

# Homeworks

## Robotics Lab 24/25:



UNIVERSITÀ DEGLI  
STUDI DI NAPOLI  
FEDERICO II

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Candidato: Hudyma Arsen

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Prof. Ing. Mario Selvaggio

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# Homework 0

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**The first homework consist basically in an introduction to the basic commands that we will use during the course, so there will be some stuff to do in the Linux shell, some with Git and Docker.**

**The first point of the first HM consist in doing some operations in the shell, the tasks are these:**

1. List the files contained in your home folder
2. List the files contained in your Desktop folder
3. Create a new text file, named as your surname in your home folder
4. Write your name and surname in the file created at step 3 using terminal commands
5. Create the directories `/r1_lab/hmwk0` in your home folder using just one command
6. Move the text file created at step 3 in the `/r1_lab/hmwk0` folder created at the step 5. List the content of the directory
7. Rename the `hmwk0` directory into `hmwk1`
8. Use `grep` command to search your surname into the file created at step 3
9. Change the owner and group of this file into root and root
10. Remove the `r1_lab` directory
11. Check the internet connection of your computer using the linux terminal
12. Create a bash script. The goal of the script is to automatically do the steps from 3 to 9.
13. Change the owner of all the files and directories under `r1_lab`

# Homework 0

And the results of the first eleven tasks are those:

```
arsen@Arsen-PC: ~  
arsen@Arsen-PC: ~ 80x50  
arsen@Arsen-PC:~$ ls  
Documenti      Musica      'rl24fold_3 (copia).zip'  Scaricati  
Immagini       proba       rl24folder                Scrivania  
loc_rep_hmwk0  Pubblici   rl24folder_new            snap  
Modelli        rl24fold_3  rl_lab                    Video  
arsen@Arsen-PC:~$ cd Scrivania/  
arsen@Arsen-PC:~/Scrivania$ ls  
Docker Docker_3.0 Docker_new  
arsen@Arsen-PC:~/Scrivania$ cd  
arsen@Arsen-PC:~$ touch Hudyma.txt  
arsen@Arsen-PC:~$ echo "Arsen Hudyma" >> Hudyma.txt  
arsen@Arsen-PC:~$ echo Hudyma.txt  
Hudyma.txt  
arsen@Arsen-PC:~$ cat Hudyma.txt  
Arsen Hudyma
```

```
arsen@Arsen-PC:~$ mkdir -p rl_lab/hmwk0  
arsen@Arsen-PC:~$ ls  
Documenti      Modelli     rl24fold_3                rl_lab      Video  
Hudyma.txt     Musica      'rl24fold_3 (copia).zip'  Scaricati  
Immagini       proba       rl24folder                Scrivania  
loc_rep_hmwk0  Pubblici   rl24folder_new            snap  
arsen@Arsen-PC:~$ cd rl_lab  
arsen@Arsen-PC:~/rl_lab$ ls  
hmwk0  
arsen@Arsen-PC:~/rl_lab$ cd ..  
arsen@Arsen-PC:~$ mv Hudyma.txt rl_lab/hmwk0  
arsen@Arsen-PC:~$ ls  
Documenti      Musica      'rl24fold_3 (copia).zip'  Scaricati  
Immagini       proba       rl24folder                Scrivania  
loc_rep_hmwk0  Pubblici   rl24folder_new            snap  
Modelli        rl24fold_3  rl_lab                    Video  
arsen@Arsen-PC:~$ cd rl_lab/  
arsen@Arsen-PC:~/rl_lab$ ls  
hmwk0  
arsen@Arsen-PC:~/rl_lab$ cd hmwk0/  
arsen@Arsen-PC:~/rl_lab/hmwk0$ ls  
Hudyma.txt  
arsen@Arsen-PC:~/rl_lab/hmwk0$ cat Hudyma.txt  
Arsen Hudyma
```

```
arsen@Arsen-PC:~/rl_lab/hmwk0$ cd ..  
arsen@Arsen-PC:~/rl_lab$ mv hmwk0 hmwk1  
arsen@Arsen-PC:~/rl_lab$ ls  
hmwk1  
arsen@Arsen-PC:~/rl_lab$ cd hmwk1/  
arsen@Arsen-PC:~/rl_lab/hmwk1$ ls  
Hudyma.txt  
arsen@Arsen-PC:~/rl_lab/hmwk1$ grep "Hudyma" Hudyma.txt  
Arsen Hudyma  
arsen@Arsen-PC:~/rl_lab/hmwk1$ chown root:root Hudyma.txt  
chown: cambiamento del proprietario di 'Hudyma.txt': Operazione non permessa  
arsen@Arsen-PC:~/rl_lab/hmwk1$ sudo chown root:root Hudyma.txt  
[sudo] password di arsen:  
arsen@Arsen-PC:~/rl_lab/hmwk1$ ls -l Hudyma.txt  
-rw-rw-r-- 1 root root 13 gen 30 16:01 Hudyma.txt  
arsen@Arsen-PC:~/rl_lab/hmwk1$ cd ../../  
arsen@Arsen-PC:~$ rm -r rl_lab/  
rm: rimuovere il file regolare protetto dalla scrittura 'rl_lab/hmwk1/Hudyma.txt'  
'?' S  
arsen@Arsen-PC:~$ ping google.com  
PING google.com (142.251.143.110) 56(84) bytes of data.  
64 bytes from trn05s03-in-f14.1e100.net (142.251.143.110): icmp_seq=1 ttl=112 ti  
me=180 ms  
64 bytes from trn05s03-in-f14.1e100.net (142.251.143.110): icmp_seq=2 ttl=112 ti  
me=115 ms  
^C  
--- google.com ping statistics ---  
3 packets transmitted, 2 received, 33.3333% packet loss, time 2002ms  
rtt min/avg/max/mdev = 115.300/147.510/179.721/32.210 ms
```



# Homework 0

Instead, the last two tasks of the first point are done here:

```
arsen@Arsen-PC: ~/rl_lab
arsen@Arsen-PC: ~/rl_lab 80x50
arsen@Arsen-PC:~$ nano scripthw0.sh
arsen@Arsen-PC:~$ ls
Documenti      Musica      'rl24fold_3 (copia).zip'  scripthw0.sh
Immagini       proba       rl24folder                Scrivania
loc_rep_hmwk0  Pubblici   rl24folder_new            snap
Modelli        rl24fold_3  Scaricati                 Video
arsen@Arsen-PC:~$ chmod +x scripthw0.sh
arsen@Arsen-PC:~$ ls
Documenti      Musica      'rl24fold_3 (copia).zip'  scripthw0.sh
Immagini       proba       rl24folder                Scrivania
loc_rep_hmwk0  Pubblici   rl24folder_new            snap
Modelli        rl24fold_3  Scaricati                 Video
arsen@Arsen-PC:~$ ./scripthw0.sh
Questo è lo script bash dell'hw0
File di testo creato!
Create anche le directory e spostato il file txt in esse!
Adesso ho rinominato una delle directory!
Cerco il cognome dello studente nel file di testo...
Arsen Hudyma
[sudo] password di arsen:
-rw-rw-r-- 1 root root 13 gen 30 18:02 Hudyma.txt
Il compito dello script è finito, ciao ;)
arsen@Arsen-PC:~$ cd rl_lab/
arsen@Arsen-PC:~/rl_lab$ chown -R root hmwk1
chown: cambiamento del proprietario di 'hmwk1/Hudyma.txt': Operazione non permes
sa
chown: cambiamento del proprietario di 'hmwk1': Operazione non permessa
arsen@Arsen-PC:~/rl_lab$ sudo chown -R root hmwk1
arsen@Arsen-PC:~/rl_lab$ ls -l hmwk1
totale 4
-rw-rw-r-- 1 root root 13 gen 30 18:02 Hudyma.txt
arsen@Arsen-PC:~/rl_lab$
```

```
arsen@Arsen-PC: ~
arsen@Arsen-PC: ~ 80x50
GNU nano 6.2 scripthw0.sh *
#!/bin/bash

echo "Questo è lo script bash dell'hw0"

cd
touch Hudyma.txt
echo "Arsen Hudyma" >> Hudyma.txt
echo "File di testo creato!"
mkdir -p rl_lab/hmwk0
mv Hudyma.txt rl_lab/hmwk0
echo "Create anche le directory e spostato il file txt in esse!"
cd rl_lab
mv hmwk0 hmwk1
echo "Adesso ho rinominato una delle directory!"
cd hmwk1
echo "Cerco il cognome dello studente nel file di testo..."
grep "Hudyma" Hudyma.txt
sudo chown root:root Hudyma.txt
ls -l Hudyma.txt
echo "Il compito dello script è finito, ciao ;)"
```

# Homework 0

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**The second point of this homework, consist in managing and learning some Git operations, specifically, here are the tasks to satisfy:**

1. Create an account on [www.github.com](https://www.github.com) (use your preferred e-mail)
2. Create a personal access token
3. Add this token to a local configuration file (to use it when it's needed)
4. Alternatively to authentication through token, generate a SSH key and add it to the ssh-agent (see [here](#))
5. Create a local repository with an `hello_world` source file
6. Create a new public remote repository on github
7. Push the local repository to github

# Homework 0

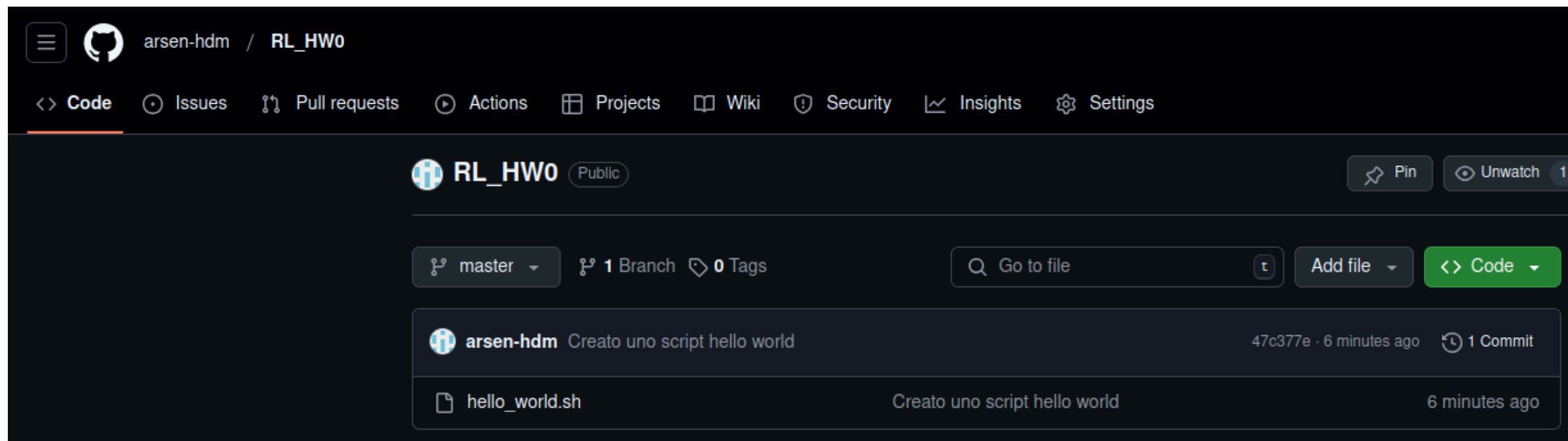
And here are the results:

```
arsen@Arsen-PC: ~/loc_rep_hmwk0
arsen@Arsen-PC: ~/loc_rep_hmwk0 80x50
arsen@Arsen-PC:~$ mkdir loc_rep_hmwk0
arsen@Arsen-PC:~$ cd loc_rep_hmwk0/
arsen@Arsen-PC:~/loc_rep_hmwk0$ git init
suggerimento: Utilizzo di 'master' come nome per il ramo iniziale. Questo nome r
amo predefinito
suggerimento: è soggetto a modifiche. Per configurare il nome del ramo iniziale
da utilizzare in all
suggerimento: dei tuoi nuovi repository, che sopprimeranno questo avviso, chiama
:
suggerimento:
suggerimento:   git config --global init.defaultBranch <nome>
suggerimento:
suggerimento: I nomi comunemente scelti al posto di 'master' sono 'main', 'trunk
' e
suggerimento: 'sviluppo'. Il ramo appena creato può essere rinominato tramite qu
esto comando:
suggerimento:
suggerimento:   git branch -m <nome>
Inizializzato repository Git vuoto in /home/arsen/loc_rep_hmwk0/.git/
arsen@Arsen-PC:~/loc_rep_hmwk0$ nano hello_world.sh
arsen@Arsen-PC:~/loc_rep_hmwk0$ chmod +x hello_world.sh
arsen@Arsen-PC:~/loc_rep_hmwk0$ ./hello_world.sh
Hello, world!!!
arsen@Arsen-PC:~/loc_rep_hmwk0$ git add hello_world.sh
arsen@Arsen-PC:~/loc_rep_hmwk0$ git add .
```

```
arsen@Arsen-PC:~/loc_rep_hmwk0$ git commit -m "Creato uno script hello world"
[master (commit radice) 47c377e] Creato uno script hello world
1 file changed, 3 insertions(+)
create mode 100755 hello_world.sh
arsen@Arsen-PC:~/loc_rep_hmwk0$ git remote add origin https://github.com/arsen-h
dm/RL_HW0.git
arsen@Arsen-PC:~/loc_rep_hmwk0$ git push origin master
Username for 'https://github.com': arsen-hdm
Password for 'https://arsen-hdm@github.com':
Enumerazione degli oggetti in corso: 3, fatto.
Conteggio degli oggetti in corso: 100% (3/3), fatto.
Scrittura degli oggetti in corso: 100% (3/3), 263 byte | 263.00 KiB/s, fatto.
3 oggetti totali (0 delta), 0 riutilizzati (0 delta), 0 riutilizzati nel file pa
ck
To https://github.com/arsen-hdm/RL_HW0.git
 * [new branch]      master -> master
arsen@Arsen-PC:~/loc_rep_hmwk0$
```

# Homework 0

---





# Homework 0

Those are the last tasks of the Git related point:

```
arsen@Arsen-PC:~/loc_rep_hmwk0$ git branch dev
arsen@Arsen-PC:~/loc_rep_hmwk0$ git switch -c dev
fatal: Un branch denominato 'dev' esiste già.
arsen@Arsen-PC:~/loc_rep_hmwk0$ git branch
  dev
* master
arsen@Arsen-PC:~/loc_rep_hmwk0$ git switch dev
Si è passati al branch 'dev'
arsen@Arsen-PC:~/loc_rep_hmwk0$ nano hello_world.sh
arsen@Arsen-PC:~/loc_rep_hmwk0$ ./hello_world.sh
Hello World!
arsen@Arsen-PC:~/loc_rep_hmwk0$ git add.
git: 'add.' non è un comando git. Vedi 'git --help'.

Il comando maggiormente simile è
  add
arsen@Arsen-PC:~/loc_rep_hmwk0$ git add .
arsen@Arsen-PC:~/loc_rep_hmwk0$ git commint -m "Modifica dello script hello worl
d"
git: 'commint' non è un comando git. Vedi 'git --help'.

Il comando maggiormente simile è
  commit
arsen@Arsen-PC:~/loc_rep_hmwk0$ git commit -m "Modifica dello script hello world
"
[dev 8a9fd3d] Modifica dello script hello world
1 file changed, 1 insertion(+), 1 deletion(-)
```

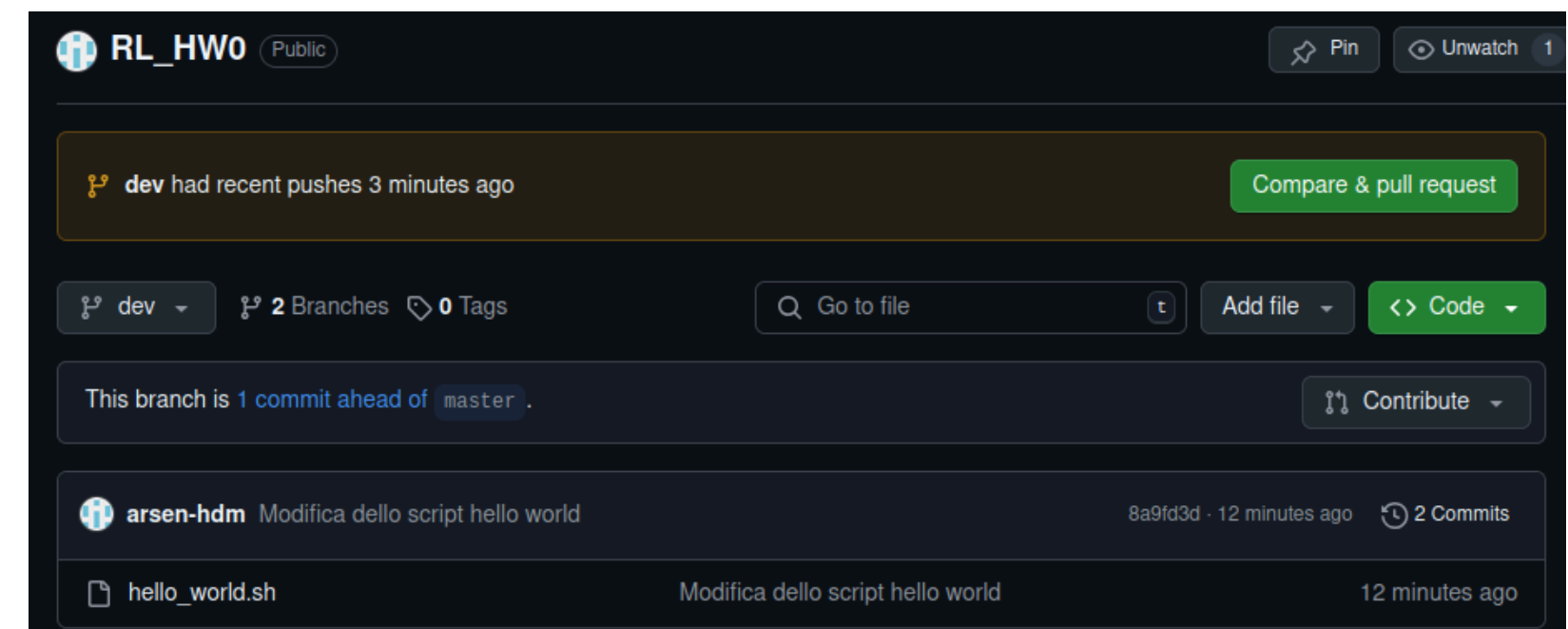
Create a new branch

1. Starting from the previous repository create a new branch called `dev`
2. Modify the `hello_world` source file
3. Upload the repository pushing to the new branch

Merge the branches

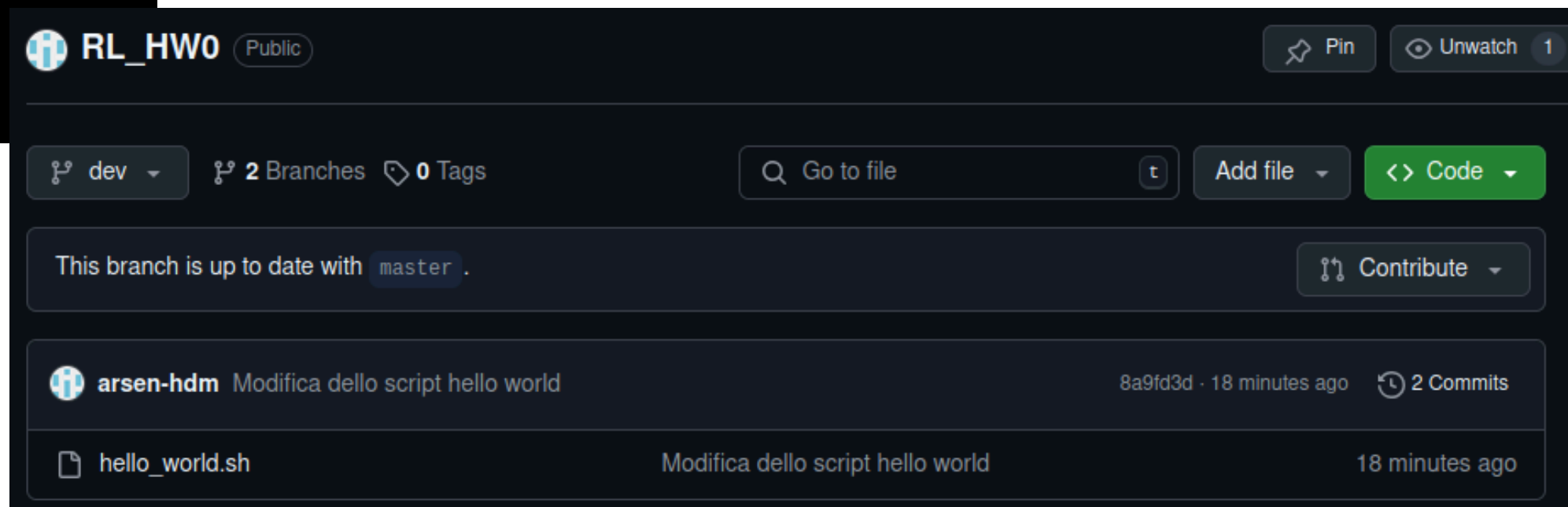
1. Merge the two branch of the previous exercise in the master one

```
arsen@Arsen-PC:~/loc_rep_hmwk0$ git push origin dev
Username for 'https://github.com': arsen-hdm
Password for 'https://arsen-hdm@github.com':
Enumerazione degli oggetti in corso: 5, fatto.
Conteggio degli oggetti in corso: 100% (5/5), fatto.
Scrittura degli oggetti in corso: 100% (3/3), 291 byte | 291.00 KiB/s, fatto.
3 oggetti totali (0 delta), 0 riutilizzati (0 delta), 0 riutilizzati nel file pack
remote:
remote: Create a pull request for 'dev' on GitHub by visiting:
remote:   https://github.com/arsen-hdm/RL_HW0/pull/new/dev
remote:
To https://github.com/arsen-hdm/RL_HW0.git
 * [new branch]      dev -> dev
arsen@Arsen-PC:~/loc_rep_hmwk0$
```



# Homework 0

```
arsen@Arsen-PC:~/loc_rep_hmwk0$ git switch master
Si è passati al branch 'master'
arsen@Arsen-PC:~/loc_rep_hmwk0$ git merge dev
Aggiornamento di 47c377e..8a9fd3d
Fast-forward
 hello_world.sh | 2 +-
 1 file changed, 1 insertion(+), 1 deletion(-)
arsen@Arsen-PC:~/loc_rep_hmwk0$ git add .
arsen@Arsen-PC:~/loc_rep_hmwk0$ git branch
  dev
* master
arsen@Arsen-PC:~/loc_rep_hmwk0$ git commit -m "Merge del branch 'dev' in 'master'"
Sul branch master
non c'è nulla di cui eseguire il commit, l'albero di lavoro è pulito
arsen@Arsen-PC:~/loc_rep_hmwk0$ git push origin master
Username for 'https://github.com': arsen-hdm
Password for 'https://arsen-hdm@github.com':
0 oggetti totali (0 delta), 0 riutilizzati (0 delta), 0 riutilizzati nel file pack
To https://github.com/arsen-hdm/RL_HW0.git
 47c377e..8a9fd3d  master -> master
arsen@Arsen-PC:~/loc_rep_hmwk0$
```



The screenshot shows the GitHub interface for the repository **RL\_HW0**, which is public. The current branch is **dev**, and there are 2 branches and 0 tags. A search bar is present with the text "Go to file". Buttons for "Add file" and "Code" are visible. A message states "This branch is up to date with master". The commit history shows a commit by **arsen-hdm** titled "Modifica dello script hello world" with commit hash **8a9fd3d** from 18 minutes ago, containing 2 commits. The file **hello\_world.sh** is listed with the same commit message and time.

# Homework 0

---

**And now, the last point of the first HW has some tasks to do with Docker, which are these:**

## Docker creation

1. Create a development folder where to put your source file
2. Create a container starting from a ROS image (use the script)
3. Create a file on the host development folder with some content
4. Check that this file exists in the container

## Docker management

1. Create multiple containers with the same image
2. Remove all the containers

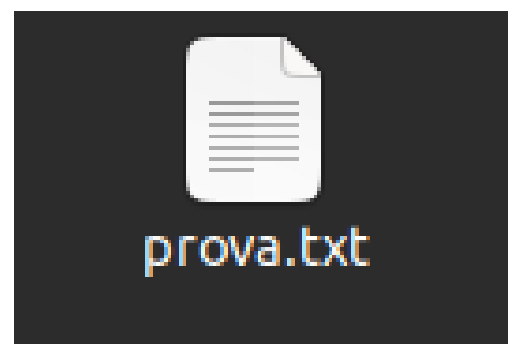
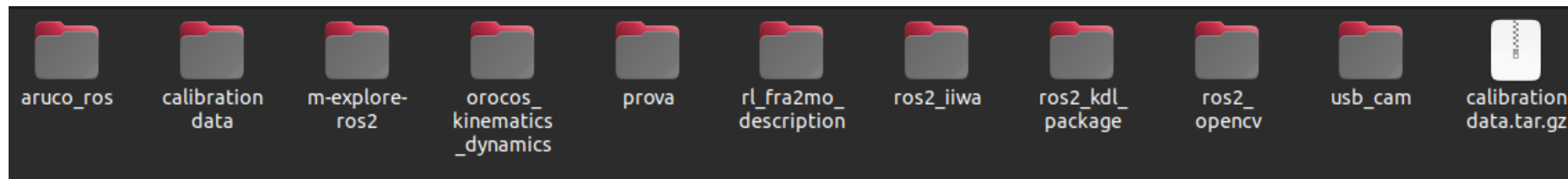
## Docker connection

1. Create a new container
2. Connect to the same container with multiple terminals

# Homework 0

---

```
arsen@Arsen-PC:~/Scrivania/Docker_3.0$ ./docker_run_container.sh rl24img_4 rl24cont_4 rl24fold_4
non-network local connections being added to access control list
user@Arsen-PC:~/ros2_ws$ ls
build  install  log  src
user@Arsen-PC:~/ros2_ws$ cd src
user@Arsen-PC:~/ros2_ws/src$ ls
aruco_ros          m-explore-ros2      ros2_iiwa          usb_cam
calibrationdata    orocos_kinematics_dynamics  ros2_kdl_package
calibrationdata.tar.gz  rl_fra2mo_description  ros2_opencv
user@Arsen-PC:~/ros2_ws/src$ mkdir prova
user@Arsen-PC:~/ros2_ws/src$ cd prova/
user@Arsen-PC:~/ros2_ws/src/prova$ touch prova.txt
user@Arsen-PC:~/ros2_ws/src/prova$
```





# Homework 0

---

And these are the final results of the HWO:

```
arsen@Arsen-PC:~$ docker ps -a
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS        NAMES
c6f4e5aac96a   rl24img_4     "/ros_entrypoint.sh ..." 10 minutes ago Up 10 minutes                rl24cont_4
arsen@Arsen-PC:~$ docker create -it --name hmwk0_container rl24img_4 /bin/bash
eee8017cd95654209d5cb5794af6adc6ba5a6841b546d6c03f0918532006478d
arsen@Arsen-PC:~$ docker ps
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS        NAMES
c6f4e5aac96a   rl24img_4     "/ros_entrypoint.sh ..." 11 minutes ago Up 11 minutes                rl24cont_4
arsen@Arsen-PC:~$ docker ps -a
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS        NAMES
eee8017cd956   rl24img_4     "/ros_entrypoint.sh ..." 13 seconds ago Created                        hmwk0_container
c6f4e5aac96a   rl24img_4     "/ros_entrypoint.sh ..." 11 minutes ago Up 11 minutes                rl24cont_4
arsen@Arsen-PC:~$ docker rm hmwk0_container
hmwk0_container
arsen@Arsen-PC:~$ docker ps -a
CONTAINER ID   IMAGE          COMMAND                  CREATED        STATUS        PORTS        NAMES
c6f4e5aac96a   rl24img_4     "/ros_entrypoint.sh ..." 12 minutes ago Up 12 minutes                rl24cont_4
arsen@Arsen-PC:~$ cd Scrivania/Docker_3.0/
arsen@Arsen-PC:~/Scrivania/Docker_3.0$ ./docker_connect.sh
Select the container to start
1 rl24cont_4
1
Connecting to the container: rl24cont_4
access control disabled, clients can connect from any host
user@Arsen-PC:~/ros2_ws$
```