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«Київський політехнічний інститут імені Ігоря Сікорського»  
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Кафедра інформаційних систем та технологій

### **Лабораторна робота №1**

з дисципліни «Технології розроблення програмного забезпечення»

Тема: «Системи контролю версій. Git.»

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Київ 2024

**Тема:** Системи контролю версій. Git.

**Мета:** Ознайомитися з принципами роботи систем контролю версій, зокрема Git, та зрозуміти, як вони дозволяють керувати змінами в програмному коді.  
Навчитися використовувати Git для відстеження змін, роботи з гілками.

**Хід роботи:**

**Ініціалізація проекту та створення першого коміту:**

```
Microsoft Windows [Version 10.0.22631.4317]
(c) Корпорация Майкрософт (Microsoft Corporation). Все права защищены.

C:\Users\User\OneDrive\Рабочий стол\qwe>git init
Initialized empty Git repository in C:/Users/User/OneDrive/Рабочий стол/qwe/.git/

C:\Users\User\OneDrive\Рабочий стол\qwe>git add .

C:\Users\User\OneDrive\Рабочий стол\qwe>git commit -m "start"
[master (root-commit) 7be8af9] start
 1 file changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 1.txt

C:\Users\User\OneDrive\Рабочий стол\qwe>git log
commit 7be8af920d975e4d9f3ea606d24a604f2f40d7cf (HEAD -> master)
Author: dLiadsk <dimaluad2@gmail.com>
Date: Thu Oct 24 13:07:39 2024 +0300

    start
```

## Демонстрація роботи reset без видалення змін:

```
C:\Users\User\OneDrive\Рабочий стол\qwe>git add .

C:\Users\User\OneDrive\Рабочий стол\qwe>git commit -m "com1"
[master c27f5b6] com1
 2 files changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 index.html
 create mode 100644 index.txt

C:\Users\User\OneDrive\Рабочий стол\qwe>git log
commit c27f5b6c0e7da1fa502197b179112026a0b1501d (HEAD -> master)
Author: dLiadsk <dimaluad2@gmail.com>
Date: Thu Oct 24 13:09:25 2024 +0300

    com1

commit 7be8af920d975e4d9f3ea606d24a604f2f40d7cf
Author: dLiadsk <dimaluad2@gmail.com>
Date: Thu Oct 24 13:07:39 2024 +0300

    start

C:\Users\User\OneDrive\Рабочий стол\qwe>git reset --soft

C:\Users\User\OneDrive\Рабочий стол\qwe>git reset --soft HEAD~1

C:\Users\User\OneDrive\Рабочий стол\qwe>git log
commit 7be8af920d975e4d9f3ea606d24a604f2f40d7cf (HEAD -> master)
Author: dLiadsk <dimaluad2@gmail.com>
Date: Thu Oct 24 13:07:39 2024 +0300

    start

C:\Users\User\OneDrive\Рабочий стол\qwe>git status
On branch master
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
    new file:   index.html
    new file:   index.txt
```

### Створення 3 гілок та комітів:

```
C:\Users\User\OneDrive\Рабочий стол\qwe>git status
On branch master
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
    new file:   index.html
    new file:   index.txt

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

C:\Users\User\OneDrive\Рабочий стол\qwe>git add .

C:\Users\User\OneDrive\Рабочий стол\qwe>git commit -m"start1"
[master 693125a] start1
 1 file changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 index.txt

C:\Users\User\OneDrive\Рабочий стол\qwe>git checkout -b br1
Switched to a new branch 'br1'

C:\Users\User\OneDrive\Рабочий стол\qwe>git checkout master
Switched to branch 'master'

C:\Users\User\OneDrive\Рабочий стол\qwe>git branch br2

C:\Users\User\OneDrive\Рабочий стол\qwe>git branch br3

C:\Users\User\OneDrive\Рабочий стол\qwe>git branch
br1
br2
br3
* master

C:\Users\User\OneDrive\Рабочий стол\qwe>git switch br1
Switched to branch 'br1'

C:\Users\User\OneDrive\Рабочий стол\qwe>git add .
```

```
C:\Users\User\OneDrive\Рабочий стол\qwe>git add .

C:\Users\User\OneDrive\Рабочий стол\qwe>git status
On branch br1
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
    new file:   2.txt

C:\Users\User\OneDrive\Рабочий стол\qwe>git add .

C:\Users\User\OneDrive\Рабочий стол\qwe>git status
On branch br1
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
    modified:   1.txt
    new file:   2.txt

C:\Users\User\OneDrive\Рабочий стол\qwe>git commit -m "added 2.txt and modified 1.txt"
[br1 c010ff3] added 2.txt and modified 1.txt
 2 files changed, 2 insertions(+)
 create mode 100644 2.txt

C:\Users\User\OneDrive\Рабочий стол\qwe>git switch br2
Switched to branch 'br2'

C:\Users\User\OneDrive\Рабочий стол\qwe>git add .

C:\Users\User\OneDrive\Рабочий стол\qwe>git commit -m "modified 1.txt"
[br2 6afc66c] modified 1.txt
 1 file changed, 1 insertion(+)

C:\Users\User\OneDrive\Рабочий стол\qwe>git add .

C:\Users\User\OneDrive\Рабочий стол\qwe>git commit -m "added 22.txt"
[br2 5b1a334] added 22.txt
 1 file changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 22.txt
```

```
C:\Users\User\OneDrive\Рабочий стол\qwe>git switch br3
Switched to branch 'br3'

C:\Users\User\OneDrive\Рабочий стол\qwe>git add .

C:\Users\User\OneDrive\Рабочий стол\qwe>git commit -m "modified 1.txt on br3"
[br3 63983bf] modified 1.txt on br3
 1 file changed, 1 insertion(+)

C:\Users\User\OneDrive\Рабочий стол\qwe>git log --all --oneline --graph
* 63983bf (HEAD -> br3) modified 1.txt on br3
| * 5b1a334 (br2) added 22.txt
| * 6afc66c modified 1.txt
|/
| * c010ff3 (br1) added 2.txt and modified 1.txt
|/
* 693125a (master) start1
* 7be8af9 start
```

## Демонстрація роботи merge, rebase та cherry-pick з конфліктом та їх вирішення:

### Merge:

```
C:\Users\User\OneDrive\Робочий стол\qwe>git merge br1
Auto-merging 1.txt
CONFLICT (content): Merge conflict in 1.txt
Automatic merge failed; fix conflicts and then commit the result.

C:\Users\User\OneDrive\Робочий стол\qwe>git status
On branch br3
You have unmerged paths.
  (fix conflicts and run "git commit")
  (use "git merge --abort" to abort the merge)

Changes to be committed:
  new file:   2.txt

Unmerged paths:
  (use "git add <file>..." to mark resolution)
    both modified:   1.txt

C:\Users\User\OneDrive\Робочий стол\qwe>git add 1.txt

C:\Users\User\OneDrive\Робочий стол\qwe>git commit
hint: Waiting for your editor to close the file... unix2dos: converting file
C:/Users/User/OneDrive/Робочий стол/qwe/.git/COMMIT_EDITMSG to DOS format...
dos2unix: converting file C:/Users/User/OneDrive/Робочий стол/qwe/.git/COMMIT_EDITMSG to
Unix format...
[br3 8ce42f0] Merge branch 'br1' into br3

C:\Users\User\OneDrive\Робочий стол\qwe>git status
On branch br3
nothing to commit, working tree clean
```

```
C:\Users\User\OneDrive\Робочий стол\qwe>git log --all --oneline --graph
*   8ce42f0 (HEAD -> br3) Merge branch 'br1' into br3
| \
|  * c010ff3 (br1) added 2.txt and modified 1.txt
* | 63983bf modified 1.txt on br3
| /
|  * 5b1a334 (br2) added 22.txt
|  * 6afc66c modified 1.txt
| /
* 693125a (master) start1
* 7be8af9 start
```

## Rebase:

```
C:\Users\User\OneDrive\Рабочий стол\qwe>git switch br2
Switched to branch 'br2'

C:\Users\User\OneDrive\Рабочий стол\qwe>git rebase br3
Auto-merging 1.txt
CONFLICT (content): Merge conflict in 1.txt
error: could not apply 6afc66c... modified 1.txt
hint: Resolve all conflicts manually, mark them as resolved with
hint: "git add/rm <conflicted_files>", then run "git rebase --continue".
hint: You can instead skip this commit: run "git rebase --skip".
hint: To abort and get back to the state before "git rebase", run "git rebase --abort".
Could not apply 6afc66c... modified 1.txt

C:\Users\User\OneDrive\Рабочий стол\qwe>git status
interactive rebase in progress; onto 8ce42f0
Last command done (1 command done):
    pick 6afc66c modified 1.txt
Next command to do (1 remaining command):
    pick 5b1a334 added 22.txt
    (use "git rebase --edit-todo" to view and edit)
You are currently rebasing branch 'br2' on '8ce42f0'.
    (fix conflicts and then run "git rebase --continue")
    (use "git rebase --skip" to skip this patch)
    (use "git rebase --abort" to check out the original branch)

Unmerged paths:
  (use "git restore --staged <file>..." to unstage)
  (use "git add <file>..." to mark resolution)
    both modified:   1.txt

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

C:\Users\User\OneDrive\Рабочий стол\qwe>git add 1.txt
```

```
C:\Users\User\OneDrive\Рабочий стол\qwe>git rebase --continue
hint: Waiting for your editor to close the file... unix2dos: converting file
C:/Users/User/OneDrive/Рабочий стол/qwe/.git/COMMIT_EDITMSG to DOS format...
dos2unix: converting file C:/Users/User/OneDrive/Рабочий стол/qwe/.git/COMMIT_EDITMSG to
Unix format...
[detached HEAD 0a14006] modified 1.txt
 1 file changed, 1 insertion(+)
Successfully rebased and updated refs/heads/br2.

C:\Users\User\OneDrive\Рабочий стол\qwe>git log --all --oneline --graph
* 9e870ea (HEAD -> br2) added 22.txt
* 0a14006 modified 1.txt
*   8ce42f0 (br3) Merge branch 'br1' into br3
| \
| * c010ff3 (br1) added 2.txt and modified 1.txt
* | 63983bf modified 1.txt on br3
| /
* 693125a (master) start1
* 7be8af9 start
```

## cherry-pick без конфлікту:

```
C:\Users\User\OneDrive\Рабочий стол\qwe>git checkout br1
Switched to branch 'br1'

C:\Users\User\OneDrive\Рабочий стол\qwe>git add .

C:\Users\User\OneDrive\Рабочий стол\qwe>git commit -m "added 3.txt and modified 2.txt"
[br1 175bae8] added 3.txt and modified 2.txt
 2 files changed, 2 insertions(+), 1 deletion(-)
 create mode 100644 3.txt

C:\Users\User\OneDrive\Рабочий стол\qwe>git log --all --oneline --graph
* 175bae8 (HEAD -> br1) added 3.txt and modified 2.txt
| * 9e870ea (br2) added 22.txt
| * 0a14006 modified 1.txt
| * 8ce42f0 (br3) Merge branch 'br1' into br3
| |
| |
| |
|/|
* | c010ff3 added 2.txt and modified 1.txt
| * 63983bf modified 1.txt on br3
|/
* 693125a (master) start1
* 7be8af9 start

C:\Users\User\OneDrive\Рабочий стол\qwe>git checkout br3
Switched to branch 'br3'

C:\Users\User\OneDrive\Рабочий стол\qwe>git cherry-pick 175bae8
[br3 7828bac] added 3.txt and modified 2.txt
Date: Thu Oct 24 16:27:00 2024 +0300
 2 files changed, 2 insertions(+), 1 deletion(-)
 create mode 100644 3.txt

C:\Users\User\OneDrive\Рабочий стол\qwe>git status
On branch br3
nothing to commit, working tree clean
```

```
C:\Users\User\OneDrive\Рабочий стол\qwe>git log --all --oneline --graph
* 7828bac (HEAD -> br3) added 3.txt and modified 2.txt
| * 175bae8 (br1) added 3.txt and modified 2.txt
| | * 9e870ea (br2) added 22.txt
| | * 0a14006 modified 1.txt
| |
| |
|/|
* | 8ce42f0 Merge branch 'br1' into br3
| |
| * c010ff3 added 2.txt and modified 1.txt
* | 63983bf modified 1.txt on br3
|/
* 693125a (master) start1
* 7be8af9 start
```



## cherry-pick з конфліктом:

```
C:\Users\User\OneDrive\Рабочий стол\qwe>git add .

C:\Users\User\OneDrive\Рабочий стол\qwe>git commit -m "modified 2.txt"
[br3 adada08] modified 2.txt
1 file changed, 2 insertions(+), 1 deletion(-)

C:\Users\User\OneDrive\Рабочий стол\qwe>git switch br1
Switched to branch 'br1'

C:\Users\User\OneDrive\Рабочий стол\qwe>git add .

C:\Users\User\OneDrive\Рабочий стол\qwe>git commit -m "modified 2.txt in br1"
[br1 f0641cc] modified 2.txt in br1
1 file changed, 2 insertions(+), 1 deletion(-)

C:\Users\User\OneDrive\Рабочий стол\qwe>git checkout br3
Switched to branch 'br3'

C:\Users\User\OneDrive\Рабочий стол\qwe>git log --all --oneline --graph
* f0641cc (br1) modified 2.txt in br1
* 175bae8 added 3.txt and modified 2.txt
| * adada08 (HEAD -> br3) modified 2.txt
| * 7828bac added 3.txt and modified 2.txt
| | * 9e870ea (br2) added 22.txt
| | * 0a14006 modified 1.txt
| | /
| * 8ce42f0 Merge branch 'br1' into br3
| | \
| | /
| / |
* | c010ff3 added 2.txt and modified 1.txt
| * 63983bf modified 1.txt on br3
| /
* 693125a (master) start1
* 7be8af9 start
```

```

C:\Users\User\OneDrive\Робочий стол\qwe>git cherry-pick f0641cc
Auto-merging 2.txt
CONFLICT (content): Merge conflict in 2.txt
error: could not apply f0641cc... modified 2.txt in br1
hint: After resolving the conflicts, mark them with
hint: "git add/rm <paths>", then run
hint: "git cherry-pick --continue".
hint: You can instead skip this commit with "git cherry-pick --skip".
hint: To abort and get back to the state before "git cherry-pick",
hint: run "git cherry-pick --abort".

C:\Users\User\OneDrive\Робочий стол\qwe>git add 2.txt

C:\Users\User\OneDrive\Робочий стол\qwe>git cherry-pick --continue
hint: Waiting for your editor to close the file... unix2dos: converting file
C:/Users/User/OneDrive/Робочий стол/qwe/.git/COMMIT_EDITMSG to DOS format...
dos2unix: converting file C:/Users/User/OneDrive/Робочий стол/qwe/.git/COMMIT_EDITMSG to
Unix format...
[br3 affca3c] modified 2.txt in br1
Date: Thu Oct 24 16:30:19 2024 +0300
1 file changed, 2 insertions(+), 1 deletion(-)

C:\Users\User\OneDrive\Робочий стол\qwe>git log --all --oneline --graph
* affca3c (HEAD -> br3) modified 2.txt in br1
* adada08 modified 2.txt
* 7828bac added 3.txt and modified 2.txt
| * f0641cc (br1) modified 2.txt in br1
| * 175bae8 added 3.txt and modified 2.txt
| | * 9e870ea (br2) added 22.txt
| | * 0a14006 modified 1.txt
| | /
| /
| /
* | 8ce42f0 Merge branch 'br1' into br3
| \
| * c010ff3 added 2.txt and modified 1.txt
* | 63983bf modified 1.txt on br3
| /
* 693125a (master) start1
* 7be8af9 start

```

**Демонстрація роботи squash:**

```
C:\Users\User\OneDrive\Рабочий стол\qwe>git rebase -i HEAD~3
hint: Waiting for your editor to close the file... unix2dos: converting file
C:/Users/User/OneDrive/Рабочий стол/qwe/.git/rebase-merge/git-rebase-todo to DOS format...
dos2unix: converting file C:/Users/User/OneDrive/Рабочий стол/qwe/.git/rebase-merge/git-
rebase-todo to Unix format...
hint: Waiting for your editor to close the file... unix2dos: converting file
C:/Users/User/OneDrive/Рабочий стол/qwe/.git/COMMIT_EDITMSG to DOS format...
dos2unix: converting file C:/Users/User/OneDrive/Рабочий стол/qwe/.git/COMMIT_EDITMSG to
Unix format...
[detached HEAD 6986970] added 3.txt and modified 2.txt
Date: Thu Oct 24 16:27:00 2024 +0300
2 files changed, 4 insertions(+), 1 deletion(-)
create mode 100644 3.txt
Successfully rebased and updated refs/heads/br3.

C:\Users\User\OneDrive\Рабочий стол\qwe>git log --all --oneline --graph
* 6986970 (HEAD -> br3) added 3.txt and modified 2.txt
| * f0641cc (br1) modified 2.txt in br1
| * 175bae8 added 3.txt and modified 2.txt
| | * 9e870ea (br2) added 22.txt
| | * 0a14006 modified 1.txt
| | /
| /
| /
* | 8ce42f0 Merge branch 'br1' into br3
| \
| * c010ff3 added 2.txt and modified 1.txt
* | 63983bf modified 1.txt on br3
| /
* 693125a (master) start1
* 7be8af9 start
```

**Висновок:** В результаті виконаної роботи було засвоєно основні принципи роботи з Git, такі як ініціалізація репозиторію, створення комітів, робота з гілками. Git є потужним інструментом для керування версіями, що значно полегшує командну роботу та забезпечує контроль над змінами у програмному коді.