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Class:	T. Y. B. Tech (Computer Engineering)
Course:	Software Engineering Laboratory
Course Code:	DJ19CEL601
Experiment No.:	09

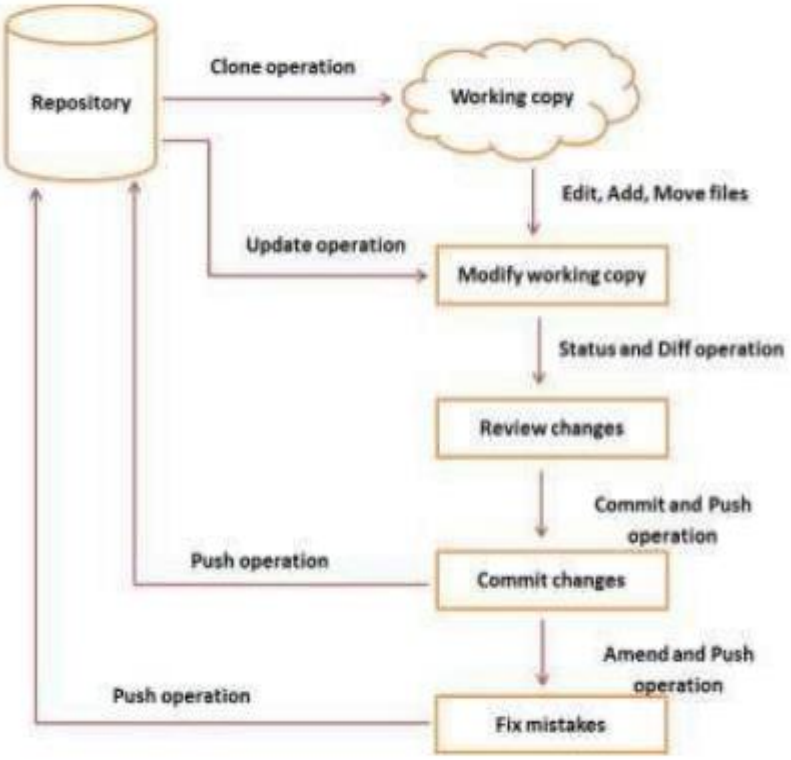
GIT:

Git is a distributed revision control and source code management system with an emphasis on speed. Git was initially designed and developed by Linus Torvalds for Linux kernel development. Git is a free software distributed under the terms of the GNU General Public License version 2.

Git Life Cycle

General workflow is as follows −

- Clone the Git repository as a working copy.
- Modify the working copy by adding/editing files.
- If necessary, update the working copy by taking other developer's changes.
- Review the changes before commit.
- Commit changes. If everything is fine, then push the changes to the repository.
- After committing, if something is wrong, then correct the last commit and push the changes to the repository.



Creating Git Repository:

```
DJSCE.Student@MUM0922CPU0710 MINGW64 ~
$ pwd
/c/Users/djsce.student

DJSCE.Student@MUM0922CPU0710 MINGW64 ~
$ mkdir project.git

DJSCE.Student@MUM0922CPU0710 MINGW64 ~
$ cd project.git/

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git
$ ls

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git
$ git -- bare init
unknown option: --
usage: git [-v | --version] [-h | --help] [-C <path>] [-c <name>=<value>]
           [--exec-path[=<path>]] [--html-path] [--man-path] [--info-path]
           [-p | --paginate | -P | --no-pager] [--no-replace-objects] [--bare]
           [--git-dir=<path>] [--work-tree=<path>] [--namespace=<name>]
           [--config-env=<name>=<envvar>] <command> [<args>]

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git
$ git --bare init
Initialized empty Git repository in C:/Users/djsce.student/project.git/

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git (BARE:master)
$ ls
HEAD  config  description  hooks/  info/  objects/  refs/

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git (BARE:master)
$ :
```

Generate Public-Private RSA Key Pair:

```
DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git (BARE:master)
$ pwd
/c/Users/djsce.student/project.git

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git (BARE:master)
$ ssh-keygen
Generating public/private rsa key pair.
Enter file in which to save the key (/c/Users/djsce.student/.ssh/id_rsa):
Created directory '/c/Users/djsce.student/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /c/Users/djsce.student/.ssh/id_rsa
Your public key has been saved in /c/Users/djsce.student/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:siF8i6a2HRpCT+lpQR3XMg/E7v49crM76cmBZkDz47E DJSCE.Student@MUM0922CPU0710
The key's randomart image is:
+---[RSA 3072]----+
|      .oo.       |
|     . o= .      |
|    . ..o=       |
|   ... ..o.      |
|  . +o =.S+      |
| . + o+ *o =     |
|. .=+ +  E ..    |
| .o* . .o.o*o    |
| .+..   ..+B*    |
+----[SHA256]-----+
```

Adding keys to authorized keys:

```
DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git (BARE:master)
$ pwd
/c/Users/djsce.student/project.git

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git (BARE:master)
$ ssh-copy-id -i ~/.ssh/id_rsa.pub
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/c/Users/djsce.student/.ssh/id_rsa.pub"
Usage: /usr/bin/ssh-copy-id [-h|-?|-f|-n|-s] [-i [identity_file]] [-p port] [-F alternative ssh_config file] [[-o <ssh -o options>] ..
.] [user@]hostname
        -f: force mode -- copy keys without trying to check if they are already installed
        -n: dry run    -- no keys are actually copied
        -s: use sftp   -- use sftp instead of executing remote-commands. Can be useful if the remote only allows sftp
        -h|-?: print this help
```

Push changes to the repository and Checking log message by executing the git log command:

```
DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git (BARE:master)
$ pwd
/c/Users/djsce.student/project.git

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git (BARE:master)
$ mkdir user1_repo

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git (BARE:master)
$ cd user1_repo/

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git/user1_repo (BARE:master)
$ git init
Initialized empty Git repository in C:/Users/djsce.student/project.git/user1_repo/.git/

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git/user1_repo (master)
$ echo 'TODO: Add Contents for README'> README

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git/user1_repo (master)
$ git status -s
?? README

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git/user1_repo (master)
$ git add.
git: 'add.' is not a git command. See 'git --help'.

The most similar command is
        add

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git/user1_repo (master)
$ git add .
warning: in the working copy of 'README', LF will be replaced by CRLF the next time Git touches it

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git/user1_repo (master)
$ git status -s
A  README

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git/user1_repo (master)
$ git commit -m 'Initial commit'
[master (root-commit) 8f9cd90] Initial commit
 Committer: DJSCE Student <DJSCE.Student@SVKMGRP.COM>
Your name and email address were configured automatically based
on your username and hostname. Please check that they are accurate.
You can suppress this message by setting them explicitly. Run the
following command and follow the instructions in your editor to edit
your configuration file:

    git config --global --edit

After doing this, you may fix the identity used for this commit with:

    git commit --amend --reset-author

 1 file changed, 1 insertion(+)
 create mode 100644 README

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git/user1_repo (master)
$ git log
commit 8f9cd90f5ca19fa2d214245f34ed436830e16c23 (HEAD -> master)
Author: DJSCE Student <DJSCE.Student@SVKMGRP.COM>
Date:   Tue May 2 12:24:10 2023 +0530

    Initial commit
```

Commit changes:

```
DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git/user1_repo (master)
$ git commit -m 'Implemented my_strlen function'
On branch master
nothing to commit, working tree clean

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git/user1_repo (master)
$ git log
commit 8f9cd90f5ca19fa2d214245f34ed436830e16c23 (HEAD -> master)
Author: DJSCE Student <DJSCE.Student@SVKMGRP.COM>
Date:   Tue May 2 12:24:10 2023 +0530

    Initial commit

DJSCE.Student@MUM0922CPU0710 MINGW64 ~/project.git/user1_repo (master)
$
```

CONCLUSION:

Git is a version control system that can keep several versions on a local workstation or integrate with a remote file management system. To perform commands, we used Git bash cmd and saved the local files to the GitHub files management server. We also saw the git log command, which stores the git activity log.