Лабораторная работа №1

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Работа в Git

Прагматика выполнения

Умение пользоваться Git

Цель выполнения лабораторной работы

Освоить на практике использование Git, Github, git flow

Задачи выполнения работы

- Создать базовую конфигурацию для работы с git.
- Создать ключ SSH.
- Создать ключ PGP.
- Настроить подписи git.
- Зарегистрироваться на Github.
- Создать локальный каталог для выполнения заданий по предмету.

Результаты выполнения лабораторной работы. Установил git-flow в Ubuntu

```
pi@pi-dell-lin:~$ sudo apt install git-flow
[sudo] password for pi:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  pandoc-data
Use 'sudo apt autoremove' to remove it.
The following NEW packages will be installed:
  git-flow
0 upgraded, 1 newly installed, 0 to remove and 108 not upgraded.
Need to get 38,8 kB of archives.
After this operation, 330 kB of additional disk space will be used.
Get:1 http://ru.archive.ubuntu.com/ubuntu focal/universe amd64 git-flow all 1.12.3-1 [38,8 kB]
Fetched 38,8 kB in 1s (74,7 kB/s)
Selecting previously unselected package git-flow.
(Reading database ... 366822 files and directories currently installed.)
Preparing to unpack .../git-flow_1.12.3-1_all.deb ...
Unpacking git-flow (1.12.3-1) ...
Setting up git-flow (1.12.3-1) ...
pi@pi-dell-lin:~$ git flow
usage: git flow <subcommand>

Available subcommands are:
   init      Initialize a new git repo with support for the branching model.
   feature   Manage your feature branches.
   bugfix    Manage your bugfix branches.
   release   Manage your release branches.
   hotfix    Manage your hotfix branches.
   support   Manage your support branches.
   version   Shows version information.
   config    Manage your git-flow configuration.
   log       Show log deviating from base branch.
```

Figure 1: 1

Установил gh

```
pi@pi-dell-lin:~$ sudo snap install gh
Download snap "gh" (502) from channel "stable"
gh 2.6.0-15-g1a10fd5a from Casper (casper-dcl) installed
pi@pi-dell-lin:~$ gh
Work seamlessly with GitHub from the command line.

USAGE
  gh <command> <subcommand> [flags]

CORE COMMANDS
  auth:        Authenticate gh and git with GitHub
  browse:      Open the repository in the browser
  codespace:   Connect to and manage your codespaces
  gist:        Manage gists
  issue:       Manage issues
  pr:          Manage pull requests
  release:     Manage releases
  repo:        Manage repositories

ACTIONS COMMANDS
  run:         View details about workflow runs
  workflow:    View details about GitHub Actions workflows

ADDITIONAL COMMANDS
  alias:       Create command shortcuts
  api:         Make an authenticated GitHub API request
  completion:  Generate shell completion scripts
  config:      Manage configuration for gh
  extension:   Manage gh extensions
  gpg-key:     Manage GPG keys
  help:        Help about any command
  search:      Search for repositories, issues, pull requests and users
  secret:      Manage GitHub secrets
  ssh-key:     Manage SSH keys

HELP TOPICS
  actions:     Learn about working with GitHub Actions
  environment: Environment variables that can be used with gh
  formatting:  Formatting options for JSON data exported from gh
  mintty:      Information about using gh with MinTTY
  reference:   A comprehensive reference of all gh commands

FLAGS
  --help      Show help for command
  --version   Show gh version

EXAMPLES
  $ gh issue create
  $ gh repo clone cli/cli
  $ gh pr checkout 321

LEARN MORE
  Use 'gh <command> <subcommand> --help' for more information about a command.
  Read the manual at https://cli.github.com/manual
```

Задал базовую настройку git. Настроил утф-8 в выводе сообщений гит.

Зададим имя начальной ветки (будем называть её master). Настроил верификацию и подписание коммитов git.

```
  auth:         Authenticate gh and git with GitHub
  browse:       Open the repository in the browser
  codespace:    Connect to and manage your codespaces
  gist:         Manage gists
  issue:        Manage issues
  pr:           Manage pull requests
  release:      Manage releases
  repo:         Manage repositories

ACTIONS COMMANDS
  run:          View details about workflow runs
  workflow:     View details about GitHub Actions workflows

ADDITIONAL COMMANDS
  alias:        Create command shortcuts
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  completion:   Generate shell completion scripts
  config:       Manage configuration for gh
  extension:    Manage gh extensions
  gpg-key:      Manage GPG keys
  help:         Help about any command
  search:       Search for repositories, issues, pull requests and users
  secret:       Manage GitHub secrets
  ssh-key:      Manage SSH keys

HELP TOPICS
  actions:      Learn about working with GitHub Actions
  environment:  Environment variables that can be used with gh
  formatting:   Formatting options for JSON data exported from gh
  mintty:       Information about using gh with MinTTY
  reference:    A comprehensive reference of all gh commands

FLAGS
  --help       Show help for command
  --version    Show gh version

EXAMPLES
  $ gh issue create
  $ gh repo clone cli/cli
```

Создайте ключи ssh по алгоритму rsa с ключём размером 4096 бит по алгоритму ed25519

```
  ssh-key:     Manage SSH keys

HELP TOPICS
  actions:     Learn about working with GitHub Actions
  environment: Environment variables that can be used with gh
  formatting:  Formatting options for JSON data exported from gh
  mintty:      Information about using gh with MinTTY
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FLAGS
  --help      Show help for command
  --version   Show gh version

EXAMPLES
  $ gh issue create
  $ gh repo clone cli/cli
  $ gh pr checkout 321

LEARN MORE
  Use 'gh <command> <subcommand> --help' for more information about a command.
  Read the manual at https://cli.github.com/manual

FEEDBACK
  Open an issue using 'gh issue create -R github.com/cli/cli'




Generating public/private rsa key pair.
Enter file in which to save the key (/home/pi/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/pi/.ssh/id_rsa
Your public key has been saved in /home/pi/.ssh/id_rsa.pub
The key fingerprint is:
SHA256:TfGE63Uk9EjhgedHSSZiGVCFnYROtuHxJeivtDY1N04 pi@pi-dell-lin
The key's randomart image is:
+---[RSA 4096]----+
|        .o*&X+o. |
|         .%B**=  |
|         *.O+*.  |
|         o* + o  |
|        S..o o   |
|          o + E  |
|         . + = . |
|          =   .  |
|         . .     |
```

Создайте ключи pgp Генерируем ключ

```
Change (N)ame, (C)omment, (E)mail or (O)kay/(Q)uit? q
gpg: Key generation canceled.
pi@pi-dell-lin:~$ gpg --full-generate-key
gpg (GnuPG) 2.2.19; Copyright (C) 2019 Free Software Foundation, Inc.
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Please select what kind of key you want:
   (1) RSA and RSA (default)
   (2) DSA and Elgamal
   (3) DSA (sign only)
   (4) RSA (sign only)
  (14) Existing key from card
Your selection? 1
RSA keys may be between 1024 and 4096 bits long.
What keysize do you want? (3072) 4096
Requested keysize is 4096 bits
Please specify how long the key should be valid.
         0 = key does not expire
      <n>  = key expires in n days
      <n>w = key expires in n weeks
      <n>m = key expires in n months
      <n>y = key expires in n years
Key is valid for? (0) 0
Key does not expire at all
Is this correct? (y/N) y

GnuPG needs to construct a user ID to identify your key.




Change (N)ame, (C)omment, (E)mail or (O)kay/(Q)uit? o
We need to generate a lot of random bytes. It is a good idea to perform
some other action (type on the keyboard, move the mouse, utilize the
disks) during the prime generation; this gives the random number
generator a better chance to gain enough entropy.
We need to generate a lot of random bytes. It is a good idea to perform
some other action (type on the keyboard, move the mouse, utilize the
disks) during the prime generation; this gives the random number
generator a better chance to gain enough entropy.
gpg: key E608895A4E9D4D60 marked as ultimately trusted
gpg: directory '/home/pi/.gnupg/openpgp-revocs.d' created
gpg: revocation certificate stored as '/home/pi/.gnupg/openpgp-revocs.d/5D16A4778F9974E32E65027DE608895A4E9D4D60.rev'
public and secret key created and signed.

pub   rsa4096 2022-09-17 [SC]
      5D16A4778F9974E32E65027DE608895A4E9D4D60
```

Figure 5: 5

Добавление PGP ключа в GitHub

Выводим список ключей и копируем отпечаток приватного ключа

Скопируйте ваш сгенерированный PGP ключ в буфер обмена

```
disks) during the prime generation; this gives the random number
generator a better chance to gain enough entropy.
gpg: key E608895A4E9D4D60 marked as ultimately trusted
gpg: directory '/home/pi/.gnupg/openpgp-revocs.d' created
gpg: revocation certificate stored as '/home/pi/.gnupg/openpgp-revocs.d/5D16A4778F9974E32E65027DE608895A4E9D4D60.rev'
public and secret key created and signed.

pub   rsa4096 2022-09-17 [SC]
      5D16A4778F9974E32E65027DE608895A4E9D4D60
uid                      Ivan Podmogilnyi <mascomen4@gmail.com>
sub   rsa4096 2022-09-17 [E]

pi@pi-dell-lin:~$ gpg --list-secret-keys --keyid-format LONG
gpg: checking the trustdb
gpg: marginals needed: 3  completes needed: 1  trust model: pgp
gpg: depth: 0  valid:   1  signed:   0  trust: 0-, 0q, 0n, 0m, 0f, 1u
/home/pi/.gnupg/pubring.kbx
------------------------
sec   rsa4096/E608895A4E9D4D60 2022-09-17 [SC]
      5D16A4778F9974E32E65027DE608895A4E9D4D60
uid
ssb   rsa4096/7B2A322C8094FA60 2022-09-17 [E]

pi@pi-dell-lin:~$ gpg --armor --export <E608895A4E9D4D60> | xclip -sel clip
bash: syntax error near unexpected token `|'
pi@pi-dell-lin:~$ gpg --armor --export <E608895A4E9D4D60> | xclip -sel clip
bash: syntax error near unexpected token `|'
pi@pi-dell-lin:~$ gpg --armor --export E608895A4E9D4D60 | xclip -sel clip

Command 'xclip' not found, but can be installed with:

sudo apt install xclip

pi@pi-dell-lin:~$ sudo apt install xclip
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  pandoc-data
Use 'sudo apt autoremove' to remove it.
The following NEW packages will be installed:
  xclip
0 upgraded, 1 newly installed, 0 to remove and 108 not upgraded.
Need to get 18,4 kB of archives.
After this operation, 60,4 kB of additional disk space will be used.
Get:1 http://ru.archive.ubuntu.com/ubuntu focal/universe amd64 xclip amd64 0.13-1 [18,4 kB]
Fetched 18,4 kB in 0s (216 kB/s)
Selecting previously unselected package xclip.
(Reading database ... 366887 files and directories currently installed.)
Preparing to unpack .../xclip_0.13-1_amd64.deb ...
Unpacking xclip (0.13-1) ...
Setting up xclip (0.13-1) ...
Processing triggers for man-db (2.9.1-1) ...
pi@pi-dell-lin:~$ gpg --armor --export E608895A4E9D4D60 | xclip -sel clip
```

Настройка автоматических подписей коммитов git

```
gpg: directory '/home/pi/.gnupg/openpgp-revocs.d' created
gpg: revocation certificate stored as '/home/pi/.gnupg/openpgp-revocs.d/5D16A4778F9974E32E65027DE608895A4E9D4D60.rev'
public and secret key created and signed.

pub   rsa4096 2022-09-17 [SC]
      5D16A4778F9974E32E65027DE608895A4E9D4D60
uid                      Ivan Podmogilnyi <mascomen4@gmail.com>
sub   rsa4096 2022-09-17 [E]

pi@pi-dell-lin:~$ gpg --list-secret-keys --keyid-format LONG
gpg: checking the trustdb
gpg: marginals needed: 3  completes needed: 1  trust model: pgp
gpg: depth: 0  valid:   1  signed:   0  trust: 0-, 0q, 0n, 0m, 0f, 1u
/home/pi/.gnupg/pubring.kbx
--------------------------
sec   rsa4096/E608895A4E9D4D60 2022-09-17 [SC]
      5D16A4778F9974E32E65027DE608895A4E9D4D60
uid
ssb   rsa4096/7B2A322C8094FA60 2022-09-17 [E]

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The following package was automatically installed and is no longer required:
  pandoc-data
Use 'sudo apt autoremove' to remove it.
The following NEW packages will be installed:
  xclip
0 upgraded, 1 newly installed, 0 to remove and 108 not upgraded.
Need to get 18,4 kB of archives.
After this operation, 60,4 kB of additional disk space will be used.
Get:1 http://ru.archive.ubuntu.com/ubuntu focal/universe amd64 xclip amd64 0.13-1 [18,4 kB]
Fetched 18,4 kB in 0s (216 kB/s)
Selecting previously unselected package xclip.
(Reading database ... 366887 files and directories currently installed.)
Preparing to unpack .../xclip_0.13-1_amd64.deb ...
Unpacking xclip (0.13-1) ...
Setting up xclip (0.13-1) ...
Processing triggers for man-db (2.9.1-1) ...
pi@pi-dell-lin:~$ gpg --armor --export E608895A4E9D4D60 | xclip -sel clip
pi@pi-dell-lin:~$ git config --global user.signingKey E608895A4E9D4D60
pi@pi-dell-lin:~$ git config --global commit.gpgsign true
pi@pi-dell-lin:~$ git config --global gpg.program $(which gpg2)
pi@pi-dell-lin:~$
```

Figure 7: 8

Настройка gh

```
gpg: depth: 0  valid:   1  signed:   0  trust: 0-, 0q, 0n, 0m, 0f, 1u
/home/pi/.gnupg/pubring.kbx
--------------------------
sec   rsa4096/E608895A4E9D4D60 2022-09-17 [SC]
      5D16A4778F9974E32E65027DE608895A4E9D4D60
uid                 [ultimate] 
ssb   rsa4096/7B2A322C8094FA60 2022-09-17 [E]

pi@pi-dell-lin:~$ gpg --armor --export <E608895A4E9D4D60> | xclip -sel clip
bash: syntax error near unexpected token `|'
pi@pi-dell-lin:~$ gpg --armor --export <E608895A4E9D4D60> | xclip -sel clip
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Use 'sudo apt autoremove' to remove it.
The following NEW packages will be installed:
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0 upgraded, 1 newly installed, 0 to remove and 108 not upgraded.
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Get:1 http://ru.archive.ubuntu.com/ubuntu focal/universe amd64 xclip amd64 0.13-1 [18,4 kB]
Fetched 18,4 kB in 0s (216 kB/s)
Selecting previously unselected package xclip.
(Reading database ... 366887 files and directories currently installed.)
Preparing to unpack .../xclip_0.13-1_amd64.deb ...
Unpacking xclip (0.13-1) ...
Setting up xclip (0.13-1) ...
Processing triggers for man-db (2.9.1-1) ...
pi@pi-dell-lin:~$ gpg --armor --export E608895A4E9D4D60 | xclip -sel clip
pi@pi-dell-lin:~$ git config --global user.signingKey E608895A4E9D4D60
pi@pi-dell-lin:~$ git config --global commit.gpgsign true
pi@pi-dell-lin:~$ git config --global gpg.program $(which gpg2)
pi@pi-dell-lin:~$ gh auth login
? What account do you want to log into? GitHub.com
? What is your preferred protocol for Git operations? HTTPS
? Authenticate Git with your GitHub credentials? Yes
? How would you like to authenticate GitHub CLI? Login with a web browser

! First copy your one-time code: 77BD-E5F6
Press Enter to open github.com in your browser...
✓ Authentication complete.
- gh config set -h github.com git_protocol https
```

Необходимо создать шаблон рабочего пространства.

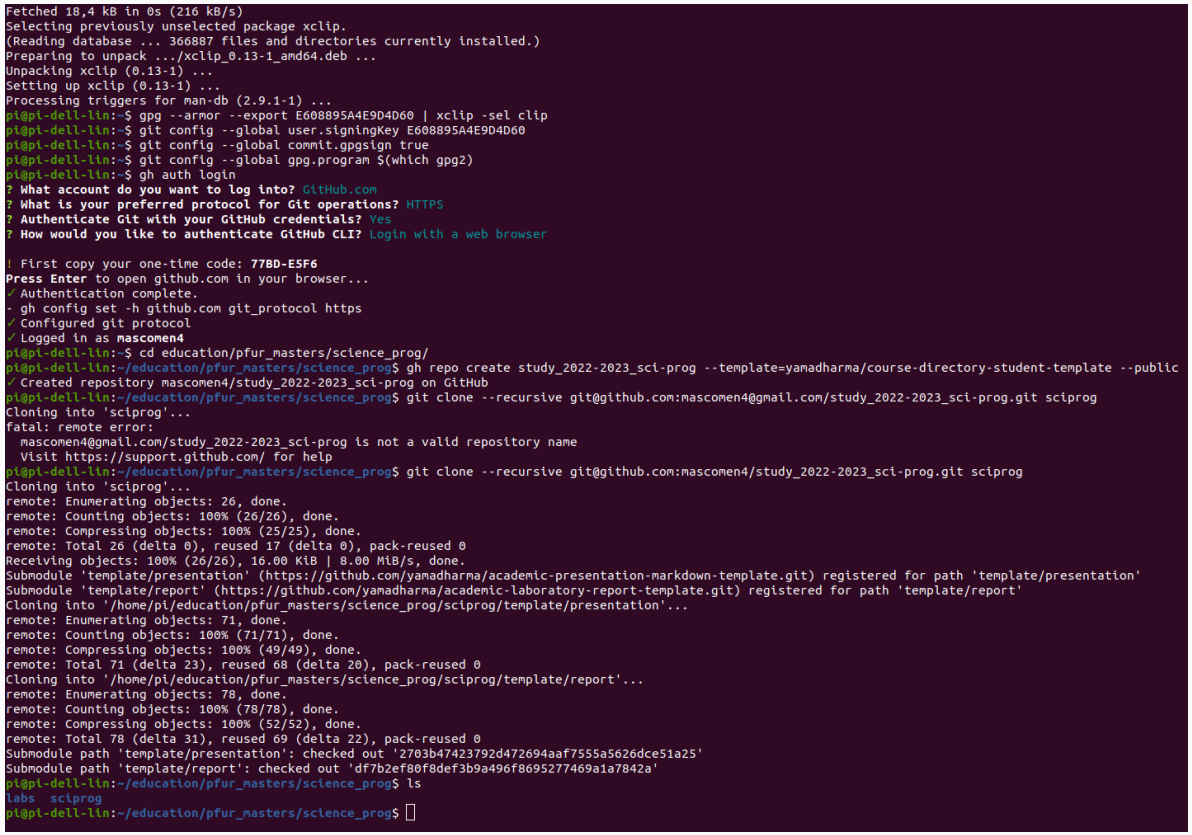

Figure 9: 10

Перейдите в каталог курса:

Удалите лишние файлы. Создайте необходимые каталоги

```
Submodule path 'template/report': checked out 'df7b2ef80f8def3b9a496f8695277469a1a7842a'
pi@pi-dell-lin:~/education/pfur_masters/science_prog$ ls
labs  sciprog
pi@pi-dell-lin:~/education/pfur_masters/science_prog$ cd scirpog
bash: cd: scirpog: No such file or directory
pi@pi-dell-lin:~/education/pfur_masters/science_prog$ cd sciprog/
pi@pi-dell-lin:~/education/pfur_masters/science_prog/sciprog$ rm package.json
pi@pi-dell-lin:~/education/pfur_masters/science_prog/sciprog$ make COURSE=sciprog
pi@pi-dell-lin:~/education/pfur_masters/science_prog/sciprog$ git add .
pi@pi-dell-lin:~/education/pfur_masters/science_prog/sciprog$ git commit -am 'feat(main): make course structure'
[master 50d46ed] feat(main): make course structure
 146 files changed, 13464 insertions(+), 14 deletions(-)
 create mode 100644 labs/lab1/presentation/Makefile
 create mode 100644 labs/lab1/presentation/image/kulyabov.jpg
 create mode 100644 labs/lab1/presentation/presentation.md
 create mode 100644 labs/lab1/report/Makefile
 create mode 100644 labs/lab1/report/bib/cite.bib
 create mode 100644 labs/lab1/report/image/placeimg_800_600_tech.jpg
 create mode 100644 labs/lab1/report/pandoc/csl/gost-r-7-0-5-2008-numeric.csl
 create mode 100644 labs/lab1/report/report.md
 create mode 100644 labs/lab2/presentation/Makefile
 create mode 100644 labs/lab2/presentation/image/kulyabov.jpg
 create mode 100644 labs/lab2/presentation/presentation.md
 create mode 100644 labs/lab2/report/Makefile
 create mode 100644 labs/lab2/report/bib/cite.bib
 create mode 100644 labs/lab2/report/image/placeimg_800_600_tech.jpg
 create mode 100644 labs/lab2/report/pandoc/csl/gost-r-7-0-5-2008-numeric.csl
 create mode 100644 labs/lab2/report/report.md
 create mode 100644 labs/lab3/presentation/Makefile
 create mode 100644 labs/lab3/presentation/image/kulyabov.jpg
 create mode 100644 labs/lab3/presentation/presentation.md
 create mode 100644 labs/lab3/report/Makefile
 create mode 100644 labs/lab3/report/bib/cite.bib
 create mode 100644 labs/lab3/report/image/placeimg_800_600_tech.jpg
 create mode 100644 labs/lab3/report/pandoc/csl/gost-r-7-0-5-2008-numeric.csl
 create mode 100644 labs/lab3/report/report.md
 create mode 100644 labs/lab4/presentation/Makefile
 create mode 100644 labs/lab4/presentation/image/kulyabov.jpg
 create mode 100644 labs/lab4/presentation/presentation.md
 create mode 100644 labs/lab4/report/Makefile
 create mode 100644 labs/lab4/report/bib/cite.bib
 create mode 100644 labs/lab4/report/image/placeimg_800_600_tech.jpg
 create mode 100644 labs/lab4/report/pandoc/csl/gost-r-7-0-5-2008-numeric.csl
 create mode 100644 labs/lab4/report/report.md
 create mode 100644 labs/lab5/presentation/Makefile
 create mode 100644 labs/lab5/presentation/image/kulyabov.jpg
 create mode 100644 labs/lab5/presentation/presentation.md
 create mode 100644 labs/lab5/report/Makefile
 create mode 100644 labs/lab5/report/bib/cite.bib
 create mode 100644 labs/lab5/report/image/placeimg_800_600_tech.jpg
 create mode 100644 labs/lab5/report/pandoc/csl/gost-r-7-0-5-2008-numeric.csl
 create mode 100644 labs/lab5/report/report.md
 create mode 100644 labs/lab6/presentation/Makefile
 create mode 100644 labs/lab6/presentation/image/kulyabov.jpg
 create mode 100644 labs/lab6/presentation/presentation.md
 create mode 100644 labs/lab6/report/Makefile
```

Отправьте файлы на сервер

```
 create mode 100644 project-personal/stage1/report/bib/cite.bib
 create mode 100644 project-personal/stage1/report/image/placeimg_800_600_tech.jpg
 create mode 100644 project-personal/stage1/report/pandoc/csl/gost-r-7-0-5-2008-numeric.csl
 create mode 100644 project-personal/stage1/report/report.md
 create mode 100644 project-personal/stage2/presentation/Makefile
 create mode 100644 project-personal/stage2/presentation/image/kulyabov.jpg
 create mode 100644 project-personal/stage2/presentation/presentation.md
 create mode 100644 project-personal/stage2/report/Makefile
 create mode 100644 project-personal/stage2/report/bib/cite.bib
 create mode 100644 project-personal/stage2/report/image/placeimg_800_600_tech.jpg
 create mode 100644 project-personal/stage2/report/pandoc/csl/gost-r-7-0-5-2008-numeric.csl
 create mode 100644 project-personal/stage2/report/report.md
 create mode 100644 project-personal/stage3/presentation/Makefile
 create mode 100644 project-personal/stage3/presentation/image/kulyabov.jpg
 create mode 100644 project-personal/stage3/presentation/presentation.md
 create mode 100644 project-personal/stage3/report/Makefile
 create mode 100644 project-personal/stage3/report/bib/cite.bib
 create mode 100644 project-personal/stage3/report/image/placeimg_800_600_tech.jpg
 create mode 100644 project-personal/stage3/report/pandoc/csl/gost-r-7-0-5-2008-numeric.csl
 create mode 100644 project-personal/stage3/report/report.md
 create mode 100644 project-personal/stage4/presentation/Makefile
 create mode 100644 project-personal/stage4/presentation/image/kulyabov.jpg
 create mode 100644 project-personal/stage4/presentation/presentation.md
 create mode 100644 project-personal/stage4/report/Makefile
 create mode 100644 project-personal/stage4/report/bib/cite.bib
 create mode 100644 project-personal/stage4/report/image/placeimg_800_600_tech.jpg
 create mode 100644 project-personal/stage4/report/pandoc/csl/gost-r-7-0-5-2008-numeric.csl
 create mode 100644 project-personal/stage4/report/report.md
 create mode 100644 project-personal/stage5/presentation/Makefile
 create mode 100644 project-personal/stage5/presentation/image/kulyabov.jpg
 create mode 100644 project-personal/stage5/presentation/presentation.md
 create mode 100644 project-personal/stage5/report/Makefile
 create mode 100644 project-personal/stage5/report/bib/cite.bib
 create mode 100644 project-personal/stage5/report/image/placeimg_800_600_tech.jpg
 create mode 100644 project-personal/stage5/report/pandoc/csl/gost-r-7-0-5-2008-numeric.csl
 create mode 100644 project-personal/stage5/report/report.md
 create mode 100644 project-personal/stage6/presentation/Makefile
 create mode 100644 project-personal/stage6/presentation/image/kulyabov.jpg
 create mode 100644 project-personal/stage6/presentation/presentation.md
 create mode 100644 project-personal/stage6/report/Makefile
 create mode 100644 project-personal/stage6/report/bib/cite.bib
 create mode 100644 project-personal/stage6/report/image/placeimg_800_600_tech.jpg
 create mode 100644 project-personal/stage6/report/pandoc/csl/gost-r-7-0-5-2008-numeric.csl
 create mode 100644 project-personal/stage6/report/report.md
pi@pi-dell-lin:~/education/pfur_masters/science_prog/sciprog$ git push
Enumerating objects: 22, done.
Counting objects: 100% (22/22), done.
Delta compression using up to 12 threads
Compressing objects: 100% (18/18), done.
Writing objects: 100% (21/21), 311.70 KiB | 2.49 MiB/s, done.
Total 21 (delta 2), reused 0 (delta 0)
remote: Resolving deltas: 100% (2/2), completed with 1 local object.
```

Выводы

Освоил на практике применение VCS Git, Github.