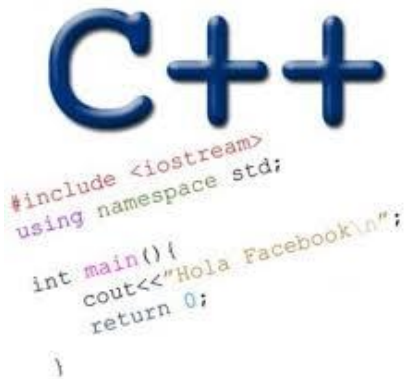
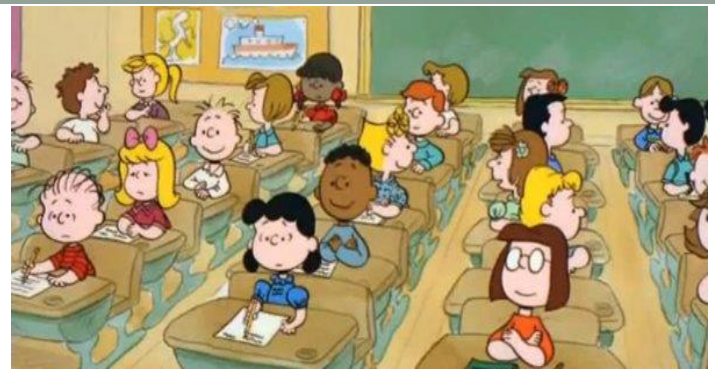
GIT AND GITHUB, C++ DATA TYPES BASIC CONTROL FLOW

Problem Solving with Computers-I

https://ucsb-cs16-wi17.github.io/



Announcements



- Submit your homework 1
- Homework 2 has been released
- Reading for homework is due before each class
- Reminder about our policy on electronic devices
- Cookies during office hours – come visit!!
- Some comments on labs:
  - Please make sure you read ALL the information in the lab write up prior to coming to section
  - Start looking for partners to pair with in your section (for lab01) – We recommend using Piazza

Which of the reasons best describes why you are taking this class?

A. You are a CS/CE major, and will be taking follow up classes
B. You are NOT a CS/CE major, but are contemplating on switching into CS or CE
C. Your major requires you to take the class. You are NOT a CS/CE major, are NOT contemplating on switching into CS or CE.
D. Other - Just curious

What is Git and Github?

- **Git** is an example of “version control”
- **Git** performs version control on “repositories”
- **Repository (repo)** is just a collection of files
- **Github** is a repository hosting service for Git

Q: Can you suggest ways to store the three different versions of hello.cpp shown on the right?

```
#include<iostream>

int main() {
}
```

v1

hello-v1.cpp

```
#include<iostream>

int main() {
   cout<<“Hello World”;
}
```

v2

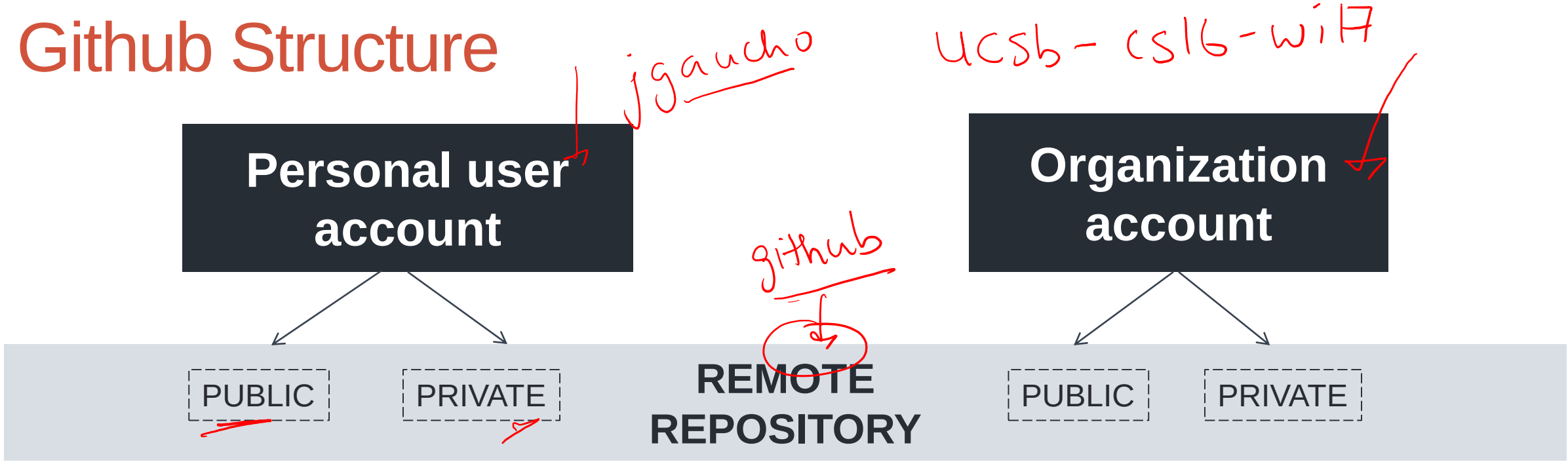
hello-v2.cpp

```
#include<iostream>

int main(){
   cout<<“Hello World”<<endl;
   return 0;
}
```

v3

Github Structure



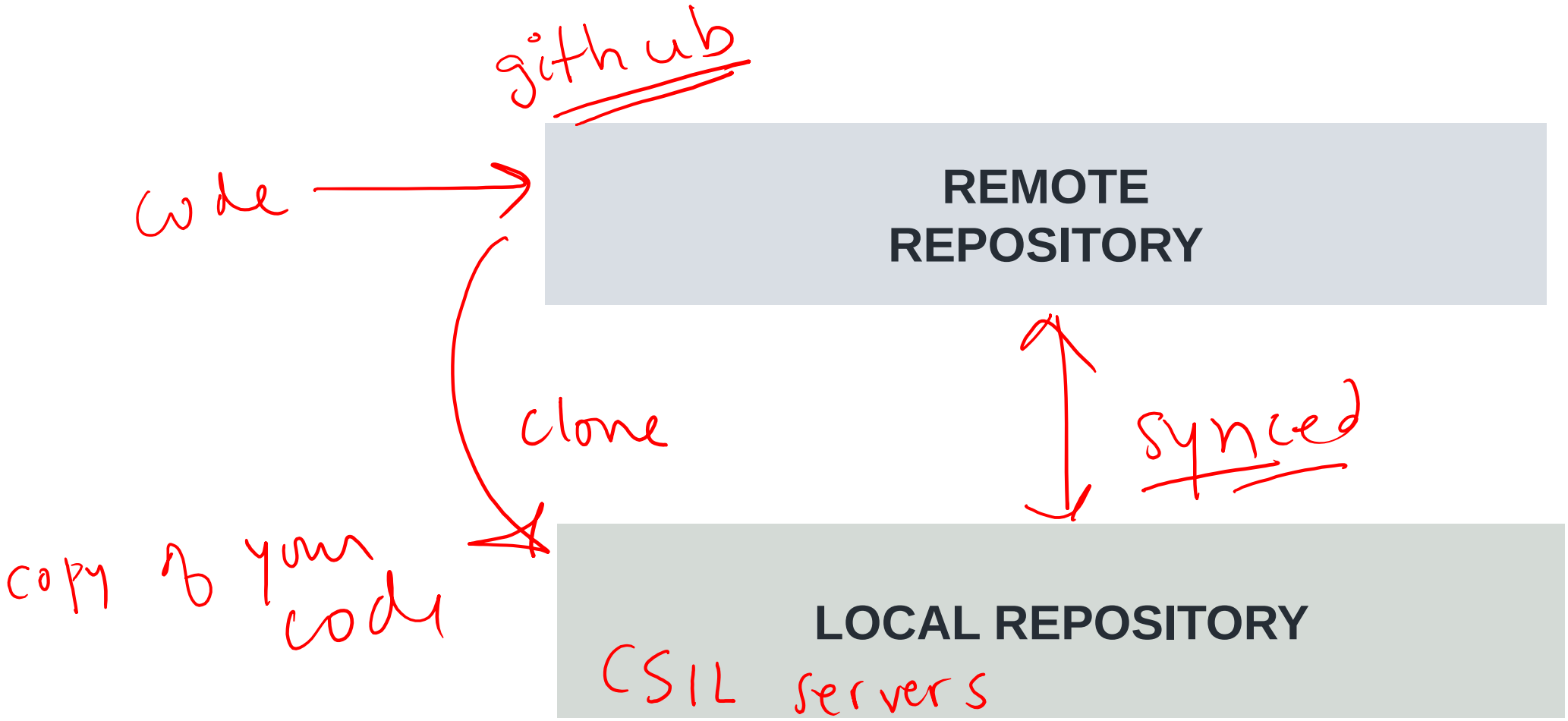
- Unlimited public repositories and collaborators on all plans
- Limited private repositories
- Ability to add unlimited repository collaborators

- Organizations are great for projects that need multiple owners & admins.
- Private repositories
- Team-based access permissions

Demo: creating a new repo in our class organization!

Cloning Repos

git clone address of repo



Demo: Cloning a repo to CSIL servers and why that's useful

Clickers out – frequency AB

Which code produces a compile-time error?

A.

```
int main(){
    cout<<"Enter two numbers:";
    cin>>a >> b;
    cout<<"The sum of "<< a << " and " << b<< " is:"<< a+b<<endl;
}
```

same as

cin>>a;
cin>>b;

return 0;

B.

```
int main(){
    int a, b;
    cout<<"The sum of "<< a << " and " << b<< " is:"<< a+b<<endl;
}
```

This will compile

return 0;

C. Both **A** and **B**

D. Neither **A** or **B**

C++ Variables and Datatypes

- **Variables** are containers to store data
- **C++** variables must be "declared" before they are used by specifying a datatype
  - `int`: Integers (1, 2, 3, 0, . . .)
  - `double`: floating point numbers (1.77, 2.3, 1.0)
  - `char`: characters 'a', 'b', 'c'

```
int main() {
    int a, b; //
    cout<<"Enter two numbers:";
    cin>>a >> b;
    cout<<"The sum of "<< a << " and " << b<< " is:"<< a+b<<endl;
}
```

In python okay to just use variables without declaring them
a = 3

C++ Uninitialized Variables

- Value of uninitialized variables is “undefined”
- Undefined means “anything goes”
- Can be a source of tricky bugs

- What is the output of the code below?

```
int main() {
    int a, b; // declared but not initialized, a & b can have any value
    cout<<"The sum of "<< a << " and " << b<< " is:"<< a+b<<endl;
}
```

Variable Assignment

- The values of variables can be initialized...

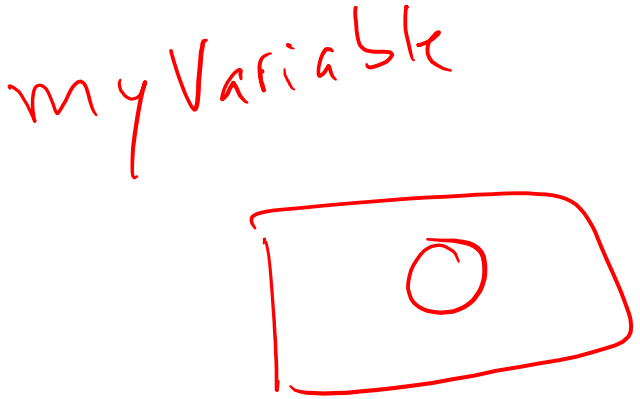
```
int myVariable = 0;
```

-or-

```
int myVariable;
myVariable = 0;
```

Variable Assignment

- ...or changed on the fly...




```
int myVariable = 0;
myVariable = 5 + 2;
```

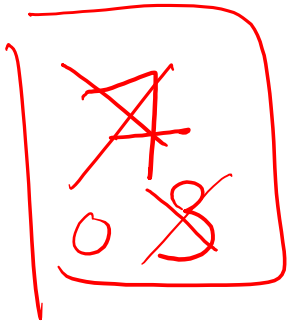
Variable Assignment

- ...or even be used to update the same variable!

```
int myVariable = 0;
myVariable = 5 + 2;
myVariable = 10 - myVariable;
myVariable = myVariable==0;
```

use the current value of myVariable

myVariable



Same as

myVariable=1;

true

1

Variable Assignment

- ...or even be used to update the same variable!

```
int myVariable = 0;
myVariable = 5 + 2;
myVariable = 10 - myVariable;
myVariable = myVariable==0;
```

Control Flow: if

- Find the main differences in each case
- Write the generalized if statement for each case

In Python	In C++
`if True:` `  itIsTrue()`	`if (true)` `  itIsTrue();`

`if True:`
`  itIsTrue()`
`  itIsAlsoTrue()`
	`if (true){`
	`  itIsTrue();`
	`  itIsAlsoTrue();`
	`}`

Generalized if statement

- The `condition` is a **Boolean expression**
- These can use relational operators

```
if ( condition ) {
   // statement 1;
   // statement 2;
}
```

true

```
if ( 1 < 2 ) {
   cout<< "foo" ;
}
```

false

```
if ( 2 == 3) {
   cout<<"foo" ;
}
```

```
if ( a < b )
   cout << "foo"
```

Fill in the ‘if’ condition to detect numbers divisible by 3

A. `x/3 == 0`

B. `!(x%3)`

mod

C. `x%3 == 0` true when x is divisible by 3

D. Either B or C

E. None of the above

```
if ( _________ )
   cout<< x << “is divisible by 3 \n” ;
}
```

Will both code instances give the same output?

0 : false
everything else : true

A. Yes because they have equivalent logic
B. Yes, even though the logic is not equivalent
C. No because the logic is not equivalent
D. One will produce a compile-time error

`int myVar =0;`	`int myVar =0;`
`if (myVar ==0)` `  cout<<"inside if\n";`	`if (myVar=0)` `  cout<<"inside if\n";`
`cout<<"outside if \n";`	`cout<<"outside if \n";`

myVar is reassigned the value 0 AND the expression evaluates to the new value of myVar

Control Flow: if-else

boolean expression

```
if (cond){
    doOnTrue();
    doThisAlso();
}  else {
    doOnFalse();
    doThisAlso();
}
```

```
if (cond)
    doOnTrue();
else
    doOnFalse();
doThisAlso();
```

- Can you write this code in a more compact way

Control Flow: for loops

```
int x;

for ( x = 0; x < 50; x++ )
   oneStatement( x );
```

Initialization

Loop condition: Checked before each iteration of the loop
If expression evaluates to false, loop terminates

action performed AFTER each iteration

// x is our loop variable

$\Downarrow$
$x = x+1$

```
for( x = 0; x < 50; x++ ) {
   statementOne();
   statementTwo();
}
```

body of the loop

Next time

- Basic File IO
- Number representation