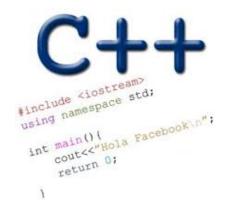
LOOPS

Problem Solving with Computers-I





ANNOUNCEMENTS

• TA, Instructor and Tutor Office hours:

https://ucsb-cs16.github.io/f19/info/schedule/

We will hold help hours outside of lab time!

Come with your questions

- Lab00 due today!
- Lab01 released, due next Tuesday.
- Lecture notes and slides updated on the website

REVIEW: PROGRAM I/O

• What are two ways for a user to provide input to a C++ program

While loops

A while loop is used to repeat code while some condition is true

```
while(BOOLEAN_EXPRESSION)
    //Code
}
Check if the BOOLEAN_EXPRESSION is true.
    * If true, the statements in loop will execute.
          * at the end of the loop, go back to 1.
          * If false, the statements in the loop will not execute.
          * the program execution after the loop continues.
```

LET'S CODE FIZZBUZZ

```
$ Let's play fizzbuzz!
Enter a positive number or -1 to quit: 1
1
```

Enter a positive number or -1 to quit: 3 Fizz

Enter a positive number or -1 to quit: 5
Buzz

Enter a positive number or -1 to quit: 15 Fizzbuzz

Enter a positive number or -1 to quit: -1 Bye

do-while loops

A while loop is used to repeat code until some condition is no longer true

```
do{
    // Code
    // This code is executed at least once
}while(BOOLEAN_EXPRESSION);
1. Execute the code in the loop
2. Check if BOOLEAN_EXPRESSION is true.
    * If true, then go back to 1.
    * If false, then exit the loop and resume program execution.
```

Continue and break

- continue;
 - can be used to stop the current iteration of a loop,
 - perform the UPDATE statement if necessary, re-check the BOOLEAN_EXPRESSION, and
 - continue with the next iteration of the loop.
- * break; can be used to break out of the **current** loop and continue execution after the end of the loop.

```
for (int i = 0; i < 10; i++) {
    if (i == 4)
        continue;
    if (i == 7)
        break;
    cout << "i = " << i << endl;
}</pre>
```

C++ types in expressions

```
int i =10;
double sum = 1/i;
cout<<sum;</pre>
```

What is printed by the above code?

- A. 0
- B. 0.1
- C. 1
- D. None of the above

Formatting output to terminal

```
See pages 91 and 190 of textbook
int i = 10;
double j = 1/static_cast<double>(i);
cout.setf(ios::fixed);  // Using a fixed point representation
cout.setf(ios::showpoint); //Show the decimal point
cout.precision(3);
cout<<j;</pre>
What is printed by the above code?
A. 0
B. 0.1
C. 0.10
D. 0.100
E. None of the above
```

C++ for loops

For loop is used to repeat code (usually a fixed number of times) General syntax of a for loop: for (INITIALIZATION; BOOLEAN EXPRESSION; UPDATE) { // code // ... Execute the INITIALIZATION statement. 2. Check if BOOLEAN EXPRESSION is true. * if true, execute code in the loop. * execute UPDATE statement. * Go back to 2. * if false, do not execute code in the loop.

* exit the loop and resume program execution.

The accumulator pattern

Write a program that calculates the series: 1+ 1/2+ 1/3+1/n, where `n` is specified by the user

Nested for loops – ASCII art!

Write a program that draws a square of a given width

```
./drawSquare 5

* * * * * *

* * * * *

* * * * *

* * * * *
```

Draw a triangle

```
Which line of the drawSquare code
(show on the right) would you modify
to draw a right angled triangle
    ./drawTriangle 5
  *
```

```
6
     for(int i = 0; i < n; i++){ //A
        for(int j=0; j < n; j++){ //B
          cout<<"* "; //C
8
9
        cout<<endl;
10
11
12
      cout<<endl:
13
```

Infinite loops

```
for (int y=0; y<10; y--)
    cout<<"Print forever\n";</pre>
int y=0;
for(;;y++)
    cout<<"Print forever\n";</pre>
int y=0;
for(;y<10;);
    y++;
int y=0;
while (y<10)
    cout<<"Print forever\n";</pre>
int y=0;
while (y=2)
    y++;
```

How is the pace of the class?

- A. Too fast
- B. Fast, but I am able to catch up once I do the labs
- C. Slow
- D. Too slow
- E. Its fine for me

Next time

- C++ functions and function call mechanics
- Variable scope (local vs. global)