

GIT

Versioning

1. Initialize a New Git Repository

```
tiago-paquete@Ubuntu1:~/repo/$ git init
```

```
=====
hint: Using 'master' as the name for the initial branch. This default
hint: branch name
hint: is subject to change. To configure the initial branch name to use
hint: in all
hint: of your new repositories, which will suppress this warning, call:
hint:
hint:   git config --global init.defaultBranch <name>
hint:
hint: Names commonly chosen instead of 'master' are 'main', 'trunk' and
hint: 'development'. The just-created branch can be renamed via this
hint: command:
hint:   git branch -m <name>
Initialized empty Git repository in /home/tiago-paquete/GitHubProjects/
T-Paquete/.git/
=====
```

2. Inspect Project Directory Contents

```
tiago-paquete@Ubuntu1:~/repo/$ ls -la
```

```
=====
total 28
drwxrwxr-x 7 tiago-paquete tiago-paquete 4096 May 20 14:15 .
drwxrwxr-x 3 tiago-paquete tiago-paquete 4096 May 20 14:01 ..
drwxrwxr-x 7 tiago-paquete tiago-paquete 4096 May 20 14:15 .git
-rw-rw-r-- 1 tiago-paquete tiago-paquete    0 May 20 14:11 file1
-rw-rw-r-- 1 tiago-paquete tiago-paquete    0 May 20 14:11 file2
-rw-rw-r-- 1 tiago-paquete tiago-paquete    0 May 20 14:11 file3
drwxrwxr-x 2 tiago-paquete tiago-paquete 4096 May 20 14:12 testdir1
drwxrwxr-x 2 tiago-paquete tiago-paquete 4096 May 20 14:12 testdir2
drwxrwxr-x 2 tiago-paquete tiago-paquete 4096 May 20 14:12 testdir3
drwxrwxr-x 2 tiago-paquete tiago-paquete 4096 May 20 14:12 testdir4
=====
```

3. Inspect Contents of a Subdirectory

```
tiago-paquete@Ubuntu1:~/repo/$ ls -la testdir1
```

```
=====
total 8
drwxrwxr-x 2 tiago-paquete tiago-paquete 4096 May 20 14:12 .
drwxrwxr-x 7 tiago-paquete tiago-paquete 4096 May 20 14:15 ..
-rw-rw-r-- 1 tiago-paquete tiago-paquete    0 May 20 14:12 file1
-rw-rw-r-- 1 tiago-paquete tiago-paquete    0 May 20 14:12 file2
-rw-rw-r-- 1 tiago-paquete tiago-paquete    0 May 20 14:12 file3
=====
```

4. Check Git Status Before Staging

```
tiago-paquete@Ubuntu1:~/repo/$ git status
```

```
=====
```

```
On branch master
```

```
No commits yet
```

```
Untracked files:
```

```
(use "git add <file>..." to include in what will be committed)
```

```
file1
file2
file3
testdir1/
testdir2/
testdir3/
testdir4/
```

```
nothing added to commit but untracked files present (use "git add" to track)
```

```
=====
```

5. Stage All Files for Commit

```
tiago-paquete@Ubuntu1:~/repo/$ git add .
```

```
tiago-paquete@Ubuntu1:~/repo/$ git status
```

```
=====
```

```
On branch master
```

```
No commits yet
```

```
Changes to be committed:
```

```
(use "git rm --cached <file>..." to unstage)
```

```
new file:   file1
new file:   file2
new file:   file3
new file:   testdir1/file1
new file:   testdir1/file2
new file:   testdir1/file3
new file:   testdir2/file1
new file:   testdir2/file2
new file:   testdir2/file3
new file:   testdir3/file1
new file:   testdir3/file2
new file:   testdir3/file3
new file:   testdir4/file1
new file:   testdir4/file2
new file:   testdir4/file3
```

```
=====
```

6. Attempt Initial Commit Without User Configuration

```
tiago-paquete@Ubuntu1:~/repo/$ git commit -m "testfiles"
```

```
=====
Author identity unknown
```

```
*** Please tell me who you are.
```

```
Run
```

```
git config --global user.email "you@example.com"
git config --global user.name "Your Name"
```

```
to set your account's default identity.
```

```
Omit --global to set the identity only in this repository.
```

```
fatal: unable to auto-detect email address (got 'tiago-paquete@Ubuntu1.
(none)')
```

7. Configure Git Global Email

```
tiago-paquete@Ubuntu1:~/repo/$ git config --global user.email
"user_email"
```

8. Configure Git Global Username

```
tiago-paquete@Ubuntu1:~/repo/$ git config --global user.name
"TiagoPaquete"
```

9. Commit Staged Files to Repository

```
tiago-paquete@Ubuntu1:~/repo/$ git commit -m "testfiles"
```

```
=====
[master (root-commit) 5f6c186] testfiles
15 files changed, 0 insertions(+), 0 deletions(-)
create mode 100644 file1
create mode 100644 file2
create mode 100644 file3
create mode 100644 testdir1/file1
create mode 100644 testdir1/file2
create mode 100644 testdir1/file3
create mode 100644 testdir2/file1
create mode 100644 testdir2/file2
create mode 100644 testdir2/file3
create mode 100644 testdir3/file1
create mode 100644 testdir3/file2
create mode 100644 testdir3/file3
```

```
create mode 100644 testdir4/file1
create mode 100644 testdir4/file2
create mode 100644 testdir4/file3
```

10. Verify Clean Working Tree After Commit

```
tiago-paquete@Ubuntu1:~/repo/$ git status
```

```
On branch master
nothing to commit, working tree clean
```

11. Add Remote Origin and Rename Branch to Main

```
tiago-paquete@Ubuntu1:~/repo/$ git remote add origin https://github.com/
T-Paquete/testfiles.git
tiago-paquete@Ubuntu1:~/repo/$ git branch -M main
```

12. Attempt Push to GitHub (Password Authentication Fails)

```
tiago-paquete@Ubuntu1:~/repo/$ git push -u origin main
```

```
Username for 'https://github.com': T-Paquete
Password for 'https://T-Paquete@github.com':
remote: Support for password authentication was removed on August 13,
2021.
remote: Please see https://docs.github.com/get-started/getting-started-
with-git/about-remote-repositories#cloning-with-https-urls for
information on currently recommended modes of authentication.
fatal: Authentication failed for 'https://github.com/T-Paquete/
testfiles.git/'
```

Recommended Solution: Use a Personal Access Token (PAT)

GitHub now requires **Personal Access Tokens** instead of passwords when using HTTPS.

Step-by-step:

Go to GitHub Settings:
<https://github.com/settings/tokens>

2

Click "Generate new token" → Choose:
Expiration (set to 30 days, 90 days, or custom)

3

Scopes like:
repo (for private and public repos)
workflow (if needed)

4

Give it a name like "Ubuntu Git Token"

5

Generate Token → Copy it immediately (you won't see it again)

6

In terminal, push again:

```
git push -u origin main
```

7

When prompted:
Username: your GitHub username (e.g., T-Paquete)
Password: paste the token instead of your real password

Optional: Cache your credentials

To avoid re-entering the token every time:

```
git config --global credential.helper cache
```

Or store it permanently (less secure):

```
git config --global credential.helper store
```

Then try pushing again and it will remember your token.

Alternative: Use SSH instead of HTTPS

Generate an SSH key (if you don't have one):

```
ssh-keygen -t ed25519 -C "your_email@example.com"
```

Add your SSH key to GitHub:

Copy the key:

```
cat ~/.ssh/id_ed25519.pub
```

Paste it here: <https://github.com/settings/ssh/new>

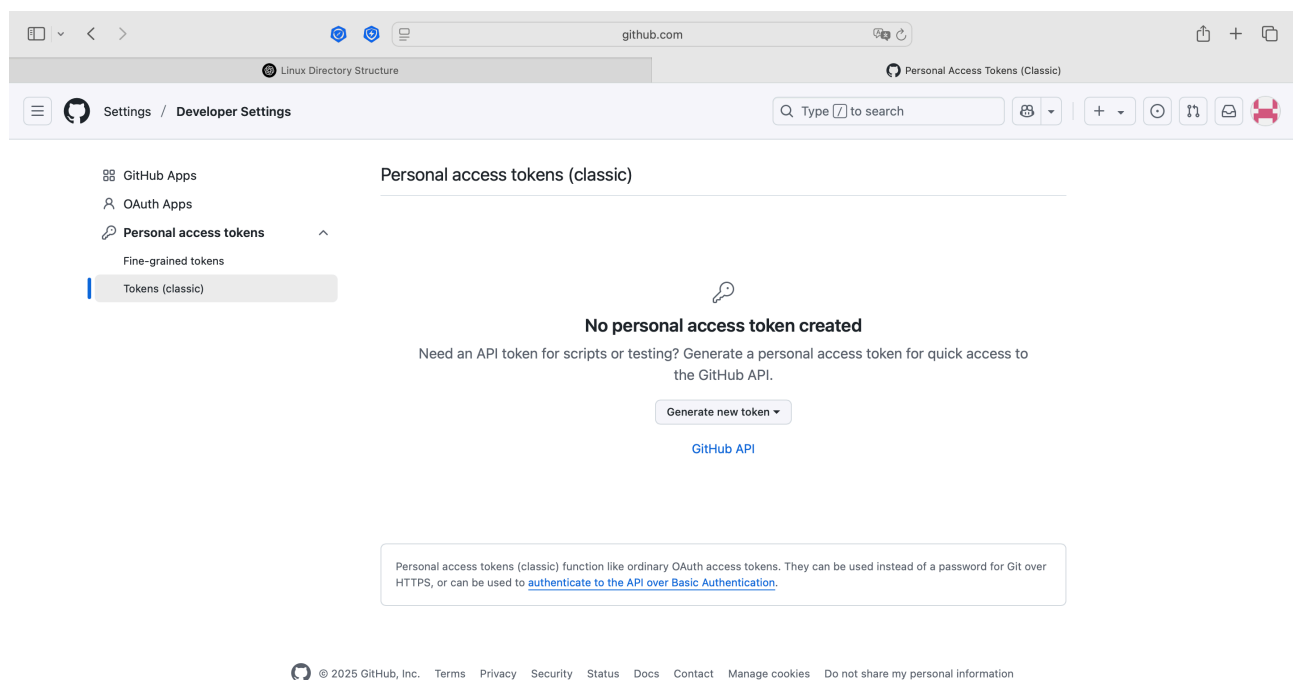
Change the remote URL:

```
git remote set-url origin git@github.com:T-Paquete/testfiles.git
```

Test it:

```
git push -u origin main
```

13. Generate a GitHub Personal Access Token (PAT)



14. Copy Generated Personal Access Token

```
ghp_XXXXXXXXXXXXXXXXXXXXXW
```

15. Push to GitHub Using PAT Authentication

```
tiago-paquete@Ubuntu1:~/repo/$ git push -u origin main
=====
Username for 'https://github.com': T-Paquete
Password for 'https://T-Paquete@github.com':
Enumerating objects: 4, done.
Counting objects: 100% (4/4), done.
Delta compression using up to 12 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (4/4), 326 bytes | 326.00 KiB/s, done.
Total 4 (delta 0), reused 0 (delta 0), pack-reused 0
To https://github.com/T-Paquete/testfiles.git
 * [new branch]      main -> main
branch 'main' set up to track 'origin/main'.
=====
```

16. Verify Remote Tracking and Clean Status

```
tiago-paquete@Ubuntu1:~/repo/$ git status
On branch main
=====
Your branch is up to date with 'origin/main'.

nothing to commit, working tree clean
=====
```

17. Inspect Git Configuration File

```
tiago-paquete@Ubuntu1:~/repo/$ cat .git/config
=====
[core]
    repositoryformatversion = 0
    filemode = true
    bare = false
    logallrefupdates = true
[remote "origin"]
    url = https://github.com/T-Paquete/testfiles.git
    fetch = +refs/heads/*:refs/remotes/origin/*
[branch "main"]
    remote = origin
    merge = refs/heads/main
=====
```

18. Edit a Tracked File and View Its Contents

```
tiago-paquete@Ubuntu1:~/repo/$ ls -l testdir1
```



```
=====
total 0
-rw-rw-r-- 1 tiago-paquete tiago-paquete 0 May 20 14:12 file1
-rw-rw-r-- 1 tiago-paquete tiago-paquete 0 May 20 14:12 file2
-rw-rw-r-- 1 tiago-paquete tiago-paquete 0 May 20 14:12 file3
=====

tiago-paquete@Ubuntu1:~/repo/$ vim testdir1/file1
tiago-paquete@Ubuntu1:~/repo/$ cat testdir1/file1
=====
test
changes
to
commit
=====
```

19. Check Status of Modified File

```
tiago-paquete@Ubuntu1:~/repo/$ git status
=====
On branch main
Your branch is up to date with 'origin/main'.

Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
    modified:   testdir1/file1

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

20. Stage Modified File for Commit

```
tiago-paquete@Ubuntu1:~/repo/$ git add testdir1/file1
tiago-paquete@Ubuntu1:~/repo/$ git status
=====
On branch main
Your branch is up to date with 'origin/main'.

Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
    modified:   testdir1/file1
=====
```

21. Commit File Changes and Review Status

```
tiago-paquete@Ubuntu1:~/repo/$ git commit -m "test committing changes"
```

```
=====
[main b7e95ab] test committing changes
1 file changed, 4 insertions(+)
=====
```

```
tiago-paquete@Ubuntu1:~/repo/$ git status
```

```
=====
On branch main
Your branch is ahead of 'origin/main' by 1 commit.
(use "git push" to publish your local commits)
```

```
nothing to commit, working tree clean
=====
```

22. Push Committed Changes to GitHub

```
tiago-paquete@Ubuntu1:~/repo/$ git push origin main
```


```
=====
Username for 'https://github.com': T-Paquete
Password for 'https://T-Paquete@github.com':
Enumerating objects: 7, done.
Counting objects: 100% (7/7), done.
Delta compression using up to 12 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (4/4), 372 bytes | 372.00 KiB/s, done.
Total 4 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To https://github.com/T-Paquete/testfiles.git
5f6c186..b7e95ab main -> main
=====
```

```
tiago-paquete@Ubuntu1:~/repo/$ git status
```


```
=====
On branch main
Your branch is up to date with 'origin/main'.
```

```
nothing to commit, working tree clean
=====
```

23. Verify Changes on GitHub After Push

 T-Paquete	test committing changes	b7e95ab · 11 minutes ago	🕒 2 Commits
📁 testdir1	test committing changes		11 minutes ago
📁 testdir2	testfiles		2 hours ago
📁 testdir3	testfiles		2 hours ago
📁 testdir4	testfiles		2 hours ago
📄 file1	testfiles		2 hours ago
📄 file2	testfiles		2 hours ago
📄 file3	testfiles		2 hours ago

24. View Local Commit History Summary

	1 file changed	+4 -0 lines changed	🔍 Search within code	⚙️
testdir1/file1	+4			
...	@@ -0,0 +1,4 @@			
1	+ test			
2	+ changes			
3	+ to			
4	+ commit			

25. Display Full Commit Log with Metadata

```
tiago-paquete@Ubuntu1:~/repo/$ git log
```

```
commit hr4xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxb7z (HEAD -> main, origin/main)
```

```
Author: TiagoPaquete <user_email>
```

```
Date: Tue May 20 17:04:57 2025 +0200
```

```
test committing changes
```

```
commit 5f6xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxb1b
```

```
Author: TiagoPaquete <user_email>
```

```
Date: Tue May 20 14:26:21 2025 +0200
```

```
testfiles
```

26. Display Concise Commit Log (--oneline)

```
tiago-paquete@Ubuntu1:~/repo/$ git log --oneline
```

```
=====
bxxxxxxb (HEAD -> main, origin/main) test committing changes
5xxxxxx6 testfiles
=====
```

27. Show Details of a Specific Commit

```
tiago-paquete@Ubuntu1:~/repo/$ git show bxxxxxxb
```

```
=====
commit hr4xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxb7z (HEAD -> main, origin/main)
Author: TiagoPaquete <user_email>
Date: Tue May 20 17:04:57 2025 +0200
```

```
test committing changes
```

```
...
```

```
@@ -0,0 +1,4 @@
+test
+changes
+to
+commit
=====
```

28. Show Latest Commit Changes

```
tiago-paquete@Ubuntu1:~/repo/$ git show
```

```
=====
commit hr4xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxb7z (HEAD -> main, origin/main)
Author: TiagoPaquete <user_email>
Date: Tue May 20 17:04:57 2025 +0200
```

```
test committing changes
```

```
diff --git a/testdir1/file1 b/testdir1/file1
```

```
...
```

```
--- a/testdir1/file1
+++ b/testdir1/file1
@@ -0,0 +1,4 @@
+test
+changes
+to
+commit
=====
```

29. Modify Tracked Files Locally

```
tiago-paquete@Ubuntu1:~/repo/$ vim testdir1/file1
tiago-paquete@Ubuntu1:~/repo/$ vim testdir2/file3
tiago-paquete@Ubuntu1:~/repo/$ cat testdir1/file1
```

```
=====
another
test
```

```
changes
2
commit
=====
```

```
tiago-paquete@Ubuntu1:~/repo/$ cat testdir2/file3
```

```
=====
and
yet
another
test
=====
```

30. Check Git Status After Local File Modifications

```
tiago-paquete@Ubuntu1:~/repo/$ git status
```

```
=====
On branch main
Your branch is up to date with 'origin/main'.
```

```
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git restore <file>..." to discard changes in working directory)
    modified:   testdir1/file1
    modified:   testdir2/file3
```

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

31. Stage Modified Files for Commit

```
tiago-paquete@Ubuntu1:~/repo/$ git add .
tiago-paquete@Ubuntu1:~/repo/$ git status
```

```
=====
On branch main
Your branch is up to date with 'origin/main'.
```

```
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
    modified:   testdir1/file1
    modified:   testdir2/file3
=====
```

32. Commit Modified Files with Message

```
tiago-paquete@Ubuntu1:~/repo/$ git commit -m "updated new commit tests"
```

```
=====
[main 8cc6b8a] updated new commit tests
 2 files changed, 7 insertions(+), 1 deletion(-)
=====
```

```
tiago-paquete@Ubuntu1:~/repo/$ git status
```

```
=====
On branch main
Your branch is ahead of 'origin/main' by 1 commit.
  (use "git push" to publish your local commits)
```

```
nothing to commit, working tree clean
=====
```

33. Push New Commit to Remote Repository

```
tiago-paquete@Ubuntu1:~/repo/$ git push origin main
```

```
=====
Username for 'https://github.com': T-Paquete
Password for 'https://T-Paquete@github.com':
Enumerating objects: 11, done.
Counting objects: 100% (11/11), done.
Delta compression using up to 12 threads
Compressing objects: 100% (4/4), done.
Writing objects: 100% (6/6), 501 bytes | 501.00 KiB/s, done.
Total 6 (delta 2), reused 0 (delta 0), pack-reused 0
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To https://github.com/T-Paquete/testfiles.git
   b7e95ab..8cc6b8a  main -> main
=====
```

```
tiago-paquete@Ubuntu1:~/repo/$ git status
```

```
=====
On branch main
Your branch is up to date with 'origin/main'.
```

```
nothing to commit, working tree clean
=====
```

34. Review Updated Commit Log (--oneline)

```
tiago-paquete@Ubuntu1:~/repo/$ git log --oneline
```

```
=====
8xxxxxxw (HEAD -> main, origin/main) updated new commit tests
xixxxxxe test committing changes
5xxxxxx9 testfiles
=====
```

35. Inspect Latest Commit with Diff View

```
tiago-paquete@Ubuntu1:~/repo/$ git show
```

```
=====
commit hr4xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxb7z (HEAD -> main, origin/main)
```

```
Author: TiagoPaquete <user_email>
```

```
Date: Tue May 20 17:34:16 2025 +0200
```

```
updated new commit tests
```

```
diff --git a/testdir1/file1 b/testdir1/file1
```

```
---
```

```
a/testdir1/file1
```

```
+++ b/testdir1/file1
```

```
@@ -1,4 +1,6 @@
```

```
+another
```

```
test
```

```
+
```

```
changes
```

```
-to
```

```
+2
```

```
commit
```

```
diff --git a/testdir2/file3 b/testdir2/file3
```

```
---
```

```
a/testdir2/file3
```

```
+++ b/testdir2/file3
```

```
@@ -0,0 +1,4 @@
```

```
+and
```

```
+yet
```

```
+another
```

```
+test
```

36. Verify Commit History on GitHub Website

testdir1/file1		+3 -1	...
...	@@ -1,4 +1,6 @@		
1	+ another		
1	2 test		
3	+		
2	4 changes		
3	- to		
5	+ 2		
4	6 commit		

testdir2/file3		+4	...
...	@@ -0,0 +1,4 @@		
1	+ and		
2	+ yet		
3	+ another		
4	+ test		

37. Confirm Clean Working Tree After Push

```
tiago-paquete@Ubuntu1:~/repo/$ git status
```

```
=====
On branch main
Your branch is up to date with 'origin/main'.
```

```
nothing to commit, working tree clean
=====
```

38. Online Changes to Repository

testfiles / testdir3 / file2

39. Fetch Remote Changes and Check Status

```
tiago-paquete@Ubuntu1:~/repo/$ git status
```

```
=====
On branch main
Your branch is up to date with 'origin/main'.
```

```
nothing to commit, working tree clean
=====
```

```
tiago-paquete@Ubuntu1:~/repo/$ git fetch
```

```
=====
Username for 'https://github.com': T-Paquete
Password for 'https://T-Paquete@github.com':
remote: Enumerating objects: 7, done.
remote: Counting objects: 100% (7/7), done.
remote: Compressing objects: 100% (4/4), done.
remote: Total 4 (delta 1), reused 0 (delta 0), pack-reused 0 (from 0)
Unpacking objects: 100% (4/4), 1.03 KiB | 1.03 MiB/s, done.
From https://github.com/T-Paquete/testfiles
   8cc6b8a..98c48ec  main       -> origin/main
=====
```

```
tiago-paquete@Ubuntu1:~/repo/$ git status
```


On branch main
Your branch is behind 'origin/main' by 1 commit, and can be fast-forwarded.

(use "git pull" to update your local branch)

nothing to commit, working tree clean

40. Pull Remote Changes into Local Repository

```
tiago-paquete@Ubuntu1:~/repo/$ git pull
```

```
=====
Username for 'https://github.com': T-Paquete
Password for 'https://T-Paquete@github.com':
Updating 8cc6b8a..98c48ec
Fast-forward
 testdir3/file2 | 8 ++++++++
 1 file changed, 8 insertions(+)
=====
```

```
tiago-paquete@Ubuntu1:~/repo/$ git status
```

```
=====
On branch main
Your branch is up to date with 'origin/main'.
```

```
nothing to commit, working tree clean
=====
```

41. Review Full Commit History Including Pulled Changes

```
tiago-paquete@Ubuntu1:~/repo/$ git log
```

```
=====
commit xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx (HEAD -> main, origin/main)
Author: T-Paquete <user_email>
Date: Tue May 20 17:44:28 2025 +0200
```

Update file2

test pull changes to local machine

```
commit xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Author: TiagoPaquete <user_email>
Date: Tue May 20 17:34:16 2025 +0200
```

updated new commit tests

```
commit xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Author: TiagoPaquete <user_email>
Date: Tue May 20 17:04:57 2025 +0200
```

test committing changes

commit xx

Author: TiagoPaquete <user_email>

Date: Tue May 20 14:26:21 2025 +0200

=====