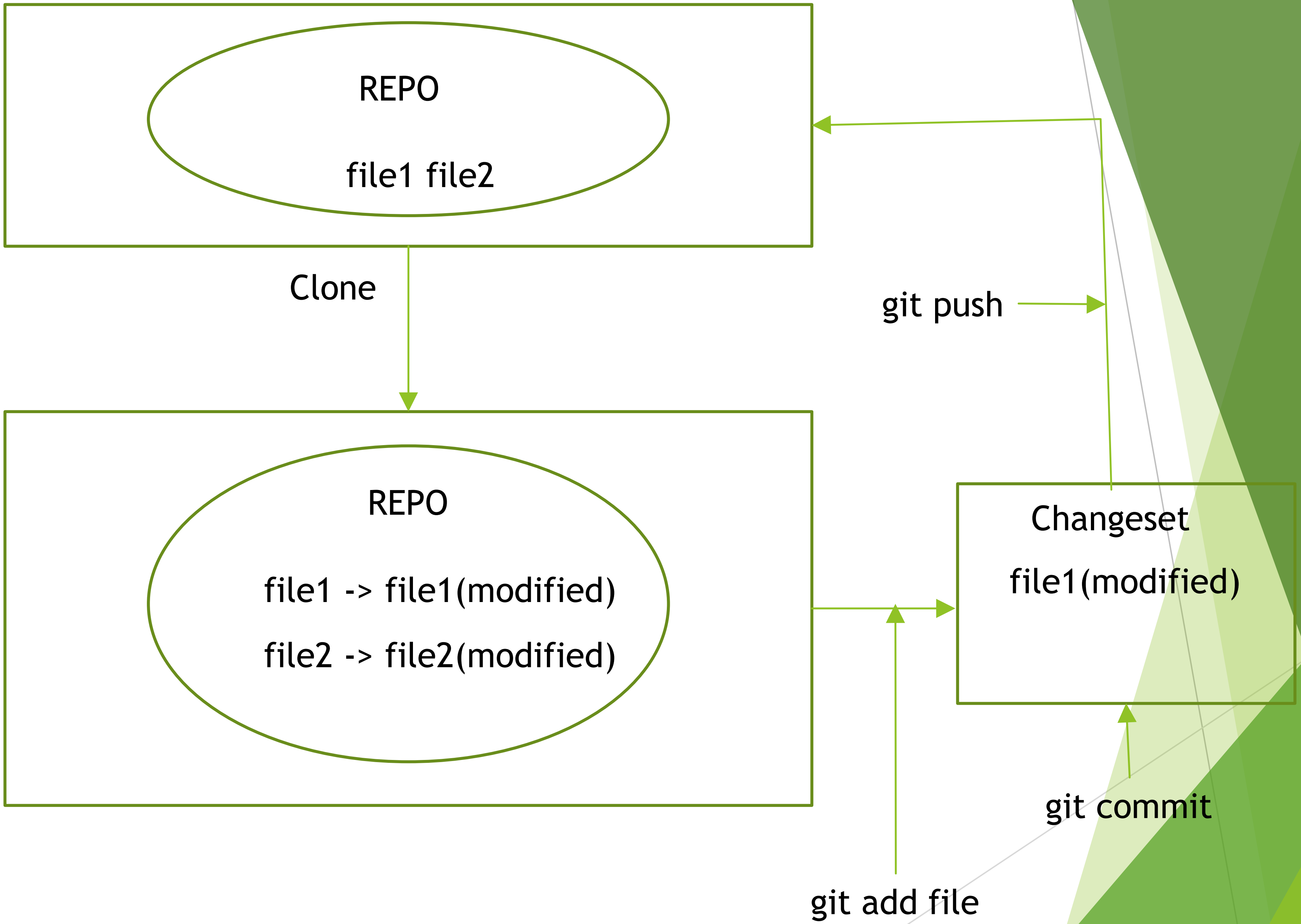
Git

An Overview

- We have seen how GitHub works
- This tutorial gives you an introduction to the GIT commands that you will be working with.
- The Git Tool helps us modify and update files in a repository.
- You will need to familiarize yourself with the Git commands.
- The GIT commands explained in this tutorial will guide you through your assignments.

Owner - Bob
GitHub Server

Bob’s
Laptop



REPO

file1 file2

Clone

REPO

file1 -> file1(modified)

file2 -> file2(modified)

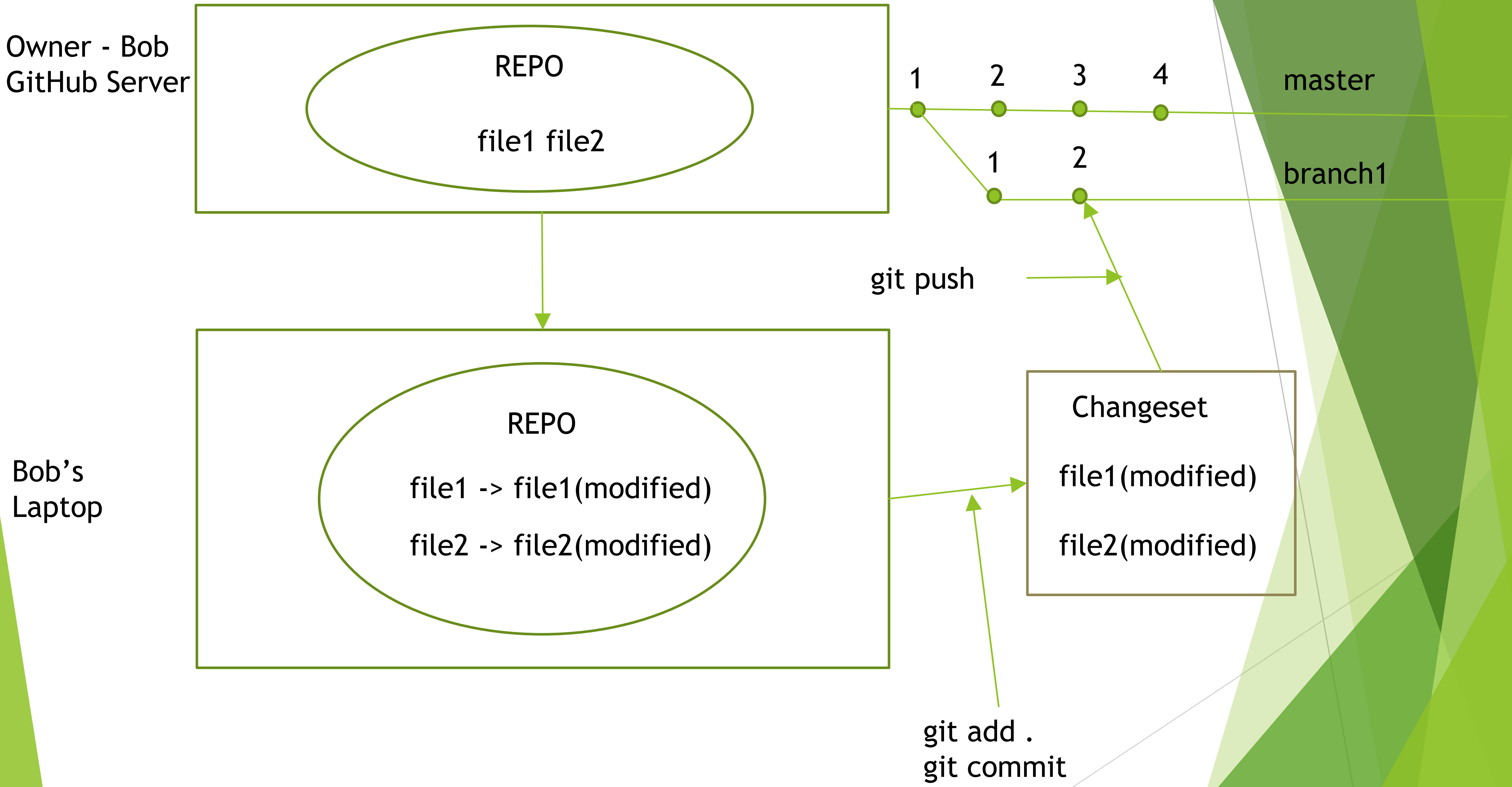
Changeset

file1(modified)

git push

git commit

git add file



Owner - Bob
GitHub Server

REPO

file1 file2

1 2 3 4 master

1 2 branch1

git push

Bob’s
Laptop

REPO

file1 -> file1(modified)

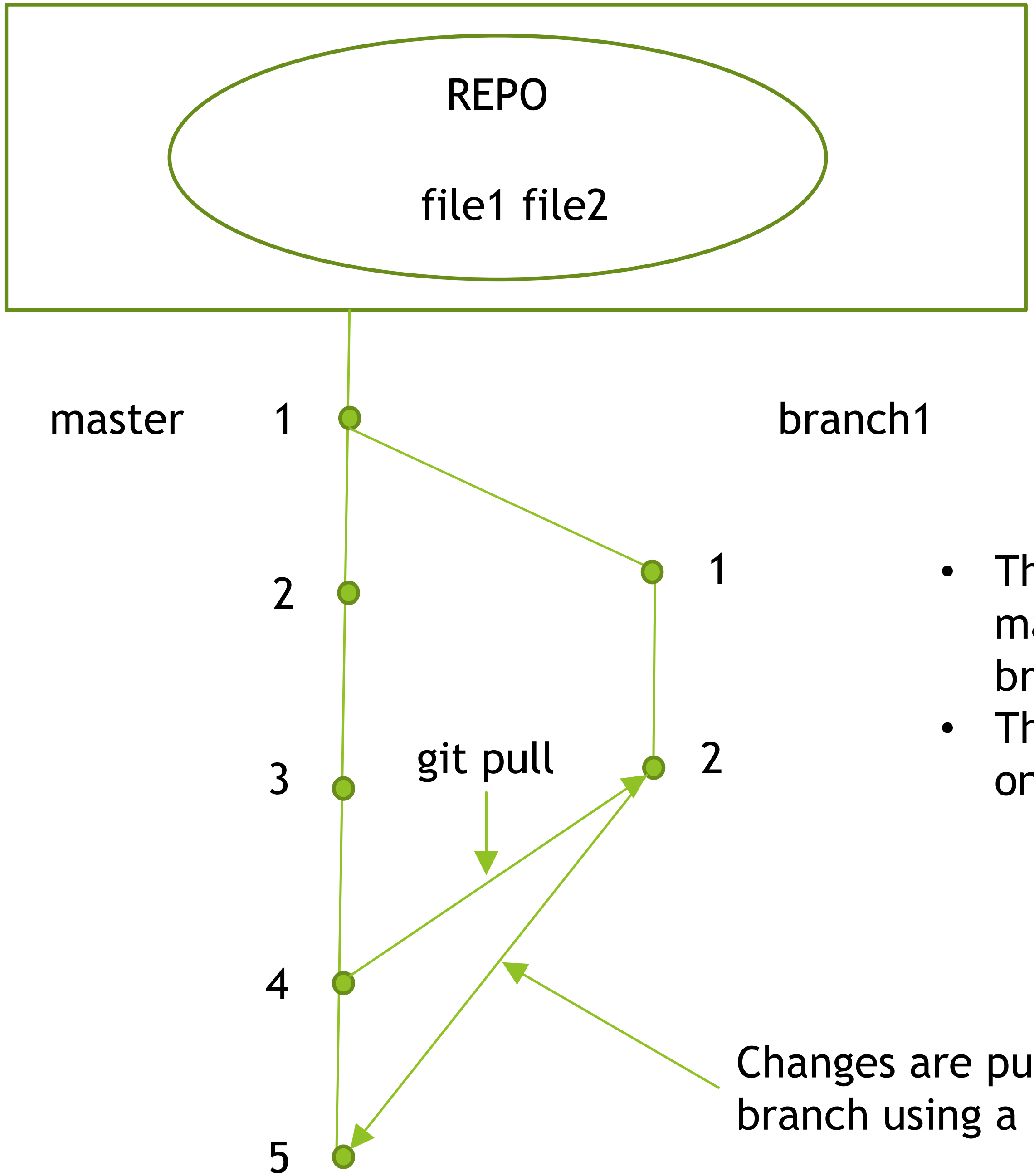
file2 -> file2(modified)

Changeset

file1(modified)

file2(modified)

git add .
git commit



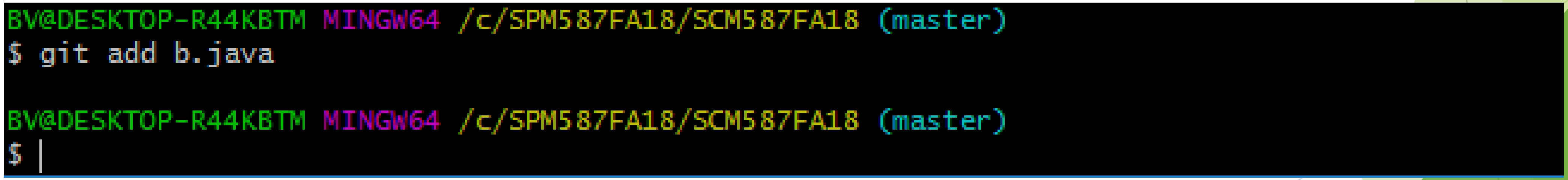
- The latest version from the master branch is pulled into the branch1
- Then the changes are merged onto the master branch

Changes are pulled onto the master branch using a pull request

git add

- Git add command adds any modified file or new file to the list of files to be committed to a branch.
- So any modified file you want to commit to a branch must first be added.

  - <u>Syntax</u>
    - **git add *filename*** ***- to add a single file***
    - **git add .** ***- to add all files in the current directory***



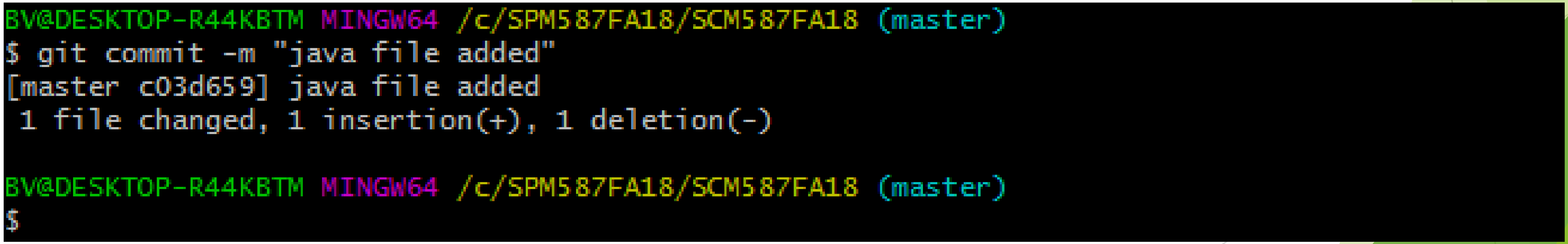
```
BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (master)
$ git add b.java

BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (master)
$ |
```

Fixes option

- We have seen in GitHub how to create issues.
- Once you have created issue that issue will open till you manually close it.
- This can be done through Git.
- Giving the “Fixes #<Issue number> during commit automatically closes the issue on GitHub.

Syntax

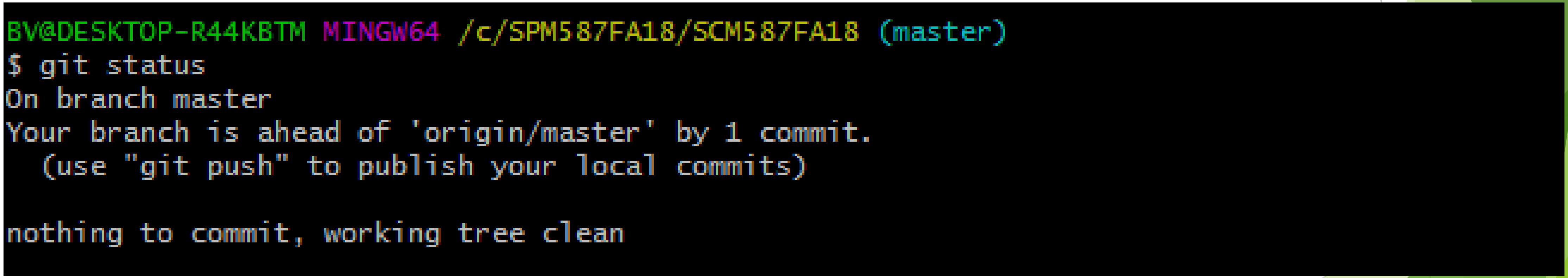
- **git commit -m “Fixes #*<Issue Number> Your message here*”**



```
BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (master)
$ git commit -m "java file added"
[master c03d659] java file added
 1 file changed, 1 insertion(+), 1 deletion(-)

BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (master)
$
```

git status

- The status command shows you the current status of the repository.
- It shows the branch that you are working in.
- It identifies the changes that are yet to be committed.
- The following screenshot from the Git Shell shows the output of the git status.



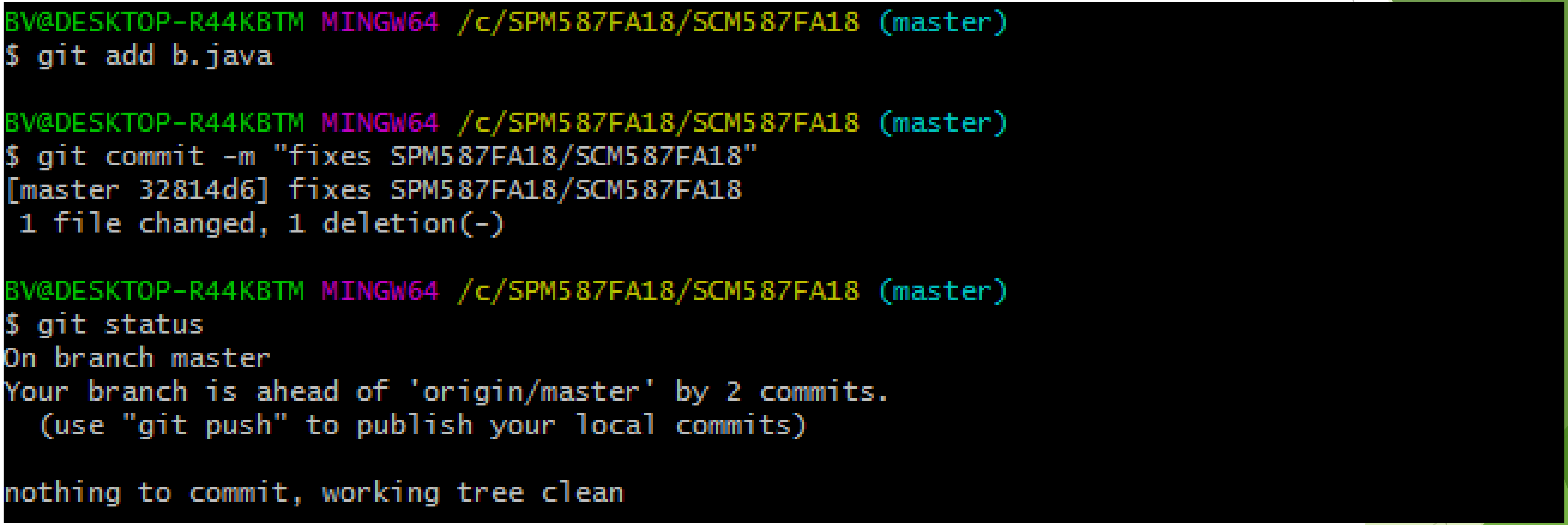
```
BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (master)
$ git status
On branch master
Your branch is ahead of 'origin/master' by 1 commit.
  (use "git push" to publish your local commits)

nothing to commit, working tree clean
```

First Commit

- Now you have a repository that is cloned and you want to modify a file and commit it.
- Once the file is modified and ready to be committed, in the Git shell type the following commands.

```
[bash]$ git add filename
[bash]$ git commit -m “Commit message here”
```

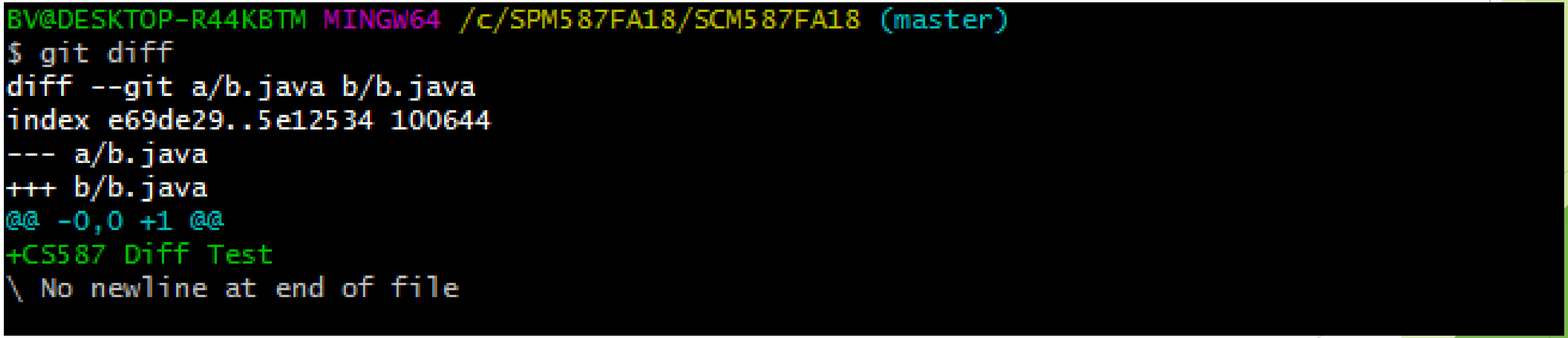
Screenshot of Adding and Committing



```
BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (master)
$ git add b.java

BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (master)
$ git commit -m "fixes SPM587FA18/SCM587FA18"
[master 32814d6] fixes SPM587FA18/SCM587FA18
 1 file changed, 1 deletion(-)

BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (master)
$ git status
On branch master
Your branch is ahead of 'origin/master' by 2 commits.
  (use "git push" to publish your local commits)

nothing to commit, working tree clean
```

git diff

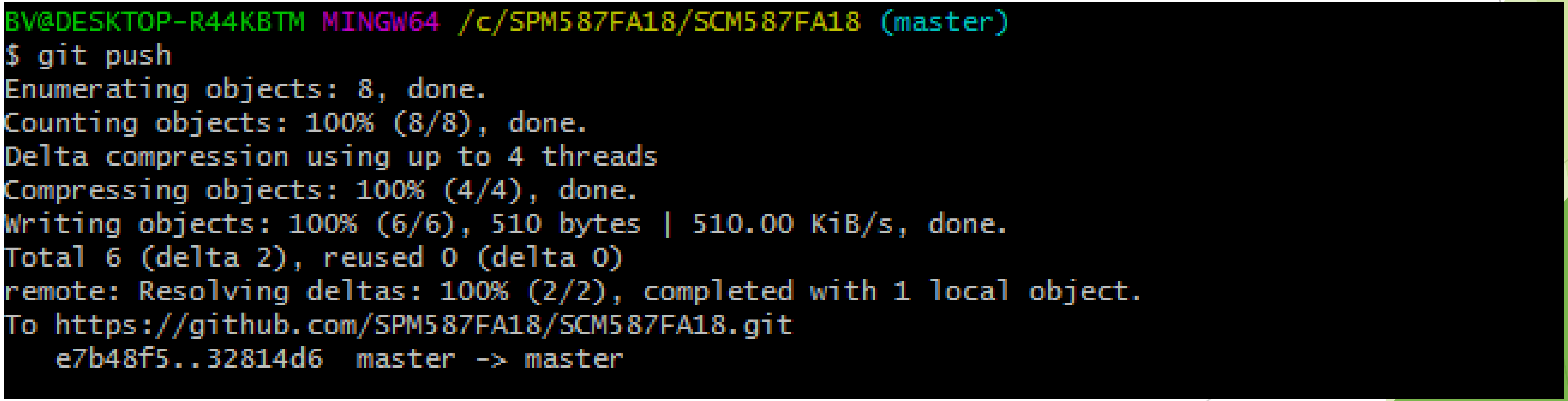
- The diff command shows the changes that have been made in a file or a directory from the last commit.
  - <u>Syntax</u>
    - git diff - shows diff for the whole root directory
    - git diff *filename* - shows diff for the file mentioned



```
BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (master)
$ git diff
diff --git a/b.java b/b.java
index e69de29..5e12534 100644
--- a/b.java
+++ b/b.java
@@ -0,0 +1 @@
+CS587 Diff Test
\ No newline at end of file
```

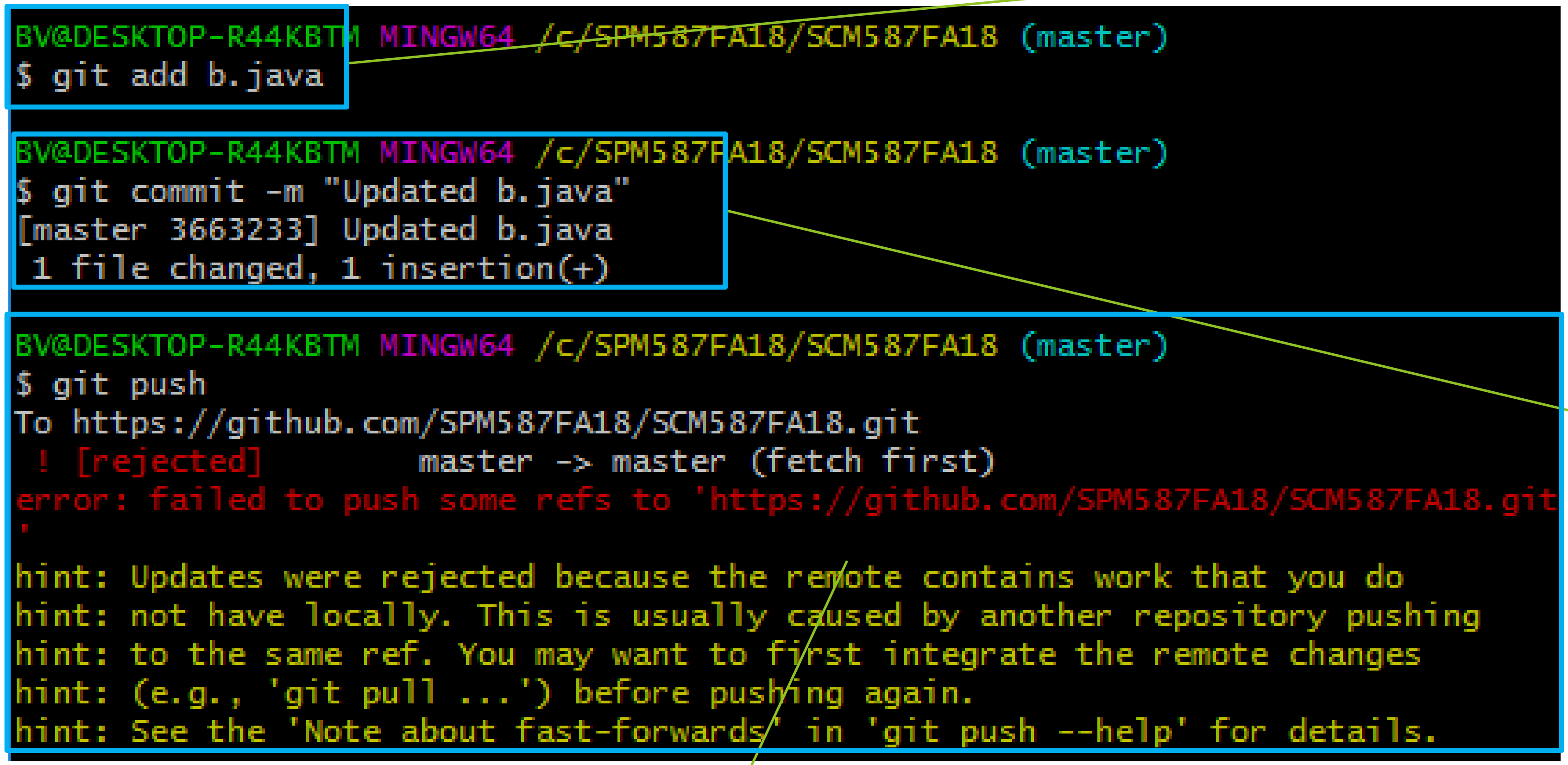
git push

- Now that we have committed the changes that we have made we want the changes to be reflected in the centralized repository
- This will enable other users to see these changes as well.
- Git push command pushes the changes that we have committed to the centralized repository.
  - **Syntax**
    - **git push**



```
BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (master)
$ git push
Enumerating objects: 8, done.
Counting objects: 100% (8/8), done.
Delta compression using up to 4 threads
Compressing objects: 100% (4/4), done.
Writing objects: 100% (6/6), 510 bytes | 510.00 KiB/s, done.
Total 6 (delta 2), reused 0 (delta 0)
remote: Resolving deltas: 100% (2/2), completed with 1 local object.
To https://github.com/SPM587FA18/SCM587FA18.git
   e7b48f5..32814d6  master -> master
```

What happens when another user commits?



```
BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (master)
$ git add b.java

BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (master)
$ git commit -m "Updated b.java"
[master 3663233] Updated b.java
 1 file changed, 1 insertion(+)

BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (master)
$ git push
To https://github.com/SPM587FA18/SCM587FA18.git
 ! [rejected]        master -> master (fetch first)
error: failed to push some refs to 'https://github.com/SPM587FA18/SCM587FA18.git
'
hint: Updates were rejected because the remote contains work that you do
hint: not have locally. This is usually caused by another repository pushing
hint: to the same ref. You may want to first integrate the remote changes
hint: (e.g., 'git pull ...') before pushing again.
hint: See the 'Note about fast-forwards' in 'git push --help' for details.
```

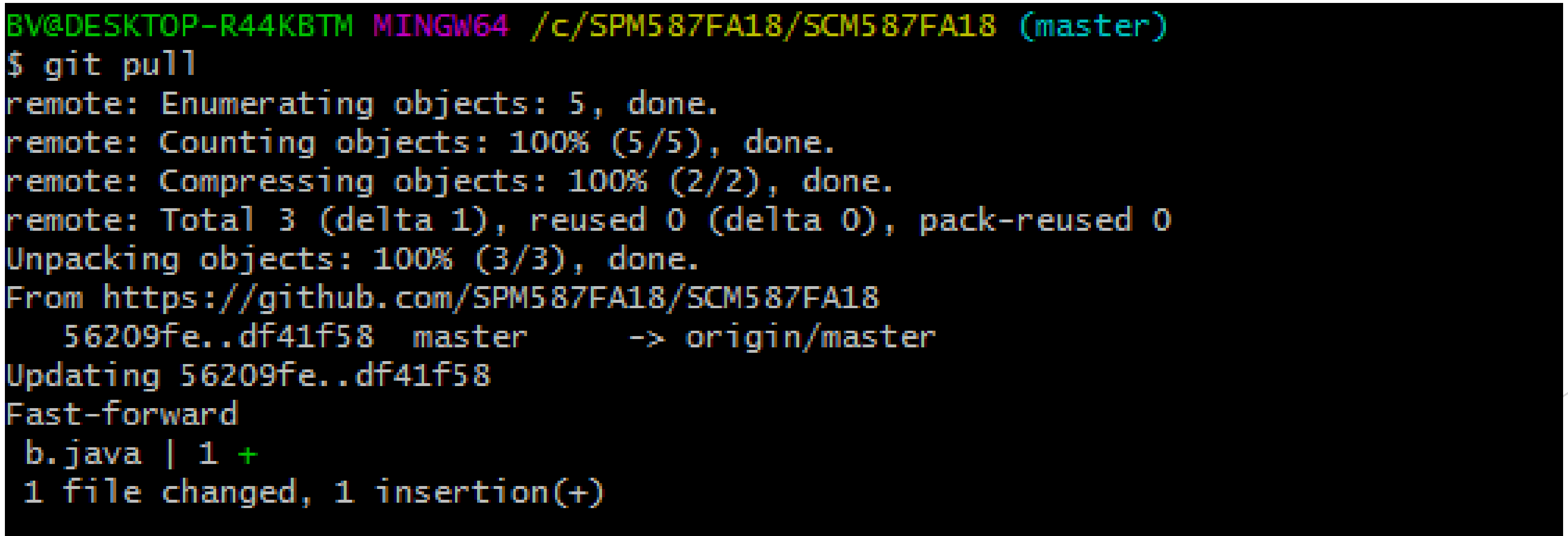
File modified and added to change set

Committing the changes

Pushing to repository getting rejected

git pull

- In the previous screenshot the git push failed because in the main repository newer changes are available which is not present in our repository.
- This means that if we upload our changes without including the changes in the repository, it will overwrite those changes.
- That is why git rejected the push command. Git pull commands updates the current repository with the newer changes available in the repository.
  - Syntax
    - git pull



```
BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (master)
$ git pull
remote: Enumerating objects: 5, done.
remote: Counting objects: 100% (5/5), 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), done.
From https://github.com/SPM587FA18/SCM587FA18
   56209fe..df41f58  master     -> origin/master
Updating 56209fe..df41f58
Fast-forward
 b.java | 1 +
 1 file changed, 1 insertion(+)
```

git branch

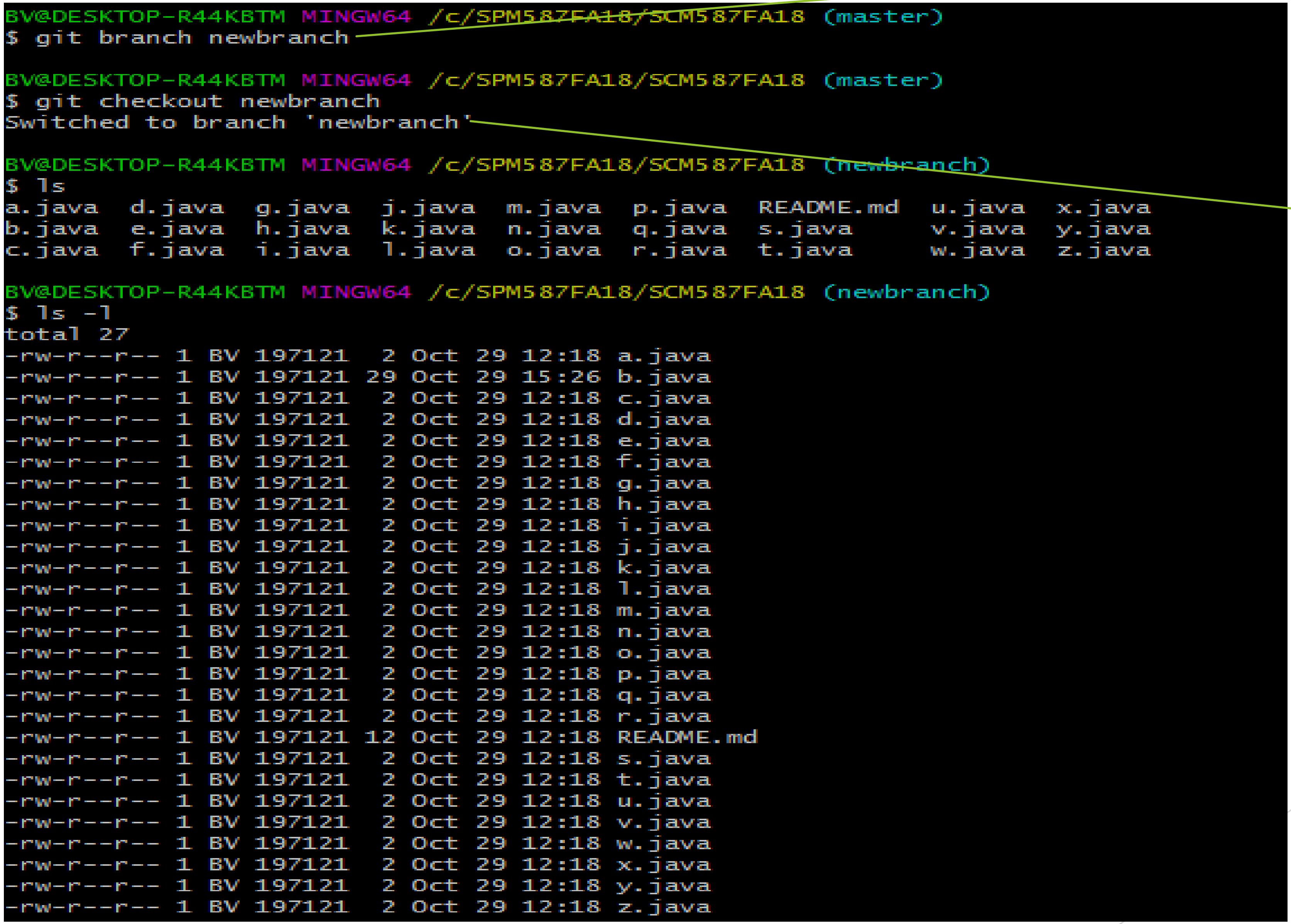
- This command creates a new branch from the main branch.
- The branch name is specified and git creates a new branch with the name.

  - **Syntax**
    - **git branch *branchname <commit number>***

git checkout

- This command is used to revert the changes to a previous commit.
  - **Syntax**
    - **git checkout *commitnumber***
- Checkout command can also help us switch to a different branch from the current branch.
  - **Syntax**
    - **git checkout -b *branchname commitnumber***

Creating and checking out a branch

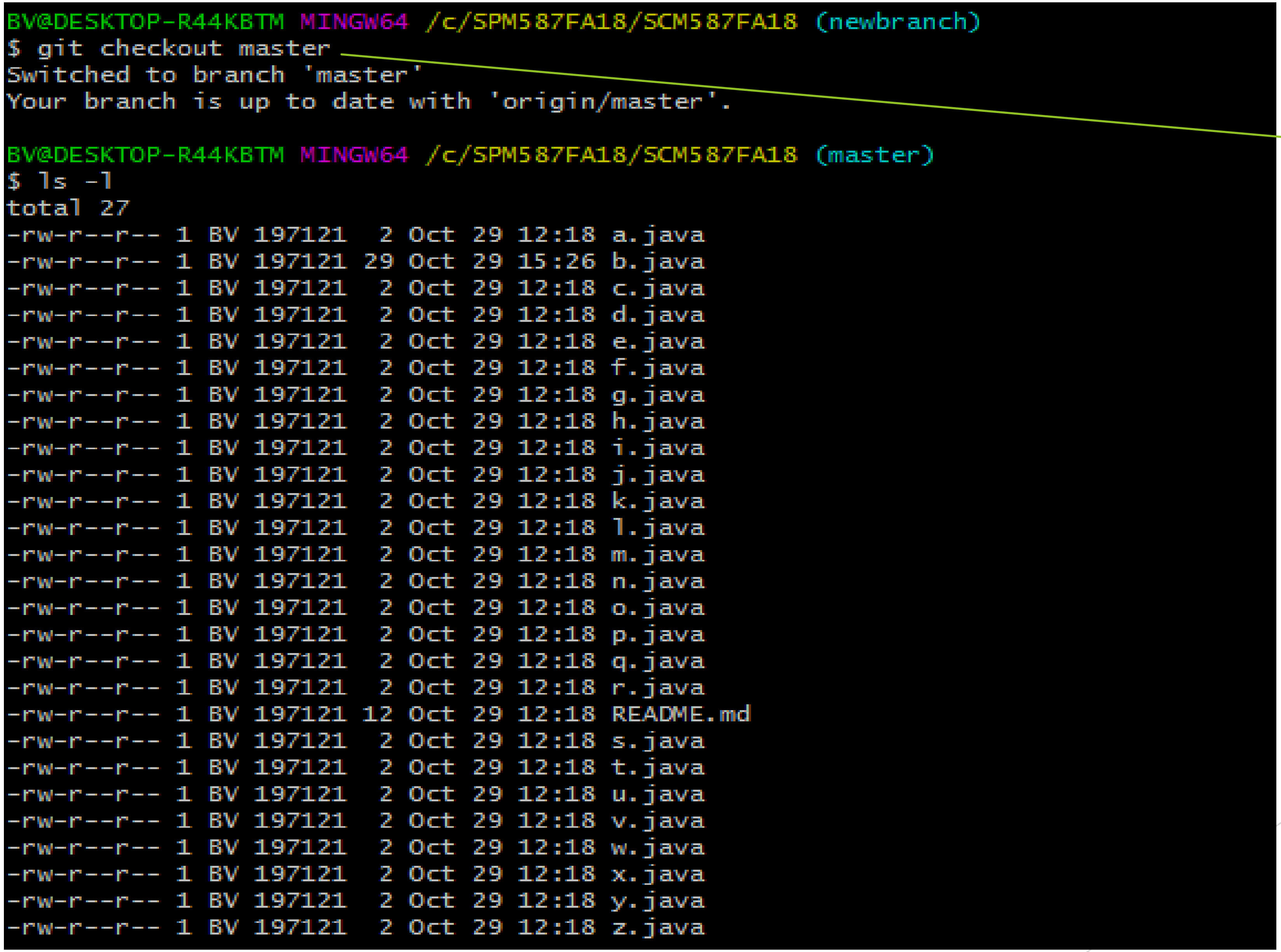


```
BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (master)
$ git branch newbranch

BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (master)
$ git checkout newbranch
Switched to branch 'newbranch'

BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (newbranch)
$ ls
a.java  d.java  g.java  j.java  m.java  p.java  README.md  u.java  x.java
b.java  e.java  h.java  k.java  n.java  q.java  s.java     v.java  y.java
c.java  f.java  i.java  l.java  o.java  r.java  t.java     w.java  z.java

BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (newbranch)
$ ls -l
total 27
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 a.java
-rw-r--r-- 1 BV 197121 29 Oct 29 15:26 b.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 c.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 d.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 e.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 f.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 g.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 h.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 i.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 j.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 k.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 l.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 m.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 n.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 o.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 p.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 q.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 r.java
-rw-r--r-- 1 BV 197121 12 Oct 29 12:18 README.md
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 s.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 t.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 u.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 v.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 w.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 x.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 y.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 z.java
```

Creating branch featureBranch

Checking out featureBranch

Creating and checking out a branch



```
BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (newbranch)
$ git checkout master
Switched to branch 'master'
Your branch is up to date with 'origin/master'.

BV@DESKTOP-R44KBTM MINGW64 /c/SPM587FA18/SCM587FA18 (master)
$ ls -l
total 27
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 a.java
-rw-r--r-- 1 BV 197121 29 Oct 29 15:26 b.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 c.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 d.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 e.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 f.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 g.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 h.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 i.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 j.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 k.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 l.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 m.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 n.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 o.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 p.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 q.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 r.java
-rw-r--r-- 1 BV 197121 12 Oct 29 12:18 README.md
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 s.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 t.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 u.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 v.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 w.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 x.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 y.java
-rw-r--r-- 1 BV 197121  2 Oct 29 12:18 z.java
```

Checking out master

Questions?