

Міністерство освіти та науки України  
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## **Лабораторна робота №1**

з дисципліни “Технології програмування для комп'ютерних систем – 3”

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**Мета:** ознайомитися з основними командами Git.

## Послідовність виконання роботи

### 1. Клонування репозиторію:

```
Anna@ANNA MINGW64 /d/Study/Semester 10
$ git clone https://github.com/SergiiPiatakov/calculator.git
Cloning into 'calculator'...
remote: Enumerating objects: 24, done.
remote: Total 24 (delta 0), reused 0 (delta 0), pack-reused 24
Unpacking objects: 100% (24/24), 2.71 KiB | 35.00 KiB/s, done.
```

### 2. Зміна місцями комітів: "fix truncation error" та "formatting: use tabs instead of spaces" – за допомогою команди `rebase -i HEAD~2`.

```
pick 4ad40a3 fix truncation error
pick cbc06d formatting: use tabs instead of spaces
```

```
Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master)
$ git rebase -i HEAD~2
error: could not apply 4ad40a3... fix truncation error
Resolve all conflicts manually, mark them as resolved with
"git add/rm <conflicted_files>", then run "git rebase --continue".
You can instead skip this commit: run "git rebase --skip".
To abort and get back to the state before "git rebase", run "git rebase --abort".
Could not apply 4ad40a3... fix truncation error
Auto-merging calculator.cpp
CONFLICT (content): Merge conflict in calculator.cpp
```

### 3. Внаслідок зміни комітів місцями виник конфлікт. Необхідно розв'язати його, виправивши конфліктні місця у файлі calculator.cpp.

```
#include "calculator.h"

int Calculator::Add (double a, double b)
{
<<<<<<< HEAD
    return a + b;
=====
    return a + b + 0.5;
>>>>>>> 4ad40a3... fix truncation error
}

int Calculator::Sub (double a, double b)
{
    return Add (a, -b);
}
```

```
#include "calculator.h"

int Calculator::Add (double a, double b)
{
    return a + b + 0.5;
}

int Calculator::Sub (double a, double b)
{
    return Add (a, -b);
}
```

### 4. Після виправлення виконуються команди:

```
$ git add calculator.cpp
$ git rebase --continue
```

```

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master)
$ git rebase -i HEAD~2
error: could not apply 4ad40a3... fix truncation error
Resolve all conflicts manually, mark them as resolved with
"git add/rm <conflicted_files>", then run "git rebase --continue".
You can instead skip this commit: run "git rebase --skip".
To abort and get back to the state before "git rebase", run "git rebase --abort".
Could not apply 4ad40a3... fix truncation error
Auto-merging calculator.cpp
CONFLICT (content): Merge conflict in calculator.cpp

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master|REBASE-i 1/2)
$ vim calculator.cpp

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master|REBASE-i 1/2)
$ git add calculator.cpp

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master|REBASE-i 1/2)
$ git rebase --continue
[detached HEAD dab0294] fix truncation error
Author: Sergii Piatakov <sergii.piatakov@globallogic.com>
1 file changed, 1 insertion(+), 1 deletion(-)
error: could not apply cbc06d... formatting: use tabs instead of spaces
Resolve all conflicts manually, mark them as resolved with
"git add/rm <conflicted_files>", then run "git rebase --continue".
You can instead skip this commit: run "git rebase --skip".
To abort and get back to the state before "git rebase", run "git rebase --abort".
Could not apply cbc06d... formatting: use tabs instead of spaces
Auto-merging calculator.cpp
CONFLICT (content): Merge conflict in calculator.cpp

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master|REBASE-i 2/2)
$ vim calculator.cpp

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master|REBASE-i 2/2)
$ git add calculator.cpp

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master|REBASE-i 2/2)
$ git rebase --continue
[detached HEAD 9907e86] formatting: use tabs instead of spaces
Author: Sergii Piatakov <sergii.piatakov@globallogic.com>
2 files changed, 5 insertions(+), 5 deletions(-)
Successfully rebased and updated refs/heads/master.

```

5. Підпишемо коміти за допомогою `rebase -i HEAD~2`.

```

edit dab0294 fix truncation error
edit 9907e86 formatting: use tabs instead of spaces

```

Для кожного файлу виконуємо команди:

```

$ git commit -amend -vs
$ git rebase --continue

```

```

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master)
$ git rebase HEAD~2
Current branch master is up to date.

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master)
$ git rebase -i HEAD~2
Stopped at dab0294... fix truncation error
You can amend the commit now, with

    git commit --amend

Once you are satisfied with your changes, run

    git rebase --continue

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master|REBASE-i 1/2)
$ git commit --amend -vs
[detached HEAD f9499fe] fix truncation error
Author: Sergii Piatakov <sergii.piatakov@globallogic.com>
Date: Thu Nov 15 15:28:04 2018 +0200
1 file changed, 1 insertion(+), 1 deletion(-)

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master|REBASE-i 1/2)
$ git rebase --continue
Stopped at 9907e86... formatting: use tabs instead of spaces
You can amend the commit now, with

    git commit --amend

Once you are satisfied with your changes, run

    git rebase --continue

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master|REBASE-i 2/2)
$ git commit --amend -vs
[detached HEAD d8e57ff] formatting: use tabs instead of spaces
Author: Sergii Piatakov <sergii.piatakov@globallogic.com>
Date: Thu Nov 15 15:26:35 2018 +0200
2 files changed, 5 insertions(+), 5 deletions(-)

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master|REBASE-i 2/2)
$ git rebase --continue
Successfully rebased and updated refs/heads/master.

```

6. Створимо два патчі за допомогою команди `git format-patch`.

```

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master)
$ git format-patch HEAD -2
0001-fix-truncation-error.patch
0002-formatting-use-tabs-instead-of-spaces.patch

```

7. Поеднаємо "improve calculation accuracy" та "fix truncation error" в один коміт, використовуючи `rebase -i HEAD~3` та команду squash (s). Підпишемо цей коміт.

```

pick 669f632 improve calculation accuracy
s f9499fe fix truncation error
pick d8e57ff formatting: use tabs instead of spaces

```

8. Видаляємо верхній коміт "formatting: use tabs instead of spaces", використовуючи `rebase -i HEAD~3` та команду drop (d).

```

pick 7832b6d improve calculation accuracy and fix truncation error
d 2ac788a formatting: use tabs instead of spaces

```

9. Перейменуємо поточне віддалене сховище на "github" та додамо ще одне віддалене сховище: <https://gitlab.com/SergiiPiatakov/calculator.git> з назвою "gitlab".

```
Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master)
$ git remote rename origin github

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master)
$ git remote add gitlab https://gitlab.com/SergiiPiatakov/calculator.git

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master)
$ git remote show
github
gitlab
```

10. За допомогою команд `git fetch` та `git log gitlab/master` отримаємо код з віддаленого сховища "gitlab" та дослідимо його.

```
Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master)
$ git fetch gitlab
remote: Enumerating objects: 10, done.
remote: Counting objects: 100% (10/10), done.
remote: Compressing objects: 100% (7/7), done.
remote: Total 7 (delta 1), reused 0 (delta 0), pack-reused 0
Unpacking objects: 100% (7/7), 903 bytes | 39.00 KiB/s, done.
From https://gitlab.com/SergiiPiatakov/calculator
 * [new branch]      master      -> gitlab/master

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master)
$ git log gitlab/master
commit d61d32dcee5a4c624759f0966d3b25fe9c06f308 (gitlab/master)
Author: Sergii Piatakov <sergii.piatakov@globallogic.com>
Date: Thu Nov 15 15:45:44 2018 +0200

    mark member-function as `static`

    In fact the `Calculator` class doesn't have member-variable, so we can
    mark `Add` and `Mul` as `static` and use them without an instance.

    Signed-off-by: Sergii Piatakov <sergii.piatakov@globallogic.com>

commit e0ea21b9da1195ac8fb8c9dbcdd4a735a159ff4d
Author: Sergii Piatakov <sergii.piatakov@globallogic.com>
Date: Thu Nov 15 15:43:25 2018 +0200

    add a multiplication operation

    Add a member-function which performs multiplication of two float point
    digits.

    Signed-off-by: Sergii Piatakov <sergii.piatakov@globallogic.com>

commit 997217087b46334ede5f8c965eebfb8a38973f19
Author: Sergii Piatakov <sergii.piatakov@globallogic.com>
Date: Thu Nov 15 15:07:05 2018 +0200

    basic implementation

    Introduce the `Calculator` class with single member-function which
    performs an addition.

    Signed-off-by: Sergii Piatakov <sergii.piatakov@globallogic.com>

commit 75c0e7cb769cbe4c8ab9f1d3c7cdfbf86041caab
Author: Sergii Piatakov <sergii.piatakov@globallogic.com>
Date: Thu Nov 15 13:13:59 2018 +0200

    Initial commit

    This commit is left empty intentionally.

    Signed-off-by: Sergii Piatakov <sergii.piatakov@globallogic.com>
```

11. Додаємо коміт: "add a multiplication operation" за допомогою команди `git cherry-pick`. Виправляємо конфліктні місця у файлі calculator.h.

```
Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master)
$ git cherry-pick e0ea21b
Auto-merging calculator.h
CONFLICT (content): Merge conflict in calculator.h
Auto-merging calculator.cpp
error: could not apply e0ea21b... add a multiplication operation
hint: after resolving the conflicts, mark the corrected paths
hint: with 'git add <paths>' or 'git rm <paths>'
hint: and commit the result with 'git commit'

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master|CHERRY-PICKING)
$ vim calculator.h

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master|CHERRY-PICKING)
$ git add calculator.h

Anna@ANNA MINGW64 /d/Study/Semester 10/calculator (master|CHERRY-PICKING)
$ git cherry-pick --continue
[master 203150b] add a multiplication operation
Author: Sergii Piatakov <sergii.piatakov@globallogic.com>
Date: Thu Nov 15 15:43:25 2018 +0200
2 files changed, 7 insertions(+), 1 deletion(-)
```

12. Додаємо власні зміни та робимо коміт.

```
#ifndef CALCULATOR_H
#define CALCULATOR_H

class Calculator
{
public:
    int Add (double, double);
    int Sub (double, double);
    int Mul (double, double);
    int Power (int, int);
};

#endif//CALCULATOR_H
```

```
#include "calculator.h"

int Calculator::Add (double a, double b)
{
    return a + b + 0.5;
}

int Calculator::Sub (double a, double b)
{
    return Add (a, -b);
}

int Calculator::Mul (double a, double b)
{
    return a * b + 0.5;
}

int Calculator::Power (int num, int power)
{
    int res = 1;
    for (int i = 0; i < power; i++)
    {
        res *= num;
    }

    return res;
}
```