Часть I: Основы Git

1. Финальные приготовления

01 Установка имени и электронной почты
```
git config --global user.name "Your Name"
git config --global user.email "your_email@whatever.com"
```

02 Имя ветки по умолчанию
```
git config --global init.defaultBranch main
```

03 Корректная обработка окончаний строк
```
git config --global core.autocrlf true
git config --global core.safecrlf warn
```

2. Создание проекта

01 Создайте страницу «Hello, World»
```
mkdir work
cd work
touch hello.html
```

02 Создайте репозиторий
```
git init
```

03 Добавьте страницу в репозиторий
```
git add hello.html
git commit -m "Initial Commit"
```

3. Проверка состояния

01 Проверьте состояние репозитория

`git status`

```
$ ^C

glkru@a7211-15 MINGW64 ~/work (main)
$ git config --global user.email "gleb.frolov.04@bk.ru"

glkru@a7211-15 MINGW64 ~/work (main)
$ ^C

glkru@a7211-15 MINGW64 ~/work (main)
$   git config --global user.name "Gleb"

glkru@a7211-15 MINGW64 ~/work (main)
$ git commit -m "Initial Commit"
[main (root-commit) e8eae23] Initial Commit
 1 file changed, 1 insertion(+)
 create mode 100644 hello.html

glkru@a7211-15 MINGW64 ~/work (main)
$ git status
On branch main
nothing to commit, working tree clean

glkru@a7211-15 MINGW64 ~/work (main)
$
```

4. Внесение изменений

01 Измените страницу «Hello, World»

02 Проверьте состояние

`git status`

5. Индексация изменений

01 Добавьте изменения

`git add hello.html`

`git status`

```
glkru@a7211-15 MINGW64 ~/work (main)
$ git status
On branch 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:   hello.html

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

glkru@a7211-15 MINGW64 ~/work (main)
$ git add hello.html
git status
On branch main
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        modified:   hello.html
```

6. Индексация и коммит

```
01
git add a.html
git add b.html
git commit -m "Changes for a and b"
git add c.html
git commit -m "Unrelated change to c"
```

7. Коммит изменений

01 Закоммитьте изменения

```
git commit
```

```
glkru@a7211-15 MINGW64 ~/work (main)
$  git add c.html

glkru@a7211-15 MINGW64 ~/work (main)
$ git commit
[main d78a839] Added privetik tag
 1 file changed, 1 insertion(+)
```

02 Проверьте состояние
```
git status
```

8. Изменения, а не файлы

01 Первое изменение: Добавьте стандартные теги страницы
```
<html>
    <body>
        <h1>Hello, World!</h1>
    </body>
</html>
```

02 Добавьте это изменение
```
git add hello.html
```

03 Второе изменение: Добавьте заголовки HTML

```html
<html>
    <head>
    </head>
    <body>
        <h1>Hello, World!</h1>
    </body>
</html>
```

04 Проверьте текущий статус

```
git status
```

05 Коммит

```
git commit -m "Added
standard HTML page tags"
git status
```

06 Добавьте второе изменение

```
git add .
git status
```

```
glkru@a7211-15 MINGW64 ~/work (main)
$ git status
On branch main
nothing to commit, working tree clean

glkru@a7211-15 MINGW64 ~/work (main)
$ git add hello.html

glkru@a7211-15 MINGW64 ~/work (main)
$ git status
On branch main
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        modified:   hello.html

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:   hello.html


glkru@a7211-15 MINGW64 ~/work (main)
$ git commit -m "Added standard HTML page tags"
git status
[main 725aace] Added standard HTML page tags
 1 file changed, 5 insertions(+), 1 deletion(-)
On branch 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:   hello.html

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

glkru@a7211-15 MINGW64 ~/work (main)
$ git add .
git status
On branch main
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        modified:   hello.html


glkru@a7211-15 MINGW64 ~/work (main)
$ $ git commit -m "Added HTML header"
[main b7614c1] Added HTML header
 1 file changed, 2 insertions(+)
bash: $: command not found
bash: [main: command not found
bash: syntax error near unexpected token `('

glkru@a7211-15 MINGW64 ~/work (main)
$
```

07 Сделайте коммит второго изменения

```
git commit -m "Added HTML header"
```

9. История

```
git log
```

01 Однострочная история

```
git log --pretty=oneline
```

```
glkru@a7211-15 MINGW64 ~/work (main)
$ git log --pretty=oneline
725aace7ef9980c23049e0e51143f43f41a37203 (HEAD -> main) Added standard HTML
page tags
d78a8393f0a20820fea87ef07cdf9a9cb92e561a Added privetik tag
65307bda7bdf11b0ffc2f8115316b5179545088e Unrelated change to c
5d01b13da6a6b5192a0bb4772bea68419c4d7afe Changes for a and b
6eefb72894580dddd55c04136b12d0b559123930 Changes for a and b
e8eae23b29d64123e7573122a53f0c38b0723fde Initial Commit

glkru@a7211-15 MINGW64 ~/work (main)
$
```

02 Контроль отображения записей

```
git log --oneline --max-count=2
git log --oneline --since="5 minutes ago"
git log --oneline --until="5 minutes ago"
git log --oneline --author="Your Name"
git log --oneline --all
```

03 Изощряемся

```
git log --all --pretty=format:"%h %cd %s (%an)" --since="7 days ago"
```

04 Конечный формат лога

```
git log --pretty=format:"%h %ad | %s%d [%an]" --date=short
git config --global format.pretty '%h %ad | %s%d [%an]'
git config --global log.date short
```

10. Получение старых версий

01 Получите хеши предыдущих коммитов

```
git log
```
```
git checkout <hash>
```
```
cat hello.html
```

02 Вернитесь к последней версии в ветке `main`

```
git switch main
```
```
cat hello.html
```

11. Создание тегов версий

01 Создайте тег первой версии

```
git tag v1
```
```
git log
```

```
glkru@a7211-15 MINGW64 ~/work (main)
$ git tag v1
git log
77f7d7f 2025-07-07 | priv (HEAD -> main, tag: v1) [Gleb]
725aace 2025-07-07 | Added standard HTML page tags [Gleb]
d78a839 2025-07-07 | Added privetik tag [Gleb]
65307bd 2025-07-07 | Unrelated change to c [Gleb]
5d01b13 2025-07-07 | Changes for a and b [Gleb]
6eefb72 2025-07-07 | Changes for a and b [Gleb]
e8eae23 2025-07-07 | Initial Commit [Gleb]
```

02 Теги для предыдущих версий

```
git checkout v1^
```
```
cat hello.html
```

03 Переключение по имени тега

```
git checkout v1
```
```
git checkout v1-beta
```

04 Просмотр тегов с помощью команды `tag`

```
git tag
```

```
git log main —all
```

```
glkru@a7211-15 MINGW64 ~/work ((v1-beta))
$ git tag
v1
v1-beta

glkru@a7211-15 MINGW64 ~/work ((v1-beta))
$ git log main --all
77f7d7f 2025-07-07 | priv (tag: v1, main) [Gleb]
725aace 2025-07-07 | Added standard HTML page tags (HEAD, tag: v1-beta) [Gleb]
d78a839 2025-07-07 | Added privetik tag [Gleb]
65307bd 2025-07-07 | Unrelated change to c [Gleb]
5d01b13 2025-07-07 | Changes for a and b [Gleb]
6eefb72 2025-07-07 | Changes for a and b [Gleb]
e8eae23 2025-07-07 | Initial Commit [Gleb]

glkru@a7211-15 MINGW64 ~/work ((v1-beta))
$ git checkout v1
Previous HEAD position was 725aace Added standard HTML page tags
HEAD is now at 77f7d7f priv

glkru@a7211-15 MINGW64 ~/work ((v1))
$
```

12. Отмена локальных изменений (до индексации)

01 Переключитесь на ветку `main`

```
git switch main
```

02 Измените `hello.html`

03 Проверьте состояние

```
git status
```

Отмена изменений в рабочем каталоге

```
git restore hello.html
git status
cat hello.html
```

```
glkru@a7211-15 MINGW64 ~/work ((v1))
$ git switch main
Switched to branch 'main'

glkru@a7211-15 MINGW64 ~/work (main)
$ git status
On branch 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:   hello.html

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

glkru@a7211-15 MINGW64 ~/work (main)
$ git restore hello.html
git status
cat hello.html
On branch main
nothing to commit, working tree clean
Hello, World
glkru@a7211-15 MINGW64 ~/work (main)
$ |
```

13. Отмена проиндексированных изменений (перед коммитом)

01 Измените файл и проиндексируйте изменения
```
git add hello.html
```

02 Проверьте состояние
```
git status
```

03 Восстановление индекса
```
git restore --staged hello.html
```

04 Восстановление рабочего каталога
```
git restore hello.html
git status
```

```
Hello, World
glkru@a7211-15 MINGW64 ~/work (main)
$ git add hello.html

glkru@a7211-15 MINGW64 ~/work (main)
$ git status
On branch main
Changes to be committed:
  (use "git restore --staged <file>..." to unstage)
        modified:   hello.html

glkru@a7211-15 MINGW64 ~/work (main)
$ git restore --staged hello.html

glkru@a7211-15 MINGW64 ~/work (main)
$ git restore hello.html
git status
On branch main
nothing to commit, working tree clean

glkru@a7211-15 MINGW64 ~/work (main)
$ |
```

14. Отмена коммитов

01 Отмена коммитов

02 Измените файл и сделайте коммит
```
git add hello.html
git commit -m "Oops, we didn't want this commit"
```

03 Сделайте коммит с новыми изменениями, отменяющими предыдущие

```
git revert HEAD
```

04 Проверьте лог

```
git log
```

```
jlkru@a7211-15 MINGW64 ~/work (main)
$ git add hello.html
git commit -m "Oops, we didn't want this commit"
[main 9c5a5a6] Oops, we didn't want this commit
 1 file changed, 8 insertions(+), 1 deletion(-)

jlkru@a7211-15 MINGW64 ~/work (main)
$ git revert HEAD
[main c5e01a8] Revert "Oops, we didn't want this commit"
 1 file changed, 1 insertion(+), 8 deletions(-)

jlkru@a7211-15 MINGW64 ~/work (main)
$ git log
c5e01a8 2025-07-07 | Revert "Oops, we didn't want this commit" (HEAD -> main) [Gleb]
9c5a5a6 2025-07-07 | Oops, we didn't want this commit [Gleb]
77f7d7f 2025-07-07 | priv (tag: v1) [Gleb]
725aace 2025-07-07 | Added standard HTML page tags (tag: v1-beta) [Gleb]
d78a839 2025-07-07 | Added privetik tag [Gleb]
55307bd 2025-07-07 | Unrelated change to c [Gleb]
5d01b13 2025-07-07 | Changes for a and b [Gleb]
5eefb72 2025-07-07 | Changes for a and b [Gleb]
e8eae23 2025-07-07 | Initial Commit [Gleb]
```

15. Удаление коммитов из ветки

01 Команда `reset`

02 Проверьте нашу историю

```
git log
```

03 Для начала отметьте эту ветку

```
git tag oops
```

04 Сброс к коммиту, предшествующему `oops`

```
git reset --hard v1
git log
```

`git log —all`

```
glkru@a7211-15 MINGW64 ~/work (main)
$
git log
c5e01a8 2025-07-07 | Revert "Oops, we didn't want this commit" (HEAD -> main) [G
leb]
9c5a5a6 2025-07-07 | Oops, we didn't want this commit [Gleb]
77f7d7f 2025-07-07 | priv (tag: v1) [Gleb]
725aace 2025-07-07 | Added standard HTML page tags (tag: v1-beta) [Gleb]
d78a839 2025-07-07 | Added privetik tag [Gleb]
65307bd 2025-07-07 | Unrelated change to c [Gleb]
5d01b13 2025-07-07 | Changes for a and b [Gleb]
6eefb72 2025-07-07 | Changes for a and b [Gleb]
e8eae23 2025-07-07 | Initial Commit [Gleb]

glkru@a7211-15 MINGW64 ~/work (main)
$ git tag oops

glkru@a7211-15 MINGW64 ~/work (main)
$ git reset --hard v1
git log
HEAD is now at 77f7d7f priv
77f7d7f 2025-07-07 | priv (HEAD -> main, tag: v1) [Gleb]
725aace 2025-07-07 | Added standard HTML page tags (tag: v1-beta) [Gleb]
d78a839 2025-07-07 | Added privetik tag [Gleb]
65307bd 2025-07-07 | Unrelated change to c [Gleb]
5d01b13 2025-07-07 | Changes for a and b [Gleb]
6eefb72 2025-07-07 | Changes for a and b [Gleb]
e8eae23 2025-07-07 | Initial Commit [Gleb]

glkru@a7211-15 MINGW64 ~/work (main)
$ ~git log --all
bash: ~git: command not found

glkru@a7211-15 MINGW64 ~/work (main)
$ git log --all
c5e01a8 2025-07-07 | Revert "Oops, we didn't want this commit" (tag: oops) [Gleb]
9c5a5a6 2025-07-07 | Oops, we didn't want this commit [Gleb]
77f7d7f 2025-07-07 | priv (HEAD -> main, tag: v1) [Gleb]
725aace 2025-07-07 | Added standard HTML page tags (tag: v1-beta) [Gleb]
d78a839 2025-07-07 | Added privetik tag [Gleb]
65307bd 2025-07-07 | Unrelated change to c [Gleb]
5d01b13 2025-07-07 | Changes for a and b [Gleb]
6eefb72 2025-07-07 | Changes for a and b [Gleb]
e8eae23 2025-07-07 | Initial Commit [Gleb]

glkru@a7211-15 MINGW64 ~/work (main)
$ |
```

16. Удаление тега `oops`

```
glkru@a7211-15 MINGW64 ~/work (main)
$ git tag -d oops
git log --all
Deleted tag 'oops' (was c5e01a8)
77f7d7f 2025-07-07 | priv (HEAD -> main, tag: v1) [Gleb]
725aace 2025-07-07 | Added standard HTML page tags (tag: v1-beta) [Gleb]
d78a839 2025-07-07 | Added privetik tag [Gleb]
65307bd 2025-07-07 | Unrelated change to c [Gleb]
5d01b13 2025-07-07 | Changes for a and b [Gleb]
6eefb72 2025-07-07 | Changes for a and b [Gleb]
e8eae23 2025-07-07 | Initial Commit [Gleb]

glkru@a7211-15 MINGW64 ~/work (main)
$ |
```

17. Внесение изменений в коммиты

01 Измените страницу, а затем сделайте коммит

```html
<!-- Author: Alexander Shvets -->
<html>
   <head>
   </head>
   <body>
      <h1>Hello, World!</h1>
   </body>
</html>
```

```
git add hello.html
git commit -m "Added copyright statement"
git log
```

02 Ой... необходим email

```html
<!-- Author: Alexander Shvets (alex@githowto.com) -->
<html>
   <head>
   </head>
   <body>
      <h1>Hello, World!</h1>
   </body>
</html>
```

Измените предыдущий коммит

```
git add hello.html
git commit --amend -m "Added copyright statement with email"
```

*04*Просмотр истории

```
git log
```

```
glkru@a7211-15 MINGW64 ~/work (main)
$ git add hello.html
git commit -m "Added copyright statement"
git log
[main c1033bc] Added copyright statement
 1 file changed, 8 insertions(+), 1 deletion(-)
c1033bc 2025-07-08 | Added copyright statement (HEAD -> main) [Gleb]
77f7d7f 2025-07-07 | priv (tag: v1) [Gleb]
725aace 2025-07-07 | Added standard HTML page tags (tag: v1-beta) [Gleb]
d78a839 2025-07-07 | Added privetik tag [Gleb]
65307bd 2025-07-07 | Unrelated change to c [Gleb]
5d01b13 2025-07-07 | Changes for a and b [Gleb]
6eefb72 2025-07-07 | Changes for a and b [Gleb]
e8eae23 2025-07-07 | Initial Commit [Gleb]

glkru@a7211-15 MINGW64 ~/work (main)
$ git add hello.html
git commit --amend -m "Added copyright statement with email"
[main b8f1f2c] Added copyright statement with email
 Date: Tue Jul 8 11:01:12 2025 +0300
 1 file changed, 8 insertions(+), 1 deletion(-)

glkru@a7211-15 MINGW64 ~/work (main)
$ git log
b8f1f2c 2025-07-08 | Added copyright statement with email (HEAD -> main) [Gleb]
77f7d7f 2025-07-07 | priv (tag: v1) [Gleb]
725aace 2025-07-07 | Added standard HTML page tags (tag: v1-beta) [Gleb]
d78a839 2025-07-07 | Added privetik tag [Gleb]
65307bd 2025-07-07 | Unrelated change to c [Gleb]
5d01b13 2025-07-07 | Changes for a and b [Gleb]
6eefb72 2025-07-07 | Changes for a and b [Gleb]
e8eae23 2025-07-07 | Initial Commit [Gleb]
```

18. Создание ветки

*01*Создайте ветку

```
git switch -c style
git status
```

*02*Добавьте файл стилей `style.css`

```
touch style.css
h1 {
    color: red;
}
```

```
git add style.css
git commit -m "Added css stylesheet"
```

03 Измените `hello.html`, чтобы он использовал `style.css`.

Файл: hello.html
```
<!-- Author: Alexander Shvets (alex@githowto.com) -->
<html>
  <head>
    <link type="text/css" rel="stylesheet" media="all" href="style.css" />
  </head>
  <body>
    <h1>Hello, World!</h1>
  </body>
</html>
```
Выполните
```
git add hello.html
git commit -m "Included stylesheet into hello.html"
```

```
glkru@a7211-15 MINGW64 ~/work (main)
$ git switch -c style
git status
Switched to a new branch 'style'
On branch style
nothing to commit, working tree clean

glkru@a7211-15 MINGW64 ~/work (style)
$ touch style.css

glkru@a7211-15 MINGW64 ~/work (style)
$ git add style.css
git commit -m "Added css stylesheet"
[style 3142196] Added css stylesheet
 1 file changed, 3 insertions(+)
 create mode 100644 style.css

glkru@a7211-15 MINGW64 ~/work (style)
$ nano hello.html

glkru@a7211-15 MINGW64 ~/work (style)
$ git add hello.html
git commit -m "Included stylesheet into hello.html"
[style 4da78f1] Included stylesheet into hello.html
 1 file changed, 2 insertions(+), 1 deletion(-)
```

19. Переключение веток

Выполните
```
git log —all
```

01 Переключение на ветку `main`

Выполните
```
git switch main
cat hello.html
```


02 Вернемся к ветке `style`

Выполните
```
git switch style
cat hello.html
```

```
glkru@a7211-15 MINGW64 ~/work (style)
$ git switch main
cat hello.html
Switched to branch 'main'
<!-- Author: Alexander Shvets (alex@githowto.com) -->
<html>
  <head>
  </head>
  <body>
    <h1>Hello, World!</h1>
  </body>
</html>
glkru@a7211-15 MINGW64 ~/work (main)
$ git switch style
cat hello.html
Switched to branch 'style'
<!-- Author: Alexander Shvets (alex@githowto.com) -->
<html>
  <head>
    <link type="text/css" rel="stylesheet" media="all" href="style.css" />
  </head>
  <body>
    <h1>Hello, World!</h1>
  </body>
</html>
```

20. Перемещение файлов

01 Просмотр истории изменений в конкретном файле

```
git log hello.html
git log style.css
```

02 Просмотр различий для конкретного файла

```
git show v
```

03 Переименуйте файл `hello.html`

```
mv hello.html index.html
git status
```
```
git add .
git status
```

04 Переместите `style.css` безопасным способом
```
mkdir css
git mv style.css css/style.css
git status
```

```
git commit -m "Renamed hello.html; moved style.css"
git log css/style.css
git log --follow css/style.css
```

21. Изменения в ветке `main`

01 Создайте файл `README`

```
This is the Hello World example from the GitHowTo tutorial.
```

Выполните
```
git switch main
git add README
git commit -m "Added README"
```

```
glkru@a7211-15 MINGW64 ~/work (style)
$ git switch main
Switched to branch 'main'

glkru@a7211-15 MINGW64 ~/work (main)
$ touch README.md

glkru@a7211-15 MINGW64 ~/work (main)
$ git switch main
git add README
git commit -m "Added README"
Already on 'main'
fatal: pathspec 'README' did not match any files
On branch main
Untracked files:
  (use "git add <file>..." to include in what will be committed)
        README.md

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

glkru@a7211-15 MINGW64 ~/work (main)
$ git add README.md

glkru@a7211-15 MINGW64 ~/work (main)
$ git commit -m "Added README"
[main 872742c] Added README
 1 file changed, 1 insertion(+)
 create mode 100644 README.md
```

22. Просмотр отличающихся веток

01 Просмотрите текущие ветки

Выполните
```
git log --all --graph
```

```
glkru@a7211-15 MINGW64 ~/work (main)
$ git log --all --graph
* 872742c 2025-07-08 | Added README (HEAD -> main) [Gleb]
| * 63224c0 2025-07-08 | Renamed hello.html; moved style.css (style) [Gleb]
| * 4da78f1 2025-07-08 | Included stylesheet into hello.html [Gleb]
| * 3142196 2025-07-08 | Added css stylesheet [Gleb]
|/
* b8f1f2c 2025-07-08 | Added copyright statement with email [Gleb]
* 77f7d7f 2025-07-07 | priv (tag: v1) [Gleb]
* 725aace 2025-07-07 | Added standard HTML page tags (tag: v1-beta) [Gleb]
* d78a839 2025-07-07 | Added privetik tag [Gleb]
* 65307bd 2025-07-07 | Unrelated change to c [Gleb]
* 5d01b13 2025-07-07 | Changes for a and b [Gleb]
* 6eefb72 2025-07-07 | Changes for a and b [Gleb]
* e8eae23 2025-07-07 | Initial Commit [Gleb]
```

23. Слияние

Слияние веток

```
git switch style
git merge main
git log --all --graph
```

```
glkru@a7211-15 MINGW64 ~/work (main)
$ git switch style
git merge main
git log --all --graph
Switched to branch 'style'
Merge made by the 'ort' strategy.
 README.md | 1 +
 1 file changed, 1 insertion(+)
 create mode 100644 README.md
*   8733f95 2025-07-08 | Merge branch 'main' into style (HEAD -> style) [Gleb]
|\
| * 872742c 2025-07-08 | Added README (main) [Gleb]
* | 63224c0 2025-07-08 | Renamed hello.html; moved style.css [Gleb]
* | 4da78f1 2025-07-08 | Included stylesheet into hello.html [Gleb]
* | 3142196 2025-07-08 | Added css stylesheet [Gleb]
|/
* b8f1f2c 2025-07-08 | Added copyright statement with email [Gleb]
* 77f7d7f 2025-07-07 | priv (tag: v1) [Gleb]
* 725aace 2025-07-07 | Added standard HTML page tags (tag: v1-beta) [Gleb]
* d78a839 2025-07-07 | Added privetik tag [Gleb]
* 65307bd 2025-07-07 | Unrelated change to c [Gleb]
* 5d01b13 2025-07-07 | Changes for a and b [Gleb]
* 6eefb72 2025-07-07 | Changes for a and b [Gleb]
* e8eae23 2025-07-07 | Initial Commit [Gleb]
```

24. Создание конфликта

Вернитесь в `main` и создайте конфликт

```
git switch main
```

Файл: hello.html

```html
<!-- Author: Alexander Shvets (alex@githowto.com) -->
<html>
  <head>
    <title>Hello World Page</title>
  </head>
  <body>
    <h1>Hello, World!</h1>
    <p>Let's learn Git together.</p>
  </body>
</html>
```

```
git add hello.html
git commit -m "Added meta title"
```

02 Просмотр веток

```
git log --all —graph
```

```
glkru@a7211-15 MINGW64 ~/work (style)
$ git switch main
Switched to branch 'main'

glkru@a7211-15 MINGW64 ~/work (main)
$ nano hello.html

glkru@a7211-15 MINGW64 ~/work (main)
$ git add hello.html
git commit -m "Added meta title"
[main cb3a359] Added meta title
 1 file changed, 3 insertions(+), 1 deletion(-)

glkru@a7211-15 MINGW64 ~/work (main)
$ git log --all --graph
* cb3a359 2025-07-08 | Added meta title (HEAD -> main) [Gleb]
| *   8733f95 2025-07-08 | Merge branch 'main' into style (style) [Gleb]
| |\
| |/
|/|
* | 872742c 2025-07-08 | Added README [Gleb]
| * 63224c0 2025-07-08 | Renamed hello.html; moved style.css [Gleb]
| * 4da78f1 2025-07-08 | Included stylesheet into hello.html [Gleb]
| * 3142196 2025-07-08 | Added css stylesheet [Gleb]
|/
* b8f1f2c 2025-07-08 | Added copyright statement with email [Gleb]
* 77f7d7f 2025-07-07 | priv (tag: v1) [Gleb]
* 725aace 2025-07-07 | Added standard HTML page tags (tag: v1-beta) [Gleb]
* d78a839 2025-07-07 | Added privetik tag [Gleb]
* 65307bd 2025-07-07 | Unrelated change to c [Gleb]
* 5d01b13 2025-07-07 | Changes for a and b [Gleb]
* 6eefb72 2025-07-07 | Changes for a and b [Gleb]
* e8eae23 2025-07-07 | Initial Commit [Gleb]
```

25. Разрешение конфликтов

01 Слияние `main` в ветку `style`

```
git switch style
git merge main
```
```
git status
```

```
Файл: index.html
<!-- Author: Alexander Shvets (alex@githowto.com) -->
<html>
  <head>
<<<<<<< HEAD:index.html
    <link type="text/css" rel="stylesheet" media="all" href="style.css" />
=======
    <title>Hello World Page</title>
>>>>>>> main:hello.html
  </head>
  <body>
    <h1>Hello, World!</h1>
    <p>Let's learn Git together.</p>
  </body>
</html>
```

02 Отмена слияния

Выполните
```
git merge –abort
git status
```

03 Решение конфликта

Выполните
```
git merge main
```
Файл: index.html
```
<!-- Author: Alexander Shvets (alex@githowto.com) -->
<html>
  <head>
    <title>Hello World Page</title>
    <link type="text/css" rel="stylesheet" media="all" href="style.css" />
  </head>
  <body>
    <h1>Hello, World!</h1>
    <p>Let's learn Git together.</p>
  </body>
</html>
```

04 Закоммитьте разрешенный конфликт

Выполните
git add index.html
git commit -m "Resolved merge conflict"
git status
git log --all --graph

```
glkru@a7211-15 MINGW64 ~/work (main)
$ git switch style
git merge main
Switched to branch 'style'
Auto-merging index.html
CONFLICT (content): Merge conflict in index.html
Automatic merge failed; fix conflicts and then commit the result.

glkru@a7211-15 MINGW64 ~/work (style|MERGING)
$ git status
On branch style
You have unmerged paths.
  (fix conflicts and run "git commit")
  (use "git merge --abort" to abort the merge)

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

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

glkru@a7211-15 MINGW64 ~/work (style|MERGING)
$ git merge --abort
git status
On branch style
nothing to commit, working tree clean

glkru@a7211-15 MINGW64 ~/work (style)
$ git merge main
Auto-merging index.html
CONFLICT (content): Merge conflict in index.html
Automatic merge failed; fix conflicts and then commit the result.

glkru@a7211-15 MINGW64 ~/work (style|MERGING)
$ nano index.html

glkru@a7211-15 MINGW64 ~/work (style|MERGING)
$ git add index.html
git commit -m "Resolved merge conflict"
git status
git log --all --graph
[style 8af9bb7] Resolved merge conflict
On branch style
nothing to commit, working tree clean
*   8af9bb7 2025-07-08 | Resolved merge conflict (HEAD -> style) [Gleb]
|\
| * cb3a359 2025-07-08 | Added meta title (main) [Gleb]
* | 8733f95 2025-07-08 | Merge branch 'main' into style [Gleb]
|\|
| * 872742c 2025-07-08 | Added README [Gleb]
* | 63224c0 2025-07-08 | Renamed hello.html; moved style.css [Gleb]
* | 4da78f1 2025-07-08 | Included stylesheet into hello.html [Gleb]
* | 3142196 2025-07-08 | Added css stylesheet [Gleb]
|/
* b8f1f2c 2025-07-08 | Added copyright statement with email [Gleb]
* 77f7d7f 2025-07-07 | priv (tag: v1) [Gleb]
* 725aace 2025-07-07 | Added standard HTML page tags (tag: v1-beta) [Gleb]
* d78a839 2025-07-07 | Added privetik tag [Gleb]
* 65307bd 2025-07-07 | Unrelated change to c [Gleb]
* 5d01b13 2025-07-07 | Changes for a and b [Gleb]
* 6eefb72 2025-07-07 | Changes for a and b [Gleb]
* e8eae23 2025-07-07 | Initial Commit [Gleb]
```

26. `rebase` против `merge`

27. Сброс ветки `style`

01 Сбросьте ветку `style`

Выполните
```
git switch style
git log –graph
```
Выполните
```
git reset --hard HEAD~2
```

02 Проверьте ветку

Выполните
```
git log --graph
```

```
glkru@a7211-15 MINGW64 ~/work (style)
$ git switch style
git log --graph
Already on 'style'
*   8af9bb7 2025-07-08 | Resolved merge conflict (HEAD -> style) [Gleb]
|\
| * cb3a359 2025-07-08 | Added meta title (main) [Gleb]
* | 8733f95 2025-07-08 | Merge branch 'main' into style [Gleb]
|\|
| * 872742c 2025-07-08 | Added README [Gleb]
* | 63224c0 2025-07-08 | Renamed hello.html; moved style.css [Gleb]
* | 4da78f1 2025-07-08 | Included stylesheet into hello.html [Gleb]
* | 3142196 2025-07-08 | Added css stylesheet [Gleb]
|/
* b8f1f2c 2025-07-08 | Added copyright statement with email [Gleb]
* 77f7d7f 2025-07-07 | priv (tag: v1) [Gleb]
* 725aace 2025-07-07 | Added standard HTML page tags (tag: v1-beta) [Gleb]
* d78a839 2025-07-07 | Added privetik tag [Gleb]
* 65307bd 2025-07-07 | Unrelated change to c [Gleb]
* 5d01b13 2025-07-07 | Changes for a and b [Gleb]
* 6eefb72 2025-07-07 | Changes for a and b [Gleb]
* e8eae23 2025-07-07 | Initial Commit [Gleb]

glkru@a7211-15 MINGW64 ~/work (style)
$ git reset --hard HEAD~2
HEAD is now at 63224c0 Renamed hello.html; moved style.css

glkru@a7211-15 MINGW64 ~/work (style)
$ git log --graph
* 63224c0 2025-07-08 | Renamed hello.html; moved style.css (HEAD -> style) [Gleb]
* 4da78f1 2025-07-08 | Included stylesheet into hello.html [Gleb]
* 3142196 2025-07-08 | Added css stylesheet [Gleb]
* b8f1f2c 2025-07-08 | Added copyright statement with email [Gleb]
* 77f7d7f 2025-07-07 | priv (tag: v1) [Gleb]
* 725aace 2025-07-07 | Added standard HTML page tags (tag: v1-beta) [Gleb]
* d78a839 2025-07-07 | Added privetik tag [Gleb]
* 65307bd 2025-07-07 | Unrelated change to c [Gleb]
* 5d01b13 2025-07-07 | Changes for a and b [Gleb]
* 6eefb72 2025-07-07 | Changes for a and b [Gleb]
* e8eae23 2025-07-07 | Initial Commit [Gleb]
```

28. Перебазирование

01 Перебазируем ветку `style` на ветку `main`

Выполните
```
git switch style
git rebase main
git status
```

Разрешение конфликта

Файл: hello.html

```html
<!-- Author: Alexander Shvets (alex@githowto.com) -->
<html>
  <head>
    <title>Hello World Page</title>
    <link type="text/css" rel="stylesheet" media="all" href="style.css" />
  </head>
  <body>
    <h1>Hello, World!</h1>
    <p>Let's learn Git together.</p>
  </body>
</html>
```

```
git add .
git rebase –continue
```

Выполните
```
git status
git log --all --graph
```

03 Слияние VS перебазирование

Конечный результат перебазирования очень похож на результат слияния.

Ветка `style` в настоящее время содержит все свои изменения, а также все изменения ветки `main`. Однако, дерево коммитов значительно отличается.

Дерево коммитов ветки `style` было переписано таким образом, что ветка `main` является частью истории коммитов. Это делает цепь коммитов линейной и гораздо более читабельной.

04 Когда использовать команду **rebase**, а когда команду **merge**?

1. Используйте команду `rebase`:

   a. Когда вы получаете изменения из удаленного репозитория и хотите применить их к своей локальной ветке.

   b. Если вы хотите, чтобы история коммитов была линейной и легко читаемой.

2. Не используйте команду `rebase`:

   a. Если текущая ветка является публичной и общей. Переписывание таких веток будет мешать работе других членов команды.

   b. Если важна *точная* история ветки коммитов (поскольку команда `rebase` переписывает историю коммитов).

```
glkru@a7211-15 MINGW64 ~/work (style)
$ git switch style
git rebase main
git status
Already on 'style'
Auto-merging hello.html
CONFLICT (content): Merge conflict in hello.html
error: could not apply 4da78f1... Included stylesheet into hello.html
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 --ab
hint: Disable this message with "git config advice.mergeConflict false"
Could not apply 4da78f1... Included stylesheet into hello.html
interactive rebase in progress; onto cb3a359
Last commands done (2 commands done):
   pick 3142196 Added css stylesheet
   pick 4da78f1 Included stylesheet into hello.html
Next command to do (1 remaining command):
   pick 63224c0 Renamed hello.html; moved style.css
  (use "git rebase --edit-todo" to view and edit)
You are currently rebasing branch 'style' on 'cb3a359'.
  (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:   hello.html

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

glkru@a7211-15 MINGW64 ~/work (style|REBASE 2/3)
$ nano hello.html

glkru@a7211-15 MINGW64 ~/work (style|REBASE 2/3)
$ git add .
git rebase --continue
[detached HEAD 8643d0b] Included stylesheet into hello.html
 1 file changed, 1 insertion(+)
Successfully rebased and updated refs/heads/style.

glkru@a7211-15 MINGW64 ~/work (style)
$ git status
git log --all --graph
On branch style
nothing to commit, working tree clean
* fd4de17 2025-07-08 | Renamed hello.html; moved style.css (HEAD -> style) [Gleb]
* 8643d0b 2025-07-08 | Included stylesheet into hello.html [Gleb]
* dbe2956 2025-07-08 | Added css stylesheet [Gleb]
* cb3a359 2025-07-08 | Added meta title (main) [Gleb]
* 872742c 2025-07-08 | Added README [Gleb]
* b8f1f2c 2025-07-08 | Added copyright statement with email [Gleb]
* 77f7d7f 2025-07-07 | priv (tag: v1) [Gleb]
* 725aace 2025-07-07 | Added standard HTML page tags (tag: v1-beta) [Gleb]
* d78a839 2025-07-07 | Added privetik tag [Gleb]
* 65307bd 2025-07-07 | Unrelated change to c [Gleb]
* 5d01b13 2025-07-07 | Changes for a and b [Gleb]
* 6eefb72 2025-07-07 | Changes for a and b [Gleb]
* e8eae23 2025-07-07 | Initial Commit [Gleb]
```

29. Слияние в ветку main

Выполните

```
git switch main
git merge style
```

02 Просмотрите логи

Выполните

```
git log --all --graph
```

```
glkru@a7211-15 MINGW64 ~/work (style)
$ git switch main
git merge style
Switched to branch 'main'
Updating cb3a359..fd4de17
Fast-forward
 css/style.css           | 3 +++
 hello.html => index.html | 1 +
 2 files changed, 4 insertions(+)
 create mode 100644 css/style.css
 rename hello.html => index.html (73%)

glkru@a7211-15 MINGW64 ~/work (main)
$ git log --all --graph
* fd4de17 2025-07-08 | Renamed hello.html; moved style.css (HEAD -> main, style) [Gleb]
* 8643d0b 2025-07-08 | Included stylesheet into hello.html [Gleb]
* dbe2956 2025-07-08 | Added css stylesheet [Gleb]
* cb3a359 2025-07-08 | Added meta title [Gleb]
* 872742c 2025-07-08 | Added README [Gleb]
* b8f1f2c 2025-07-08 | Added copyright statement with email [Gleb]
* 77f7d7f 2025-07-07 | priv (tag: v1) [Gleb]
* 725aace 2025-07-07 | Added standard HTML page tags (tag: v1-beta) [Gleb]
* d78a839 2025-07-07 | Added privetik tag [Gleb]
* 65307bd 2025-07-07 | Unrelated change to c [Gleb]
* 5d01b13 2025-07-07 | Changes for a and b [Gleb]
* 6eefb72 2025-07-07 | Changes for a and b [Gleb]
* e8eae23 2025-07-07 | Initial Commit [Gleb]
```

Часть II: Несколько репозиториев

30. Клонирование репозиториев

01 Перейдите в директорию `repositories`

Выполните

```
cd ..
pwd
ls
```

02 Создайте клон репозитория `work`

Выполните

```
git clone work home
ls
```

```
glkru@a7211-15 MINGW64 ~
$ mkdir repositories

glkru@a7211-15 MINGW64 ~
$ mv work repositories

glkru@a7211-15 MINGW64 ~
$ cd repositories

glkru@a7211-15 MINGW64 ~/repositories
$ git clone work home
ls
Cloning into 'home'...
done.
home/  work/
```

31. Просмотр клонированного репозитория

01 Посмотрите на клонированный репозиторий

Выполните
`cd home`
`ls`

02 Просмотрите историю репозитория

Выполните
`git log --all`

```
glkru@a7211-15 MINGW64 ~/repositories
$ cd home
ls
README.md  a.html  b.html  c.html  css/  index.html

glkru@a7211-15 MINGW64 ~/repositories/home (main)
$ git log --all
fd4de17 2025-07-08 | Renamed hello.html; moved style.css (HEAD -> main, origin/style, origin/main, origin/HEAD) [Gleb]
8643d0b 2025-07-08 | Included stylesheet into hello.html [Gleb]
dbe2956 2025-07-08 | Added css stylesheet [Gleb]
cb3a359 2025-07-08 | Added meta title [Gleb]
872742c 2025-07-08 | Added README [Gleb]
b8f1f2c 2025-07-08 | Added copyright statement with email [Gleb]
77f7d7f 2025-07-07 | priv (tag: v1) [Gleb]
725aace 2025-07-07 | Added standard HTML page tags (tag: v1-beta) [Gleb]
d78a839 2025-07-07 | Added privetik tag [Gleb]
65307bd 2025-07-07 | Unrelated change to c [Gleb]
5d01b13 2025-07-07 | Changes for a and b [Gleb]
6eefb72 2025-07-07 | Changes for a and b [Gleb]
e8eae23 2025-07-07 | Initial Commit [Gleb]
```

32. Что такое origin?

Выполните
`git`
`remote`

Выполните
`git remote show origin`

```
glkru@a7211-15 MINGW64 ~/repositories/home (main)
$ git remote
origin

glkru@a7211-15 MINGW64 ~/repositories/home (main)
$ git remote show origin
* remote origin
  Fetch URL: C:/Users/glkru/repositories/work
  Push  URL: C:/Users/glkru/repositories/work
  HEAD branch: main
  Remote branches:
    main  tracked
    style tracked
  Local branch configured for 'git pull':
    main merges with remote main
  Local ref configured for 'git push':
    main pushes to main (up to date)
```

33. Удаленные ветки

Выполните
`git branch`

Выполните
git branch -a

```
glkru@a7211-15 MINGW64 ~/repositories/home (main)
$ git branch
* main

glkru@a7211-15 MINGW64 ~/repositories/home (main)
$ git branch -a
* main
  remotes/origin/HEAD -> origin/main
  remotes/origin/main
  remotes/origin/style
```

34. Изменение оригинального репозитория

01 Внесите изменения в оригинальный репозиторий work

Выполните
cd ../work

Файл: README
This is the Hello World example from the Git tutorial.
(changed in origin)

Выполните
git add README
git commit -m "Changed README in original repo"

```
glkru@a7211-15 MINGW64 ~/repositories/home (main)
$ cd ../work

glkru@a7211-15 MINGW64 ~/repositories/work (main)
$ nano README

glkru@a7211-15 MINGW64 ~/repositories/work (main)
$ nano README.md

glkru@a7211-15 MINGW64 ~/repositories/work (main)
$ git add README
git commit -m "Changed README in original repo"
fatal: pathspec 'README' did not match any files
On branch 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:   README.md

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

glkru@a7211-15 MINGW64 ~/repositories/work (main)
$ git add README.md
warning: in the working copy of 'README.md', LF will be replaced by CRLF the next time Git touches it

glkru@a7211-15 MINGW64 ~/repositories/work (main)
$ git commit -m "Changed README in original repo"
[main 6bdf3cf] Changed README in original repo
 1 file changed, 2 insertions(+), 1 deletion(-)
```

35. Подтягивание изменений

Выполните

```
cd ../home
git fetch
git log --all
```

01 Проверьте README

Выполните

```
cat README
```

```
$ cd ../home
git fetch
git log --all
remote: Enumerating objects: 5, done.
remote: Counting objects: 100% (5/5), done.
remote: Compressing objects: 100% (3/3), done.
remote: Total 3 (delta 1), reused 0 (delta 0), pack-reused 0 (from 0)
Unpacking objects: 100% (3/3), 341 bytes | 16.00 KiB/s, done.
From C:/Users/glkru/repositories/work
   fd4de17..6bdf3cf  main        -> origin/main
6bdf3cf 2025-07-08 | Changed README in original repo (origin/main, origin/HEAD) [Gleb]
fd4de17 2025-07-08 | Renamed hello.html; moved style.css (HEAD -> main, origin/style) [Gleb]
8643d0b 2025-07-08 | Included stylesheet into hello.html [Gleb]
dbe2956 2025-07-08 | Added css stylesheet [Gleb]
cb3a359 2025-07-08 | Added meta title [Gleb]
872742c 2025-07-08 | Added README [Gleb]
b8f1f2c 2025-07-08 | Added copyright statement with email [Gleb]
77f7d7f 2025-07-07 | priv (tag: v1) [Gleb]
725aace 2025-07-07 | Added standard HTML page tags (tag: v1-beta) [Gleb]
d78a839 2025-07-07 | Added privetik tag [Gleb]
65307bd 2025-07-07 | Unrelated change to c [Gleb]
5d01b13 2025-07-07 | Changes for a and b [Gleb]
6eefb72 2025-07-07 | Changes for a and b [Gleb]
e8eae23 2025-07-07 | Initial Commit [Gleb]

glkru@a7211-15 MINGW64 ~/repositories/home (main)
$ cat README
cat: README: No such file or directory

glkru@a7211-15 MINGW64 ~/repositories/home (main)
$ cat README.md
This is the Hello World example from the GitHowTo tutorial.
```

36. Слияние подтянутых изменений

01 Слейте подтянутые изменения в локальную ветку `main`

Выполните

```
git merge origin/main
```

02 Еще раз проверьте файл `README`

Выполните

```
cat README
```

```
glkru@a7211-15 MINGW64 ~/repositories/home (main)
$ git merge origin/main
Updating fd4de17..6bdf3cf
Fast-forward
 README.md | 3 ++-
 1 file changed, 2 insertions(+), 1 deletion(-)

glkru@a7211-15 MINGW64 ~/repositories/home (main)
$ cat README.md
This is the Hello World example from the Git tutorial.
(changed in origin)

glkru@a7211-15 MINGW64 ~/repositories/home (main)
$ git pull
Already up to date.
```

```
git pull
```

37. Добавление ветки наблюдения

01 Добавьте локальную ветку, которая отслеживает удаленную ветку

Выполните
```
git branch --track style origin/style
git branch -a
git log --max-count=2
```

```
glkru@a7211-15 MINGW64 ~/repositories/home (main)
$ git branch --track style origin/style
git branch -a
git log --max-count=2
branch 'style' set up to track 'origin/style'.
* main
  style
  remotes/origin/HEAD -> origin/main
  remotes/origin/main
  remotes/origin/style
6bdf3cf 2025-07-08 | Changed README in original repo (HEAD -> main, origin/main, origin/HEAD) [Gleb]
fd4de17 2025-07-08 | Renamed hello.html; moved style.css (origin/style, style) [Gleb]
```

38. Чистые репозитории

01 Создайте чистый репозиторий

Выполните
```
cd ..
git clone --bare work
work.git
ls work.git
```

```
glkru@a7211-15 MINGW64 ~/repositories/home (main)
$ cd ..
git clone --bare work work.git
ls work.git
Cloning into bare repository 'work.git'...
done.
HEAD  config  description  hooks/  info/  objects/  packed-refs  refs/
```

39. Добавление удаленного репозитория

Выполните
```
cd work
git remote add shared ../work.git
```

```
glkru@a7211-15 MINGW64 ~/repositories
$ cd work
git remote add shared ../work.git
```

40. Отправка изменений

Выполните

git switch main
git add README
git commit -m "Added shared comment to readme"

Выполните

git push shared main

```
glkru@a7211-15 MINGW64 ~/repositories/work (main)
$ git add README.md
warning: in the working copy of 'README.md', LF will be replaced by CRLF the next time Git touches it

glkru@a7211-15 MINGW64 ~/repositories/work (main)
$ git commit -m "Added shared comment to readme"
[main 9d72347] Added shared comment to readme
 1 file changed, 1 insertion(+), 1 deletion(-)

glkru@a7211-15 MINGW64 ~/repositories/work (main)
$ git push shared main
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 8 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 369 bytes | 369.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0), pack-reused 0 (from 0)
To ../work.git
   6bdf3cf..9d72347  main -> main

glkru@a7211-15 MINGW64 ~/repositories/work (main)
$ |
```

41. Подтягивание общих изменений

Выполните

cd ../home

Выполните

git remote add shared
../work.git
git branch --track shared
main
git pull shared main
cat README

```
glkru@a7211-15 MINGW64 ~/repositories/work (main)
$ cd ../home

glkru@a7211-15 MINGW64 ~/repositories/home (main)
$ git remote add shared ../work.git
git branch --track shared main
git pull shared main
cat README
branch 'shared' set up to track 'main'.
remote: Enumerating objects: 5, done.
remote: Counting objects: 100% (5/5), done.
remote: Compressing objects: 100% (3/3), done.
remote: Total 3 (delta 1), reused 0 (delta 0), pack-reused 0 (from 0)
Unpacking objects: 100% (3/3), 349 bytes | 13.00 KiB/s, done.
From ../work
 * branch            main        -> FETCH_HEAD
 * [new branch]      main        -> shared/main
Updating 6bdf3cf..9d72347
Fast-forward
 README.md | 2 +-
 1 file changed, 1 insertion(+), 1 deletion(-)
cat: README: No such file or directory

glkru@a7211-15 MINGW64 ~/repositories/home (main)
$

glkru@a7211-15 MINGW64 ~/repositories/home (main)
$ cat README.md
This is the Hello World example from the Git tutorial.
(changed in the origin and pushed to shared)
```