

Software Methods and Tools

Assignment-8, Spring-2017



Submitted by:

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Imagine that you are working on a project (e.g. the Snake application) with another two students, and you have decided to use GIT to manage your source code.

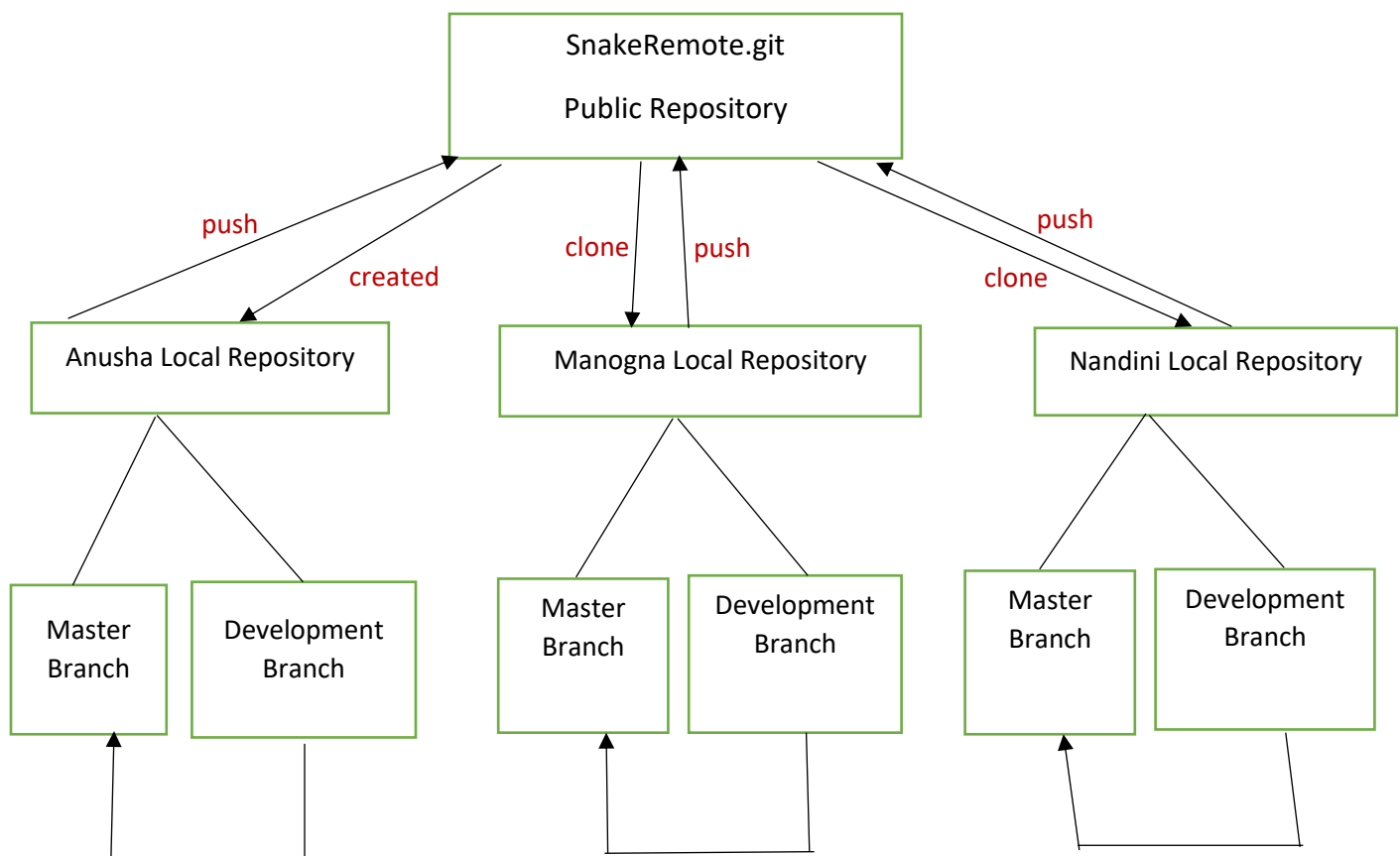
Develop a working flow that characterizes how you will use GIT in this project. You cannot use the working flows included in the lecture slides. Instead, you must design a working flow that suggests a new collaboration pattern of using GIT.

In addition, your designed working flow must involve all the important concepts/operations of GIT. These include: remote branch, tracking branch, branching, merging, merging conflicts, repository creation, tracking new files, modifying files, staging files, committing changes, fetching, pulling, and pushing.

Your working flow must start from the initial repository creation.

Draw a diagram to illustrate the working process (Similar to the diagram of the integration manager workflow included in the lecture slides).

As part of this assignment I created the following collaboration for Git Repository. There are three developers named as: Anusha, Manogna and Nandini. Three developers have development branches to do development changes and then push it to master branch. Further changes in master branch can be pushed to remote repository named as SnakeRemote.git. ManognaLocalGit and NandiniLocalGit are cloned from remote repository whereas AnushaLocalGit is created and pushed to remote for first time.



Step 1) Creating Repository: Setting up remote repository named as SnakeRemote.git using command

git init --bare

```
MINGW64:/c:/Users/malin/Desktop/SMTLabAssignment8/SnakeRemote.git
malin@LAPTOP-CNTM57BU MINGW64 ~
$ git config --global user.name "Anusha"

malin@LAPTOP-CNTM57BU MINGW64 ~
$ git config --global core.editor emacs

malin@LAPTOP-CNTM57BU MINGW64 ~
$ cd Desktop

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop
$ cd S
SMT/                               SnakeGameTestCases.zip          spark-1.6.1-bin-hadoop2.6/
SMT-Lab_Assignment-5.rar          Software Methods and Tools.docx  Start Tor Browser.lnk

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop
$ cd SMTLabAssignment8

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8
$ mkdir SnakeRemote.git

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8
$ cd SnakeRemote.git

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/SnakeRemote.git
$ git init--bare
git: 'init--bare' is not a git command. See 'git --help'.

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/SnakeRemote.git
$ git init --bare
Initialized empty Git repository in C:/Users/malin/Desktop/SMTLabAssignment8/SnakeRemote.git/

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/SnakeRemote.git (BARE:master)
$ ls
config  description  HEAD  hooks/  info/  objects/  refs/

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/SnakeRemote.git (BARE:master)
$
```

Step 2: Creating Repository and Tracking new files: Creating local repository for Anusha

Commands used:

git init --bare ← to initialize local repository

git add * ← to add tracked files to staging

`git commit -m "commit message"` ← to commit staging files to local repository

`git remote add origin SnakeRemote.git` ← to add remote repository connection to local one

`git push origin master` ← to push local changes to remote repository

```
malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/SnakeRemote.git (BARE:master)
$ cd ..

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8
$ mkdir AnushaLocalGit

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8
$ cd AnushaLocalGit

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/AnushaLocalGit
$ git init
Initialized empty Git repository in C:/Users/malin/Desktop/SMTLabAssignment8/AnushaLocalGit/.git/

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/AnushaLocalGit (master)
$ git add *
fatal: pathspec '*' did not match any files

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/AnushaLocalGit (master)
$ git add *
warning: LF will be replaced by CRLF in org/psnbtech/BoardPanel.java.
The file will have its original line endings in your working directory.
warning: LF will be replaced by CRLF in org/psnbtech/Clock.java.
The file will have its original line endings in your working directory.
warning: LF will be replaced by CRLF in org/psnbtech/Direction.java.
The file will have its original line endings in your working directory.
warning: LF will be replaced by CRLF in org/psnbtech/SidePanel.java.
The file will have its original line endings in your working directory.
warning: LF will be replaced by CRLF in org/psnbtech/SnakeGame.java.
The file will have its original line endings in your working directory.
warning: LF will be replaced by CRLF in org/psnbtech/TileType.java.
The file will have its original line endings in your working directory.

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/AnushaLocalGit (master)
$ git commit -m "Initial import by Anusha"
[master (root-commit) f9a46d8] Initial import by Anusha
6 files changed, 1159 insertions(+)
create mode 100644 org/psnbtech/BoardPanel.java
create mode 100644 org/psnbtech/Clock.java
create mode 100644 org/psnbtech/Direction.java
create mode 100644 org/psnbtech/SidePanel.java
create mode 100644 org/psnbtech/SnakeGame.java
create mode 100644 org/psnbtech/TileType.java
```

```
malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/AnushaLocalGit (master)
$ git remote add origin C:/Users/malin/Desktop/SMTLabAssignment8/SnakeRemote.git

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/AnushaLocalGit (master)
$ git remote
origin

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/AnushaLocalGit (master)
$ git push origin master
Counting objects: 10, done.
Delta compression using up to 4 threads.
Compressing objects: 100% (8/8), done.
Writing objects: 100% (10/10), 9.62 KiB | 0 bytes/s, done.
Total 10 (delta 0), reused 0 (delta 0)
To C:/Users/malin/Desktop/SMTLabAssignment8/SnakeRemote.git
 * [new branch]      master -> master
```

Step 3) Cloning Repository: Create clone repository for developer Manogna.

Commands used:

git clone SnakeRemote.git ManognaLocalGit ← to clone remote repository to local one

```
malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8
$ git clone file:///C:/Users/malin/Desktop/SMTLabAssignment8/SnakeRemote.git ManognaLocalGit
Cloning into 'ManognaLocalGit'...
remote: Counting objects: 10, done.
remote: Compressing objects: 100% (8/8), done.
remote: Total 10 (delta 0), reused 0 (delta 0)
Receiving objects: 100% (10/10), 9.62 KiB | 0 bytes/s, done.

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8
$ cd ManognaLocalGit

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/ManognaLocalGit (master)
$ ls
org/
```

Step 4) Branch Creation: created development branch in ManognaLocalGit

Commands used:

git checkout -b development

```
malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/ManognaLocalGit (master)
$ git checkout -b development
Switched to a new branch 'development'
```

Step 5) Staging files addition:

made changes to SnakeGame.java file at line 107

```
100     private int nextFruitScore;
101
102     /**
103      * Creates a new SnakeGame instance. Creates a new window,
104      * and sets up the controller input.
105      */
106     private SnakeGame() {
107         super("Snake Remake"); // new comment added by Manogna in development
108         setLayout(new BorderLayout());
109         setDefaultCloseOperation(EXIT_ON_CLOSE);
110         setResizable(false);
111
112         /**
113          * Initialize the game's panels and add them to the window.
114          */
115         this.board = new BoardPanel(this);
116         this.side = new SidePanel(this);
117
118         add(board, BorderLayout.CENTER);
119         add(side, BorderLayout.EAST);
120
121         /**
122          * Adds a new key listener to the frame to process input.
123          */
124         addKeyListener(new KeyAdapter() {
125
```

Checking status of changed file as

Commands used:

git status

```
malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/ManognaLocalGit (development)
$ git status
On branch development
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git checkout -- <file>..." to discard changes in working directory)

        modified:   org/psnbtech/SnakeGame.java

no changes added to commit (use "git add" and/or "git commit -a")
```

Staging the modified file, committing it to local branch and then committing it to server

Commands used:

git add SnakeGame.java

git commit -m "Development in Progress"

git push origin development

```
malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/ManognaLocalGit/org/psnbtech (development)
$ git add SnakeGame.java

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/ManognaLocalGit/org/psnbtech (development)
$ git commit -m "Development in Progress"
[development a7edaa6] Development in Progress
1 file changed, 1 insertion(+), 1 deletion(-)

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/ManognaLocalGit/org/psnbtech (development)
$ git push origin development
Counting objects: 5, done.
Delta compression using up to 4 threads.
Compressing objects: 100% (3/3), done.
Writing objects: 100% (5/5), 427 bytes | 0 bytes/s, done.
Total 5 (delta 2), reused 0 (delta 0)
To file:///C:/Users/malin/Desktop/SMTLabAssignment8/SnakeRemote.git
 * [new branch]      development -> development

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/ManognaLocalGit/org/psnbtech (development)
$ git checkout master
Switched to branch 'master'
Your branch is up-to-date with 'origin/master'.
```

Step 6) Cloning and Fetching Repository: Create another clone repository for developer Nandini.

Commands used:

`git clone SnakeRemote.git NandiniLocalGit`

```
malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8
$ git clone file:///C:/Users/malin/Desktop/SMTLabAssignment8/SnakeRemote.git NandiniLocalGit
Cloning into 'NandiniLocalGit'...
remote: Counting objects: 15, done.
remote: Compressing objects: 100% (11/11), done.

Receiving objects: 100% (15/15), 9.96 KiB | 0 bytes/s, done.
Resolving deltas: 100% (2/2), done.
```

Show remote branch information and fetching it to Nandini local repository.

Commands used:

`git remote show origin` ← show remote repository information

`git fetch origin`


```
malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit (master)
$ git remote show origin
* remote origin
  Fetch URL: file:///C:/Users/malin/Desktop/SMTLabAssignment8/SnakeRemote.git
  Push URL: file:///C:/Users/malin/Desktop/SMTLabAssignment8/SnakeRemote.git
  HEAD branch: master
  Remote branches:
    development tracked
    master tracked
  Local branch configured for 'git pull':
    master merges with remote master
  Local ref configured for 'git push':
    master pushes to master (up to date)

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit (master)
$ git fetch origin
```

Step 7) Tracking branch, Remote branch and Merging: Creating new tracking branch from remote branch and then merging branch

Commands used:

`git checkout -b developmentByNandini origin/development` ← tracking branch creating using remote branch

`git checkout master`

`git merge developmentByNandini` ← merging the branches
`development to master`

```
14 | * @author Brendan Jones
15 | *
16 | */
17 | public class SnakeGame extends JFrame {
18 |
19 |     /**
20 |      * The Serial Version UID.
21 |      */
22 |     private static final long serialVersionUID = 6678292058307426314L; // new comment in development branch
23 |
24 |     /**
25 |      * The number of milliseconds that should pass between each frame.
26 |      */
27 |     private static final long FRAME_TIME = 1000L / 50L;
28 |
29 |     /**
30 |      * The minimum length of the snake. This allows the snake to grow
31 |      * right when the game starts, so that we're not just a head moving
32 |      * around on the board.
33 |      */
```

```
malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit (development)
$ git checkout -b developmentByNandini origin/development
Branch developmentByNandini set up to track remote branch development from origin.
Switched to a new branch 'developmentByNandini'

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit (developmentByNandini)
$ git checkout master
Switched to branch 'master'
Your branch is up-to-date with 'origin/master'.

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit (master)
$ git merge developmentByNandini
Updating f9a46d8..a7edaa6
Fast-forward
 org/psnbtech/SnakeGame.java | 2 +-
 1 file changed, 1 insertion(+), 1 deletion(-)
```

Step 7) Conflict: In Nandini directory by different changes in same line in different branches

Added changes in developmentByNandini branch and master branch at same line. As you can see below conflict show both master and development branches changes for merging.

```
16 | */
17 | public class SnakeGame extends JFrame {
18 |     /**
19 |      * The Serial Version UID.
20 |      */
21 |     /**
22 |     <<<<<< HEAD
23 |     private static final long serialVersionUID = 6678292058307426314L; // new comment added in master branch
24 |     =====
25 |     private static final long serialVersionUID = 6678292058307426314L; // new comment in development branch
26 |     >>>>>> developmentByNandini
27 |
28 |     /**
29 |      * The number of milliseconds that should pass between each frame.
30 |      */
31 |     private static final long FRAME_TIME = 1000L / 50L;
32 |
```

Commands executed for the same in development branch:

Commands used:

git checkout developmentByNandini

git add SnakeGame.java

git commit -m "development in Progress By Nandini"

git push origin developmentByNandini

```
malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit (master)
$ git checkout developmentByNandini
Switched to branch 'developmentByNandini'
Your branch is up-to-date with 'origin/development'.

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit (developmentByNandini)
$ cd org/psnbtech

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit/org/psnbtech (developmentByNandini)
$ git status
On branch developmentByNandini
Your branch is up-to-date with 'origin/development'.
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git checkout -- <file>..." to discard changes in working directory)

        modified:   SnakeGame.java

no changes added to commit (use "git add" and/or "git commit -a")

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit/org/psnbtech (developmentByNandini)
$ git add SnakeGame.java

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit/org/psnbtech (developmentByNandini)
$ git commit -m "development in Progress by Nandini"
[developmentByNandini ef2e53c] development in Progress by Nandini
 1 file changed, 1 insertion(+), 1 deletion(-)

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit/org/psnbtech (developmentByNandini)
$ git push origin developmentByNandini
Counting objects: 5, done.
Delta compression using up to 4 threads.
Compressing objects: 100% (3/3), done.
Writing objects: 100% (5/5), 426 bytes | 0 bytes/s, done.
Total 5 (delta 2), reused 0 (delta 0)
To file:///C:/Users/malin/Desktop/SMTLabAssignment8/SnakeRemote.git
 * [new branch]      developmentByNandini -> developmentByNandini
```

Commands executed in master branch: After manually editing SnakeGame.java at same line as in developmentByNandini branch

Commands used:

git checkout master

git add SnakeGame.java

git commit -m "progress in master by nandini"

git merge developmentByNandini

```
malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit/org/psnbtech (developmentByNandini)
$ git checkout master
Switched to branch 'master'
Your branch is ahead of 'origin/master' by 1 commit.
(use "git push" to publish your local commits)

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit/org/psnbtech (master)
$ git status
On branch master
Your branch is ahead of 'origin/master' by 1 commit.
(use "git push" to publish your local commits)
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git checkout -- <file>..." to discard changes in working directory)

        modified:   SnakeGame.java

no changes added to commit (use "git add" and/or "git commit -a")

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit/org/psnbtech (master)
$ git add SnakeGame.java

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit/org/psnbtech (master)
$ git commit -m "progress in master by nandini"
[master 0dd8be4] progress in master by nandini
 1 file changed, 1 insertion(+), 1 deletion(-)

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit/org/psnbtech (master)
$ git merge developmentByNandini
Auto-merging org/psnbtech/SnakeGame.java
CONFLICT (content): Merge conflict in org/psnbtech/SnakeGame.java
Automatic merge failed; fix conflicts and then commit the result.
```

As you can see conflict arises as same line changes between developmentByNandini and master branch

Step 8) Conflict Resolution:

Manually edit the file and then add it to master branch.

Commands used:

git add SnakeGame.java

git commit -m "adding master branch changes"

git merge developmentByNandini

No conflict as user have manually edited the file.

```
malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit/org/psnbtech (master|MERGING)
$ git status
On branch master
Your branch is ahead of 'origin/master' by 2 commits.
  (use "git push" to publish your local commits)
You have unmerged paths.
  (fix conflicts and run "git commit")
  (use "git merge --abort" to abort the merge)

Unmerged paths:
  (use "git add <file>..." to mark resolution)

        both modified:   SnakeGame.java

no changes added to commit (use "git add" and/or "git commit -a")

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit/org/psnbtech (master|MERGING)
$ git add SnakeGame.java

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit/org/psnbtech (master|MERGING)
$ git commit -m "adding changes from master by Nandini"
[master 2dbe377] adding changes from master by Nandini

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/NandiniLocalGit/org/psnbtech (master)
$ git merge developmentByNandini
Already up-to-date.
```

Step 9) Use of pull command for fetching changes

Pulling the changes in AnushaLocalGit Repository

Commands used:

Git pull

```
malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8
$ cd AnushaLocalGit/

malin@LAPTOP-CNTM57BU MINGW64 ~/Desktop/SMTLabAssignment8/AnushaLocalGit (master)
$ git pull
remote: Counting objects: 10, done.
remote: Compressing objects: 100% (6/6), done.
remote: Total 10 (delta 4), reused 0 (delta 0)
Unpacking objects: 100% (10/10), done.
From C:/Users/malin/Desktop/SMTLabAssignment8/SnakeRemote
 * [new branch]      development      -> origin/development
 * [new branch]      developmentByNandini -> origin/developmentByNandini
There is no tracking information for the current branch.
Please specify which branch you want to merge with.
See git-pull(1) for details.

    git pull <remote> <branch>

If you wish to set tracking information for this branch you can do so with:

    git branch --set-upstream-to=origin/<branch> master
```