CSE 333 – SECTION 1

Git Setup & Function Pointers

Your TAs

- 8 of us!

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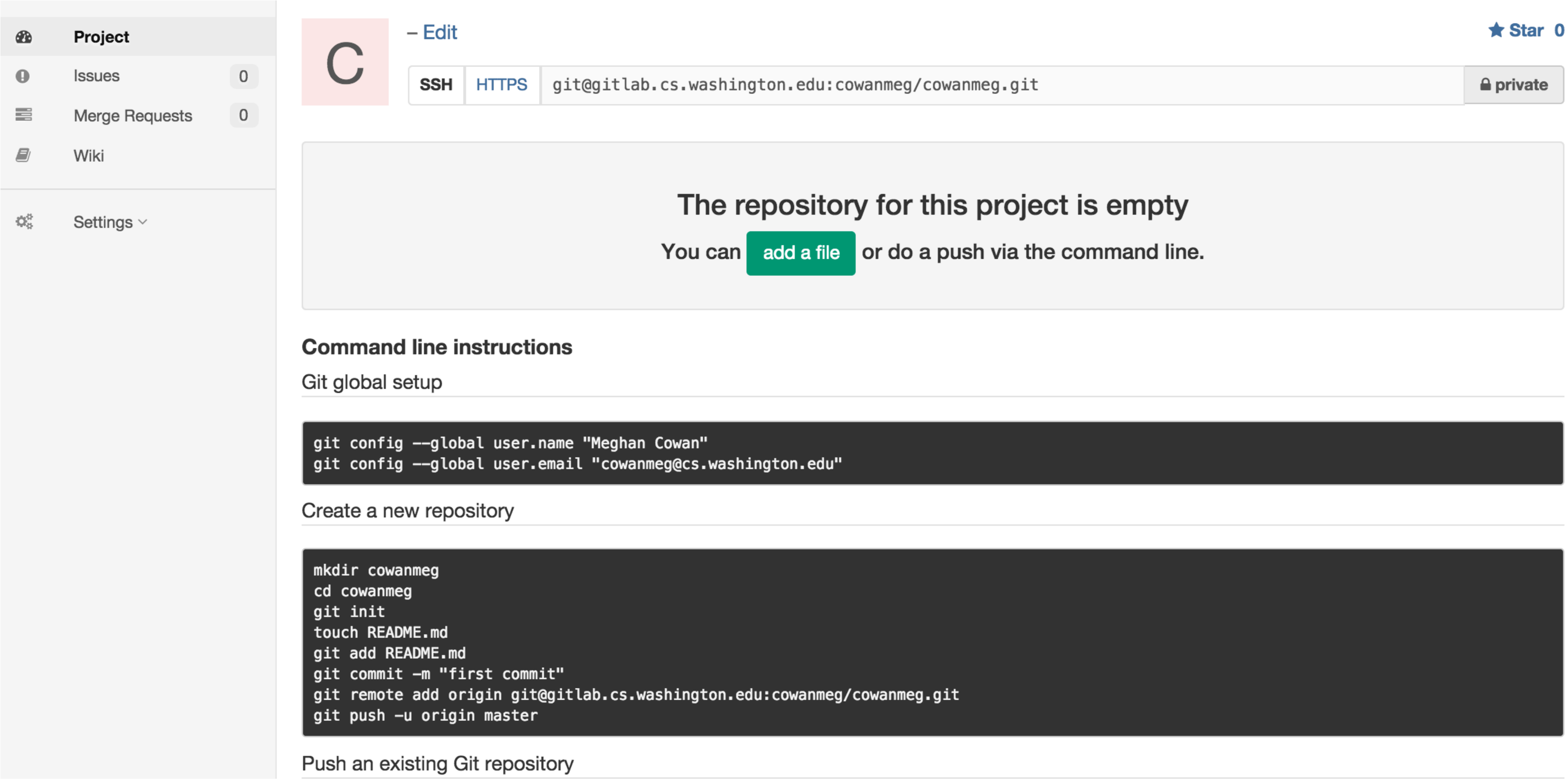
- Please use the discussion board!

Gitlab Intro - Sign In

- Sign In using your **CSE netID**
- https://gitlab.cs.washington.edu/

- Most of you should have repos created for you



git@gitlab.cs.washington.edu:cowanmeg/cowanmeg.git

The repository for this project is empty

You can add a file or do a push via the command line.

Command line instructions

Git global setup

```
git config --global user.name "Meghan Cowan"
git config --global user.email "cowanmeg@cs.washington.edu"
```

Create a new repository

```
mkdir cowanmeg
cd cowanmeg
git init
touch README.md
git add README.md
git commit -m "first commit"
git remote add origin git@gitlab.cs.washington.edu:cowanmeg/cowanmeg.git
git push -u origin master
```

Push an existing Git repository

SSH Key Generation

Step 1a: Check if you have a key

- Run **cat ~/.ssh/id_rsa.pub**
- If you see a long string starting with ssh-rsa or ssh-dsa go to Step 2

Step 1b: Generate a new SSH key if necessary

- Run **ssh-keygen -t rsa -C "<netid>@cs.washington.edu"** to generate a new key
- Click enter to skip creating a password
  - git docs suggest creating a password, but it's overkill for 333 and complicates operations

Step 2: Copy SSH key

- run **cat ~/.ssh/id_rsa.pub**
- Copy the complete key key starting with ssh- and ending with your username and host

Step 3: Add SSH key to gitlab

- Navigate to your ssh-keys page (click on your avatar in the upper-right, then "Settings," then "SSH Keys" in the left-side menu)
- Paste into the "Key" text box and give a "Title" to identify what machine the key is for
- Click the green "Add key" button below "Title"

First Commit

1) **git clone <repo url from project page>**
   - Clones your repo
2) **touch README.md**
   - Creates an empty file called README.md
3) **git status**
   - Prints out the status of the repo: you should see 1 new file README.md
4) **git add README.md**
   - Stages a new file/updated file for commit. git status: README.md staged for commit
5) **git commit -m "First Commit"**
   - Commits all staged files with the provided comment/message.
     git status: Your branch is ahead by 1 commit.
6) **git push**
   - Publishes the changes to the central repo. You should now see these changes in the web interface (may need to refresh).
   - Might need **git push -u origin master** on first commit (only)

References

- **SSH Key generation:** https://gitlab.cs.washington.edu/help/ssh/README.md

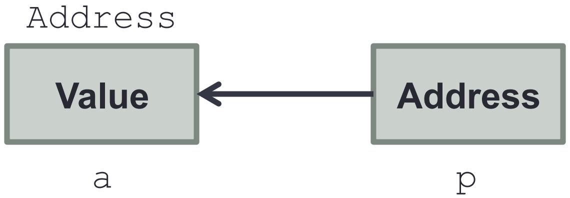
- **Basic Git Tutorial:** https://courses.cs.washington.edu/courses/cse333/18su/hw/git.html

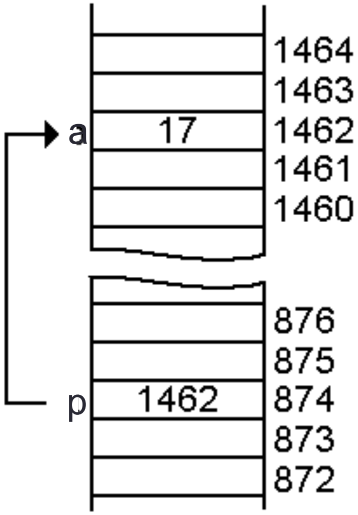
Quick Refresher on C

- General purpose programming language
- Procedural
- Often used in low-level system programming
- Supports use of pointer arithmetic
- Provides facilities for managing memory
- C passes all of its arguments by value
  - Pass-by-reference is simulated by passing the address of a variable

Pointers

- A data type that stores an address
- Used to indirectly refer to values
- Can add to or subtract from the address
  - It's just another number





Example

[basic_pointer.c]

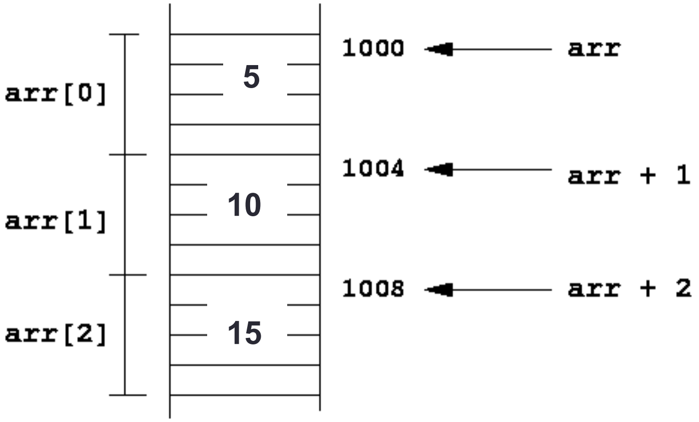
```c
#include <stdio.h>
void f(int *j) {
  (*j)++;
}
int main() {
  int i = 20;
  int *p = &i;
  f(p);
  printf("i = %d\n", i);
  return 0;
}
```

Arrays and pointers

- arr[0] <==> *arr
- arr[2] <==> *(arr + 2)

- How about arr, arr+2,

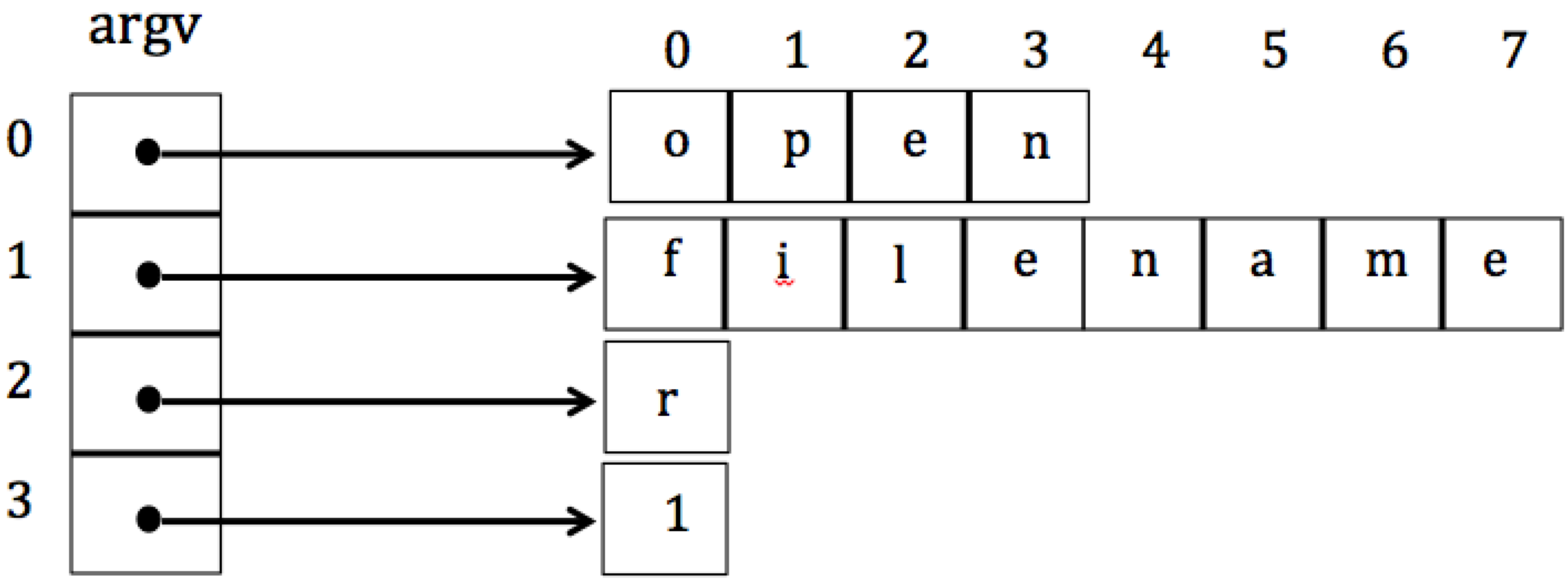
*arr+2 or *arr++?



Error! Don’t use *arr++.

Arrays and pointers

```
$ open  filename  r  1
```



Output parameters

- What if you want to modify a passed in parameter?
  - Why would this be useful in the first place?
  - Multiple return values

Output parameters

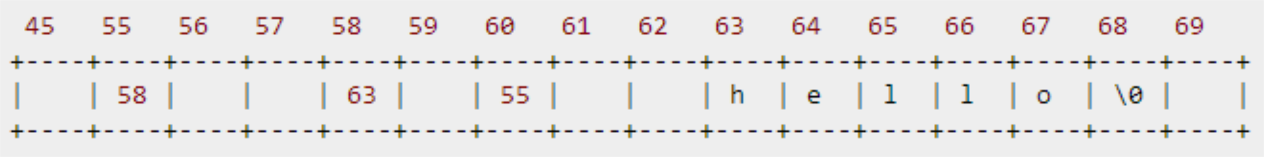
```
void make4_v1(int i) {
  i = 4;
}

void make4_v2(int *i) {
  int j = 4;
  i = &j;
}

void make4_v3(int *i) {
  *i = 4;
}
```

See also: `[output_params.c]`

Pointers to pointers



```
  45   55   56   57   58   59   60   61   62   63   64   65   66   67   68   69
+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
|    | 58 |    |    | 63 |    | 55 |    |    | h  | e  | l  | l  | o  | \0 |    |
+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
```

```
char *c = “hello”;
char **cp = &c;
char ***cpp = &cp;
```

- Why could this be useful?

Function pointers

- We can have pointers to functions as well
- We will be using these in the homework assignments!

- Syntax is a little awkward
  - Example: `int (*ptr_to_int_fn)(int, int)`
  - Makes sense if you think about it
- Demo: `[function_pointer.c]`

Looking up documentation

- Don’t go straight to Google / Stack Overflow / etc.
- Use the built-in man pages
  - **`man <program/utility/function>`**
  - **`man -f <name>`** or **`whatis <name>`**
  - **`apropos <keyword>`**
- Much more documentation is linked on the 333 home page
  - Under “Resources” on the left side of the page

Questions, Comments, Concerns

- Do you have any?
- Exercises going ok?
- Lectures make sense?