**Practicing Loops**

**For Loop**

Observe the given code. Discuss what you think the output will be, then run the code to see if you are correct. OR… Look at the projected output and fill in the missing blanks.

| **Code** | **Output** |
| --- | --- |
| for(int i = 1; i < 10; i += 2)  std::cout << "i: " << i; | i: 1i: 3i: 5i: 7i: 9 |
| for(int i = 5; i > 0; i--)  std::cout << "i: " << i; | i: 5i: 4i: 3i: 2i: 1 |
| for(int i = 5; i < 0; i--)  std::cout << "i: " << i; | N/A nothing |
| for(int i = 10;\_\_\_\_\_\_\_\_\_\_\_\_\_\_; i-=2 )  std::cout << i << " "; | 10 8 6 4 2 |
| for(int i = 1; \_\_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_)  std::cout << i<< " " ; | 1 2 3 4 5 |
| int sum = 0;  for(int i = 0; i <= 10; i++)  sum += i;  std::cout << "Sum: " << sum; | Sum: 55 |
| std::cout << "Enter a number: ";  int num;  std::cin >> num;  for(int i = 0; i <= num; i++)  if(i % 2 == 0)  std::cout << "i: " << i; | Finish the for loop to output all the Even numbers up to and including the user input. |

**While Loops**

A loop is a set of instructions that are to be repeated. All loops have three main components: *initialize*, *test*, and *update*.

| // pre-test loop  int number = 1;  while ( number <= 10 ){  std::cout << number << " ";  number++;  } | // post-test loop  int number = 1;  do {  std::cout << number << " ";  number++;  }while ( number <= 10 ); |
| --- | --- |

1. Explain why the while loop is called a pretest loop and the do-while is called the post-test loop.

In the pretest loop, the loop tests condition **BEFORE** each iteration

In the posttest loop the loop test condition **AFTER** each iteration

1. What is the output (to the screen) by each while loop in the example above?

Both outputs are

1 2 3 4 5 6 7 8 9 10

1. What is the output if you remove the number++ statement?

It creates an infinite loop displaying 1

1. Change the number variable to 12 ( int number = 12; ). What is the output of the loops? Do you get the same results in each loop? Explain why or why not.

For the pretest loop, there is no output when ran. This is because the condition (if less than or equal to 10) is ran before the iteration, therefore returning nothing

For the posttest loop, output is just a single 12. Even though 12 is not less than or equal to 10, because the condition is tested after the loop is ran, it allowed one 12 to display.

1. Rewrite the following for loop code to use a while loop.

int sum = 0;

for(int i = 0; i <= 10; i++)

sum += i;

std::cout << "Sum: " << sum;

#include <iostream>

Using namespace std;

Int main(){

Int i = 0;

Int sum = 0;

while(i <= 10){

sum += i;

i++;

}

cout << "Sum: " << sum;

}