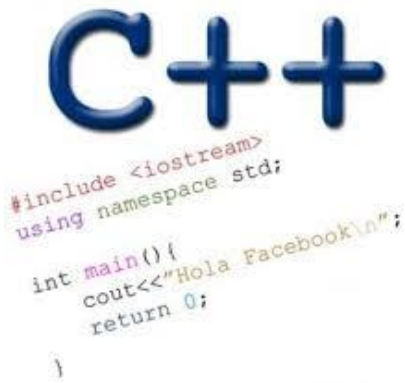
LOOPS

Problem Solving with Computers-I

https://ucsb-cs16-sp17.github.io/



Announcements

- We will not have any enrollment changes.
- Change of section requests- completed
- If you want to pair with someone in the same section (different mentor group), let your current mentor know asap
- Mentor groups will be finalized by tomorrow.
- 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 ;
}
```

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 ;
}
```

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

Sample run of the program: (You must use while loops)

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

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

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
```

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

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

int j =0;
while(j < 15){
   cout << j << endl ;
   j++;
}
```

Nesting control structure

```
for (int i = 0; i < 15; i++){
    if(i%3 ==0)
        cout<<"fizz"<<endl;
    else
        cout << i << endl ;
}
```

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

Which line of the drawSquare code (show on the right) would you modify to draw a right angled triangle

```
  ./drawTriangle
Enter the length of the base
5

*
**
***
****
```

```
5 int main(){
6     int side;
7     cout<<"Enter the length of the base"<<endl;
8     cin>>side;
9
10     for(int j = 0;  j < side;  j++){ //A
11         for(int i=0; i < side; i++){ //B
12             cout<<"*";   //C
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;
}
```

B.

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

C.

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

D. They are ALL equivalent

Infinite loops

```
for(int y=0;y<10;y--)
    cout<<"Print forever\n";
```

```
int y=0;
for(;;y++)
    cout<<"Print forever\n";
```

```
int y=0;
for(;y<10;);
    y++;
```

```
int y=0;
while(y<10)
    cout<<"Print forever\n";
```

```
int y=0;
while(y=2)
    y++;
```

Next time

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