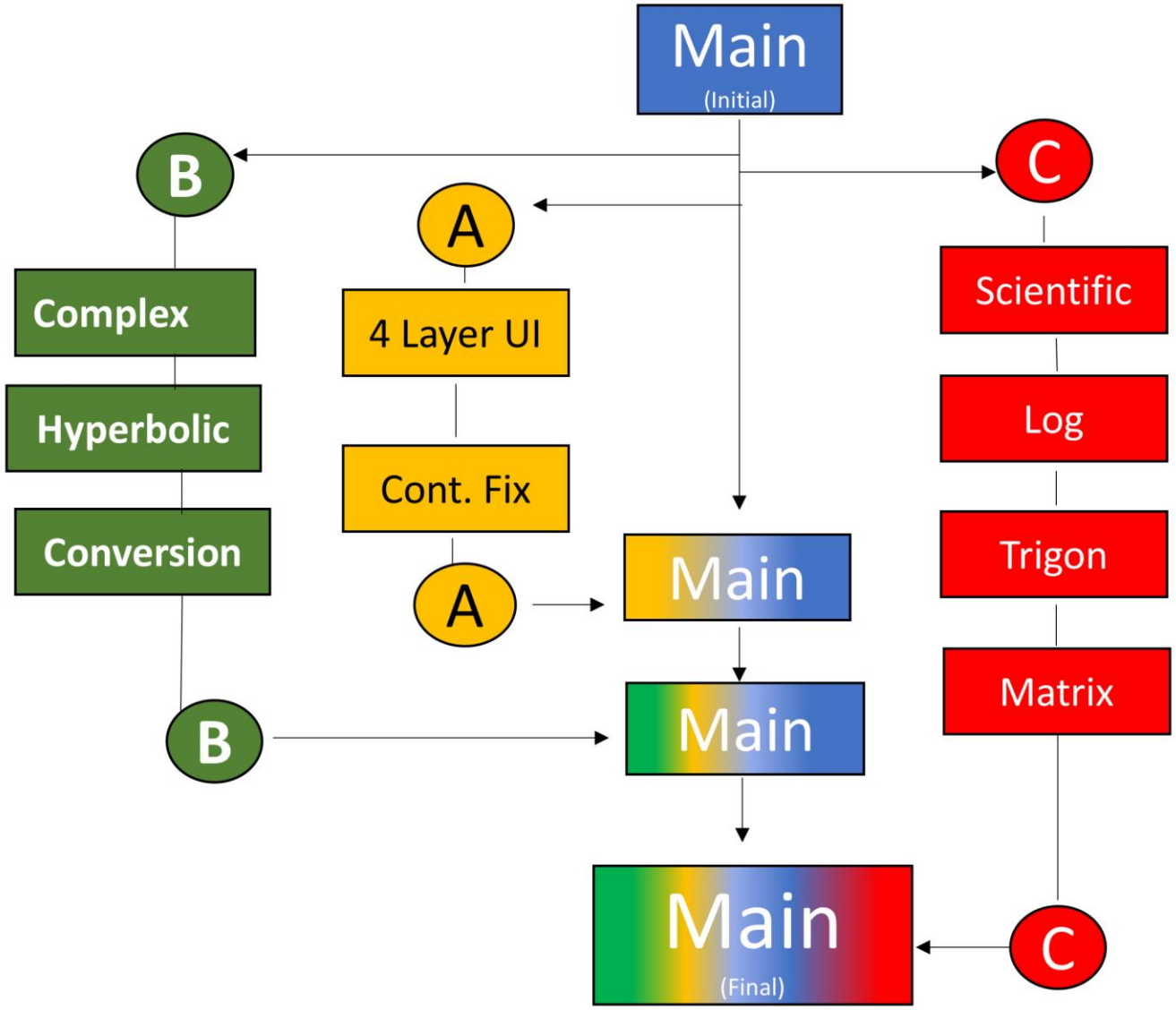
Overview

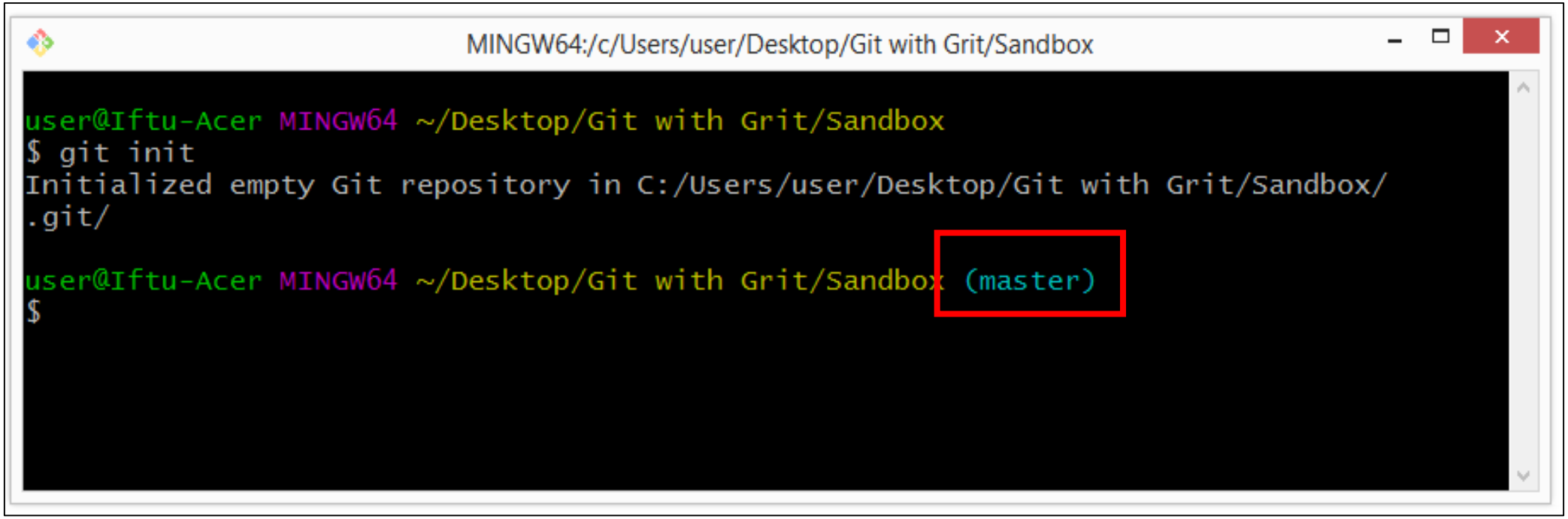
https://learngitbranching.js.org/?NODEMO

Make the Smart Choice !



Vs.

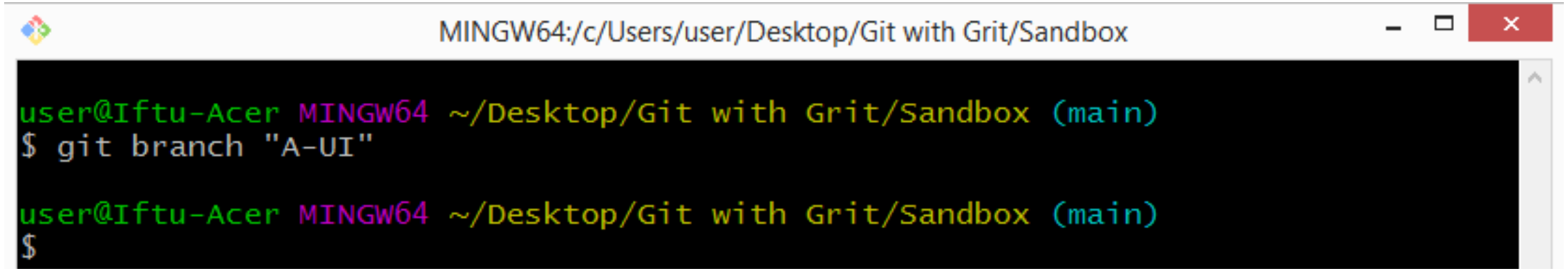




So, the earlier day, we were on a branch named **MASTER**

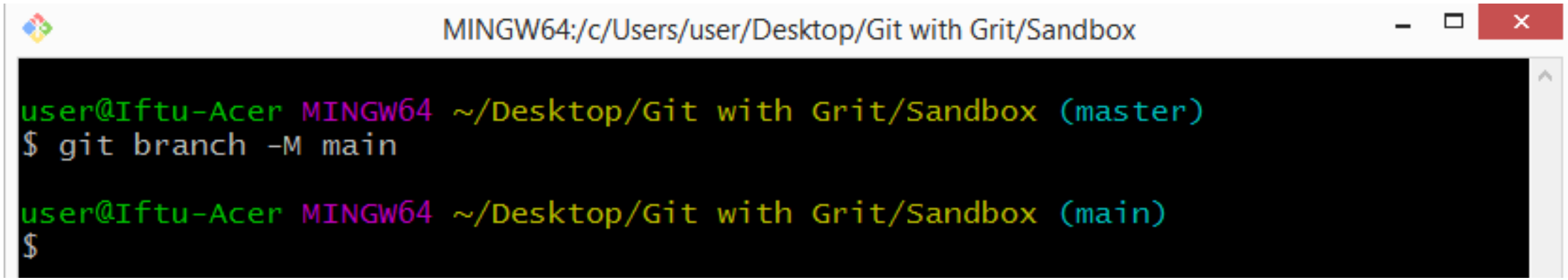
Creating New Branch named A-UI

```
$ git branch “Br Name”
```



Let's rename Master to MAIN

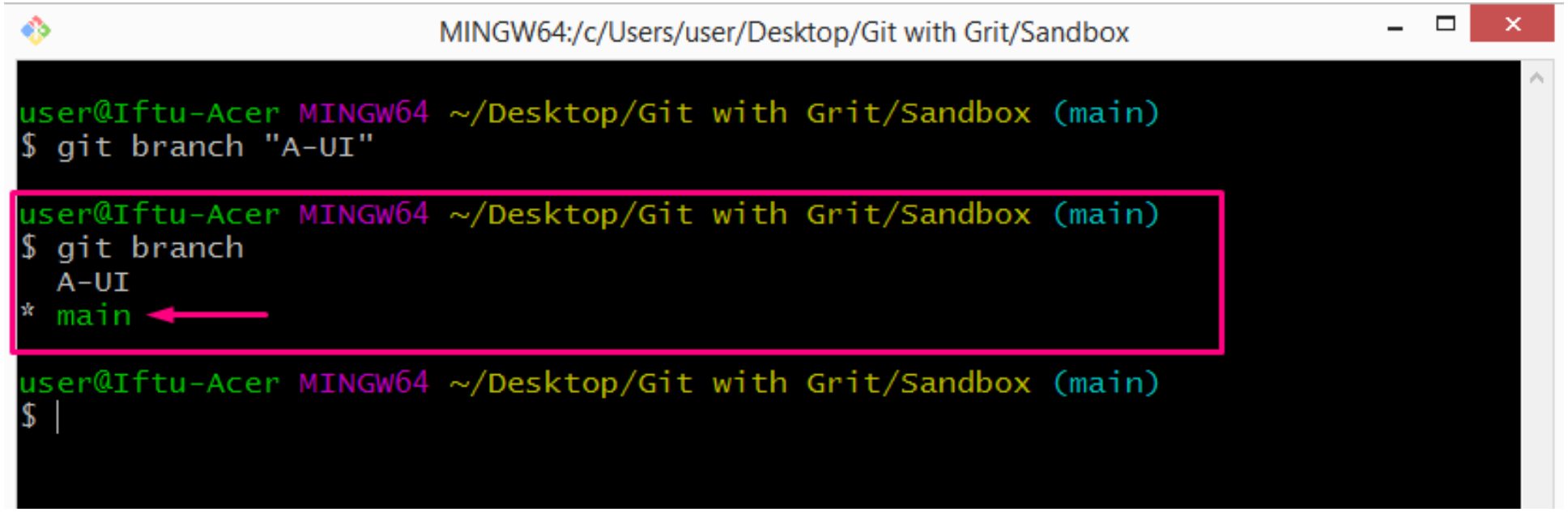
```
$ git branch -M main
```



This renaming is done as a part of an adoption by GitHub from October 1st,2020 .
"Main" is the default branch name in GitHub
https://github.com/github/renaming

See the list of all branches

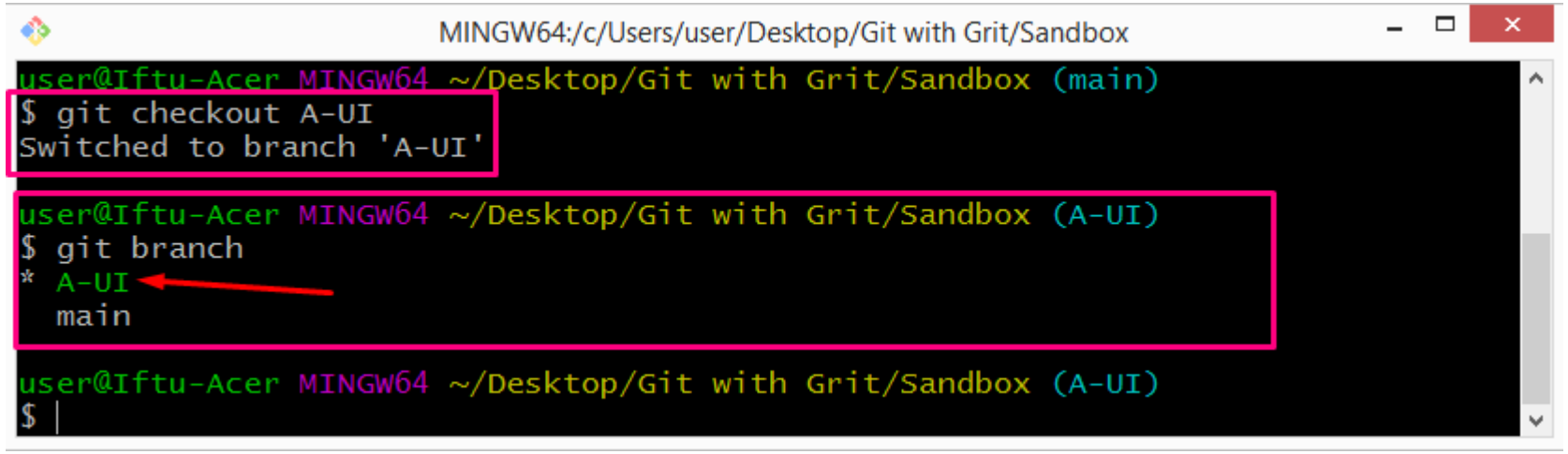
```
$ git branch
```



Asterisk (*) indicate the current branch

Going to other Branches

```
$ git checkout “Branch Name”
```



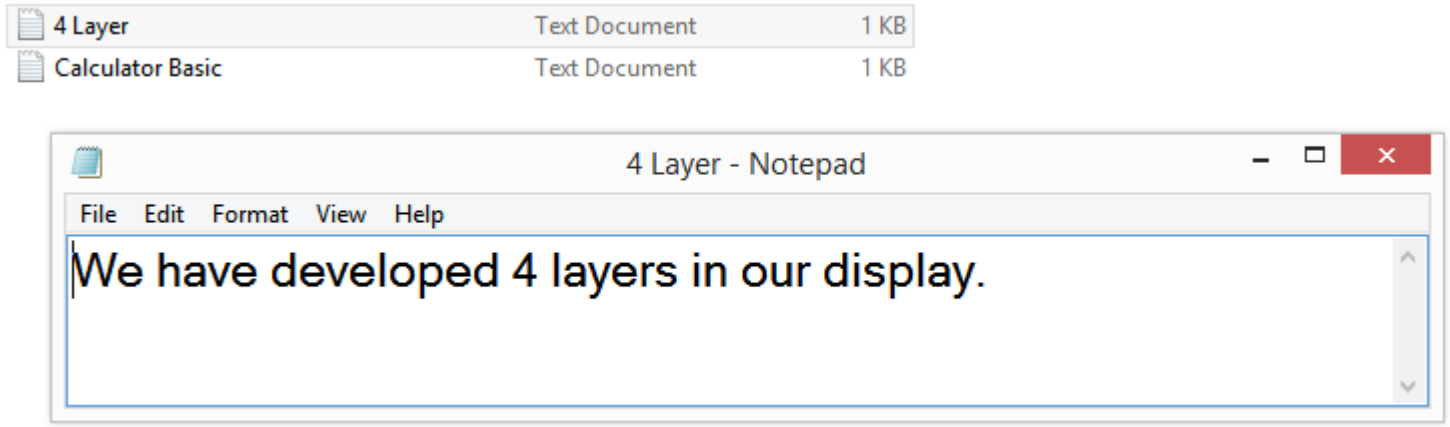
Asterisk (*) indicating the A-UI branch
Also have a look at the bracket **(A-UI)**

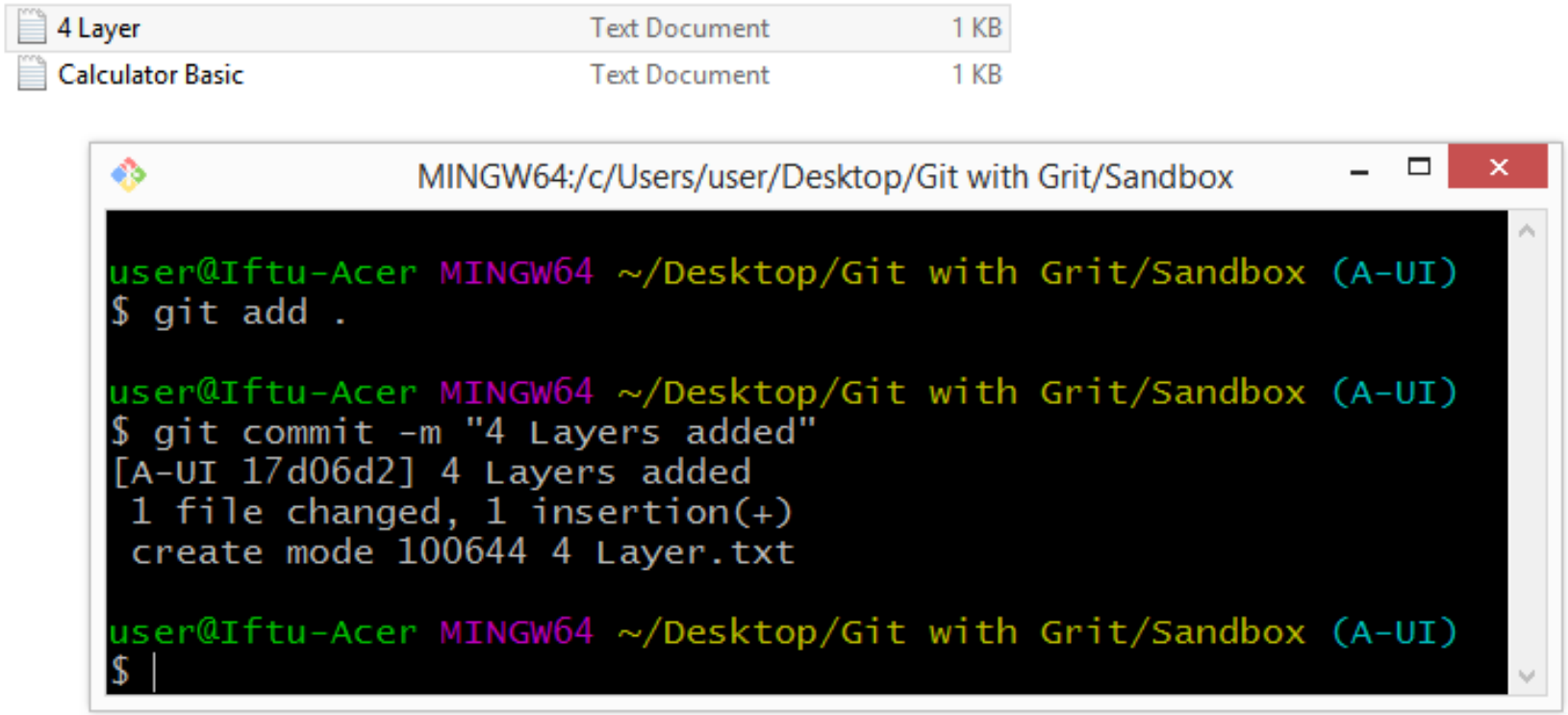
Branch creation and checkout can be done with just 1 command

```
$ git checkout -b “Branch Name”
```

Let’s Work on other branch

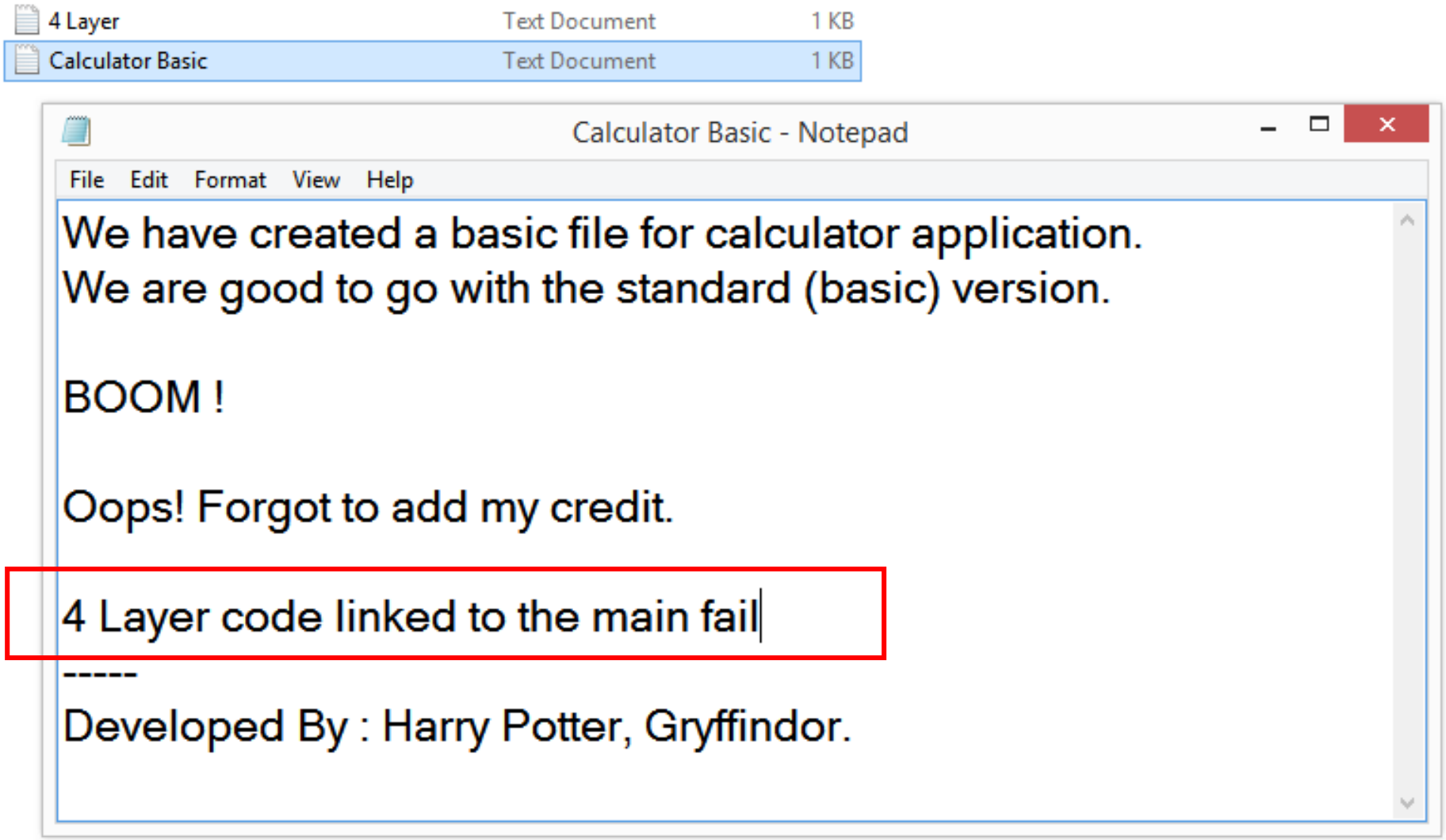
File added



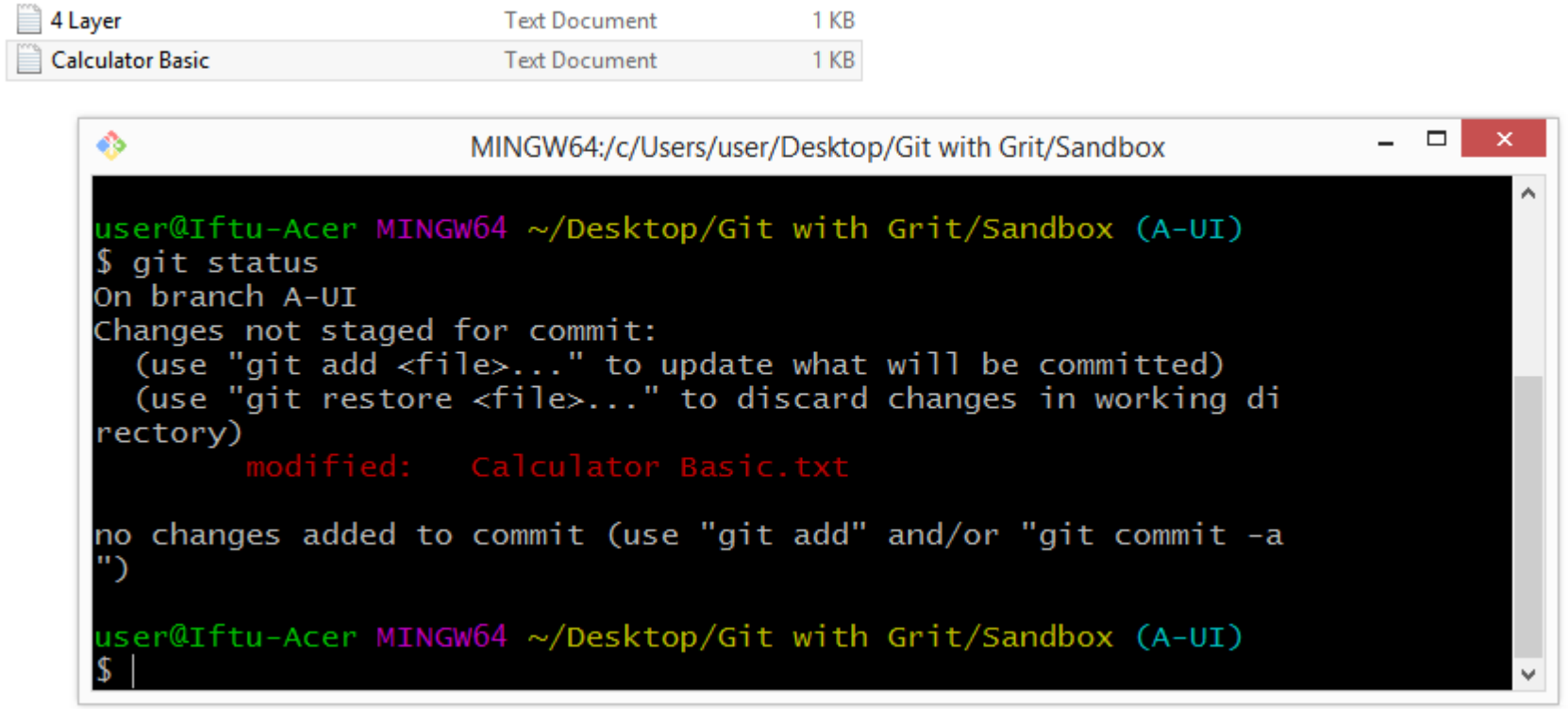



```
$ git add .
$ git commit
```

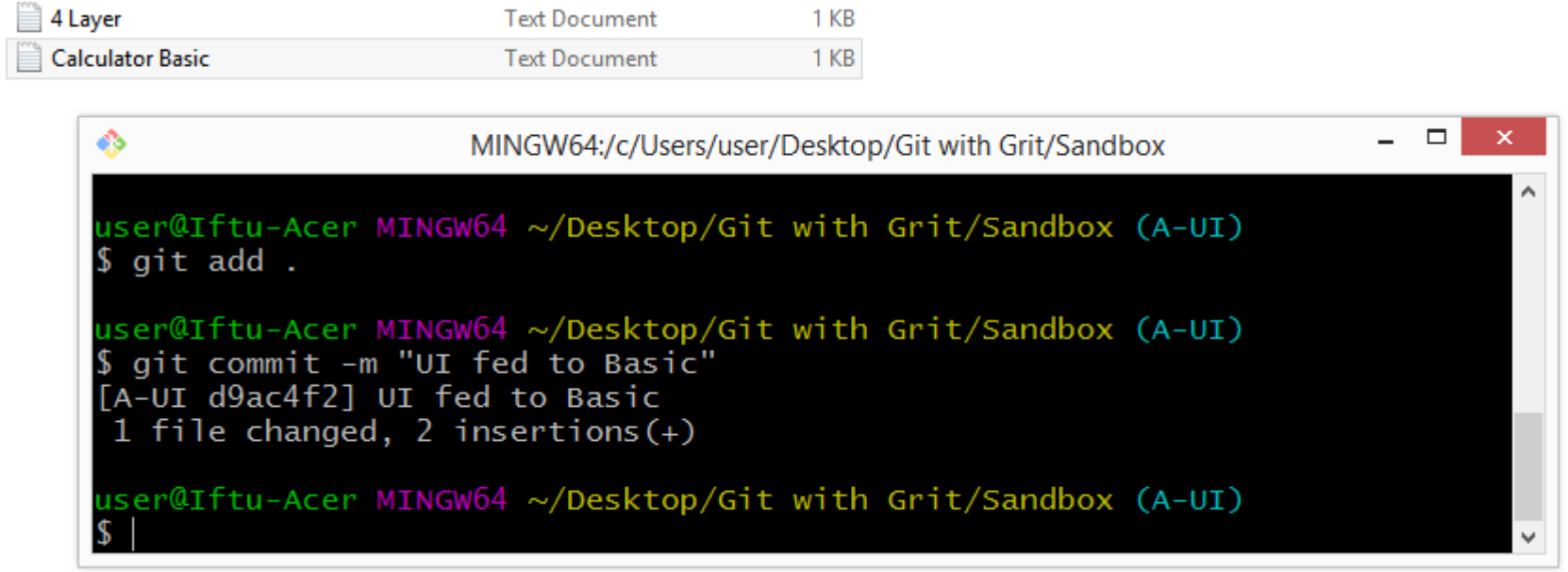
Edited the file from MAIN branch , here in the A-UI Branch



```
$ git status
```

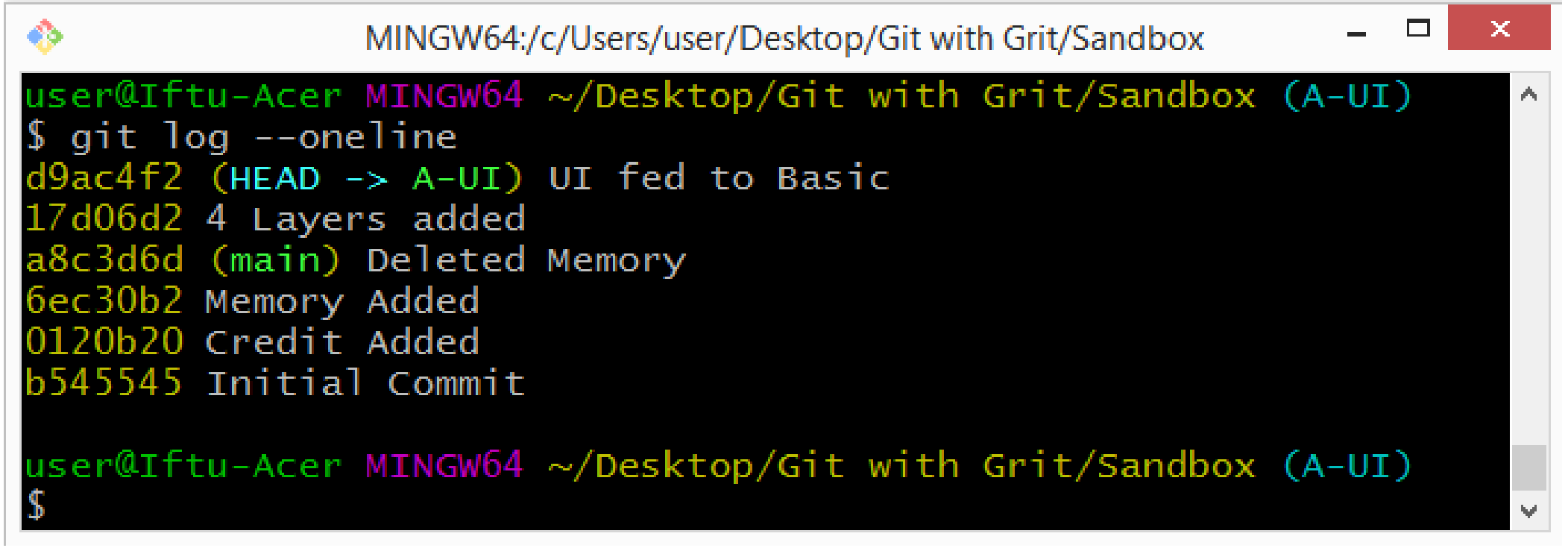


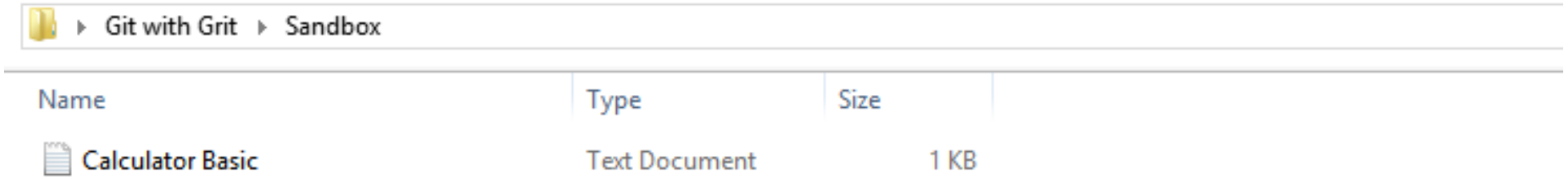

```
$ git add .
$ git commit
```



Let’s see the history

```
$ git log --oneline
```

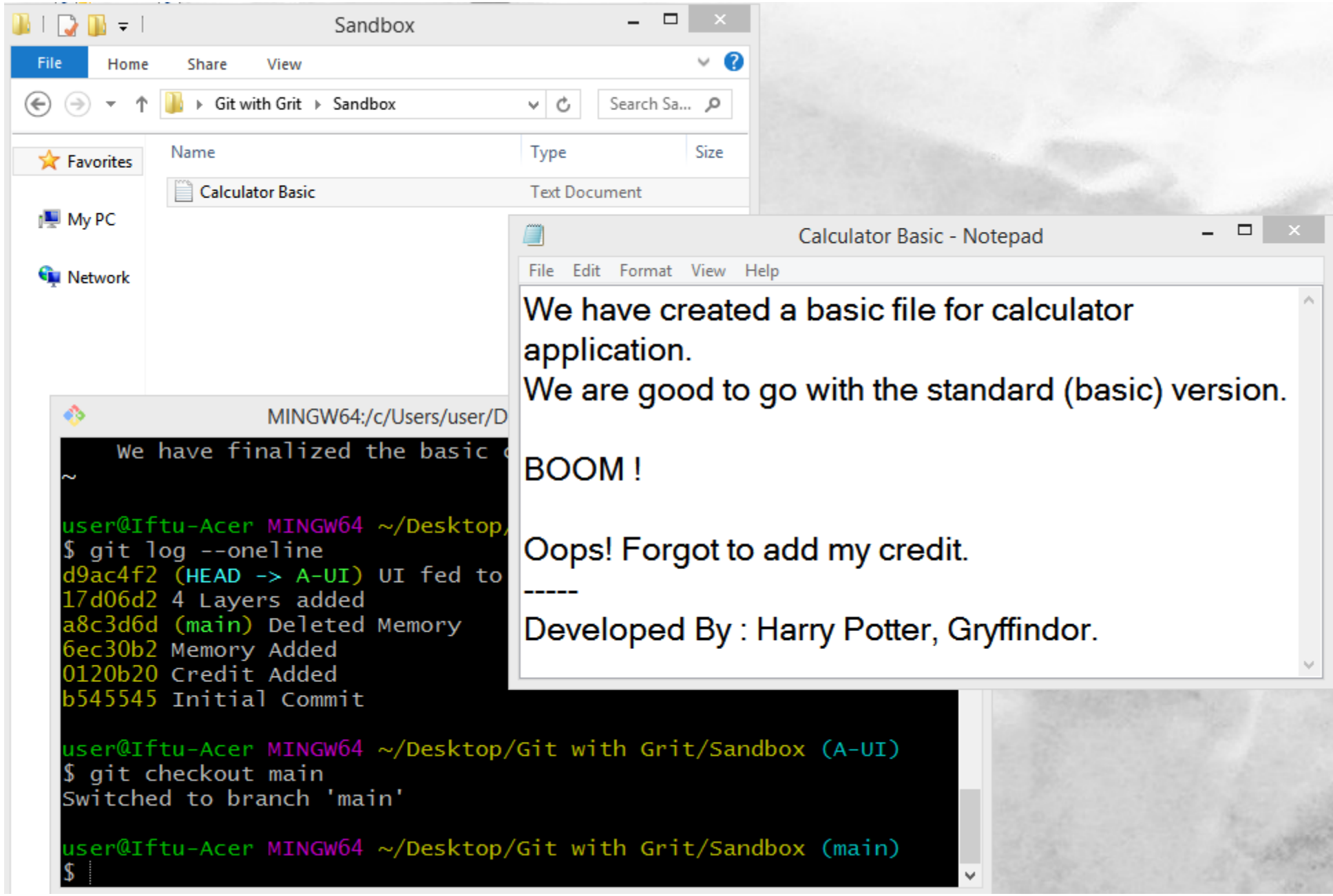


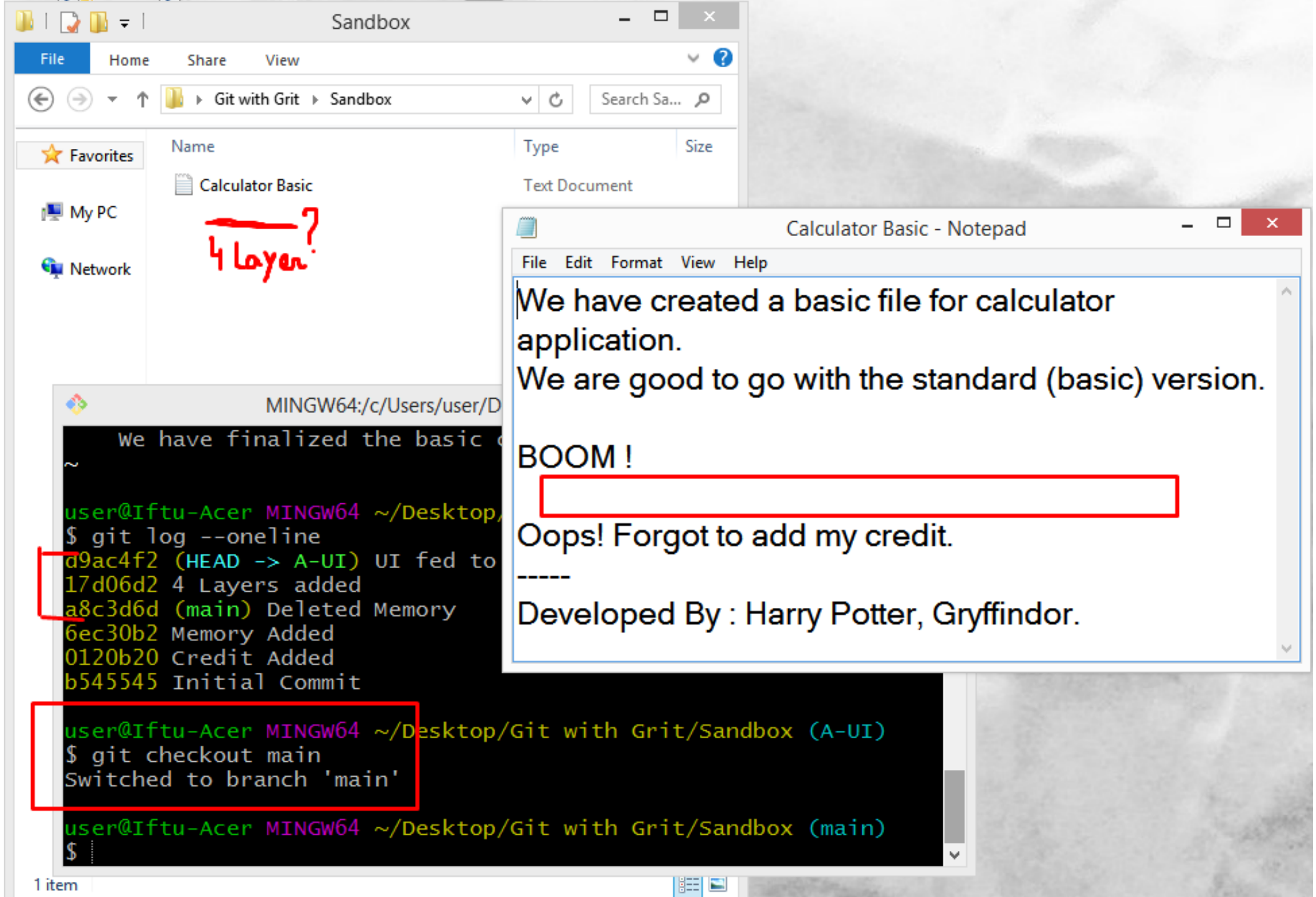


The moment we checked out to MAIN branch that “4 Layer.txt” of A-UI branch disappeared

That edit disappeared as well.
Why not ?

We edited in the **A-UI** branch, not in the **main**.




Sandbox
File
Home
Share
View
Git with Grit
Sandbox
Search Sa...
Favorites
My PC
Network
Name
Type
Size
Calculator Basic
Text Document
4 layer?
1 item
Calculator Basic - Notepad
File
Edit
Format
View
Help
We have created a basic file for calculator application.
We are good to go with the standard (basic) version.
BOOM !
Oops! Forgot to add my credit.

Developed By : Harry Potter, Gryffindor.
MINGW64:/c/Users/user/D
We have finalized the basic
~
user@Iftu-Acer MINGW64 ~/Desktop/
$ git log --oneline
d9ac4f2 (HEAD -> A-UI) UI fed to
17d06d2 4 Layers added
a8c3d6d (main) Deleted Memory
6ec30b2 Memory Added
0120b20 Credit Added
b545545 Initial Commit
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Sandbox (A-UI)
$ git checkout main
Switched to branch 'main'
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Sandbox (main)
$

Let’s see all the commits made after we went to A-UI earlier

```
$ git log main..A-UI
```

Commits that are on **A-UI** , but not in **main**.

Let’s explore the differences between the branches

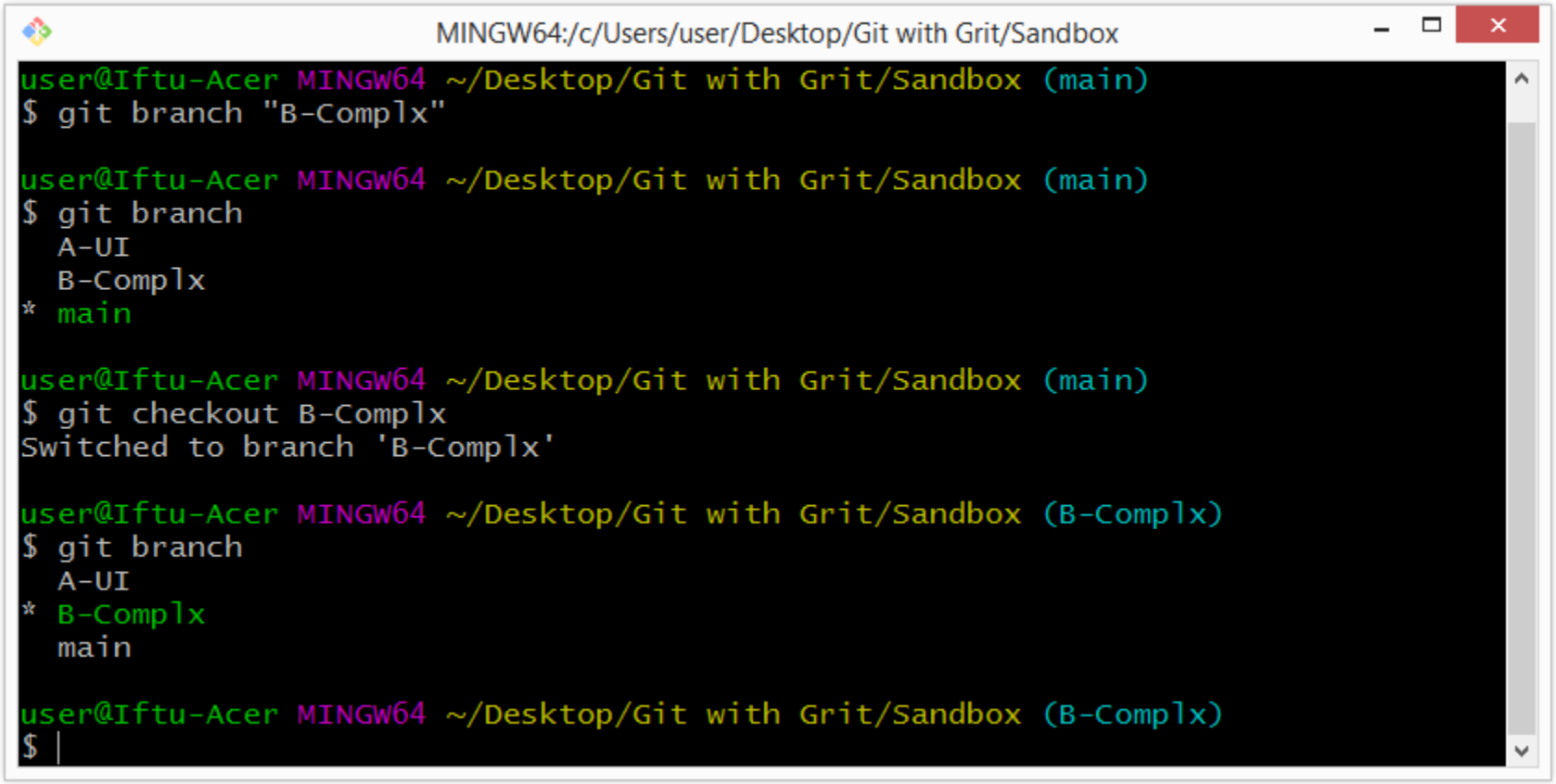
```
$ git diff main..A-UI
```

MINGW64:/c/Users/user/Desktop/Git with Grit/Sandbox

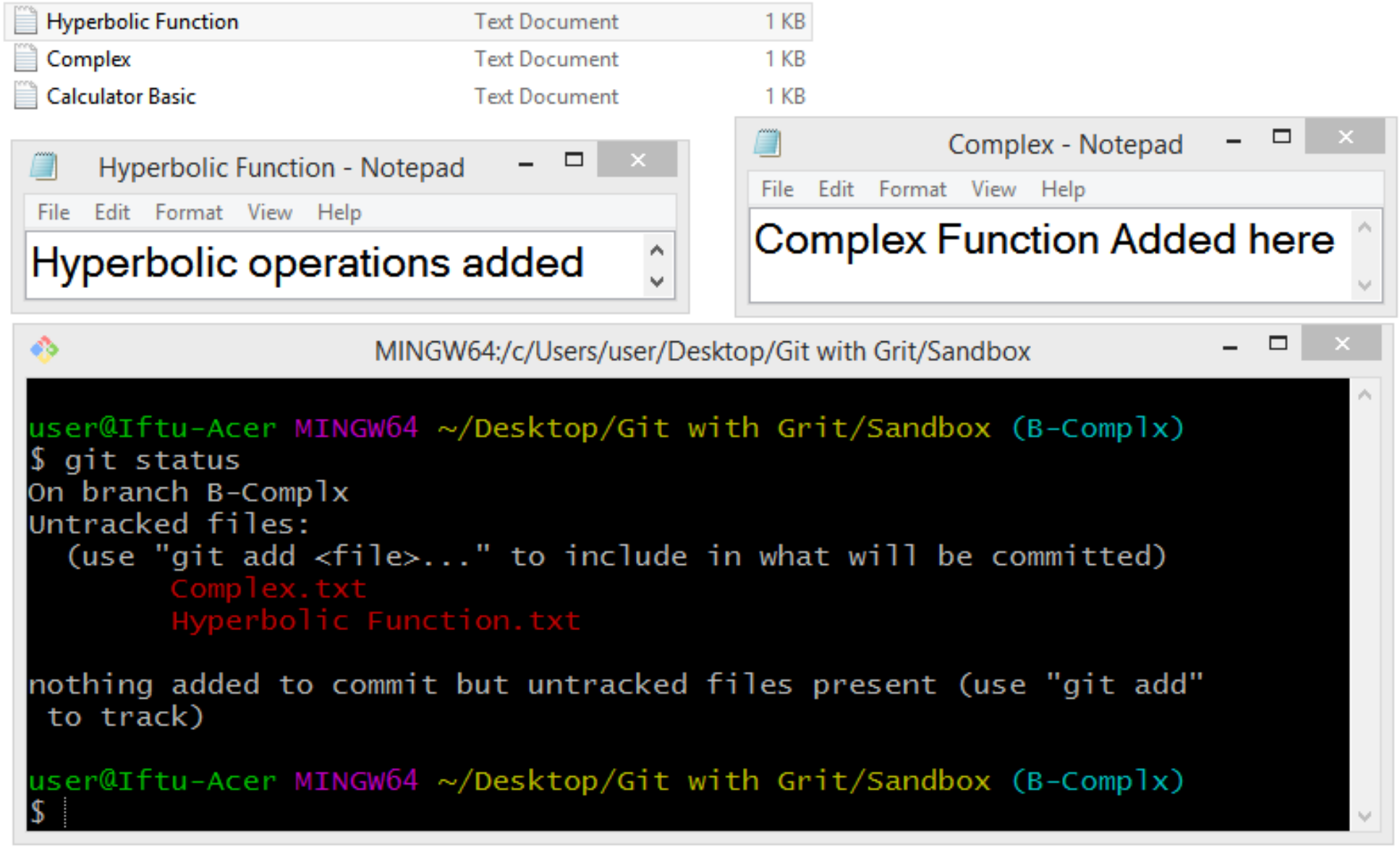
```
user@Iftu Acer MINGW64 ~/Desktop/Git with Grit/Sandbox (main)
$ git diff main..A-UI
diff --git a/4 Layer.txt b/4 Layer.txt
new file mode 100644
index 0000000..e377639
--- /dev/null
+++ b/4 Layer.txt
@@ -0,0 +1 @@
+We have developed 4 layers in our display.
\ No newline at end of file
diff --git a/Calculator Basic.txt b/Calculator Basic.txt
index 78f8959..67c4ddf 100644
--- a/Calculator Basic.txt
+++ b/Calculator Basic.txt
@@ -4,5 +4,7 @@ We are good to go with the standard (basic) version.
 BOOM !

 Oops! Forgot to add my credit.
+
:...skipping...
diff --git a/4 Layer.txt b/4 Layer.txt
new file mode 100644
index 0000000..e377639
--- /dev/null
+++ b/4 Layer.txt
@@ -0,0 +1 @@
+We have developed 4 layers in our display.
\ No newline at end of file
diff --git a/Calculator Basic.txt b/Calculator Basic.txt
index 78f8959..67c4ddf 100644
--- a/Calculator Basic.txt
+++ b/Calculator Basic.txt
@@ -4,5 +4,7 @@ We are good to go with the standard (basic) version.
 BOOM !

 Oops! Forgot to add my credit.
+
+4 Layer code linked to the main fail
```

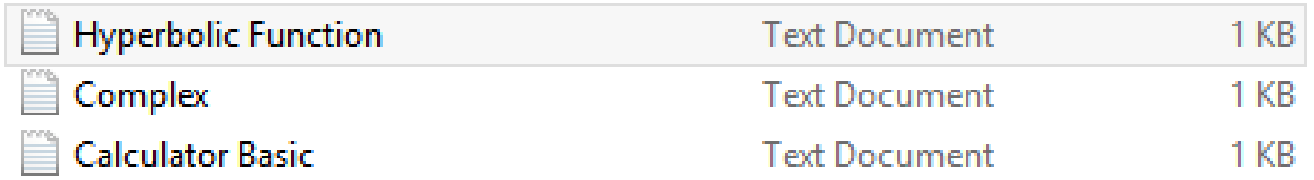
During editing, I wrote "fail" instead of "file".
Sorry for the Spelling error

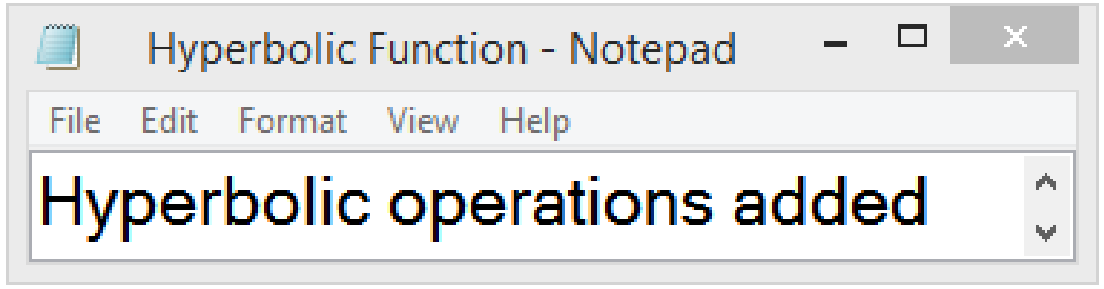
Create another branch

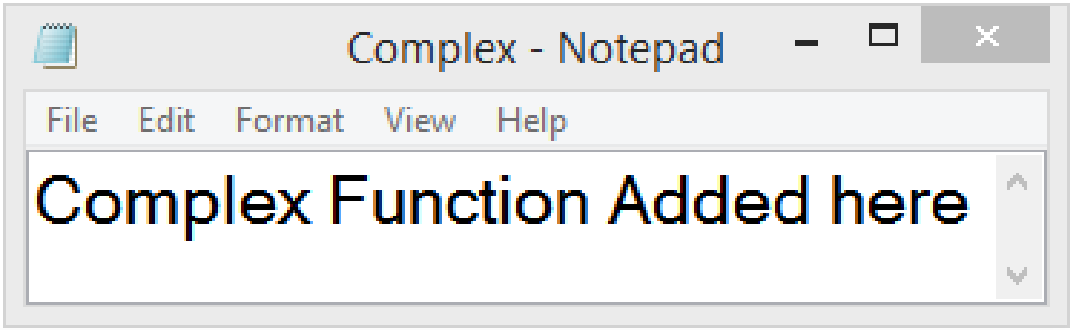


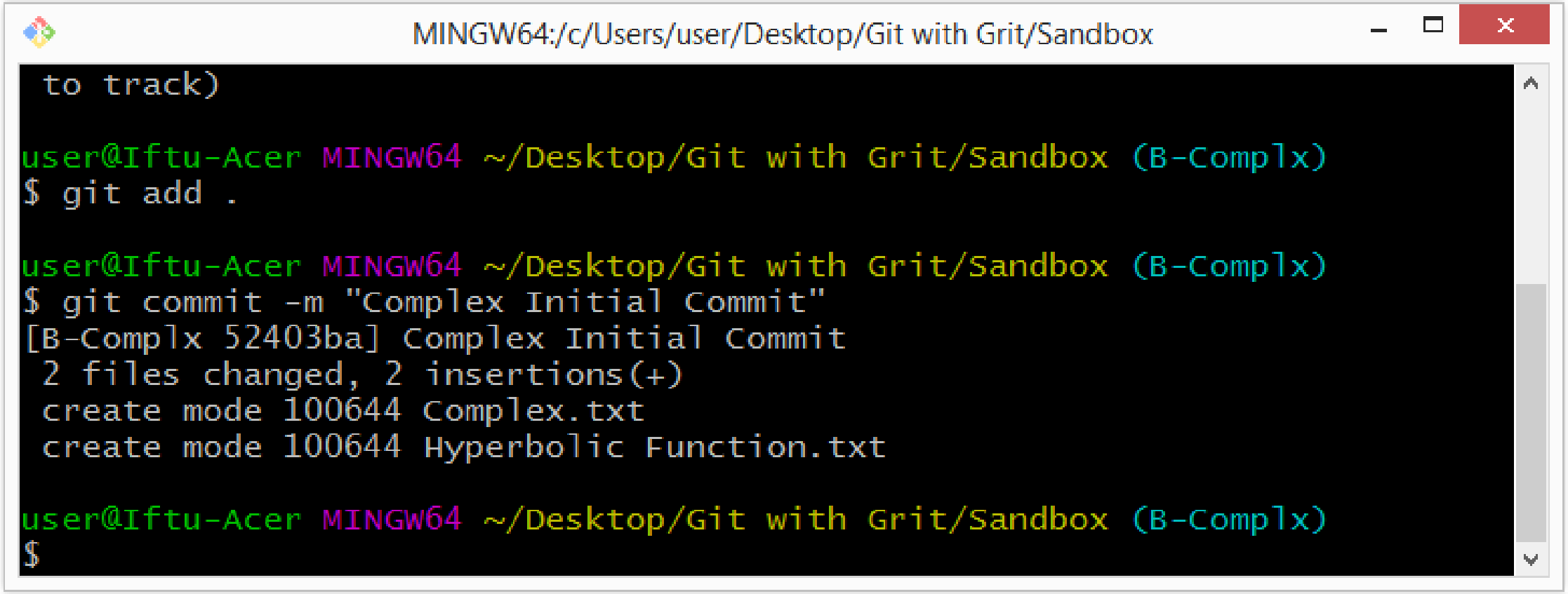
Bringing Changes in the new branch “B-Complx”




Hyperbolic Function Text Document 1 KB
Complex Text Document 1 KB
Calculator Basic Text Document 1 KB

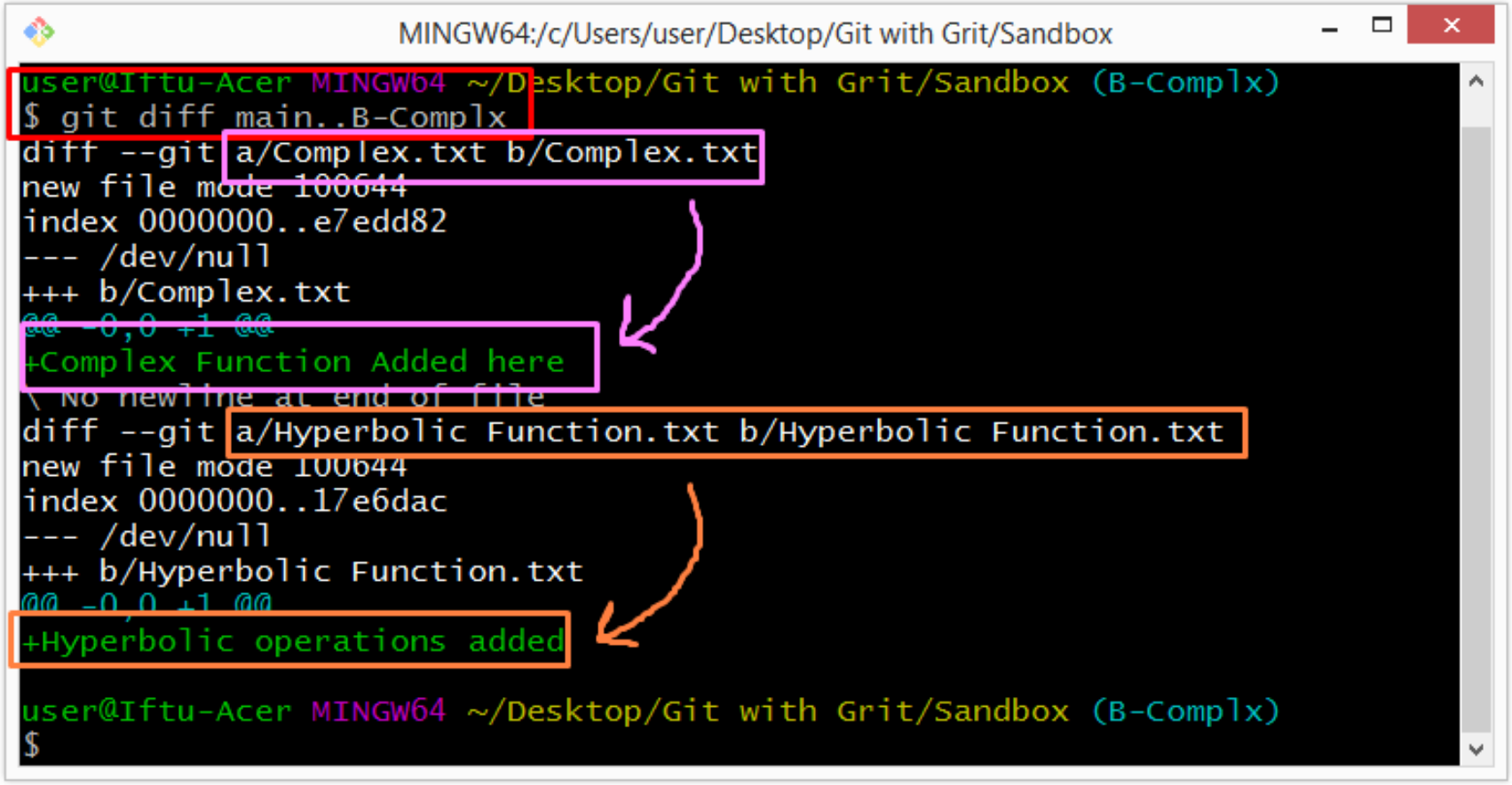

Hyperbolic Function - Notepad
File Edit Format View Help
Hyperbolic operations added

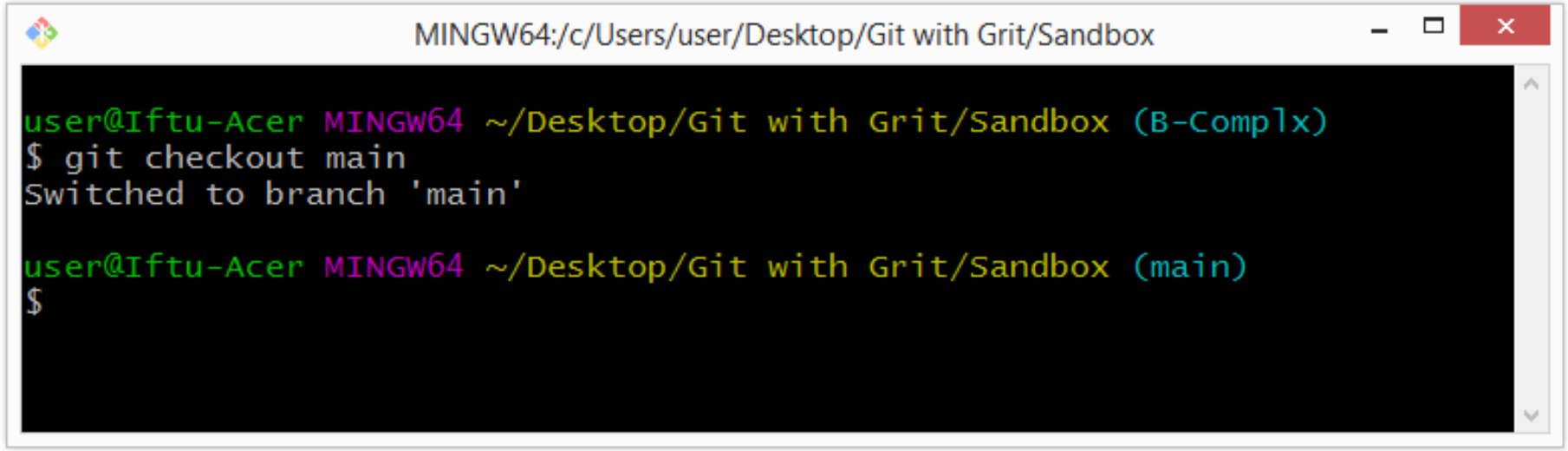

Complex - Notepad
File Edit Format View Help
Complex Function Added here


MINGW64:/c/Users/user/Desktop/Git with Grit/Sandbox
to track)
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Sandbox (B-Complx)
$ git add .
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Sandbox (B-Complx)
$ git commit -m "Complex Initial Commit"
[B-Complx 52403ba] Complex Initial Commit
2 files changed, 2 insertions(+)
create mode 100644 Complex.txt
create mode 100644 Hyperbolic Function.txt
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Sandbox (B-Complx)
$

$ git diff main..B-Complx

Hyperbolic Function	Text Document	1 KB
Complex	Text Document	1 KB
Calculator Basic	Text Document	1 KB





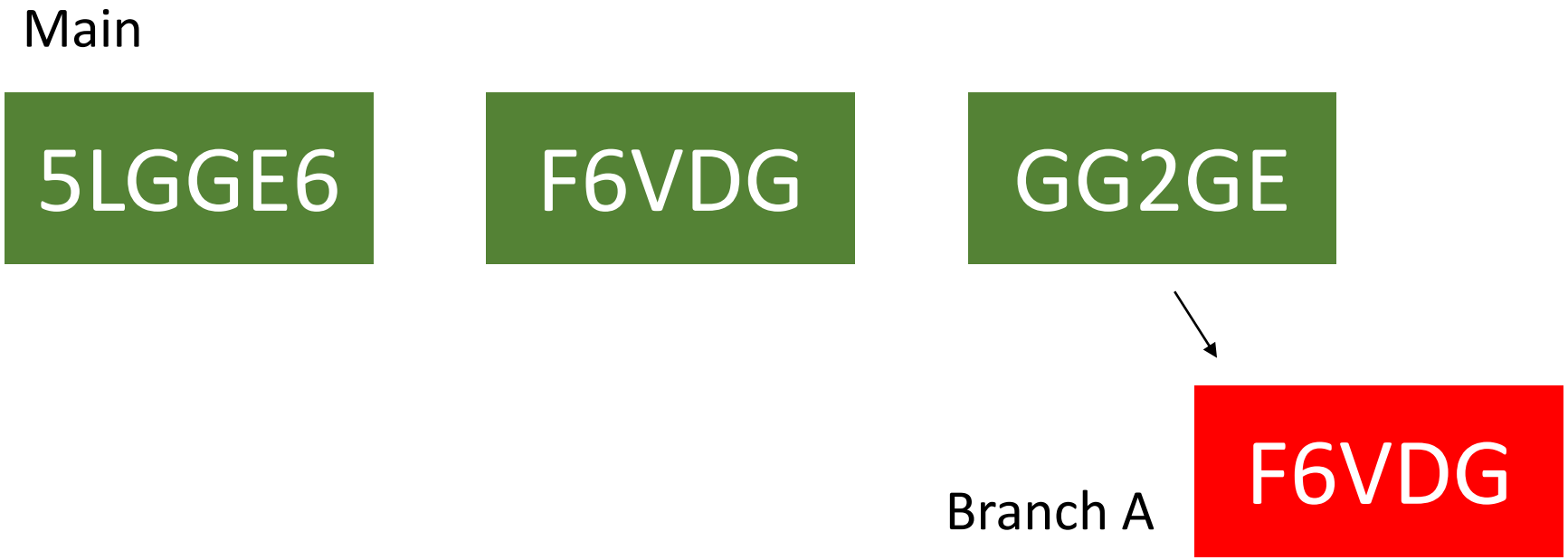
Our works from that **B-Complx** branch disappeared when we switched to **main** branch

Time to

MERGE

the branches

Fast forward vs True Merge

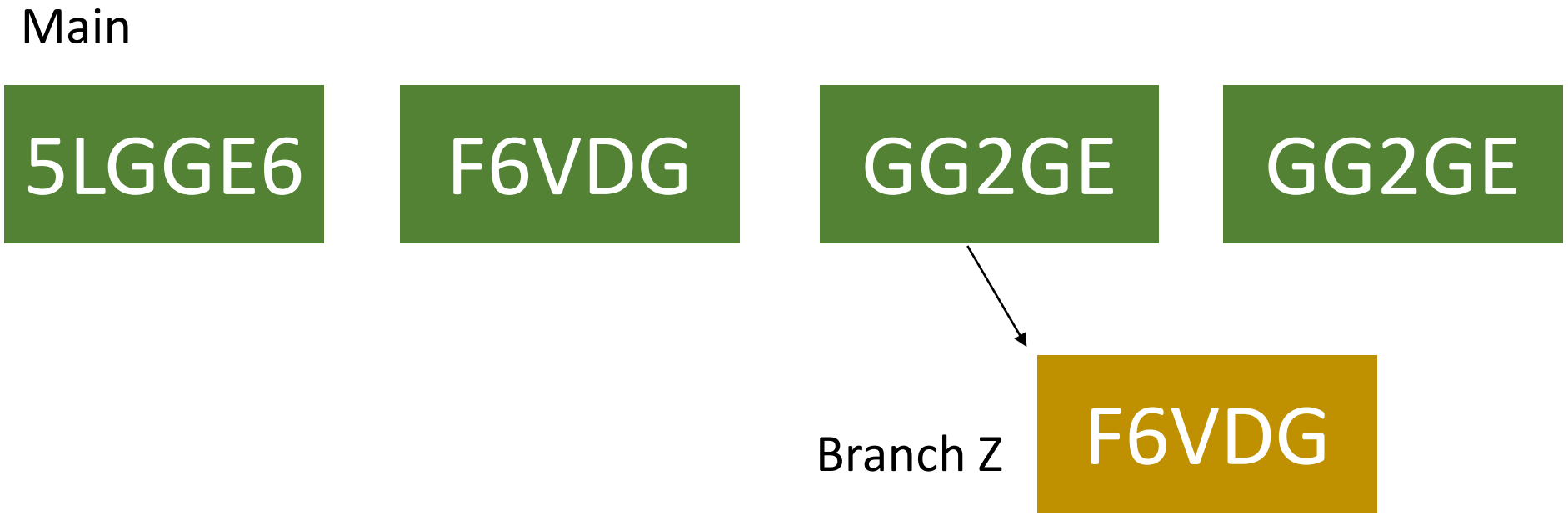


Fast forward

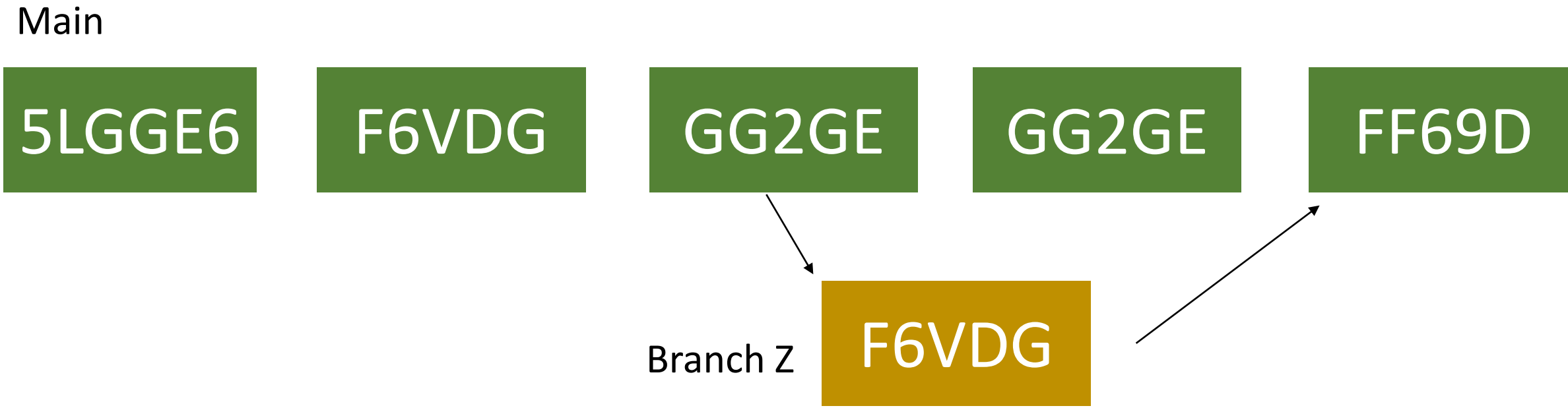
Main

Branch A

True Merge

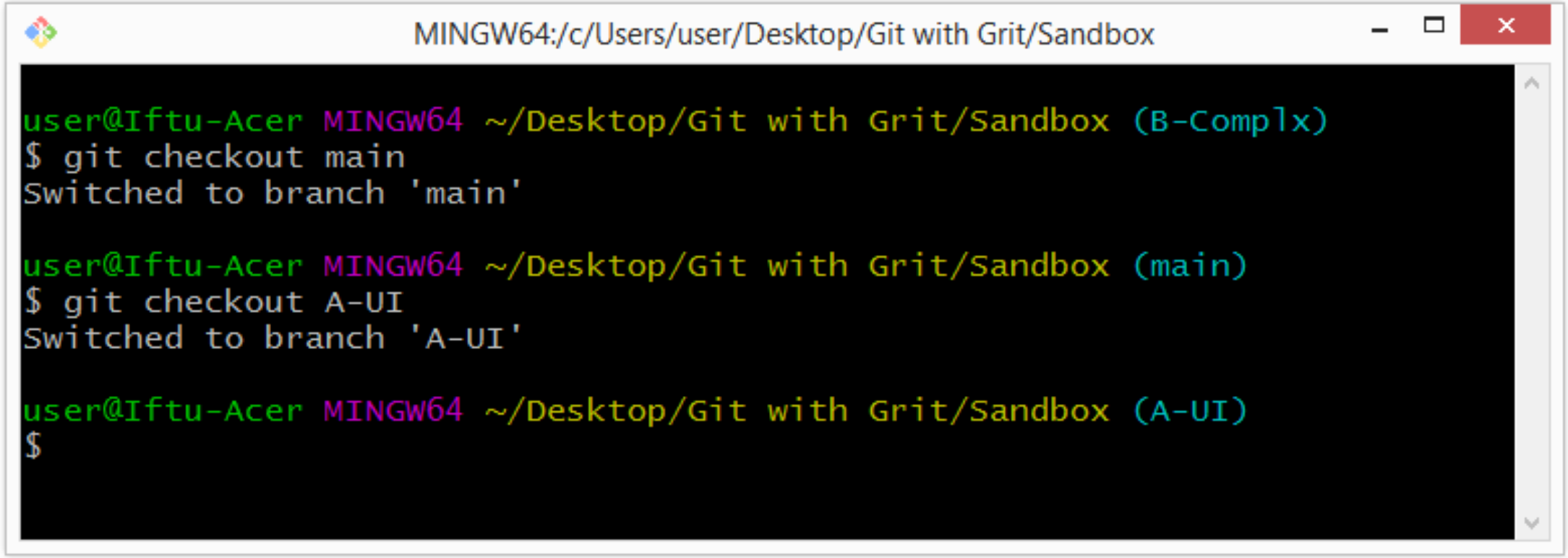


True Merge



We will merge **A-UI** to the **main**.

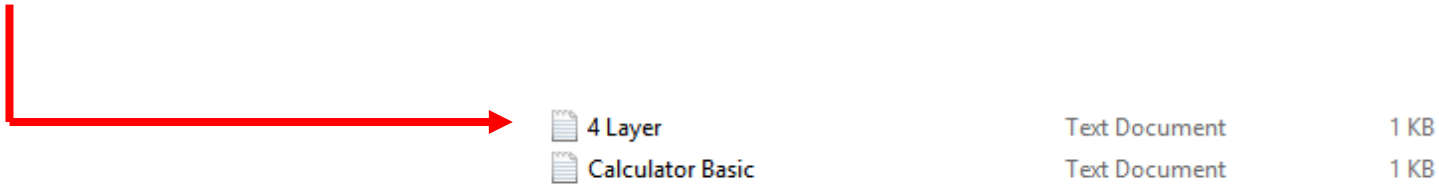
So we need to be on the **main** in order merge into the **main**



$ git merge A-UI

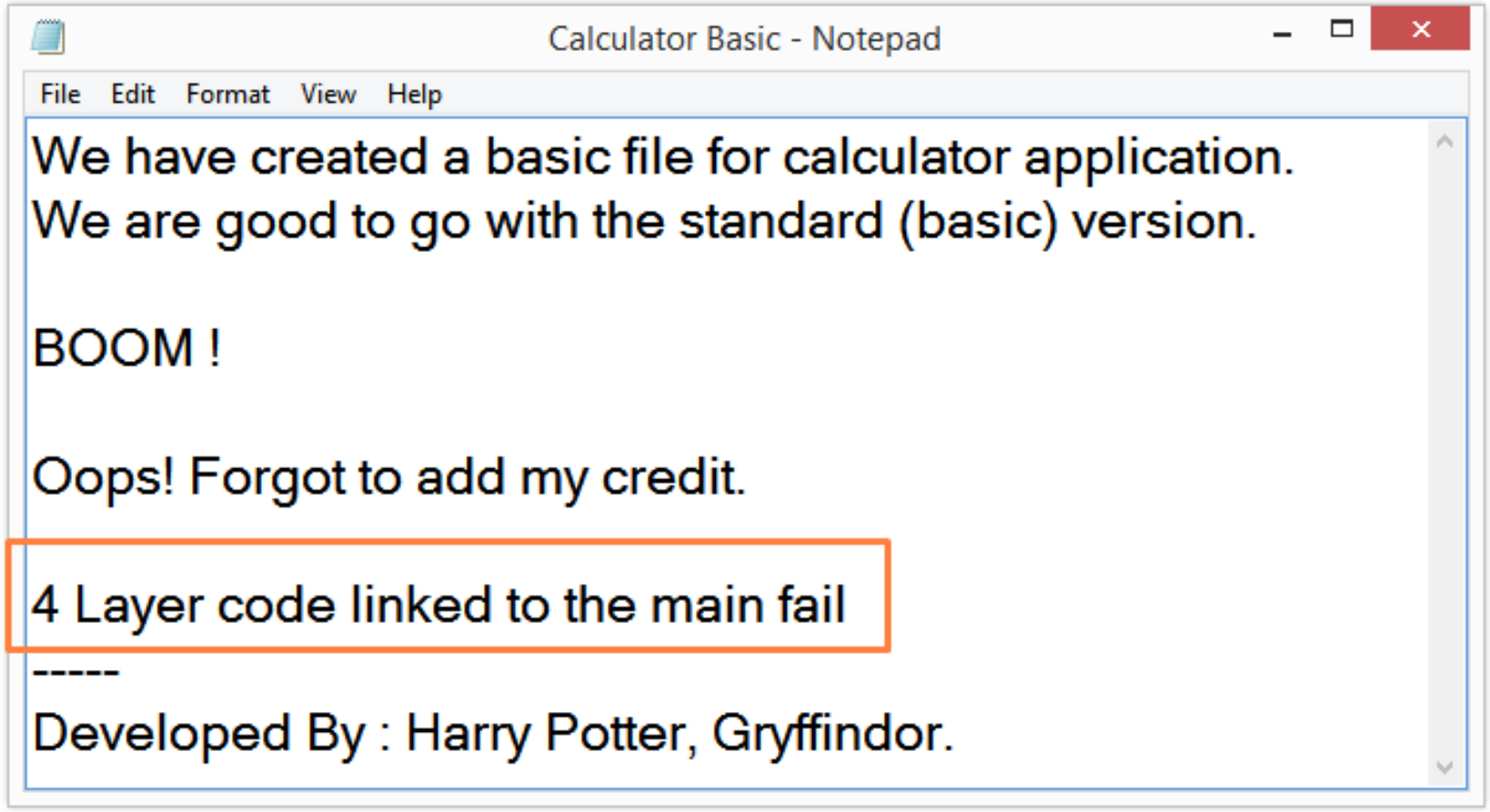
4 Layer	Text Document	1 KB
Calculator Basic	Text Document	1 KB

Did you notice the appearance of “4 Layer.txt” file ?



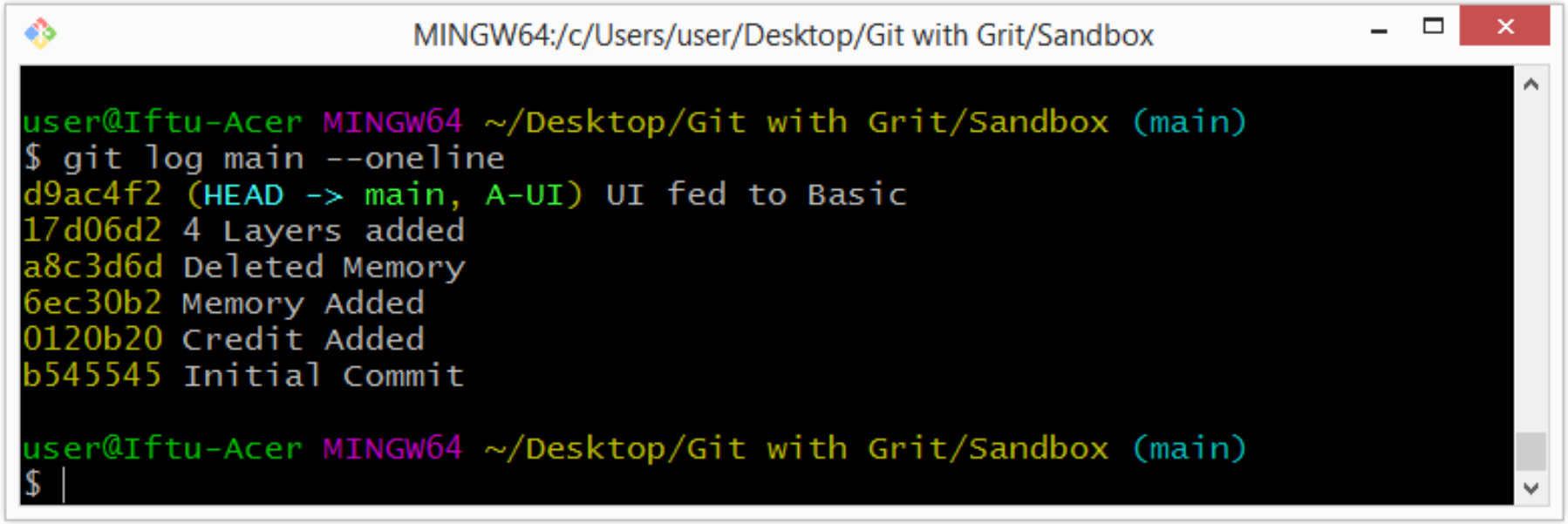
Changes merged as well

4 Layer	Text Document	1 KB
Calculator Basic	Text Document	1 KB



What about the LOG now ?

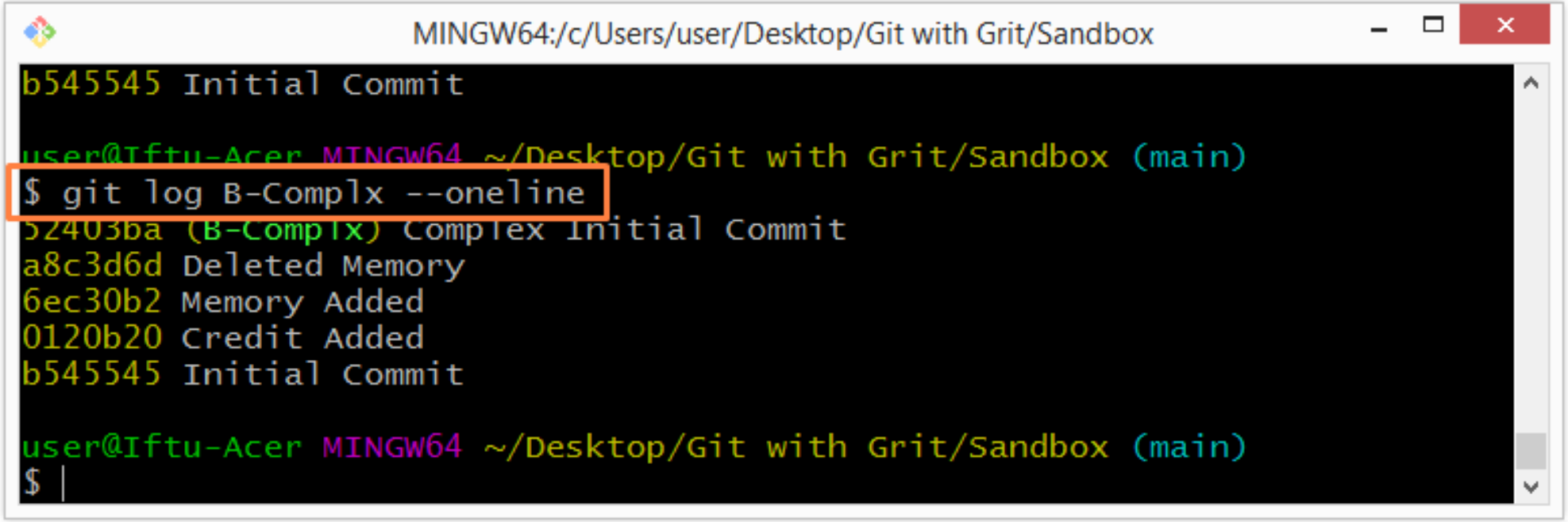
4 Layer	Text Document	1 KB
Calculator Basic	Text Document	1 KB



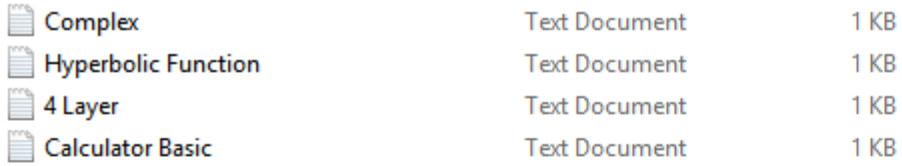
Let’s see the left out branch

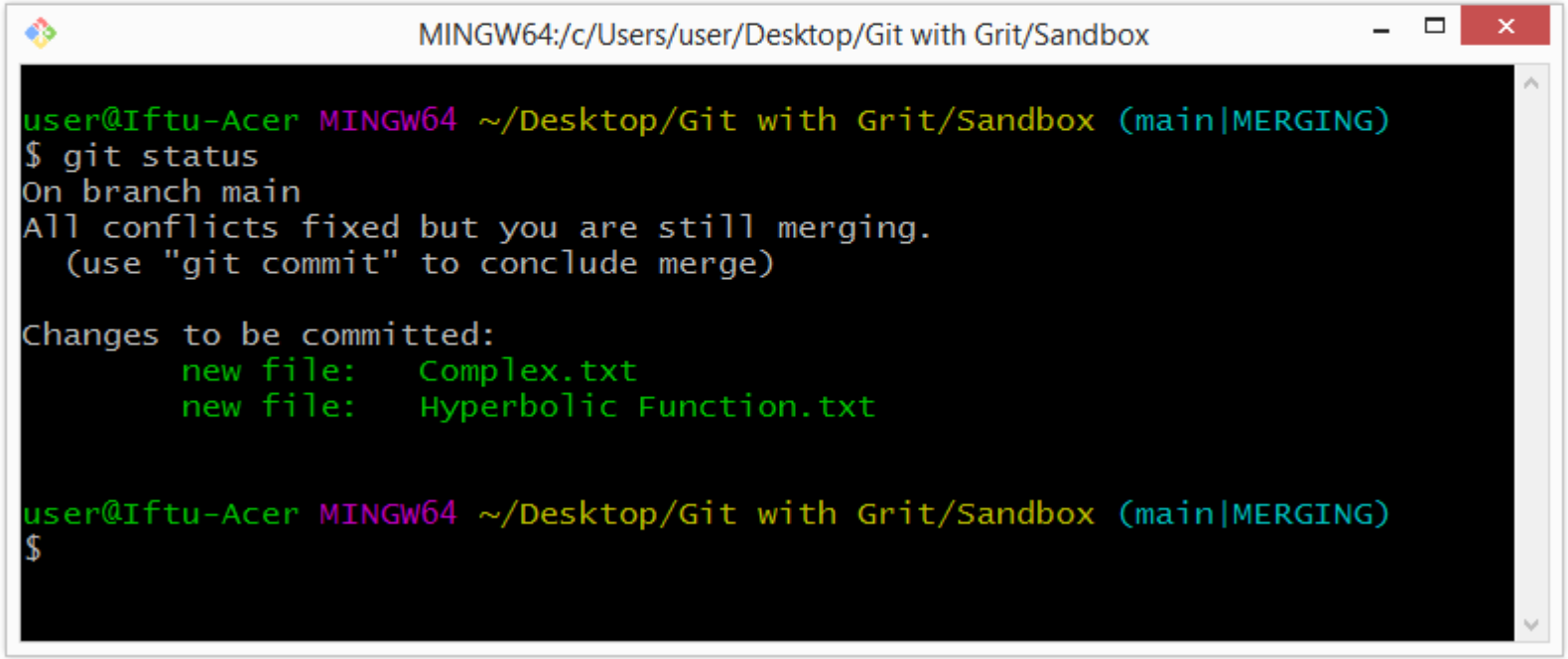
```
$ git log B-Complx --oneline
```

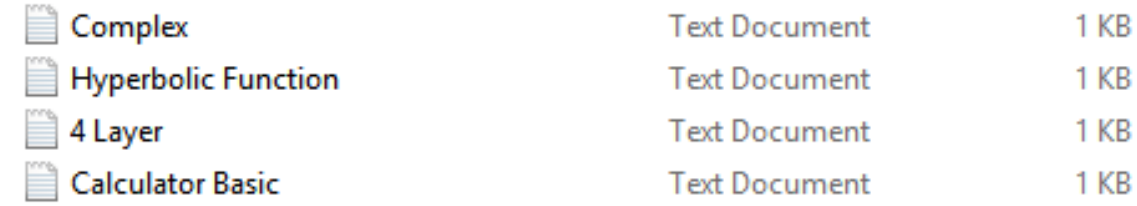
4 Layer	Text Document	1 KB
Calculator Basic	Text Document	1 KB

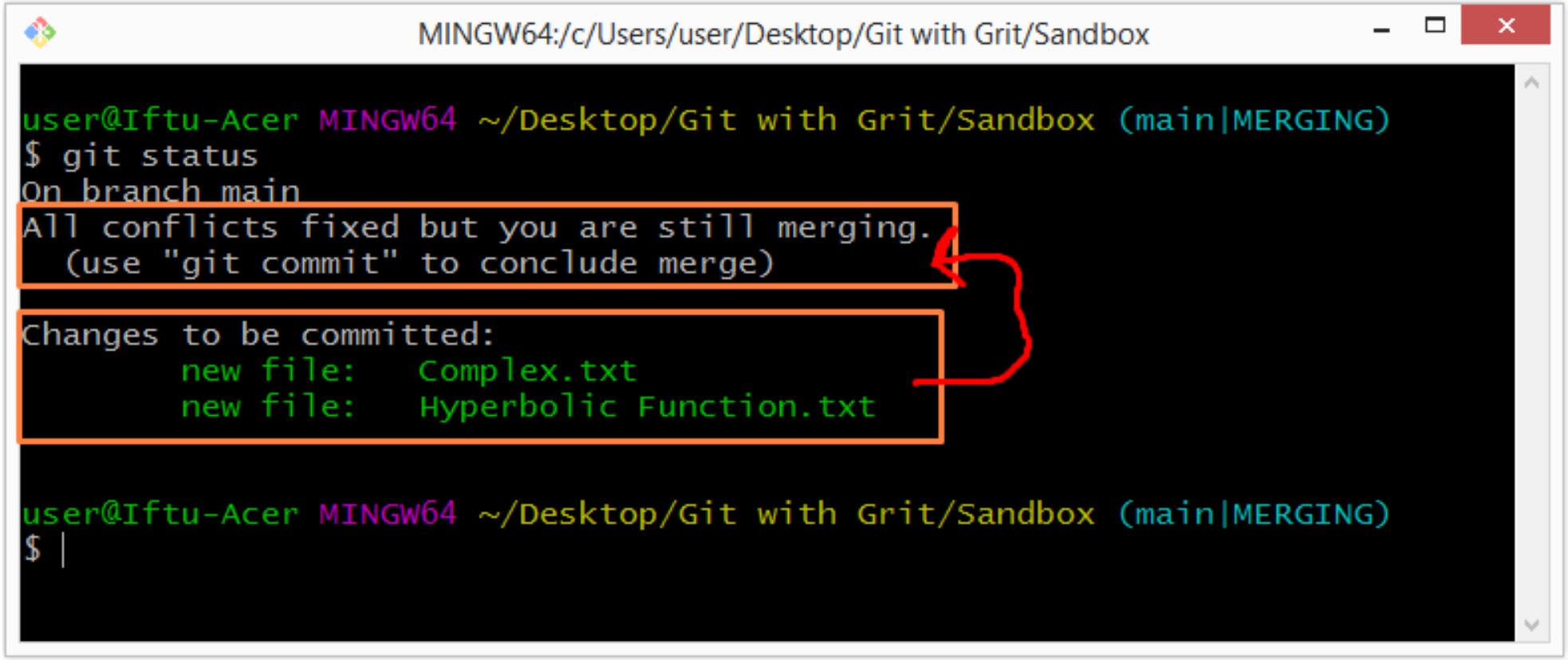


Let’s merge B-Complx now.
Oops ! There is CONFLICT

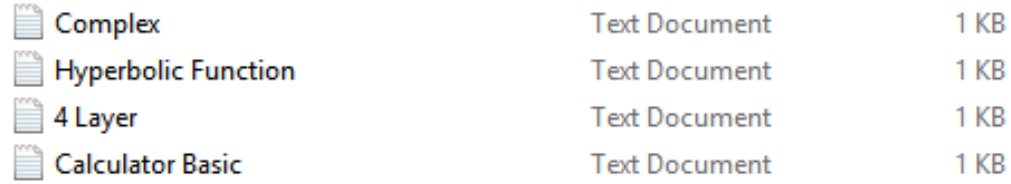




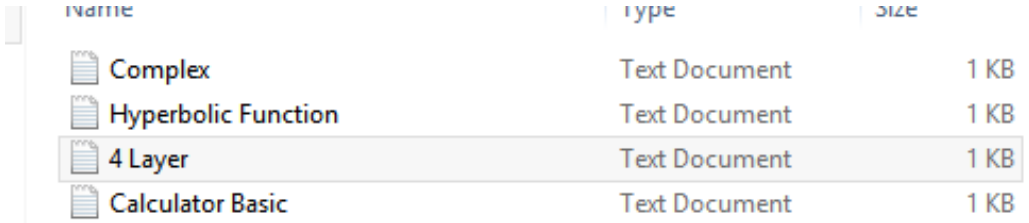


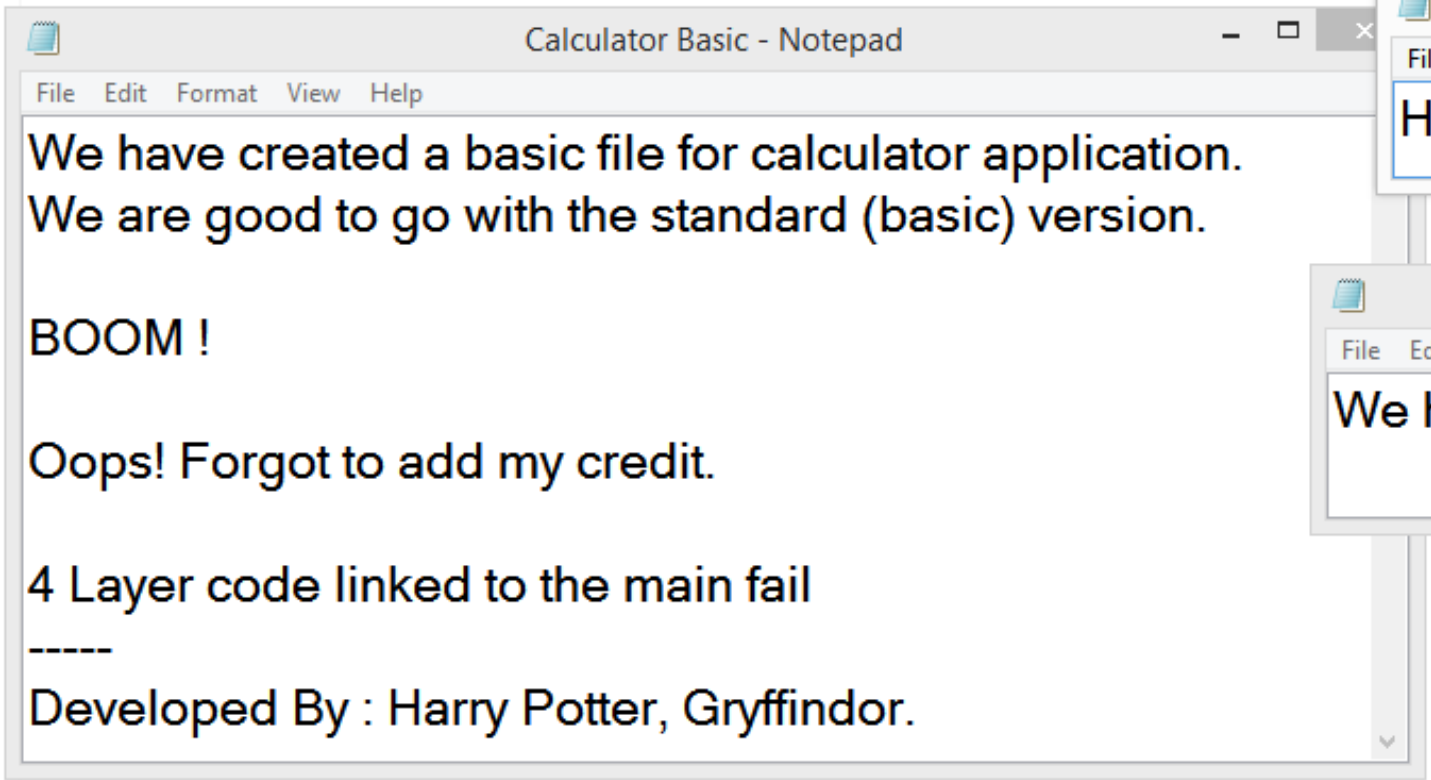


Git suggested to commit those changes. We will be doing that now

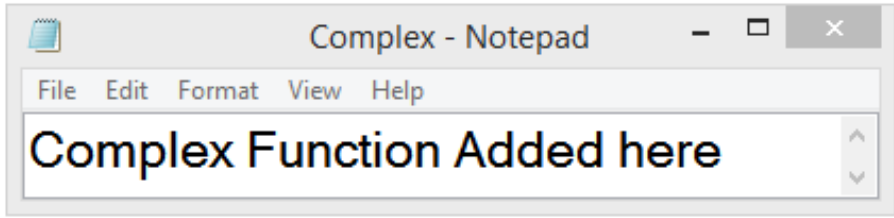


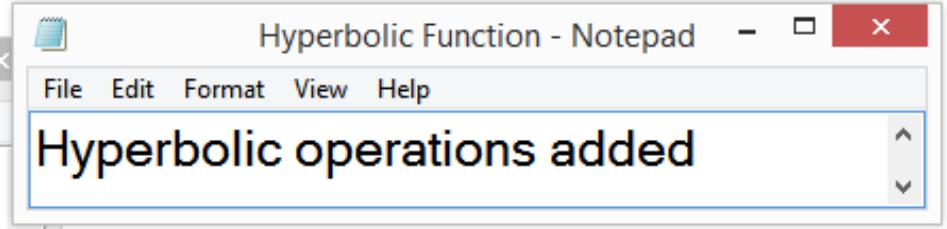
Done and dusted ! Phew !!!
Always take suggestion from Mr.Git

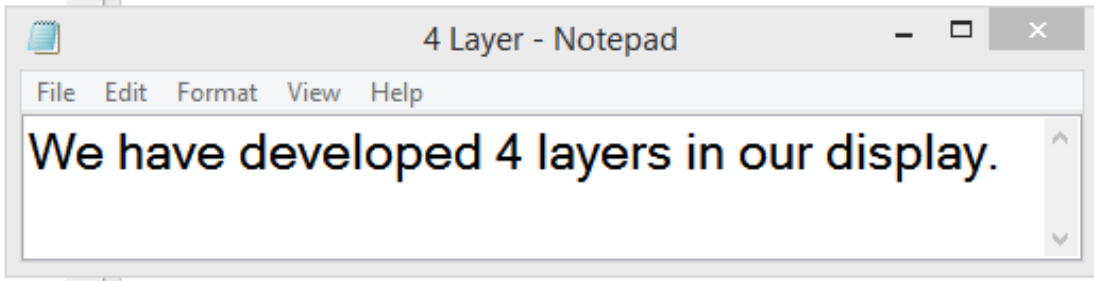

Name
Type
Size
Complex
Text Document
1 KB
Hyperbolic Function
Text Document
1 KB
4 Layer
Text Document
1 KB
Calculator Basic
Text Document
1 KB


Calculator Basic - Notepad
File Edit Format View Help
We have created a basic file for calculator application.
We are good to go with the standard (basic) version.
BOOM !
Oops! Forgot to add my credit.
4 Layer code linked to the main fail

Developed By : Harry Potter, Gryffindor.


Complex - Notepad
File Edit Format View Help
Complex Function Added here


Hyperbolic Function - Notepad
File Edit Format View Help
Hyperbolic operations added


4 Layer - Notepad
File Edit Format View Help
We have developed 4 layers in our display.

Time to work on

REMOTE

repository

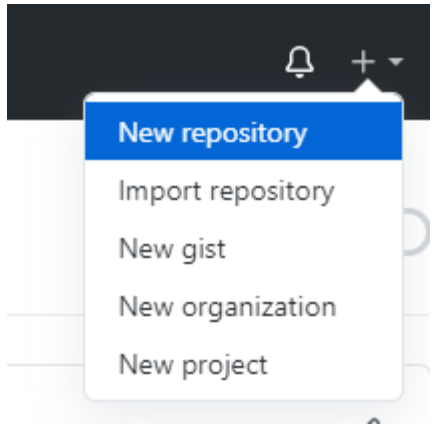
Remote

GitHub

GitLab

Bitbucket

- Adding remote repo
- Push
- Push branches
- Clone
- Check the remote via remote –v
- Push
- Collaboration
- Add Collaborator
- Fetch
- Pull



Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere?
Import a repository.

Repository template
Start your repository with a template repository's contents.

No template

Owner * [redacted] / **Repository name** *

Great repository names are short and memorable. Need inspiration? How about studious-octo-meme?

Description (optional)

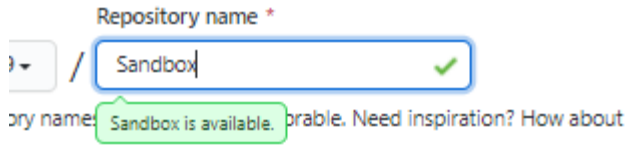
Public
Anyone on the internet can see this repository. You choose who can commit.

Private
You choose who can see and commit to this repository.

Initialize this repository with:
Skip this step if you're importing an existing repository.

- Add a README file
  This is where you can write a long description for your project. Learn more.
- Add .gitignore
  Choose which files not to track from a list of templates. Learn more.
- Choose a license
  A license tells others what they can and can't do with your code. Learn more.

Create repository



Public
Anyone on the internet can see this repository. You choose who can commit.

Private
You choose who can see and commit to this repository.

Initialize this repository with:
Skip this step if you're importing an existing repository.

- Add a README file
  This is where you can write a long description for your project. Learn more.
- Add .gitignore
  Choose which files not to track from a list of templates. Learn more.
- Choose a license
  A license tells others what they can and can't do with your code. Learn more.

Create repository

Quick setup — if you've done this kind of thing before

Set up in Desktop or HTTPS SSH https://github.com/Iftu119/Sandbox.git

Get started by creating a new file or uploading an existing file. We recommend every repository include a README, LICENSE, and .gitignore.

...or create a new repository on the command line

```
echo "# Sandbox" >> README.md
git init
git add README.md
git commit -m "first commit"
git branch -M main
git remote add origin https://github.com/Iftu119/Sandbox.git
git push -u origin main
```

...or push an existing repository from the command line

```
git remote add origin https://github.com/Iftu119/Sandbox.git
git branch -M main
git push -u origin main
```

...or import code from another repository

You can initialize this repository with code from a Subversion, Mercurial, or TFS project.

Import code

Quick setup — if you've done this kind of thing before

Set up in Desktop or HTTPS SSH https://github.com/Iftu119/Sandbox.git

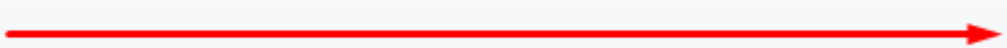
Get started by creating a new file or uploading an existing file. We recommend every repository include a README, LICENSE, and .gitignore.

...or create a new repository on the command line

```
echo "# Sandbox" >> README.md
git init
git add README.md
git commit -m "first commit"
git branch -M main
git remote add origin https://github.com/Iftu119/Sandbox.git
git push -u origin main
```

...or push an existing repository from the command line

```
git remote add origin https://github.com/Iftu119/Sandbox.git
git branch -M main
git push -u origin main
```



...or import code from another repository

You can initialize this repository with code from a Subversion, Mercurial, or TFS project.

Import code

We have already named the default branch MAIN .

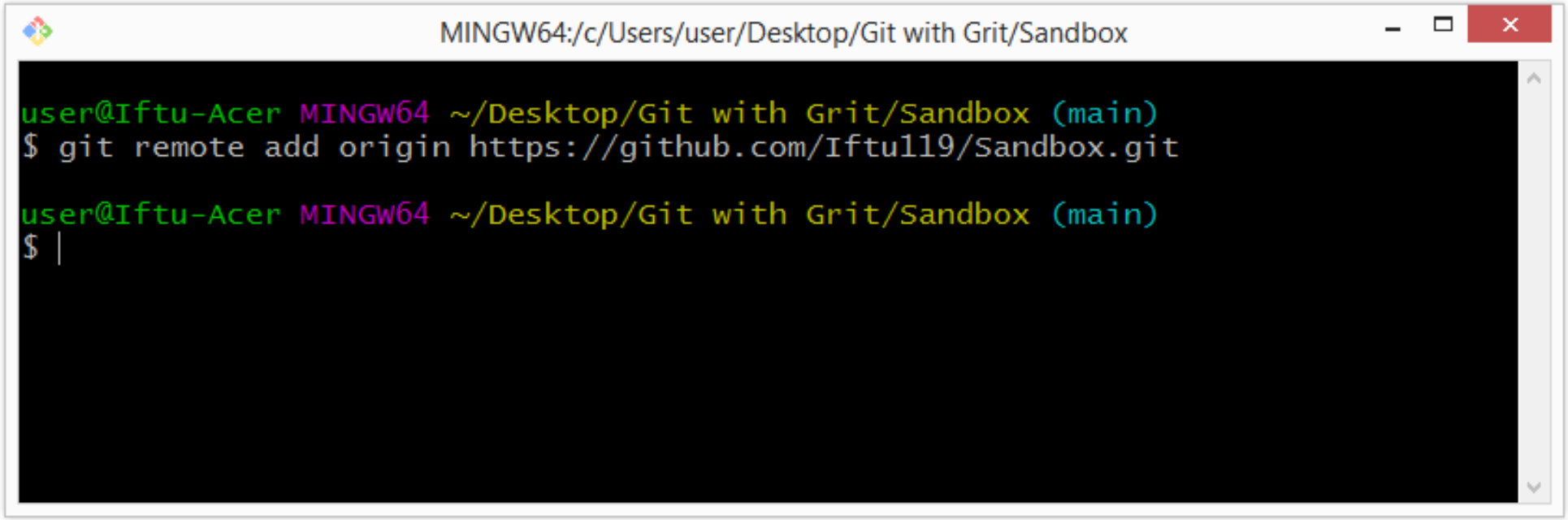
So that 2nd line with

$ git branch –M main

is NOT required for us now.

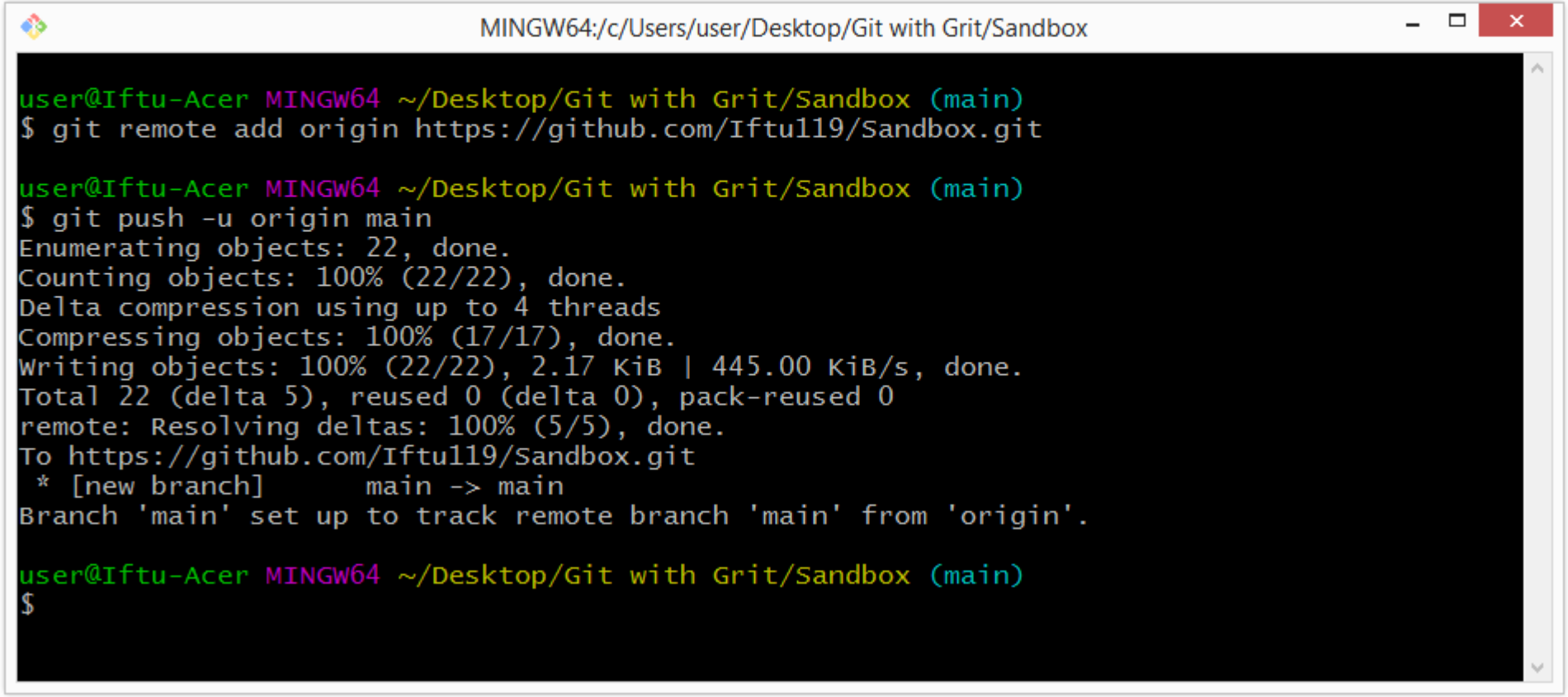
$ git remote add origin <URL>

Complex	Text Document	1 KB
Hyperbolic Function	Text Document	1 KB
4 Layer	Text Document	1 KB
Calculator Basic	Text Document	1 KB



$ git push -u origin main

Complex	Text Document	1 KB
Hyperbolic Function	Text Document	1 KB
4 Layer	Text Document	1 KB
Calculator Basic	Text Document	1 KB



Things got updated in the remote repository on Github

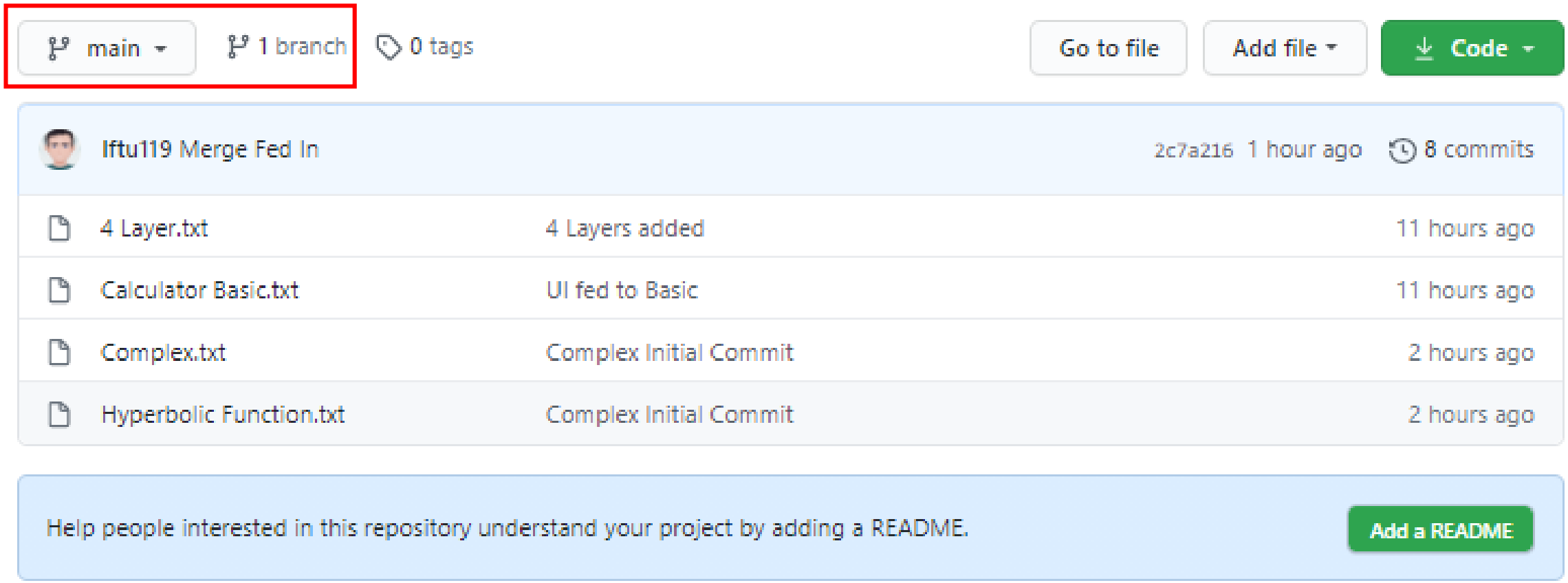
main | 1 branch | 0 tags | Go to file | Add file | Code

Iftu119 Merge Fed In — 2c7a216 1 hour ago — 8 commits

4 Layer.txt	4 Layers added	11 hours ago
Calculator Basic.txt	UI fed to Basic	11 hours ago
Complex.txt	Complex Initial Commit	2 hours ago
Hyperbolic Function.txt	Complex Initial Commit	2 hours ago

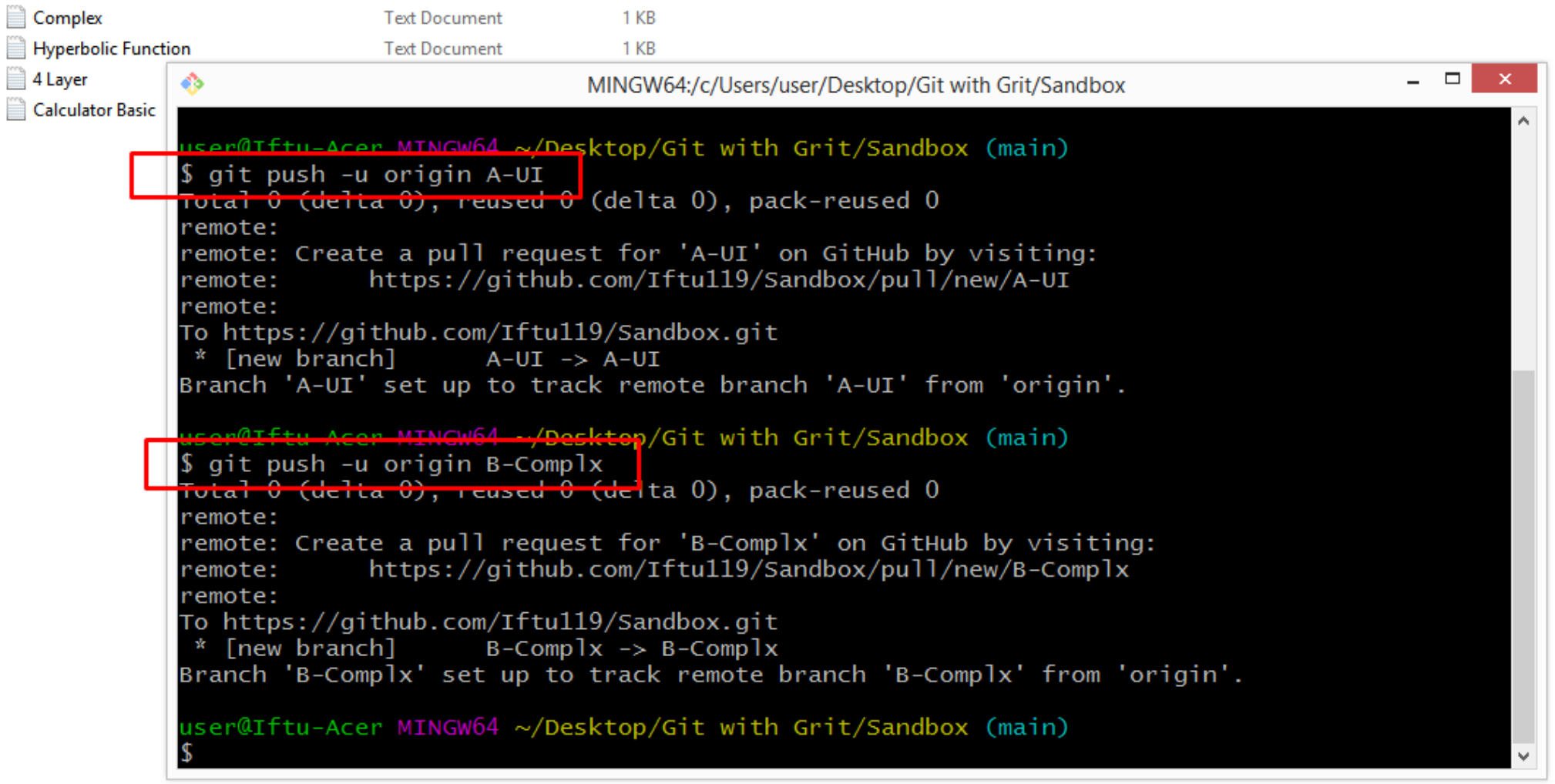
Help people interested in this repository understand your project by adding a README. Add a README

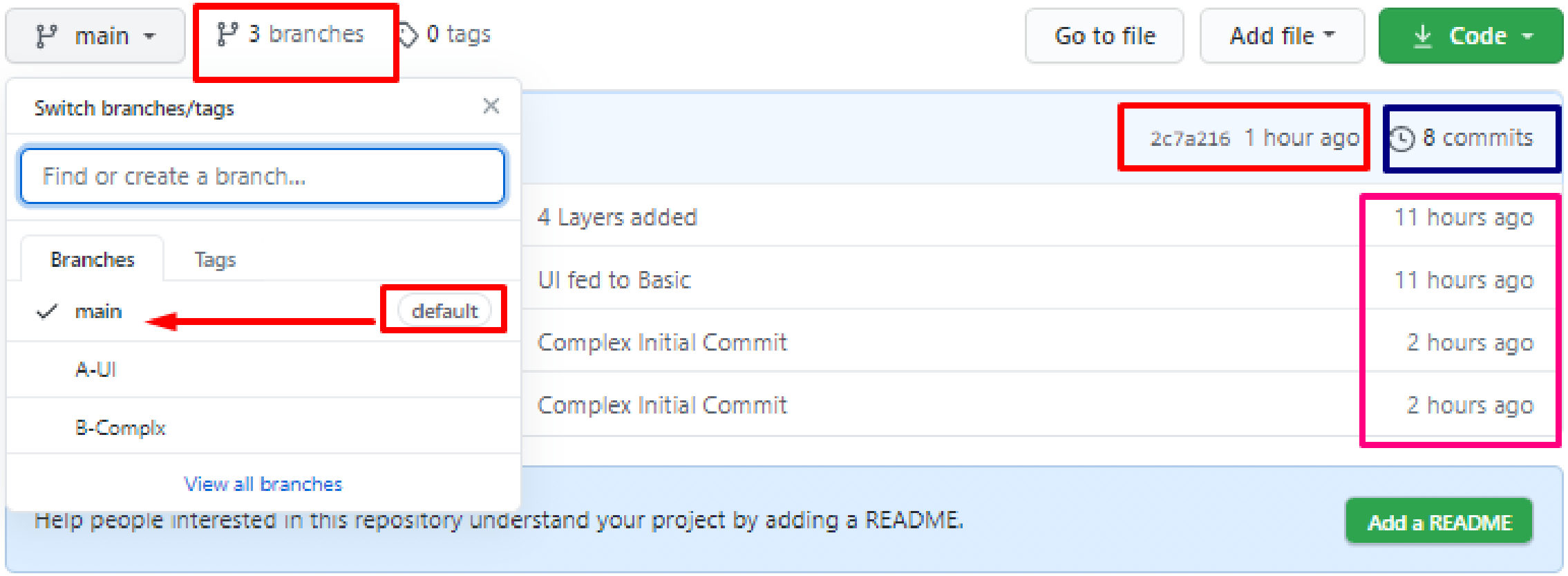
Did you notice that we have only pushed the **main** branch ?
Rest of the branches are not there in GitHub

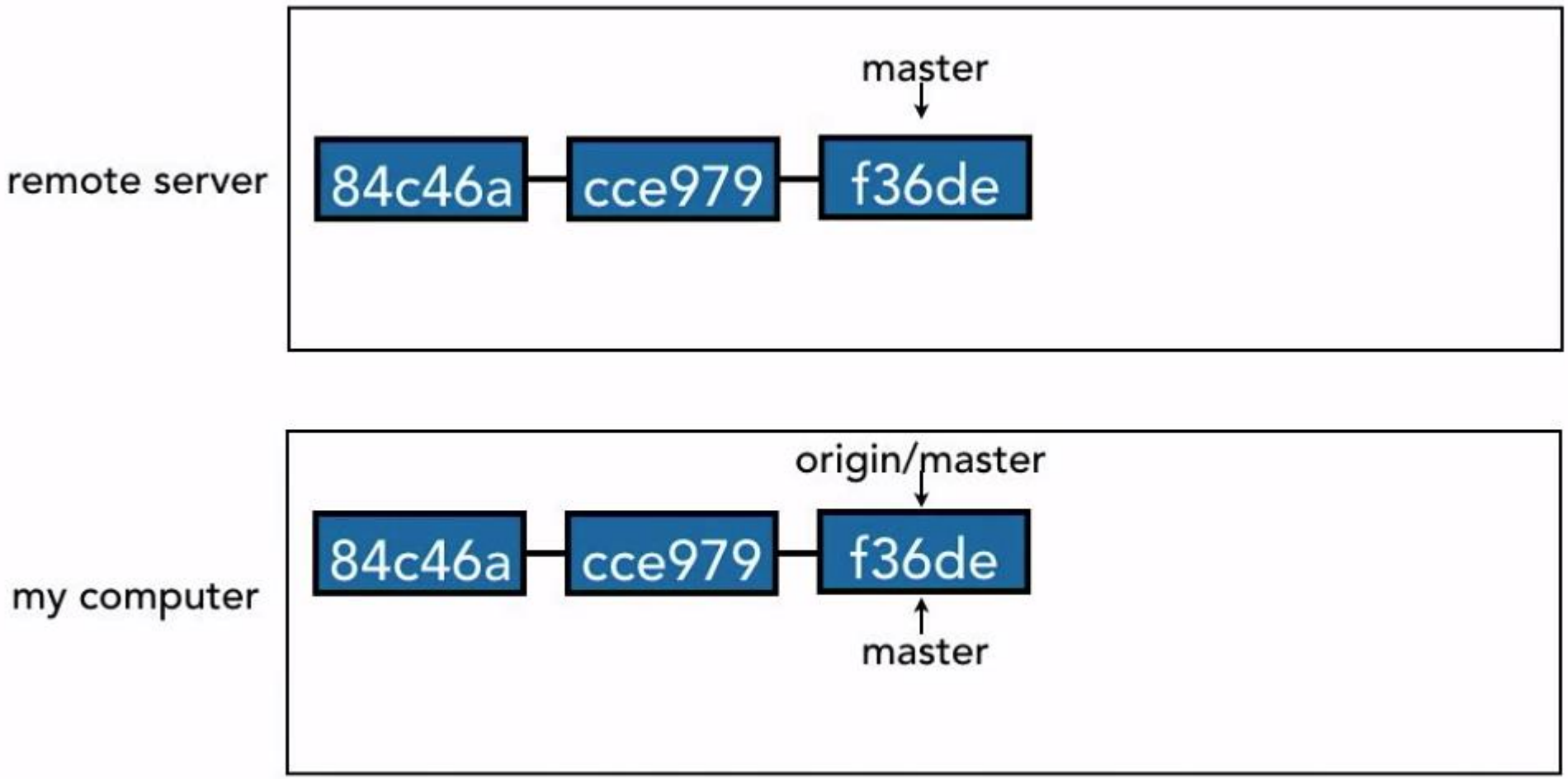


Let’s push other branches.

```
$ git push –u origin A-UI
$ git push –u origin B-Complx
```




main
3 branches
0 tags
Go to file
Add file
Code
Switch branches/tags
Find or create a branch...
Branches
Tags
main
default
A-UI
B-Complx
View all branches
2c7a216 1 hour ago
8 commits
4 Layers added
11 hours ago
UI fed to Basic
11 hours ago
Complex Initial Commit
2 hours ago
Complex Initial Commit
2 hours ago
Help people interested in this repository understand your project by adding a README.
Add a README



Credit : LinkedIn Learning

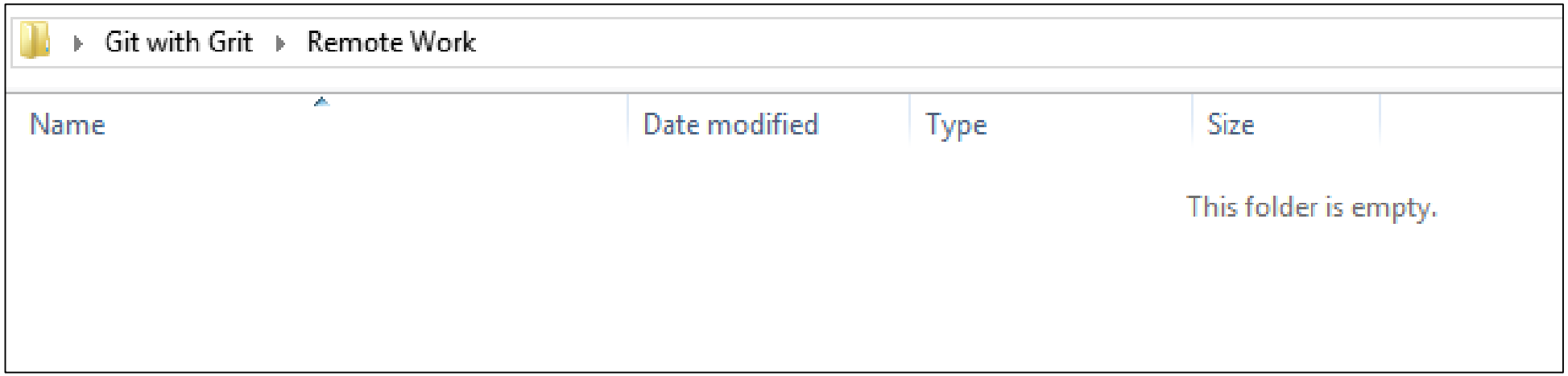
Let’s forget the local repository we have. We shall bring the works from the Remote repository and then resume working.

Time for

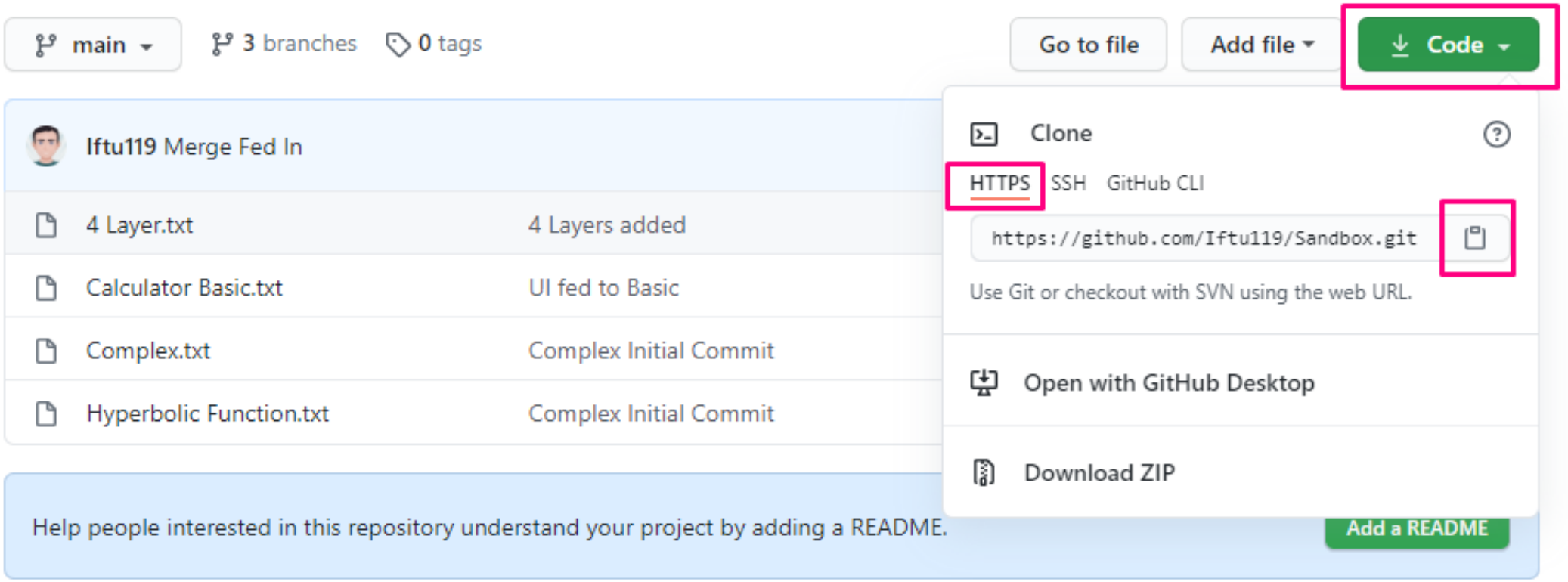
CLONE

operation

Git with Grit > Remote Work (New Directory)



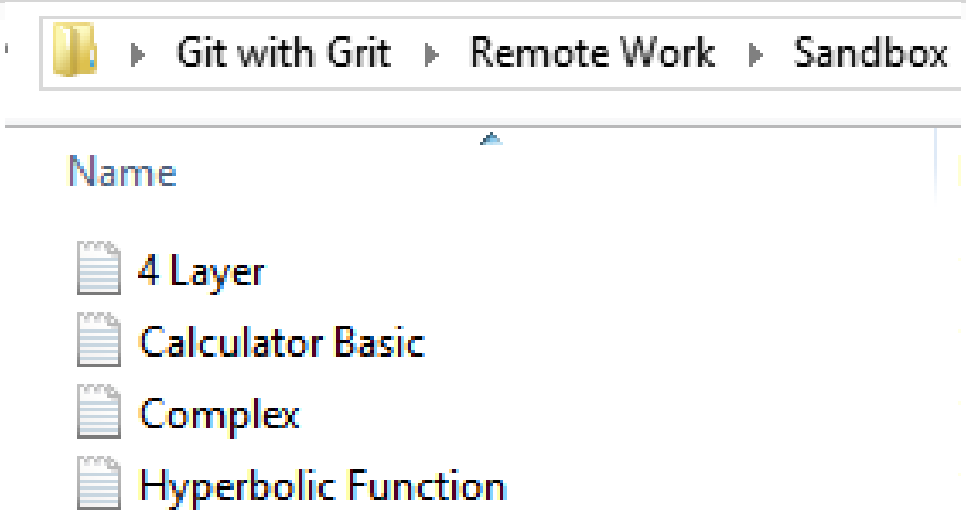
Copy the HTTPS



$ git clone <https>

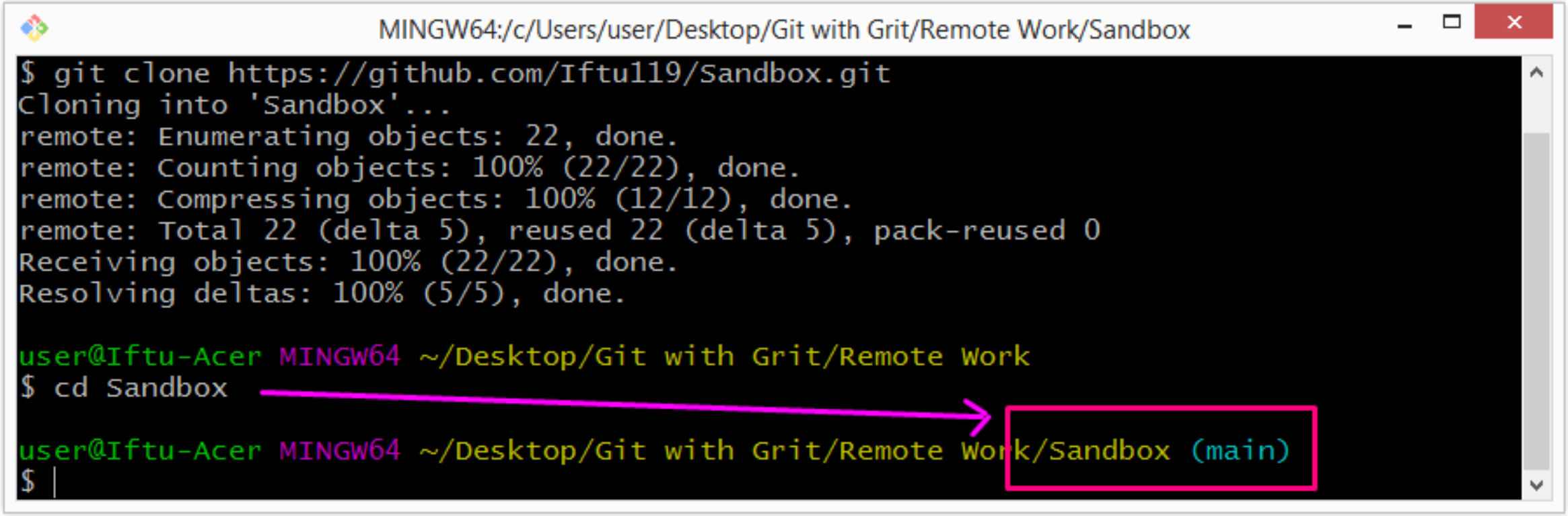
MINGW64:/c/Users/user/Desktop/Git with Grit/Remote Work/Sandbox

```
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Remote Work
$ git clone https://github.com/Iftu119/Sandbox.git
Cloning into 'Sandbox'...
remote: Enumerating objects: 22, done.
remote: Counting objects: 100% (22/22), done.
remote: Compressing objects: 100% (12/12), done.
remote: Total 22 (delta 5), reused 22 (delta 5), pack-reused 0
Receiving objects: 100% (22/22), done.
Resolving deltas: 100% (5/5), done.
```

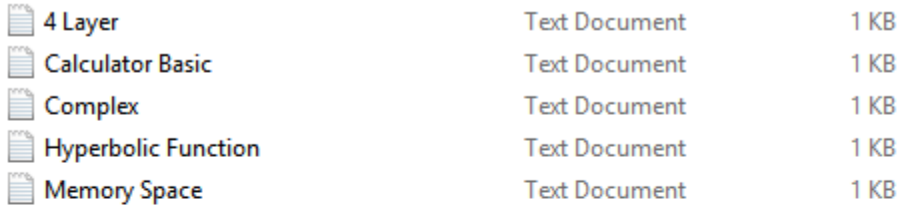


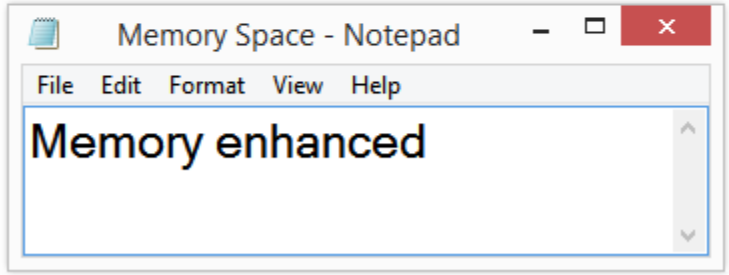
Let’s get into the CLONED “Sandbox”

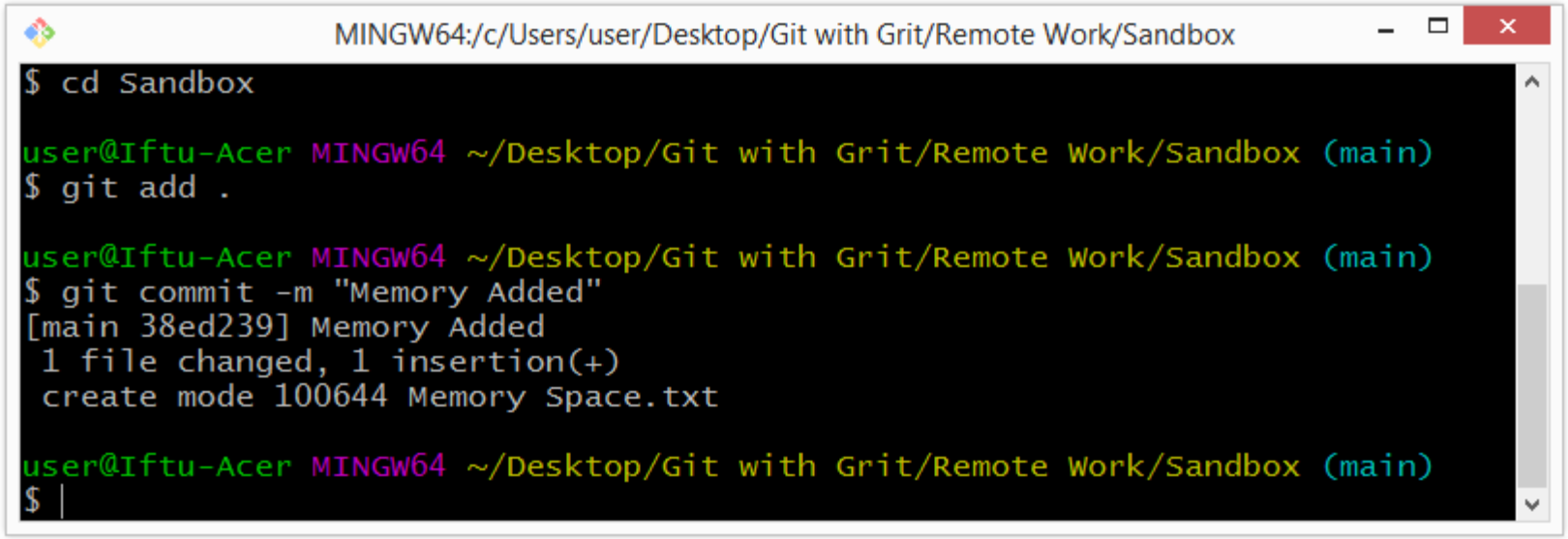
Sandbox File folder



New file added,commited

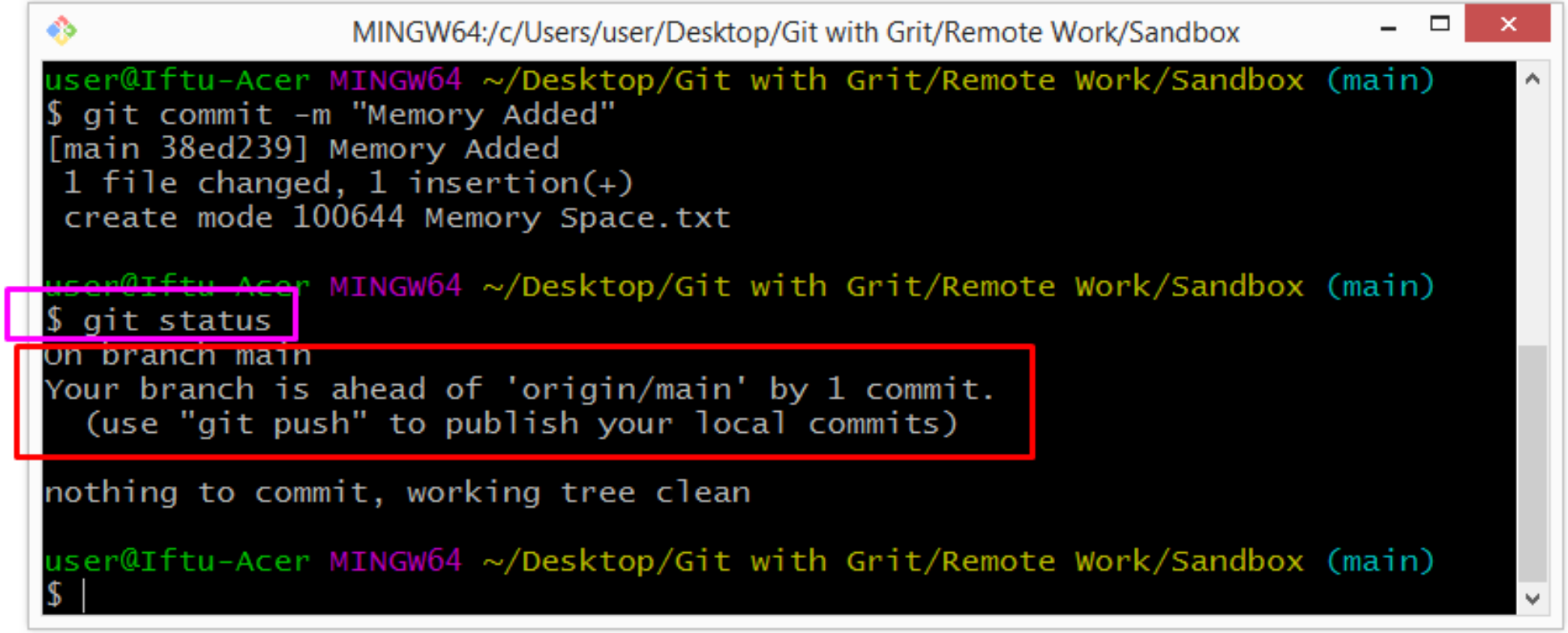






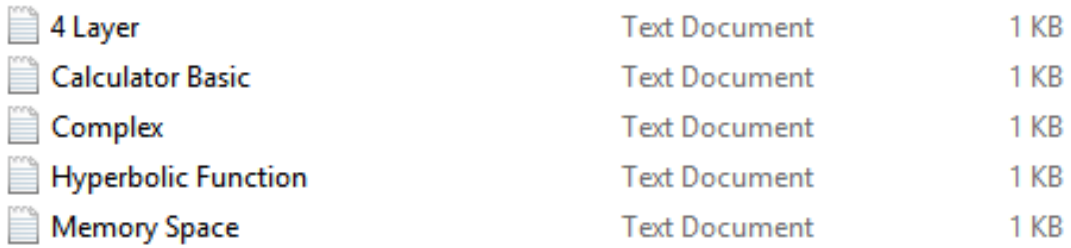
So what's the status now ?

4 Layer	Text Document	1 KB
Calculator Basic	Text Document	1 KB
Complex	Text Document	1 KB
Hyperbolic Function	Text Document	1 KB
Memory Space	Text Document	1 KB

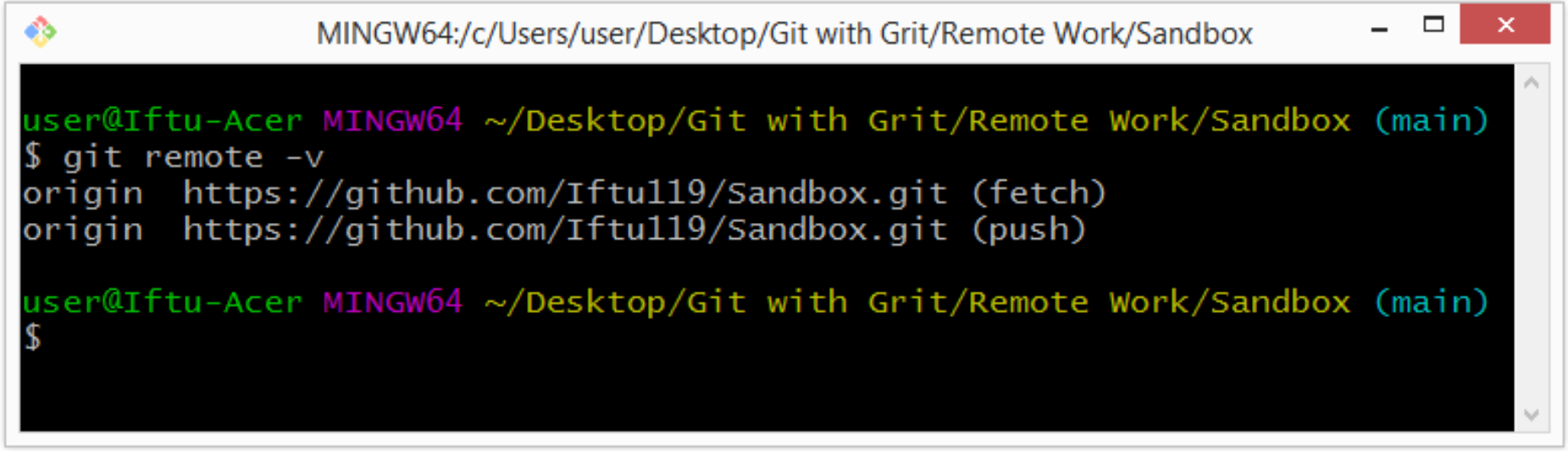


What are the remote repositories we currently have ?

```
$ git remote -v
```

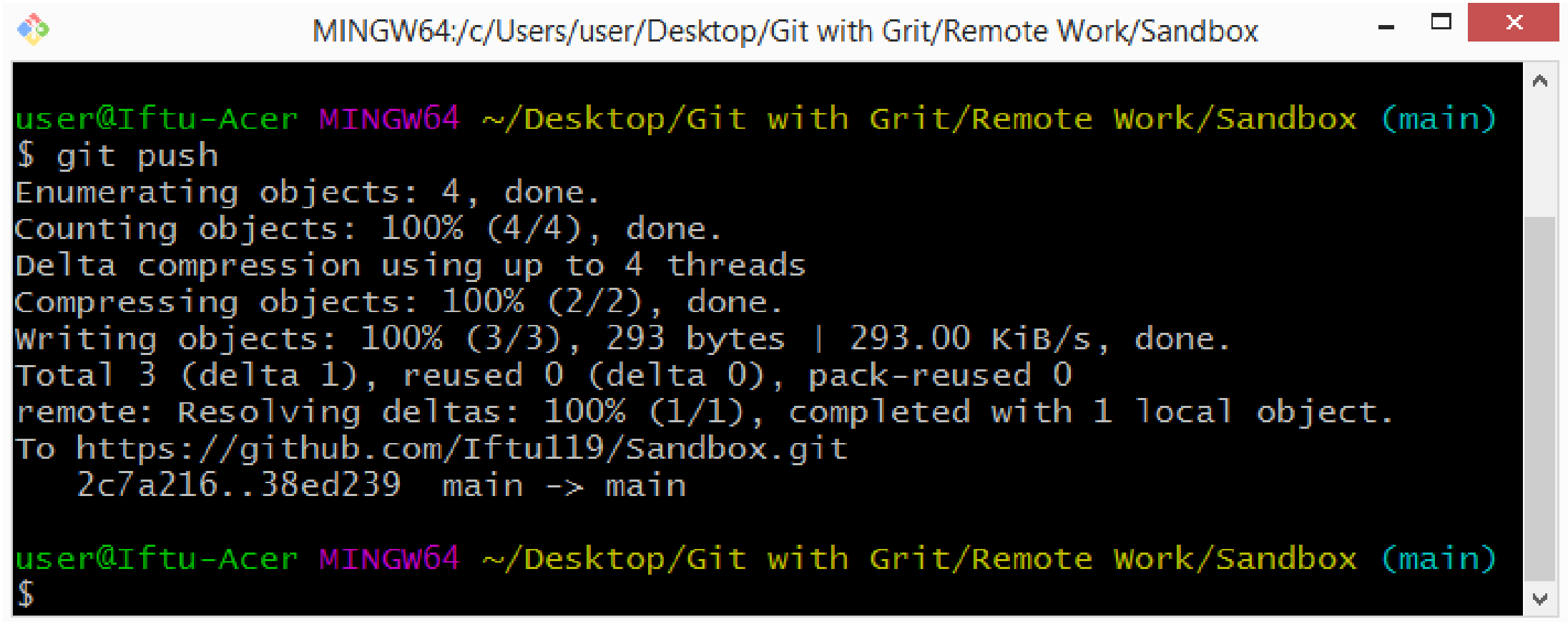


4 Layer	Text Document	1 KB
Calculator Basic	Text Document	1 KB
Complex	Text Document	1 KB
Hyperbolic Function	Text Document	1 KB
Memory Space	Text Document	1 KB

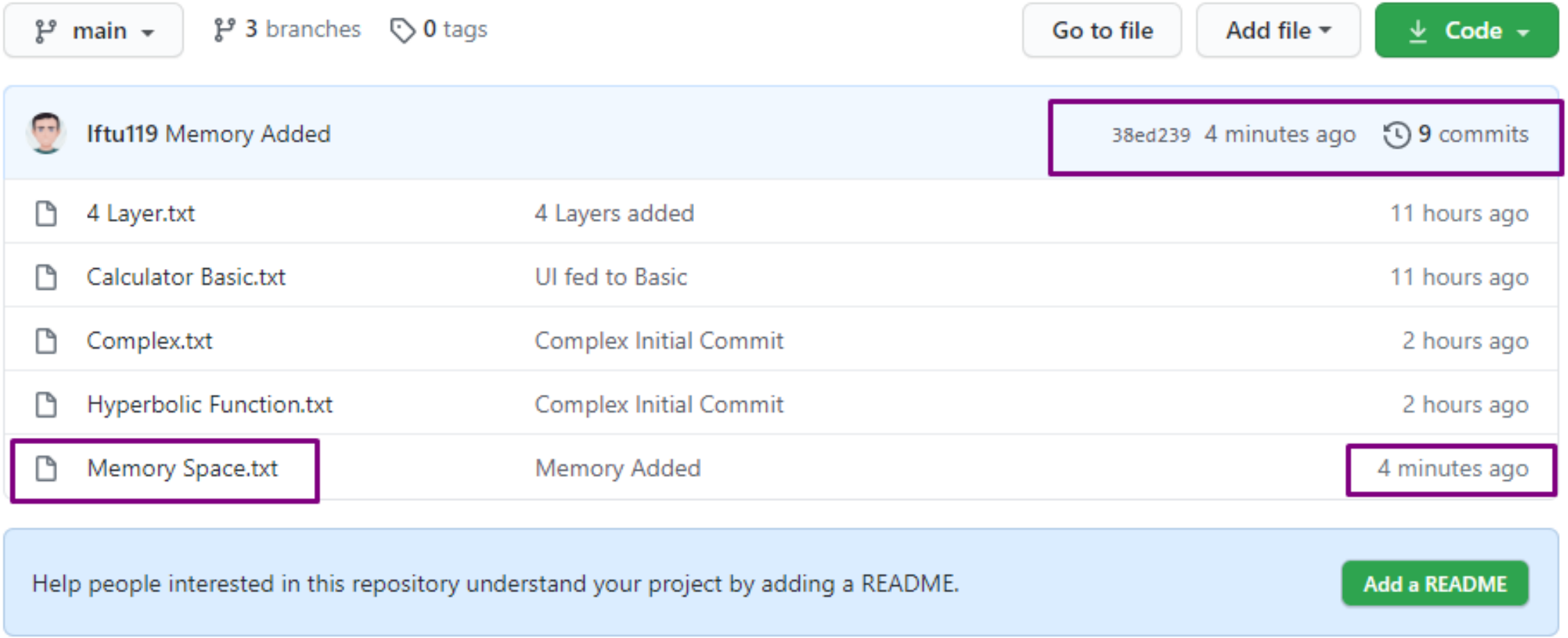


Time to **PUSH** our changes to the remote repo

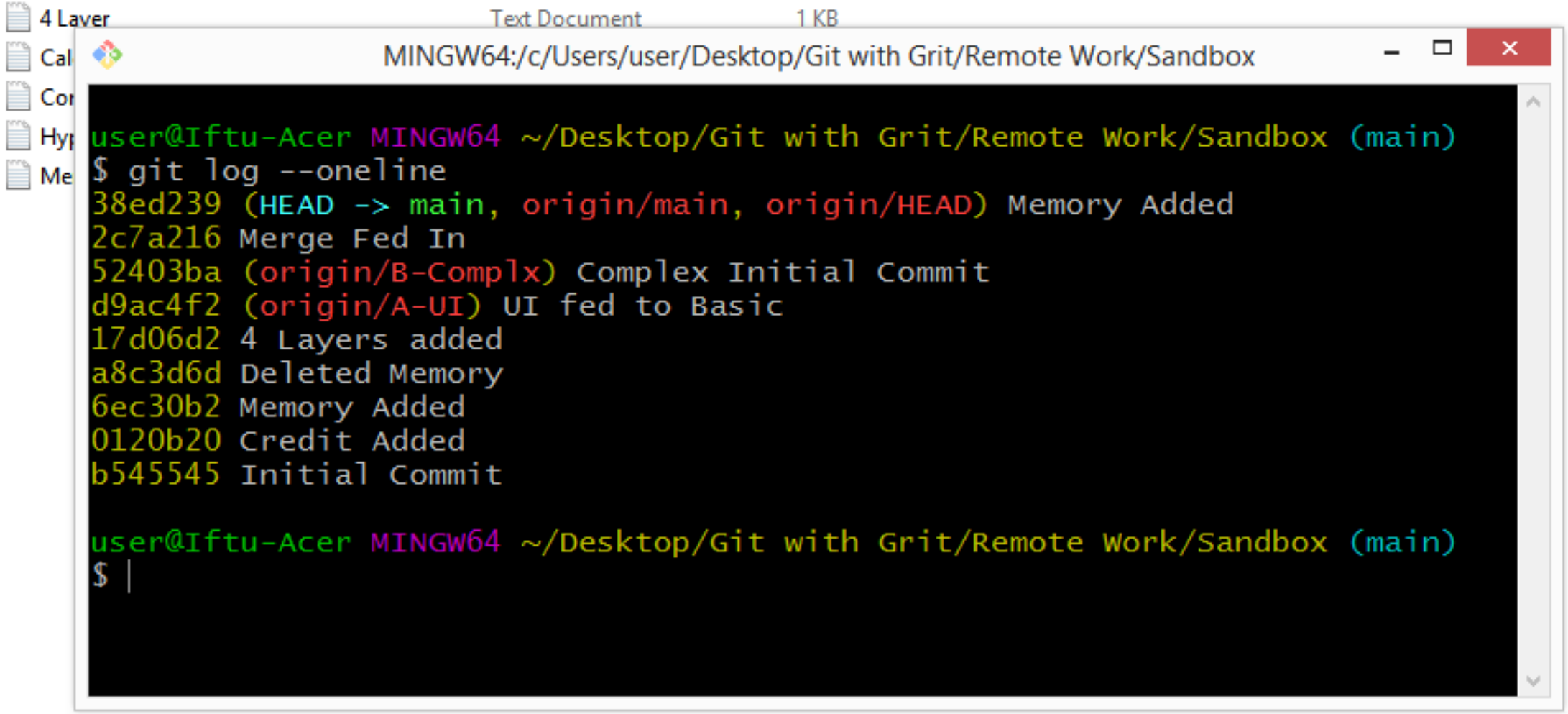
```
$ git push ( or $ git push origin main )
```



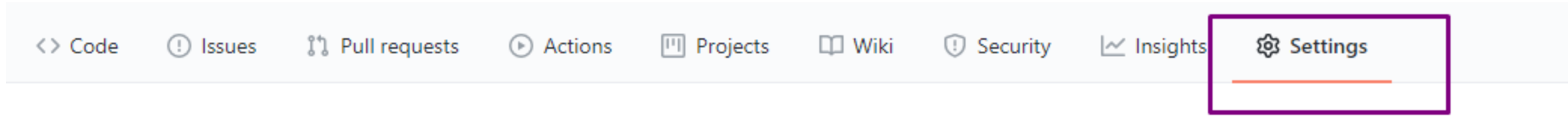
Let’s see if our remote repo got updated

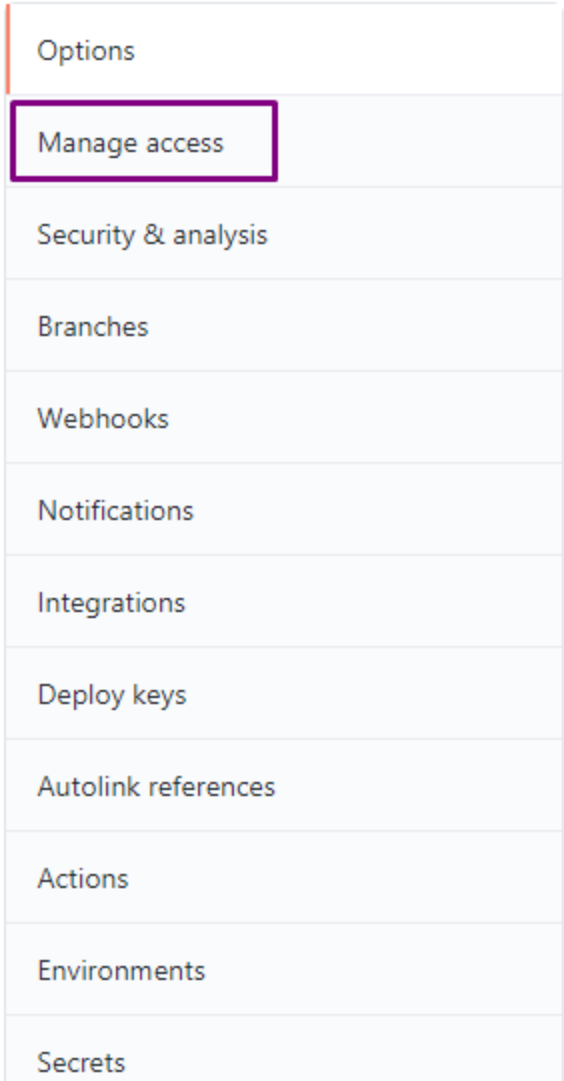


Time to have a look at the log



Collaborate





Settings

Repository name

Sandbox

Rename

Template repository

Template repositories let users generate new repositories with the same directory structure and files. Learn more.

Social preview

Upload an image to customize your repository's social media preview.

Images should be at least 640×320px (1280×640px for best display).

Download template

Options
Manage access
Security & analysis
Branches
Webhooks
Notifications
Integrations
Deploy keys
Autolink references
Actions
Environments
Secrets

Who has access

PUBLIC REPOSITORY

This repository is public and visible to anyone.

Manage

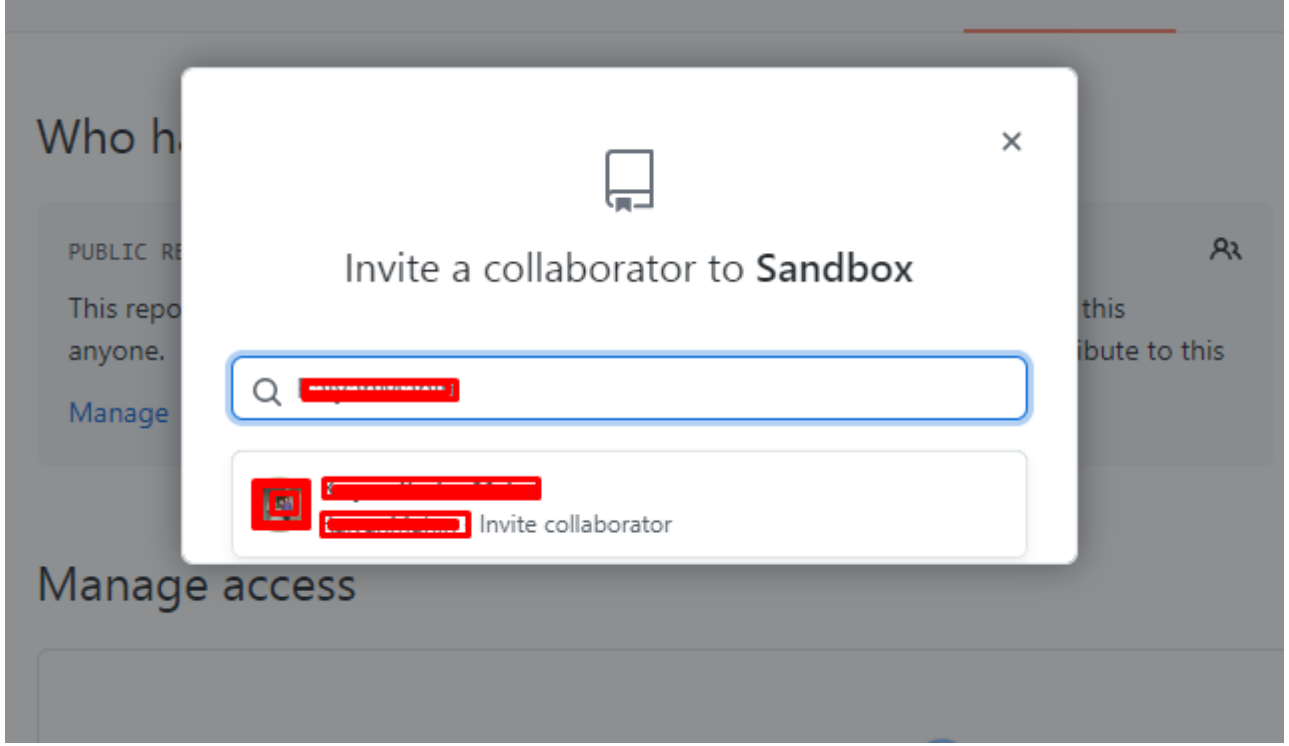
DIRECT ACCESS

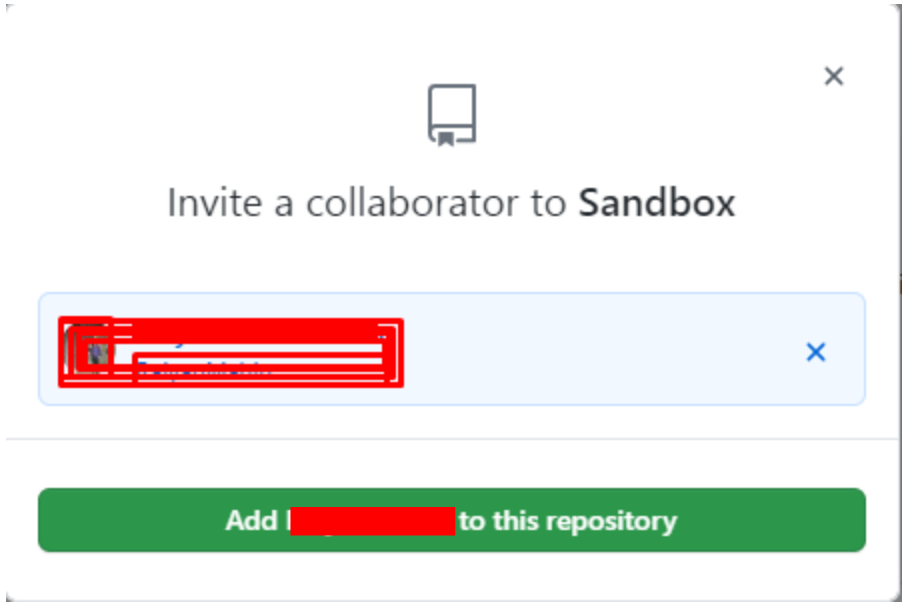
0 collaborators have access to this repository. Only you can contribute to this repository.

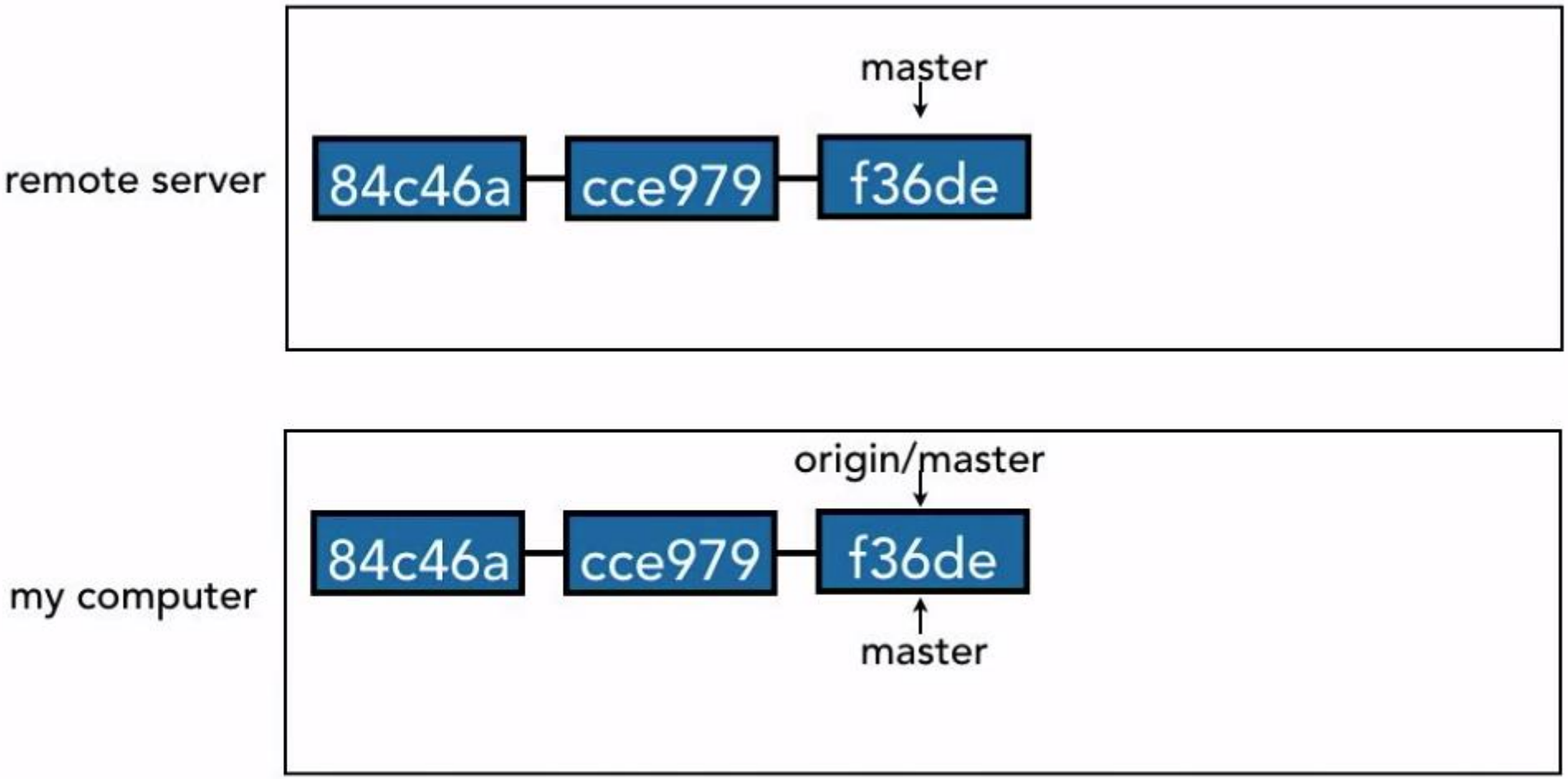
Manage access

You haven't invited any collaborators yet

Invite a collaborator


Who h
PUBLIC RE
This repo
anyone.
Manage
this
ibute to this
Invite a collaborator to Sandbox
[redacted]
[redacted]
Invite collaborator
Manage access


Invite a collaborator to Sandbox
[redacted]
Add [redacted] to this repository



Credit : LinkedIn Learning

Wait.

Wait..

Wait...

for the Collaborator

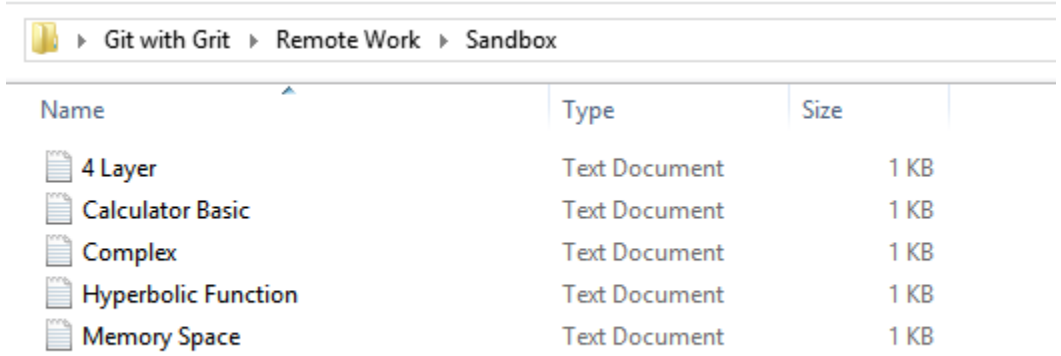
main 3 branches 0 tags Go to file Add file Code

RaiyanMahin Create Contribution.txt cb15b45 13 hours ago 10 commits

4 Layer.txt	4 Layers added	yesterday
Calculator Basic.txt	UI fed to Basic	yesterday
Complex.txt	Complex Initial Commit	17 hours ago
Contribution.txt	Create Contribution.txt	13 hours ago
Hyperbolic Function.txt	Complex Initial Commit	17 hours ago
Memory Space.txt	Memory Added	15 hours ago

Help people interested in this repository understand your project by adding a README. Add a README

Let’s see our local repository now


Git with Grit
Remote Work
Sandbox
Name
Type
Size
4 Layer
Text Document
1 KB
Calculator Basic
Text Document
1 KB
Complex
Text Document
1 KB
Hyperbolic Function
Text Document
1 KB
Memory Space
Text Document
1 KB

4 Layer
Text Document
1 KB
MINGW64:/c/Users/user/Desktop/Git with Grit/Remote Work/Sandbox
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Remote Work/Sandbox (main)
$ git status
On branch main
Your branch is up to date with 'origin/main'.
nothing to commit, working tree clean
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Remote Work/Sandbox (main)
$

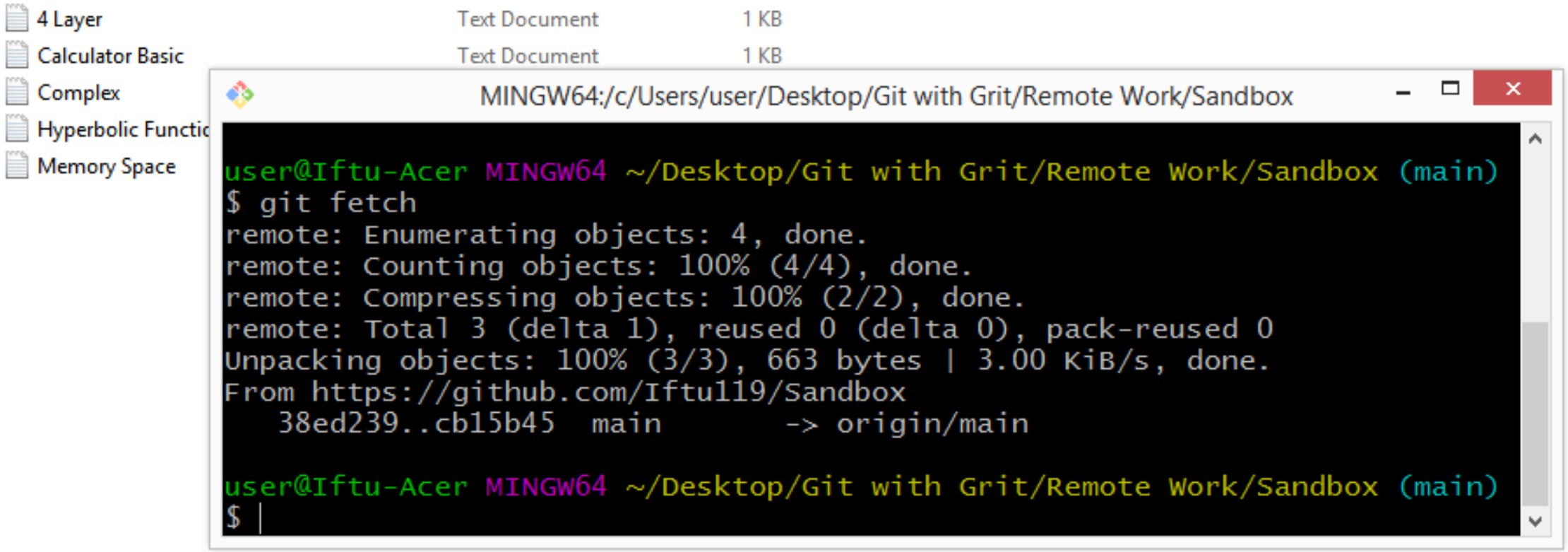
Local has got no idea that we have made progress in the remote repo. Now we need to make sure that our local repo gets in sync with the remote.

Time to

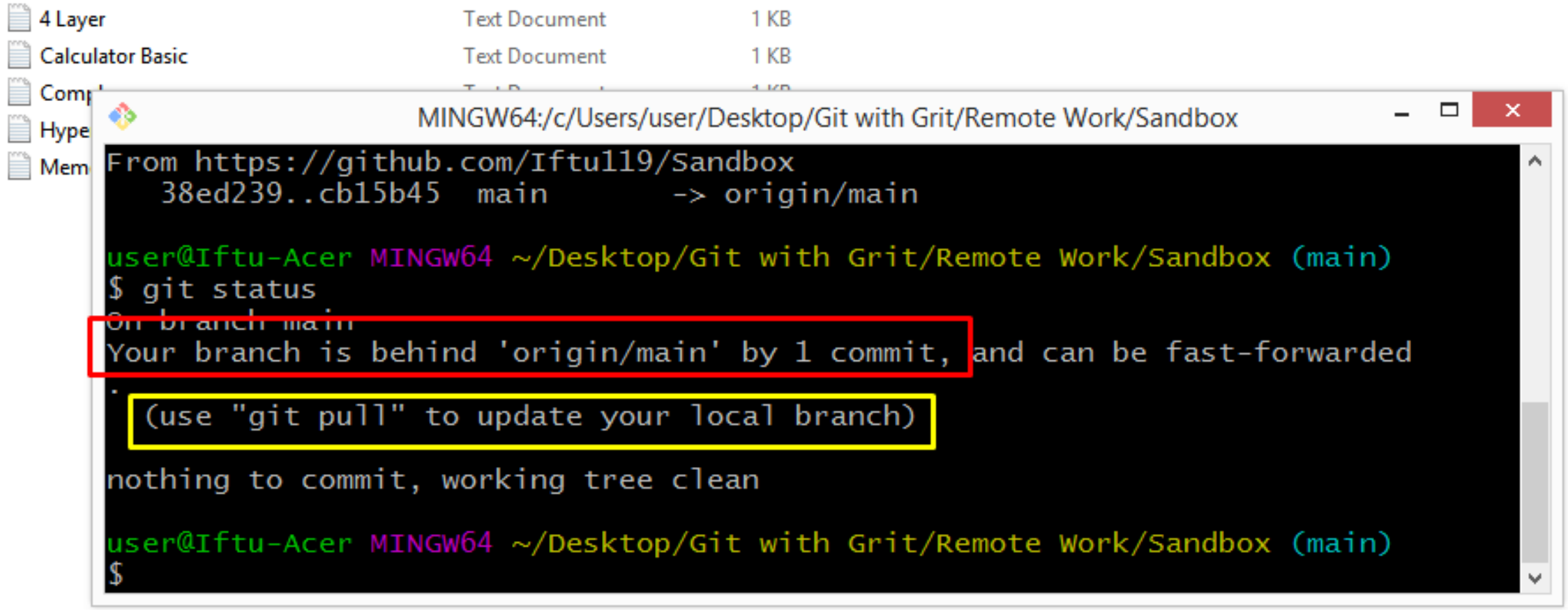
FETCH

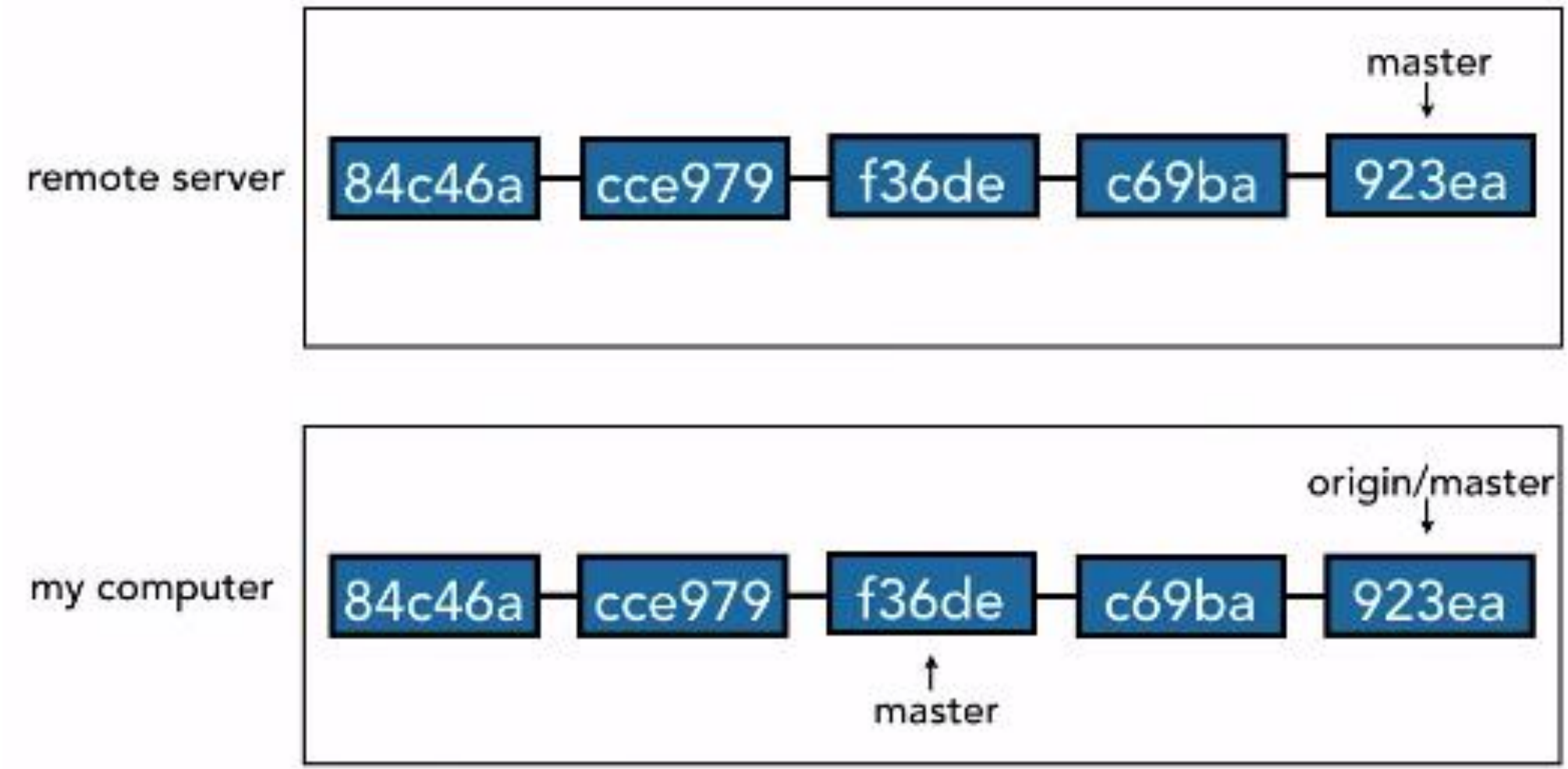
the changes

$ git fetch


4 Layer Text Document 1 KB
Calculator Basic Text Document 1 KB
Complex
Hyperbolic Functic
Memory Space
MINGW64:/c/Users/user/Desktop/Git with Grit/Remote Work/Sandbox
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Remote Work/Sandbox (main)
$ git fetch
remote: Enumerating objects: 4, done.
remote: Counting objects: 100% (4/4), done.
remote: Compressing objects: 100% (2/2), done.
remote: Total 3 (delta 1), reused 0 (delta 0), pack-reused 0
Unpacking objects: 100% (3/3), 663 bytes | 3.00 KiB/s, done.
From https://github.com/Iftu119/Sandbox
38ed239..cb15b45 main -> origin/main
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Remote Work/Sandbox (main)
$

Now we need to know the **status**




remote server
master
84c46a
cce979
f36de
c69ba
923ea
my computer
origin/master
84c46a
cce979
f36de
c69ba
923ea
master

```
$ git merge origin/master
```

Fetch + Merge (Tracking Branch)
= Pull

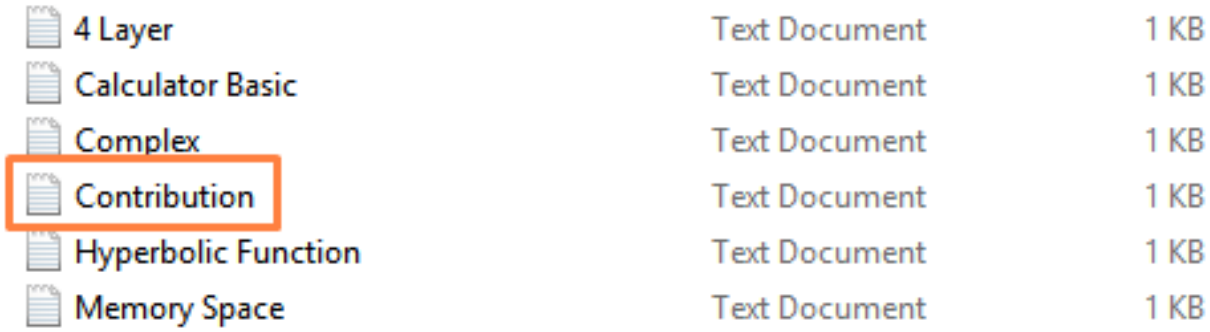
So we are 1 commit behind from the remote.
Git suggested us to pull those updated

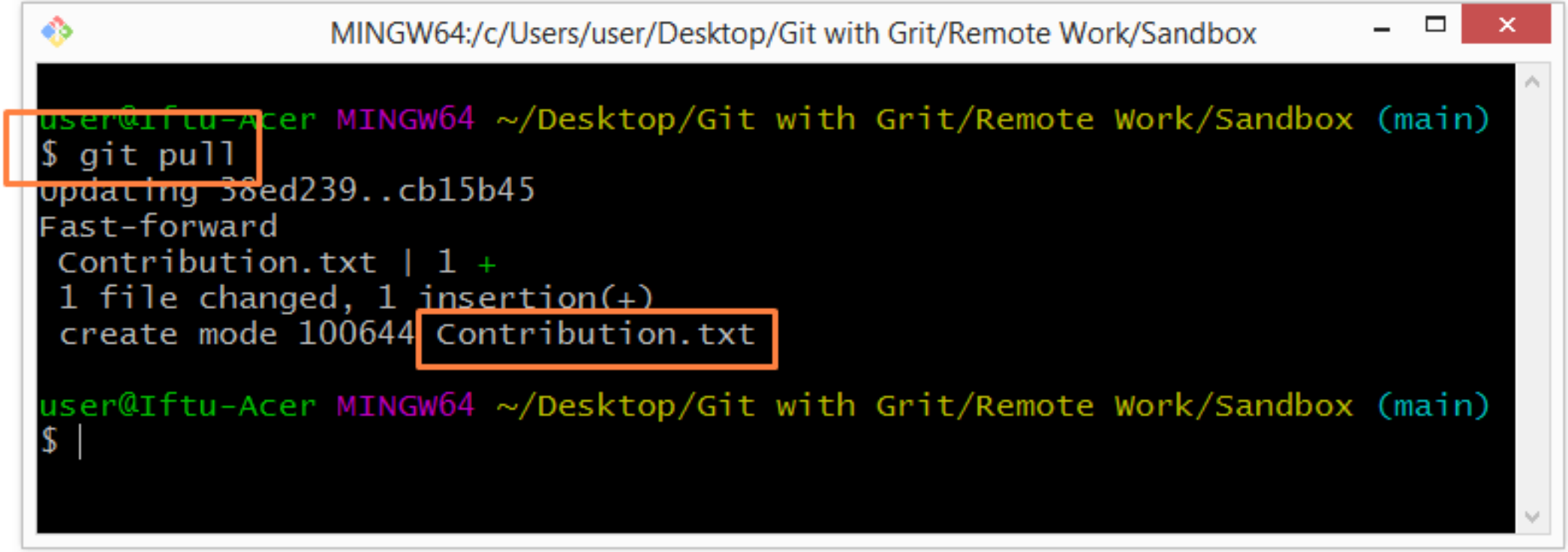
Need to

PULL

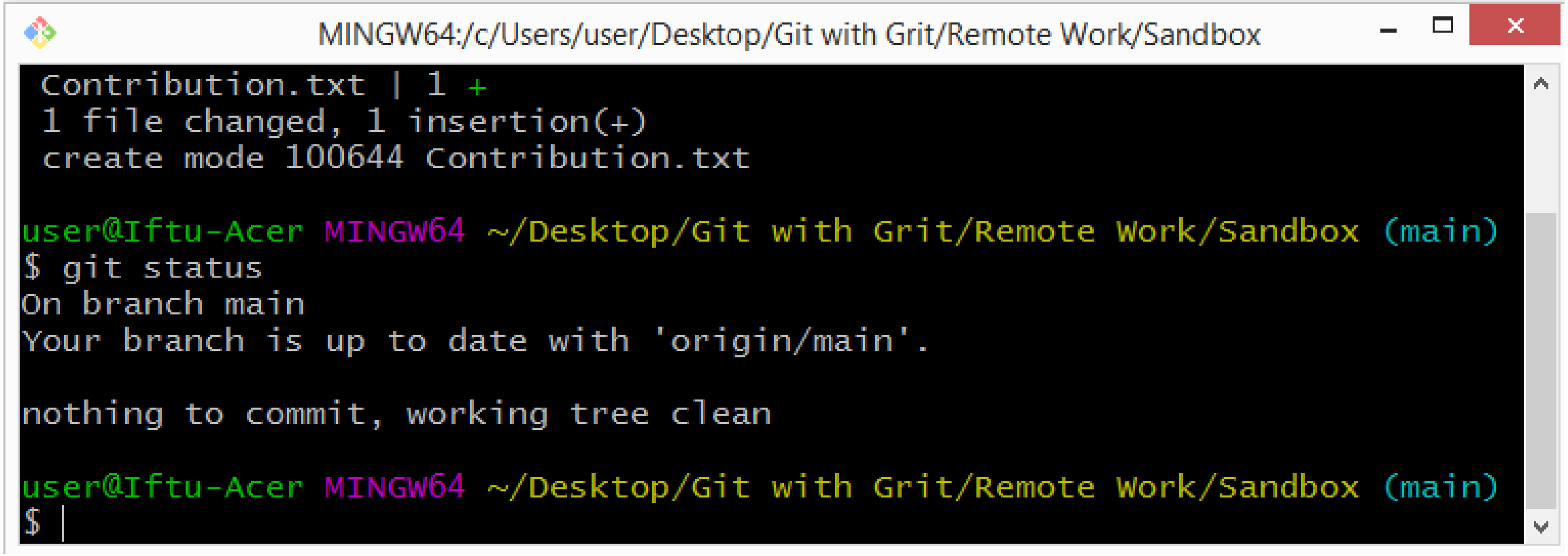
the changes

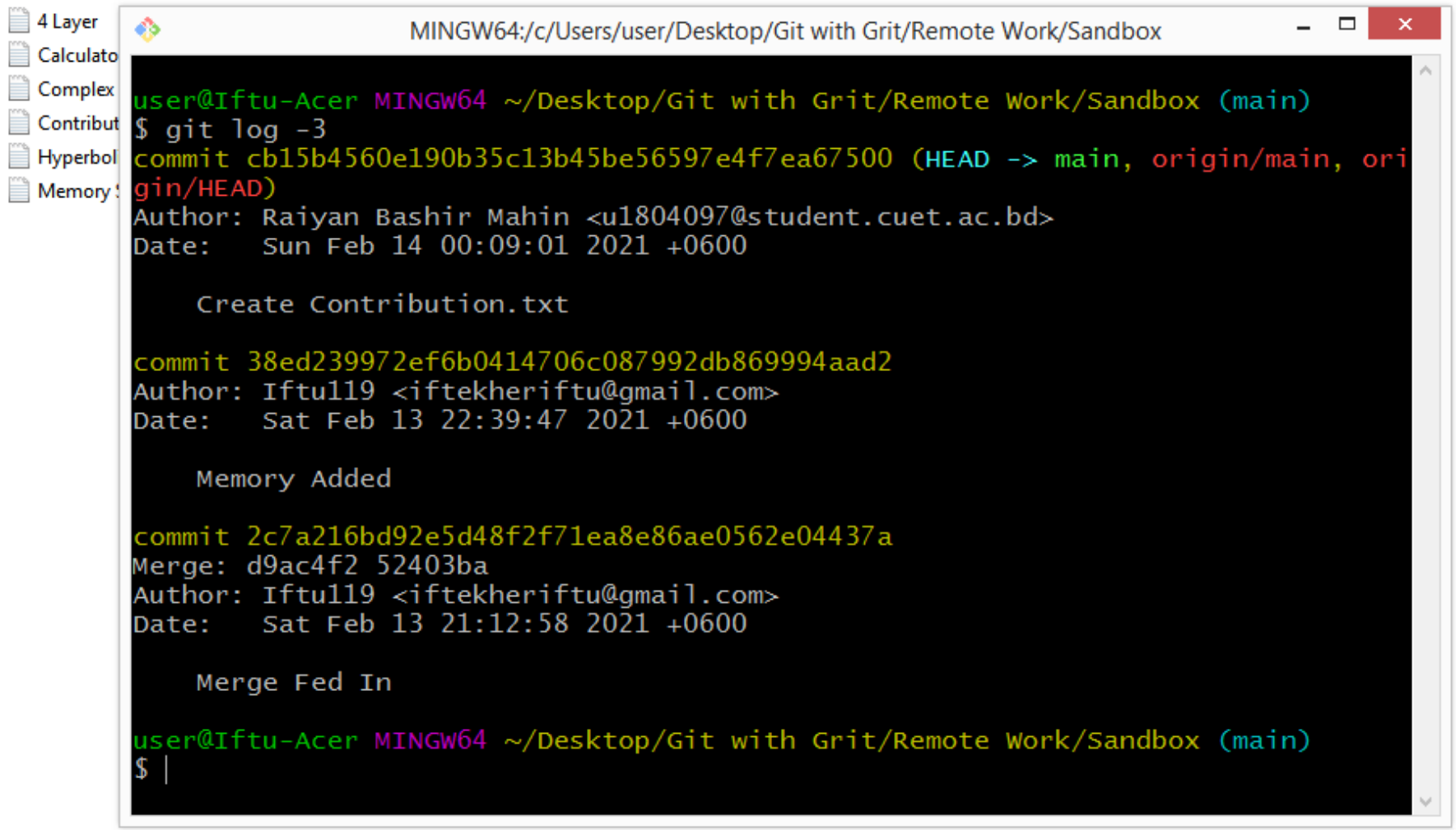
$ git pull


4 Layer Text Document 1 KB
Calculator Basic Text Document 1 KB
Complex Text Document 1 KB
Contribution Text Document 1 KB
Hyperbolic Function Text Document 1 KB
Memory Space Text Document 1 KB

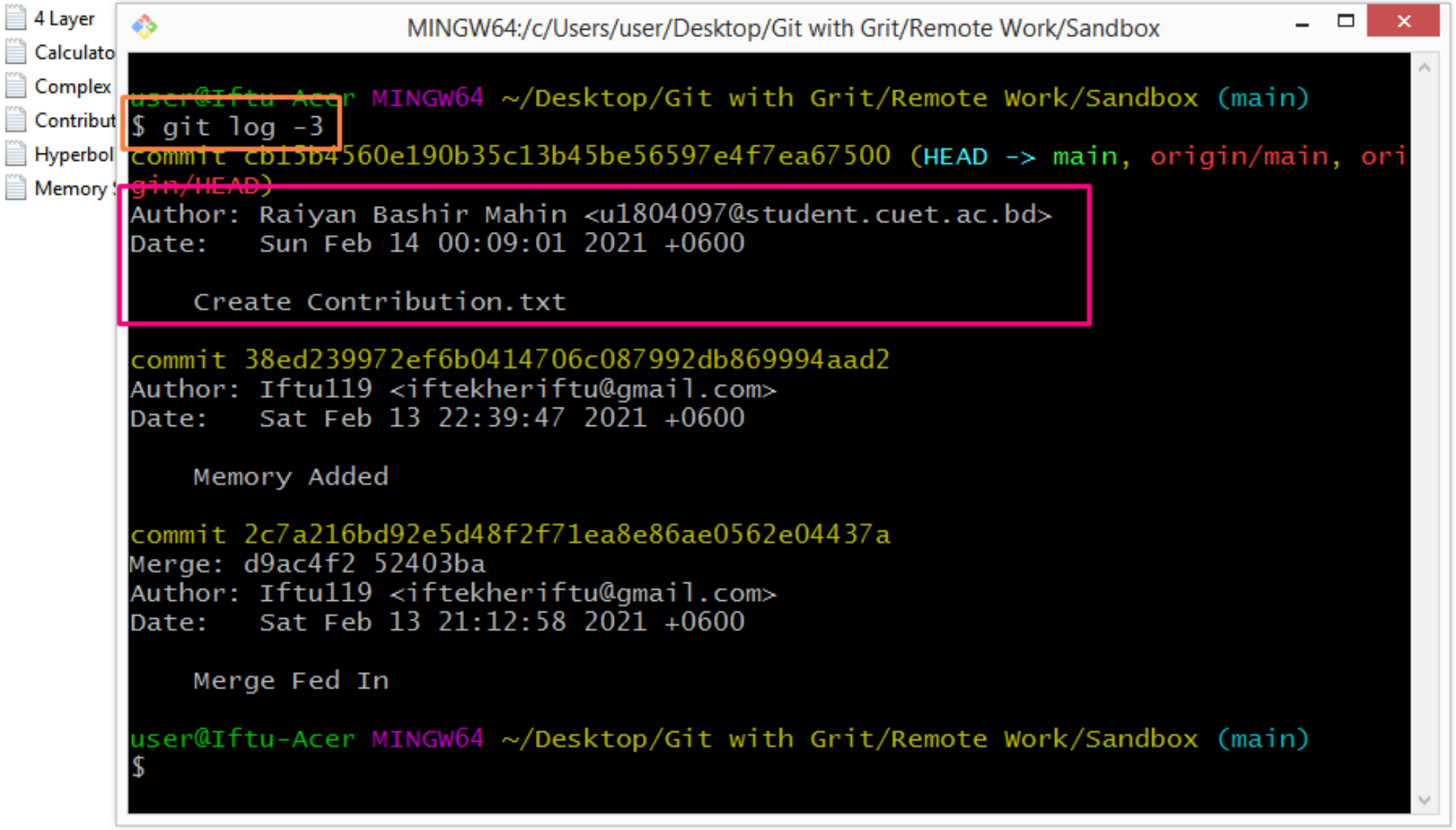

MINGW64:/c/Users/user/Desktop/Git with Grit/Remote Work/Sandbox
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Remote Work/Sandbox (main)
$ git pull
Updating 38ed239..cb15b45
Fast-forward
Contribution.txt | 1 +
1 file changed, 1 insertion(+)
create mode 100644 Contribution.txt
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Remote Work/Sandbox (main)
$

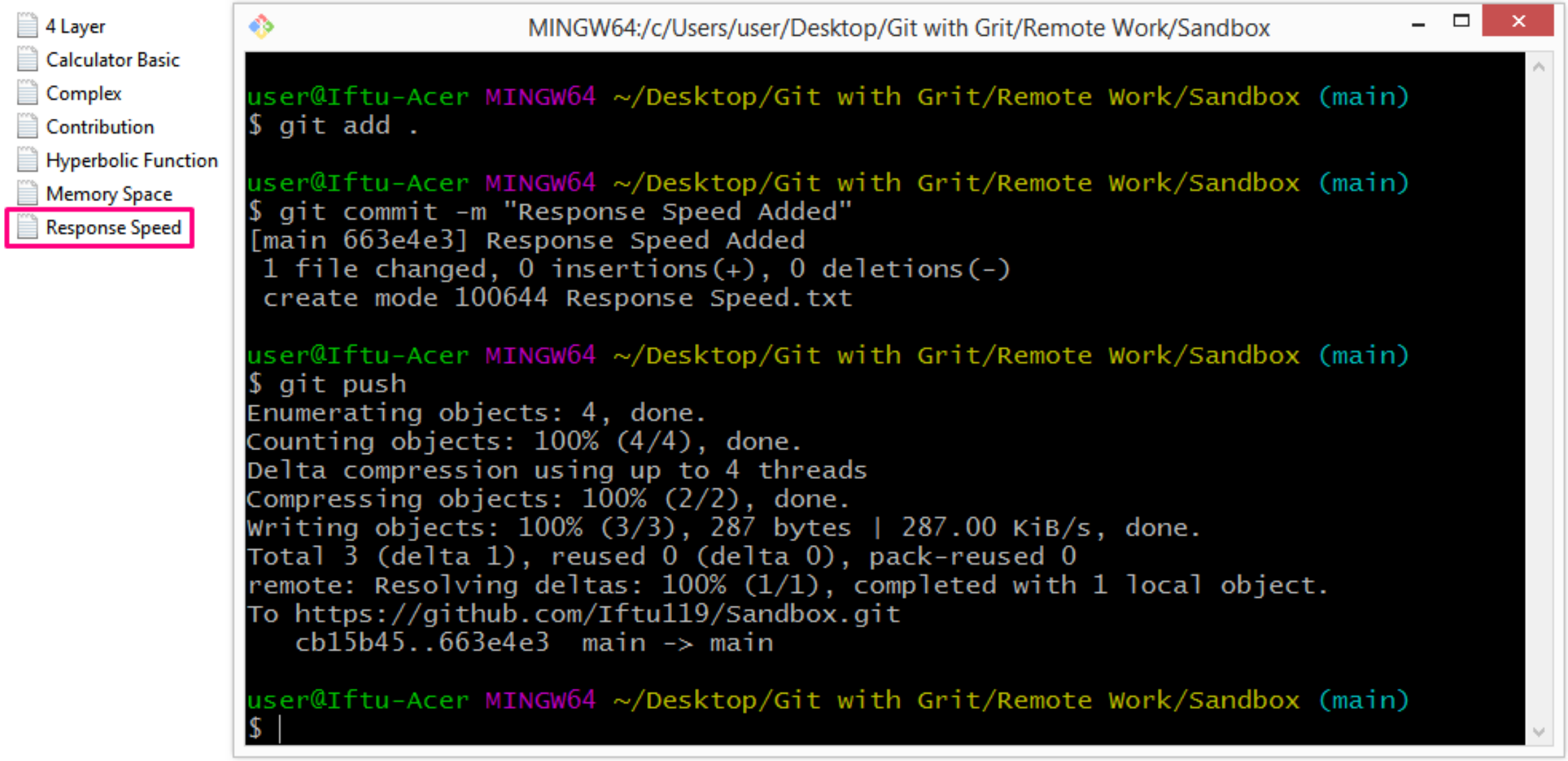
Status Looks good Now !




4 Layer
Calculato
Complex
Contribut
Hyperbol
Memory
MINGW64:/c/Users/user/Desktop/Git with Grit/Remote Work/Sandbox
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Remote Work/Sandbox (main)
$ git log -3
commit cb15b4560e190b35c13b45be56597e4f7ea67500 (HEAD -> main, origin/main, ori
gin/HEAD)
Author: Raiyan Bashir Mahin <u1804097@student.cuet.ac.bd>
Date: Sun Feb 14 00:09:01 2021 +0600
Create Contribution.txt
commit 38ed239972ef6b0414706c087992db869994aad2
Author: Iftu119 <iftekheriftu@gmail.com>
Date: Sat Feb 13 22:39:47 2021 +0600
Memory Added
commit 2c7a216bd92e5d48f2f71ea8e86ae0562e04437a
Merge: d9ac4f2 52403ba
Author: Iftu119 <iftekheriftu@gmail.com>
Date: Sat Feb 13 21:12:58 2021 +0600
Merge Fed In
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Remote Work/Sandbox (main)
$

Let's check the **LOG** to find out who actually contributed to this repository




4 Layer
Calculator Basic
Complex
Contribution
Hyperbolic Function
Memory Space
Response Speed
MINGW64:/c/Users/user/Desktop/Git with Grit/Remote Work/Sandbox
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Remote Work/Sandbox (main)
$ git add .
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Remote Work/Sandbox (main)
$ git commit -m "Response Speed Added"
[main 663e4e3] Response Speed Added
1 file changed, 0 insertions(+), 0 deletions(-)
create mode 100644 Response Speed.txt
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Remote Work/Sandbox (main)
$ git push
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 4 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 287 bytes | 287.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To https://github.com/Iftu119/Sandbox.git
cb15b45..663e4e3 main -> main
user@Iftu-Acer MINGW64 ~/Desktop/Git with Grit/Remote Work/Sandbox (main)
$

main 3 branches 0 tags Go to file Add file Code

Iftu119 Response Speed Added 663e4e3 1 minute ago 11 commits

4 Layer.txt	4 Layers added	yesterday
Calculator Basic.txt	UI fed to Basic	yesterday
Complex.txt	Complex Initial Commit	17 hours ago
Contribution.txt	Create Contribution.txt	14 hours ago
Hyperbolic Function.txt	Complex Initial Commit	17 hours ago
Memory Space.txt	Memory Added	15 hours ago
Response Speed.txt	Response Speed Added	1 minute ago

Help people interested in this repository understand your project by adding a README. Add a README

Gracias