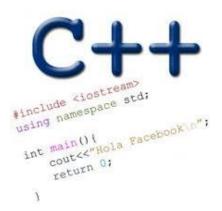
LOOPS

Problem Solving with Computers-I

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





Announcements

- Homeworks should be submitted in the provided template
- HW 3 and 4 released, due next week in class

Clickers out – frequency AB

Control Flow: for loops

```
for ( int i = 0; i < 15; i++ ) {
  cout << i << endl ;
}</pre>
```

What is the output of the above code?

Write a program that generates the following output:

```
1, 2, 3, 4, 5, 6, 7, 8, 9, 10
```

Previous code:

```
for (int i = 0; i < 15; i++) {
  cout << i << endl ;
}</pre>
```

Modify the program from the previous example to print a sequence: x_min, x_min+1, x_min+2,x_max for user specified inputs x_min and x_max

Sample run of the program:

```
$ ./test
Enter the limits of the sequence
10 15
10, 11, 12, 13, 14, 15
```

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

Sample run of the program:

```
Enter the number of terms in the sequence 4
Sum of the first 4 terms is: 10
```

Fizzbuzz – 3.0

```
1
```

2

fizz

4

buzz

fizz

7

8

fizz

buzz

fizzbuzz

Let's code Fizzbuzz 3.0!

Control Flow: while loops

```
while(Boolean expression) {
    //statement 1
    //statement 2
}
```

Repeat the previous exercises with while loops

Use while loops to print a sequence: x_min, x_min+1, x_min+2,x_max for user specified inputs x_min and x_max

\$./test_while Enter the limits of the sequence 10 15 10, 11, 12, 13, 14, 15

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

Sample run of the program:

```
Enter the number of terms in the sequence
2
Sum of the first 2 terms is : 1.500
```

C++ types in expressions

```
int i =10;
double sum = 1/i;
```

What is printed by the above code?

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

Setting up output when printing doubles

```
int i = 10;
double sum = 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<<sum;
What is printed by the above code?
A. 0
B. 0.1
C. 0.10
D. 0.100
E. None of the above
```

for loop OR while loop? Which one should you use?

```
for (int i = 0; i < 15; i++) {
  cout << i << endl ;</pre>
int j = 0;
while (j < 15) {
  cout << j << endl ;</pre>
  j++;
```

Nesting control structure

```
for (int i = 0; i < 15; i++) {
   if(i%3 ==0)
       cout<<"fizz"<<endl;</pre>
   else
      cout << i << endl ;</pre>
Can we write nested for loops?
```

Nested for loops – ASCII art!

Write a program that draws a square of a given width

```
./drawSquare
Enter the width of the square
5
*****
****
*****
*****
```

Draw a triangle

```
5 int main(){
Which line of the drawSquare code
                                        6
                                            int side;
(show on the right) would you modify
                                            cout<<"Enter the length of the base"<<endl;
                                        8
                                            cin>>side;
to draw a right angled triangle
                                        9
                                             for(int j = 0; j < side; j++){ //A
                                       10
  ./drawTriangle
                                               for(int i=0; i < side; i++){ //B
                                       11
Enter the length of the base
                                       12
                                                  cout<<"*"; //C
5
                                       13
                                       14
                                               cout<<endl;
                                                             //D
*
                                       15
**
                                       16
                                             cout<<endl;
                                                             //E
***
                                       17
***
```

18 }

Identify the code that is not equivalent to the other two?

Assume 'n' is an integer that has already been declared (may be positive or negative)

```
A. for( int x = 0; x < n; x++ ) {
    cout<<x <<endl;
}</pre>
```

```
В.
```

```
int x = 0;
while(x < n) {
   cout << x << endl;
   x++;
}</pre>
```

```
int x = 0;
do{
   cout << x << endl;
   x++;
} while (x < n);</pre>
```

D. They are ALL equivalent

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++;
```

Next time

- C++ functions and function call mechanics
- Passing parameters to programs