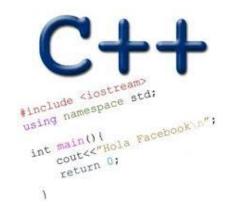
# C++ DATA TYPES BASIC CONTROL FLOW

Problem Solving with Computers-I Chapter 1 and Chapter 2

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





CLICKERS OUT – FREQUENCY AB

# Review: Program compilation

What does it mean to "compile" a C++ program?

- A. Write the implementation of the program in a .cpp file
- B. Convert the program into a form understandable by the processor
- C. Execute the program to get an output
- D. None of the above

#### Review: Kinds of errors

Which of the following types of errors is produced if our program divides a number by 0?

- A. Compile-time error
- B. Run-time error
- C. Both A and B
- D. Neither A or B

# Review: Which code produces a compile-time error?

```
int main(){
   cout<<"Enter two numbers:";
   cin>>a >> b;
   cout<<"The sum of "<< a << " and " << b<< " is:"<< a+b<<endl;
   return 0;
int main(){
   int a, b;
   cout<<"The sum of "<< a << " and " << b<< " is:"<< a+b<<endl;
   return 0;
Both A and B
```

D. Neither A or B

## Review: 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
  - double: floating point numbers
  - char: characters

#### 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;
    cout<<"The sum of "<< a << " and " << b<< " is:"<< a+b<<endl;
}
```

# Variable Assignment

The values of variables can be initialized...

...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;
```

# Let's play Fizzbuzz

#### Let's code Fizzbuzz -1.0

```
$Enter a number: 5
$ Enter a number: 1
                         $Enter a number: 6
$ Enter a number: 2
                         fizz
                         $Enter a number: 7
$ Enter a number: 3
fizz
                         $Enter a number: 15
$ Enter a number: 4
                         fizz
```

#### Control flow: if statement

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

```
if ( Boolean expression) {
   // statement 1;
   // statement 2;
}
```

- In C++ 0 evaluates to a false
- Everything else evaluates to true

## Examples of if statements

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

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

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

Use the curly braces even if you have a single statement in your if

#### Fill in the 'if' condition to detect numbers divisible by 3

```
A. x/3 == 0
B. ! (x%3)
C. x%3 == 0
```

- D. Either B or C
- E. None of the above

```
if ( _____ )
  cout<< x << "is divisible by 3 \n" ;
}</pre>
```

#### Control Flow: if-else

```
if (x > 0) {
    pet = dog;
    count++;
} else {
    pet = cat;
    count++;
}
```

Can you write this code in a more compact way?

## Control Flow: Multiway if-else

```
if (x > 100) {
    pet = dog;
    count++;
} else if (x > 90) {
    pet = cat;
    count++;
} else {
    pet = owl;
}
```

Can you write this code in a more compact way?

#### Let's code Fizzbuzz -2.0

```
$Enter a number: 5
$ Enter a number: 1
                         buzz
                         $Enter a number: 6
$ Enter a number: 2
                         fizz
                         $Enter a number: 10
$ Enter a number: 3
                         buzz
fizz
                         $Enter a number: 15
$ Enter a number: 4
                         fizzbuzz
```

## Control Flow: for loops

```
int x;
for ( x = 0; x < 50; x++ ) {
  cout << x;
}</pre>
```

#### Fizzbuzz – 3.0

1

2

fizz

4

buzz

fizz

7

8

fizz

buzz

fizzbuzz

Let's code Fizzbuzz 2.0!

### Write a program that calculates the sum

# What is printed by this code?

- A. Inside if
- B. Outside if

```
int myVar =0;

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

cout<<"outside if \n";</pre>
```

# What is printed by this code?

- A. Inside if
- B. Outside if

```
int myVar = 0;

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

cout<<"outside if \n";</pre>
```

#### Next time

- While loops, nested loops
- Github