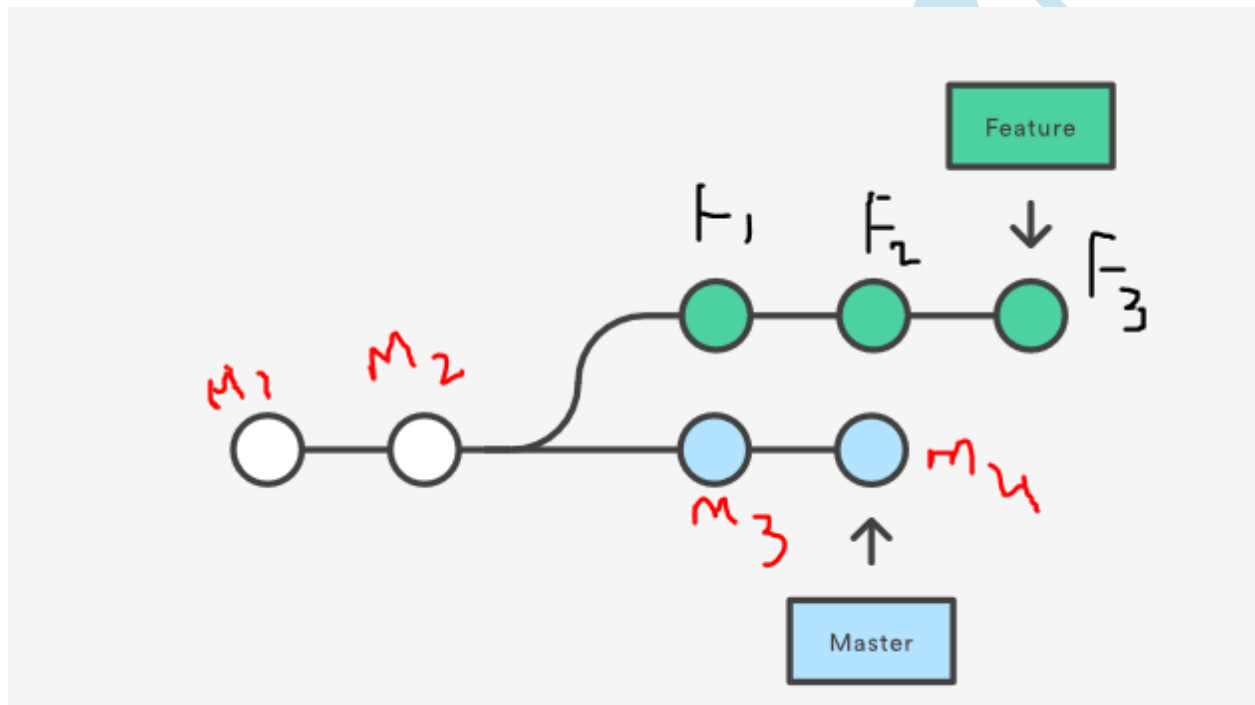## Git Merge and Rebase

Senario:

You are working on a new feature in your project? Chances are that you created a separate branch for that purpose. But what if you want to add these changes to the master branch? Then MERGE or REBASE can be helpful, so let's have a look at these commands!

git-merge - Join two or more development histories together.

for ex:

The master branch having 4 commits m1,m2,m3,m4 and feature branch having m1,m2,f1,f2,f3

now i want to combined the changes of both into one place . In this scenario we will go for merge or rebase commands. let's see the what the difference between these two commands and usages.

Merge scenario:

In this scenario

1. first we have master branch and master branch having two commits i.e.m1,m2.

```
root@vuser-HVM-domU:~/databytes# git log
commit 725cc7e3d820e349e218a6ef5db697b8c302bb83
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 15:21:38 2018 +0530

    m2 commit

commit e9a90886c1b74a99adaf67301d89b8882b3fe0a1
Author: madhu <ybmadhu707@gmail.com>
Date:    Mon Dec 3 17:07:56 2018 +0530

    msg1
```

2. we got a new work and we created for this new branch called **feature**. this feature branch having data up to m1,m2 commits.

$ git fetch

$git checkout feature

3. Now i implemented some code in feature branch and did two commits in feature branch called f1 and f2. Now feature branch having four commit logs i.e. m1,m2,f1,f2.

```
root@vuser-HVM-domU:~/databytes# git log
commit dfe2e67dd559a8739c88eb5d37c1d108db20a7d7
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 17:00:15 2018 +0530

    f2
commit a483de22e14d7198cc29ad31cb1b2f7ffd3e27e7
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 16:59:34 2018 +0530

    f1
commit 725cc7e3d820e349e218a6ef5db697b8c302bb83
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 15:21:38 2018 +0530

    m2 commit
commit e9a90886c1b74a99adaf67301d89b8882b3fe0a1
Author: madhu <ybmadhu707@gmail.com>
Date:    Mon Dec 3 17:07:56 2018 +0530

    msg1
```

4. now i want to merge my feature branch to master branch. i am using merge command for this scenario.

Note : mean while some other worked on the master branch and they committed code with 2 commits called m3,m4.

$git checkout master

$git log

this master branch logs

```
root@vuser-HVM-domU:~/databytes# git log
commit 1e9d628017df6d6e5bab90aae185002198c88c11
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 17:19:48 2018 +0530

    m4

commit 1b2a575d76b90132a33e7df2ada9de88681a283d
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 17:19:17 2018 +0530

    m3

commit 725cc7e3d820e349e218a6ef5db697b8c302bb83
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 15:21:38 2018 +0530

    m2 commit

commit e9a90886c1b74a99adaf67301d89b8882b3fe0a1
Author: madhu <ybmadhu707@gmail.com>
Date:    Mon Dec 3 17:07:56 2018 +0530

    msg1
```

5. here i am using --squash option for auto merge to avoid merge conflicts

$ git merge --squash feature

```
root@vuser-HVM-domU:~/databytes# git merge --squash feature
Squash commit -- not updating HEAD
Automatic merge went well; stopped before committing as requested
```

```
root@vuser-HVM-domU:~/databytes# git commit -m "merging master branch and feature branch"
[master e224d9e] merging master branch and feature branch
 3 files changed, 6 insertions(+)
 create mode 100644 care.txt
 create mode 100644 sure.txt
```

after see the project structure you will get the all files from feature branch.

let's see the logs from master branch.

```
root@vuser-HVM-domU:~/databytes# git log
commit e224d9e21aac75a5f65517b08b6b364eab3383bd
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 17:27:16 2018 +0530

    merging master branch and feature branch

commit 1e9d628017df6d6e5bab90aae185002198c88c11
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 17:19:48 2018 +0530

    m4

commit 1b2a575d76b90132a33e7df2ada9de88681a283d
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 17:19:17 2018 +0530

    m3

commit 725cc7e3d820e349e218a6ef5db697b8c302bb83
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 15:21:38 2018 +0530

    m2 commit

commit e9a90886c1b74a99adaf67301d89b8882b3fe0a1
Author: madhu <ybmadhu707@gmail.com>
Date:    Mon Dec 3 17:07:56 2018 +0530

    msg1
```
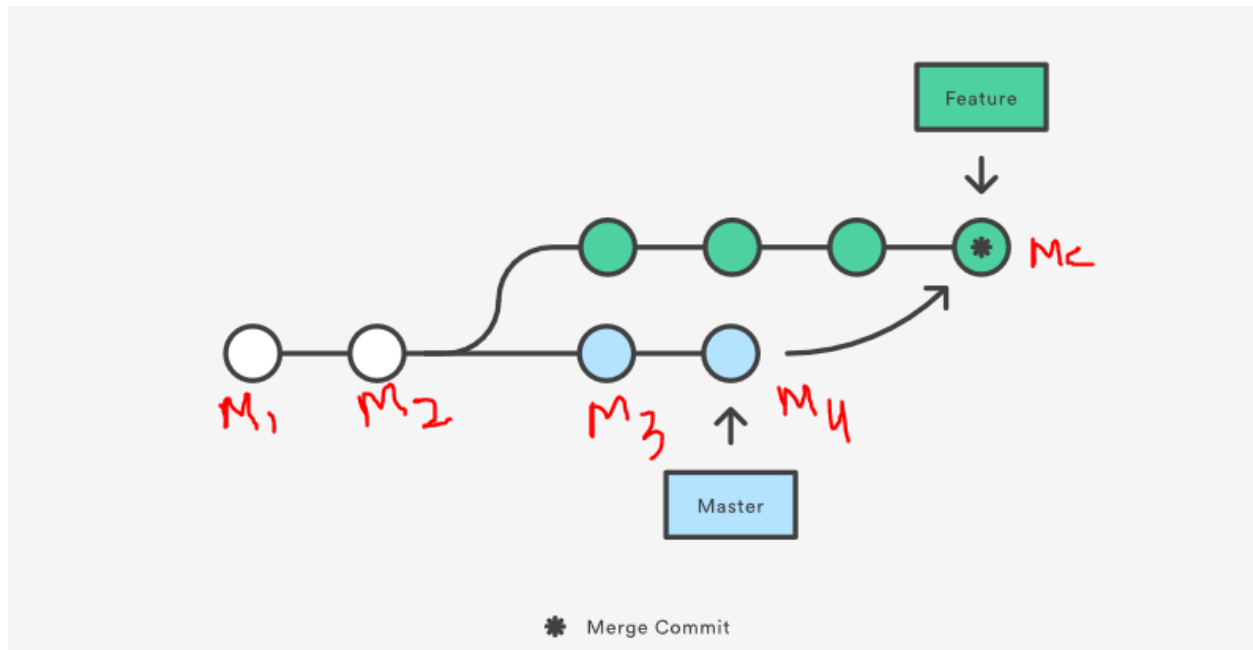
Note : we are successfully merge the feature branch to master. here we miss the history commit messages of feature branch. if you want to history of feature branch committed messages we should use rebase.

After merge out structure is look likes below diagram. *mc is merge commit

Note : this is new scenario using rebase how we can merge. for this scenario i am going to back how the previous project look like same.

$ git reset --hard HEAD~1   ---> i am deleting latest commits (last 3 commits i deleted)

Now see the logs at master branch. Now we can see the only m1,m2 committed messages only.

```
root@vuser-HVM-domU:~/databytes# git log
commit 725cc7e3d820e349e218a6ef5db697b8c302bb83
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 15:21:38 2018 +0530

    m2 commit

commit e9a90886c1b74a99adaf67301d89b8882b3fe0a1
Author: madhu <ybmadhu707@gmail.com>
Date:    Mon Dec 3 17:07:56 2018 +0530

    msg1
```

6. I am switching to feature branch.

$git checkout feature

$git log

```
root@vuser-HVM-domU:~/databytes# git log
commit dfe2e67dd559a8739c88eb5d37c1d108db20a7d7
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 17:00:15 2018 +0530

    f2

commit a483de22e14d7198cc29ad31cb1b2f7ffd3e27e7
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 16:59:34 2018 +0530

    f1

commit 725cc7e3d820e349e218a6ef5db697b8c302bb83
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 15:21:38 2018 +0530

    m2 commit

commit e9a90886c1b74a99adaf67301d89b8882b3fe0a1
Author: madhu <ybmadhu707@gmail.com>
Date:    Mon Dec 3 17:07:56 2018 +0530

    msg1
```

7. mean while some other persons are push to master code with m3,m4 commits..

see the logs

```
root@vuser-HVM-domU:~/databytes# git log
commit 94d9bca92ae56c724b8872780271f2e543658146
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 18:24:00 2018 +0530

    m4

commit b38478d25a97b9cfa9213b9d069cddaa9da18575
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 18:22:33 2018 +0530

    m3

commit 725cc7e3d820e349e218a6ef5db697b8c302bb83
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 15:21:38 2018 +0530

    m2 commit

commit e9a90886c1b74a99adaf67301d89b8882b3fe0a1
Author: madhu <ybmadhu707@gmail.com>
Date:    Mon Dec 3 17:07:56 2018 +0530

    msg1
```

7. now think you're in feature branch if not switch the feature branch.

$git checkout feature

$ git log

```
root@vuser-HVM-domU:~/databytes# git log
commit dfe2e67dd559a8739c88eb5d37c1d108db20a7d7
Author: madhu <ybmadhu707@gmail.com>
Date:   Fri Dec 14 17:00:15 2018 +0530

    f2

commit a483de22e14d7198cc29ad31cb1b2f7ffd3e27e7
Author: madhu <ybmadhu707@gmail.com>
Date:   Fri Dec 14 16:59:34 2018 +0530

    f1

commit 725cc7e3d820e349e218a6ef5db697b8c302bb83
Author: madhu <ybmadhu707@gmail.com>
Date:   Fri Dec 14 15:21:38 2018 +0530

    m2 commit

commit e9a90886c1b74a99adaf67301d89b8882b3fe0a1
Author: madhu <ybmadhu707@gmail.com>
Date:   Mon Dec 3 17:07:56 2018 +0530

    msg1
```

Now do the git rebase on feature branch.

$ git rebase master

lets see the logs.

```
root@vuser-HVM-domU:~/databytes# git rebase master
First, rewinding head to replay your work on top of it...
Applying: f1
Applying: f2
```

```
root@vuser-HVM-domU:~/databytes# git log
commit 00c89c099ba253040a7cb64fcf90da817d10e14e
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 17:00:15 2018 +0530

     f2

commit de43034dcad3ae703f3b08d0a6bcfae2a6481ace
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 16:59:34 2018 +0530

     f1

commit 94d9bca92ae56c724b8872780271f2e543658146
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 18:24:00 2018 +0530

     m4

commit b38478d25a97b9cfa9213b9d069cddaa9da18575
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 18:22:33 2018 +0530

     m3

commit 725cc7e3d820e349e218a6ef5db697b8c302bb83
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 15:21:38 2018 +0530

     m2 commit

commit e9a90886c1b74a99adaf67301d89b8882b3fe0a1
Author: madhu <ybmadhu707@gmail.com>
Date:    Mon Dec 3 17:07:56 2018 +0530

     msg1
```

Now checkout to master branch..

$git checkout master

now see the logs at master branch we have only m1,m2,m3,m4 commits.

then run the rebase command at master branch

$git rebase feature

```
root@vuser-HVM-domU:~/databytes# git rebase feature
First, rewinding head to replay your work on top of it...
Fast-forwarded master to feature.
root@vuser-HVM-domU:~/databytes#
```

see the logs now this time we should see the commits in log m1,m2,m3,m4,f1,f2

$git log

```
root@vuser-HVM-domU:~/databytes# git log
commit 00c89c099ba253040a7cb64fcf90da817d10e14e
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 17:00:15 2018 +0530

    f2

commit de43034dcad3ae703f3b08d0a6bcfae2a6481ace
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 16:59:34 2018 +0530

    f1

commit 94d9bca92ae56c724b8872780271f2e543658146
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 18:24:00 2018 +0530

    m4

commit b38478d25a97b9cfa9213b9d069cddaa9da18575
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 18:22:33 2018 +0530

    m3

commit 725cc7e3d820e349e218a6ef5db697b8c302bb83
Author: madhu <ybmadhu707@gmail.com>
Date:    Fri Dec 14 15:21:38 2018 +0530

    m2 commit

commit e9a90886c1b74a99adaf67301d89b8882b3fe0a1
Author: madhu <ybmadhu707@gmail.com>
Date:    Mon Dec 3 17:07:56 2018 +0530

    msg1
```

Now we can able to see the history feature branch commits as well...