

ENGSCI 233

Quality Control Lab

Date: 24 March 2022

Lab Background and Objectives

The purpose of this lab is to gain experience with software design practices that help you write easy to understand, bug-free code.

To do this, we will revisit the connect four game from week 1 and develop **unit tests** for an already existing implementation. Also, we are going to complete the docstrings from your `sdlab.functions.py` script.

In addition, changes you make to the code will be recorded in a **git repository** and this will become your submission for the lab. For more information, refer to the [`quality_control.ipynb`](#) notebook.

All exercises in this lab are REQUIRED.

In order to complete the lab, you have been provided with the following files:

- developed `connect_four.py` script
- a git repository address file `qclab_repository.txt`
- `.gitignore`, a configuration file that tells git *not* to track some files

1 Version control with git and Bitbucket

IMPORTANT: *If you are working on your own computer, you will need to download and install git from <https://git-scm.com/downloads>*

Version control is the practice of regularly snapshotting your code and documenting changes. **git** is a computer program that helps you implement version control. **Bitbucket** is a company that, amongst other services, provides cloud hosting and a web interface to your git repository. You should understand the difference between the three.

In this lab, we'll just cover the basics:

1. Setting up a new repository (repo) on Bitbucket.

2. Using git to **clone** a local copy of your repo.
3. **Adding, committing and pushing** changes to the remote repo.

1.1 Create Bitbucket account

Open <https://bitbucket.org/product/> and click on the **Log in** button.

1.2 Login to Bitbucket

The University has an agreement with Atlassian and you can login using **Continue with Google** together with your University email address.

1.3 Configure the interface

Choose the following settings and click **Submit**.

Before we drop you in Bitbucket, help us tailor your experience

What describes your experience with source control? I have no experience ▾

How many people do you think you'll work with on Bitbucket? 1-5 ▾

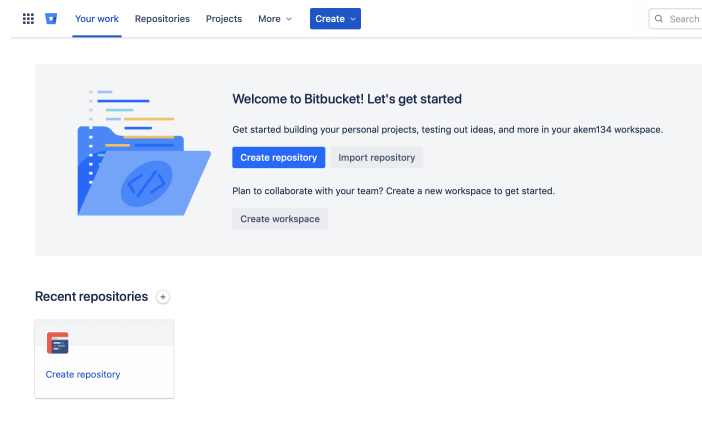
What best describes your role? Student ▾

What best describes how you plan to use Bitbucket? Learning Git ▾

[Skip](#) [Submit](#)

1.4 Create a new repository

Click on **Create repository** and get started.



Choose a **Project** name and a **Repository** name. Obviously, the **Workspace** will be named after yourself.

Create a new repository [Import repository](#)

Workspace: Andreas Kempa-Liehr

Project name:

Repository name:

Access level: Private repository
Uncheck to make this repository public. Public repositories typically contain open-source code and can be viewed by anyone.

Include a README?: Yes, with a tutorial (for begin...

Default branch name:

Include .gitignore?: Yes (recommended)

[Advanced settings](#)

Create repository Cancel

And another click on Create repository will finish the process.

1.5 Configure your App password

Click on the account menu in the top right and choose Personal settings.

objects More Create

Andreas Kempa-Liehr / engsci233

4

Where you'll find this repository's source files. To give your users an idea of what they'll find here, add a description.

master Files Filter files

File	Size	Last commit	Message
.gitignore	624 B	3 minutes ago	Initial commit
README.md	2.56 KB	3 minutes ago	Initial commit

Account menu:

- ACCOUNT
 - Invit
 - Andreas Kempa-Liehr (AK)
 - Switch account
 - Manage account
- RECENT WORKSPACES
 - Andreas Kempa-Liehr
 - All workspaces
- SETTINGS
 - Personal settings**
 - Labs
 - Disable the new navigation
 - Log out

Choose App passwords from the menu on the left hand side.

Your work Repositories Projects More Create

Account settings

- Email aliases
- Notifications
- ACCESS MANAGEMENT
 - App authorizations
 - App passwords**
- SECURITY
 - SSH keys
 - Two-step verification
- Sessions
- Audit log
- FEATURES
 - Labs

Upgrade to Premium

Get enforced merge checks, enforced 2FA, additional build minutes, and more with Bitbucket Premium.

Upgrade

Account settings

Avatar: AK

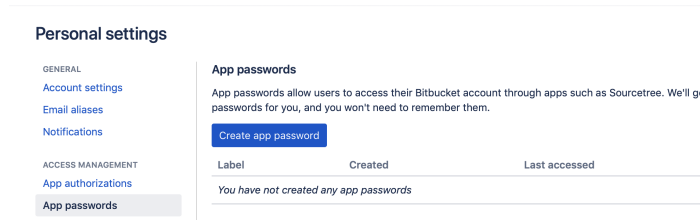
Name: Andreas Kempa-Liehr

Update your avatar, name, email address, and password or delete your account through your account settings.

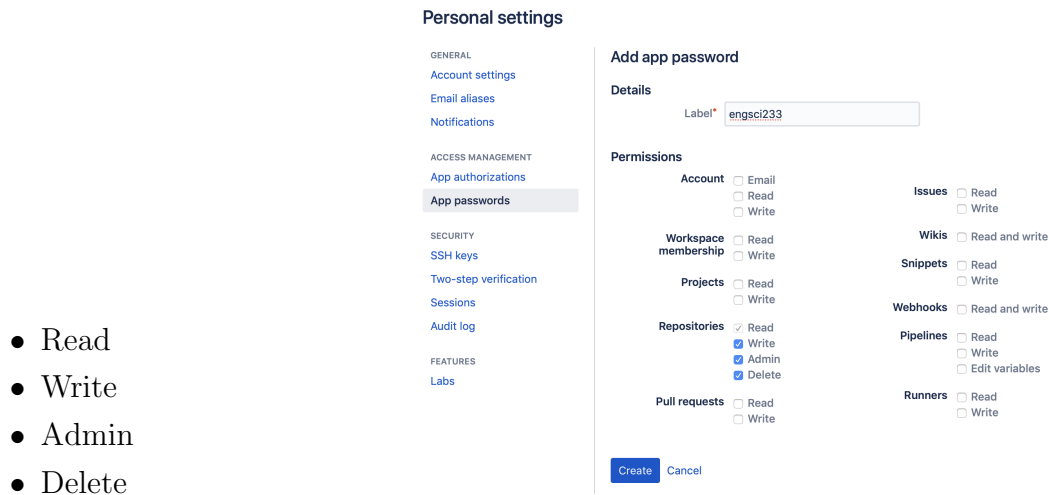
Bitbucket profile settings

Username: akem134 [\(change\)](#)

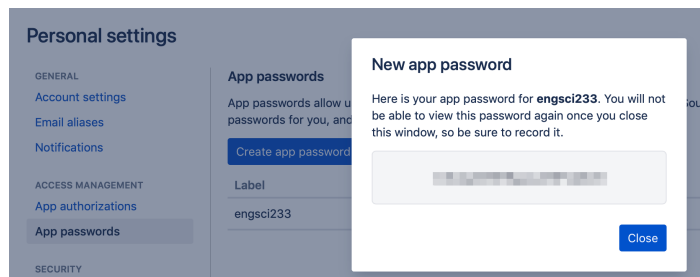
The next step is to Create app password.



Choose a suitable label for your app password and tick under Repositories



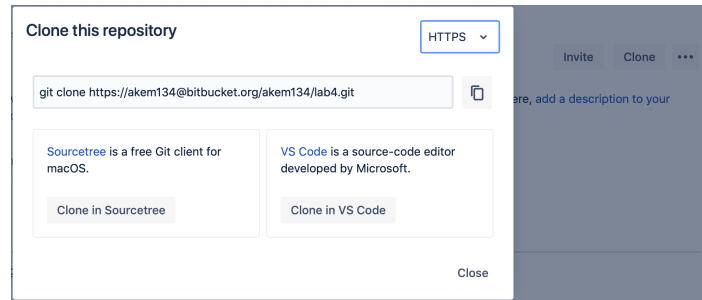
Write down your New app password. Note, never ever store passwords or API keys in a repository!



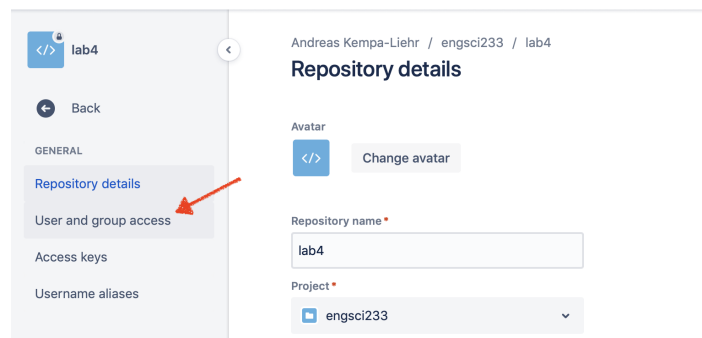
1.6 Add Andreas as collaborator to your repository

This step is very important, because we cannot mark your repository, if you do not grant Andreas access to your repository

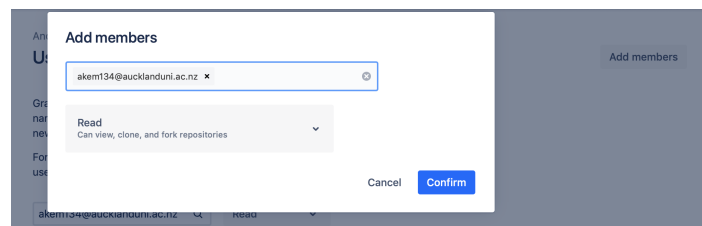
Your repository should now look similar to the following screenshot and you need to choose Repository settings at the bottom of the left hand menu.



Choose User and group access:

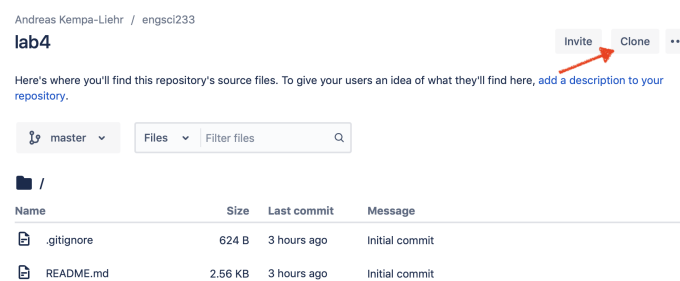


Add member `akem134@aucklanduni.ac.nz` with Read access to your repository and confirm.

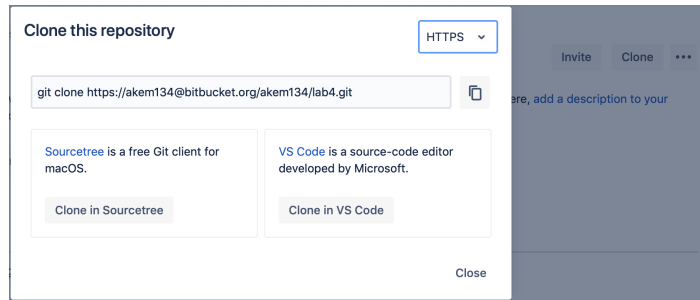


1.7 Clone your repository

Your repository should now look similar to the following screenshot.



Choose the Clone button from the top right the `git clone` command including the repository URL into the clipboard.



Copy this command

```
git clone https://akem134@bitbucket.org/akem134/lab4.git
```

into your terminal¹, hit return, and use the **App password** from step 1.5.

Now, your repository will be cloned into a new folder on your hard drive.

2 Push the provided files to the server

2.1 Copy files into local repository

Copy the provided files

- `connect_four.py`,
- `qclab_repository.txt`, and
- `.gitignore`.

into the folder.

2.2 Add files to the repository

Switch into your terminal or **Git CMD**, change directory, and add each of the copied files to the repository:

```
git add connect_four.py
git add qclab_repository.txt
git add .gitignore
git commit -m "Added lab files."
```

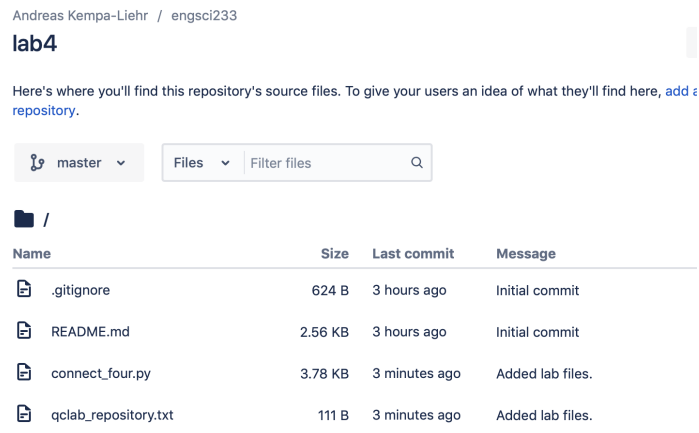
¹On a windows system this might be the **Git CMD**, which you can choose from the Start menu after installing Git from <https://git-scm.com/downloads>

2.3 Push the files into the Bitbucket repository

Execute the following command:

```
git push origin
```

Now, you can switch to your browser and refresh the Bitbucket tab. Check if the files are correctly displayed.



Congratulations!

3 Document your `sdlab_functions.py` script

- Copy your `sdlab_functions.py` script from last week into the repository, add, and commit the script.
- Complete the docstrings of the file using the numpy/scipy style of writing docstrings. Don't forget to include a mini example, which demonstrates the respective function.
- Add and commit your changes with sensible commit messages.

4 Debug the connect four implementation

Your task is to debug the provided connect four implementation. Some errors are obvious as soon as try to play a game. Others might be more hidden.

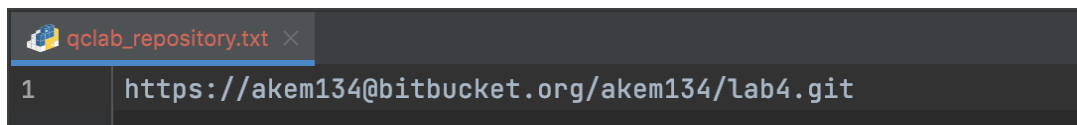
- Debug the obvious errors first, add, and commit the changes. This is a good point to read through Natalie Pina's comments on writing good commit mes-

sages².

- Write three separate test scripts for each of the functions
 - `drop_token()`,
 - `game_is_won()`, and
 - `init_field()`.
- The test scripts should start with `test_` followed by the function name and should test the expected usage of the functions as well as ridiculous argument values and boundary cases. Don't forget to add and commit your changes to your local repository. Amend the implementation of the function with error handling where appropriate.

Submission Instructions

For this lab, you should submit ONLY `qclab_repository.txt`, containing the address to your Bitbucket repository.

A screenshot of a code editor window. The title bar shows a file named 'qclab_repository.txt' with a close button. The editor content shows a single line of text: 'https://akem134@bitbucket.org/akem134/lab4.git'. The line is numbered '1' on the left margin.

DO NOT SUBMIT ANY OTHER FILES.

Files `conncet_four.py`, `sdlab_functions.py`, `test_drop_token.py`, `test_game_is_won.py`, and `test_init_field.py` will be assessed as part of this lab assignment, however these files will be accessed by downloading your repository. Ensure that you have committed all changes before submitting.

IMPORTANT: Make sure that you give me user access to your **PRIVATE** repository (p. 4).

IF YOU DO NOT ADD ME, I CANNOT DOWNLOAD YOUR REPOSITORY AND MARK YOUR ASSIGNMENT.

Remember, all submissions are compared against each other and those from previous years. Copying someone else's code and changing the variable names constitutes academic misconduct by *both* parties.

²<https://www.freecodecamp.org/news/how-to-write-better-git-commit-messages/>