CSE 414: Section 1
VM, Git/GitLab, SQLite

September 27th, 2018

Administrivia

HW1 due on GitLab on Tuesday, October 2nd at 11:59 P.M.

WQ1 due on Gradiance on Friday, October 5th at 11:59 P.M

Sign up for Piazza! piazza.com/washington/autumn2018/cse414

Sign up for AWS credit! (see HW1 spec)

Virtual Machine

CSE Virtual Machine (VM)

We will be developing on Linux, CentOS
https://www.cs.washington.edu/lab/software/linuxhomevm

The VM will help!
A lot of stuff is pre-installed
Fewer setup bugs (a huge problem previous quarters)

VM Demo!

Git/Gitlab Walkthrough

Install and Configure Git

Linux (Debian/Ubuntu):

```
    sudo apt-get update
    sudo apt-get install git
```

Mac:

http://git-scm.com/download/mac

Windows:

http://git-scm.com/download/win

Verify git installation (do this first to check to see if git is already installed)

```
    git --version
```

Configure username:

```
    git config --global user.name
"John Doe"
```

Configure user email:

```
    git config --global user.email
"netid@uw.edu"
```

Detailed instructions from GitLab:
https://gitlab.cs.washington.edu/help/ssh/README

Register your Computer on Gitlab (SSH)

To generate a SSH key pair (if you don't have one):

- Linux/Mac: `ssh-keygen -t rsa -C "netid@uw.edu" -b 4096`
- Windows: use PuttyGen to generate and save keys
- Use the suggested save path (`~/.ssh/id_rsa.pub`)
- Password for keys is optional

On Gitlab > User Settings (under your profile icon) > SSH Keys:

- Paste in your public key (copy from typing `cat ~/.ssh/id_rsa.pub`)
- Name your key anything
- Hit "Add Key"

Gitlab

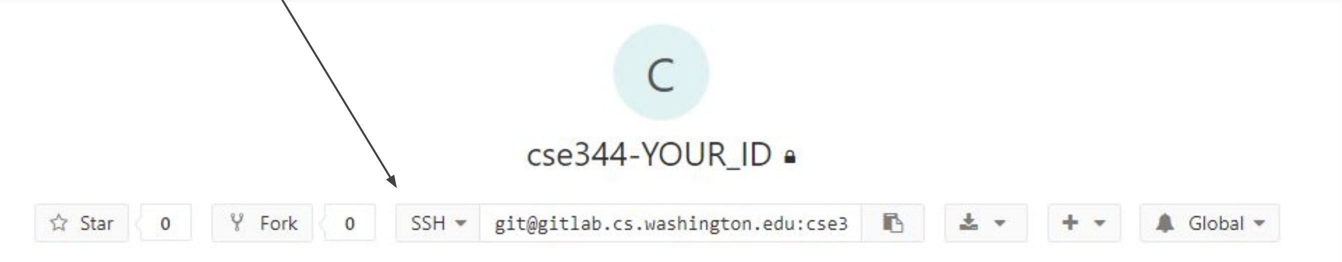
Login with UW NetID

https://gitlab.cs.washington.edu/users/sign_in

Make sure you have access to your CSE 414 project repository (cse414-netid)

Try to clone your repo

```
git clone [repoURL]
```



git@gitlab.cs.washington.edu:cse3

More resources for learning git:
https://help.github.com/articles/git-and-github-learning-resources/
https://try.github.io/levels/1/challenges/1
https://courses.cs.washington.edu/courses/cse391/17sp/lectures/9/391Lecture09-Git-17sp.pdf

Git Basics

Git commands you should be familiar with:

```
git status
git clone [repo path]
git pull
    (for HWs, “git pull upstream master”)
git add [files]
git commit -m “a useful message”
git push
git diff
```

Dealing with conflicts:

You must manually edit files that have conflicts
(git doesn’t know which version is “right”)

THIS IS GIT. IT TRACKS COLLABORATIVE WORK ON PROJECTS THROUGH A BEAUTIFUL DISTRIBUTED GRAPH THEORY TREE MODEL.
COOL. HOW DO WE USE IT?
NO IDEA. JUST MEMORIZE THESE SHELL COMMANDS AND TYPE THEM TO SYNC UP. IF YOU GET ERRORS, SAVE YOUR WORK ELSEWHERE, DELETE THE PROJECT, AND DOWNLOAD A FRESH COPY.

Git Demo!

DB Review & Using SQLite

Review: Database and DBMS

- What is a database?

- What is a DBMS?

Review: Database and DBMS

- What is a database?
  - Collection of organized files containing related **data persisting over a long period of time**
- What is a DBMS?
  - Program that allows for **efficient management of large databases**

SQL (Structural Query Language)

- Language designed for managing data held in a relational database management system (RDBMS)

- Declarative query language

- What can it do?
    - Data insert, delete, query, schema creation, etc.

SQLite: What is it?

- C library that implements a relational data management system (DBMS)
- sqlite3: a standalone program that can run programs and manage an SQLite database

SQLite Installation

Linux - Open a terminal, then run the command:

```
sudo apt-get install sqlite3
```

Mac -

1) Download Homebrew: instructions @ https://brew.sh/
2) Open a terminal, then run the command:

```
brew install sqlite3
```

SQLite Installation (con’t)

Windows -

1) Go to https://www.sqlite.org/download.html and download the third option down (sqlite-tools-win32-x86-3200100.zip) under “Precompiled Binaries for Windows”
2) Extract files into directory of your choice
3) Add that directory to the environment variable “path”

Running SQLite

Linux/Mac - Open a terminal, then run the command:

```
sqlite3 [database]
```

where “database” is the name of the database

Windows -

1) In cmd, go to directory where you extracted sqlite3.exe files
2) Run the command: `sqlite3 [database]`

Questions on installation or running SQLite? Post on Piazza or visit us during OH!

SQLite: Basic SQL Statements

CREATE TABLE: creates a new table

[ex] CREATE TABLE tableName (columnName int, ...);

SQLite: Basic SQL Statements

INSERT INTO: inserts new data into table

[ex] INSERT INTO tableName VALUES (value1, …);

SQLite: Basic SQL Statements

SELECT: gets existing data from table

[ex] SELECT columnName FROM tableName;

SQLite: Basic SQL Statements

UPDATE: updates data in table

```
[ex] UPDATE tableName
         SET ….
         WHERE [condition];
```

SQLite: Basic SQL Statements

DELETE: deletes data in table

```
[ex] DELETE FROM tableName
         WHERE [condition];
```

SQLite: Special Operators

DATE operator: lets you work with dates and times; declare as varchar (see hw1 documentation)

```
[ex] SELECT * FROM tableName WHERE dateColumn  ='YYYY-MM-DD';

        SELECT * FROM tableName WHERE dateColumn < DATE('now', '-1

                month');
```

Other operators: LIKE, LENGTH(string), SUBSTR(string, start index, end index), etc.

SQLite: Special Commands

.help - list other . commands

.header on/off - show/hide column headers in query results

.mode [mode type] - change how to separate the columns in each row/tuple (for better formatting)

Mode type examples: csv, tabs, line

More SQL (For Reference)

- WHERE clause - filter records
- AND, OR operator - filter records based on more than one condition
- LIKE operator - used in a WHERE clause to search for a specified pattern in a column
- AS - give an alias name to a table or a column
- Relational operators: =, >, >=, <, <=

SQL Demo!

Cosette query checker:
https://demo.cosette.cs.washington.edu/

SQL Programming Style

Make sure to alias all of your tables in the FROM clause

Although it is not necessary to execute on sqlite3, it is considered bad style in this course to not do so

Ex: SELECT * FROM **Students AS S** WHERE S.name = ‘Johnny’

This will be especially important when writing queries with self joins (more than one instance of the same table) in future homework assignments

You can check to see if your hw queries follow these guidelines using the cosette tool

Didn’t understand everything? That’s okay! This was just a preview.

SQL basics will be explained further in lecture before your homework is due.

*Post on Piazza or come to OH if you have any questions!