

CECS 174 – Lecture 13 – While Loops

While Loop –

Whenever we have a section of code that needs to be repeated we place it inside of a loop. There are a few different types of loops, but first we will cover a while loop. A while loop repeats any code that's within its brackets while the condition returns true.

```
initialization;

while ( condition is true )
{
    statements;
    updater;
}
```

Example:

```
int num1 = 0;

while ( num1 != 10 )
{
    System.out.print("Enter a number: ");
    num1 = in.nextInt();
}

/* Output:
Enter a number: 2
Enter a number: 5
Enter a number: 8
Enter a number: 10
*/
```

Infinite Loops –

A loop that never terminates is called an infinite loop (i.e. it runs an infinite number of times). There are cases where you might want to actually have your loop run forever, but in most cases it is due to an error. It happens when your condition always evaluates to true.

Example:

```
int num2 = 5;

while ( num2 == 5 ) //always true, num2 is never updated
{
    System.out.println("Number = " + num2);
}
```

Counting –

Often we need to repeat a loop a pre-determined number of times. To do this we need to figure out what our starting and ending case must be to repeat the loop the exact number of times we need it to.

Example: We need a statement to repeat exactly 5 times.

```
int counter = 0; //starting case

while ( counter < 5 ) //end condition
{
    System.out.println( "Count = " + counter);
    counter++;      //incrementer
}

/* Output:
Count = 0
Count = 1
Count = 2
Count = 3
Count = 4
*/
```

This loop may have executed five times, but we may not have wanted this exact output we may have wanted it to count from 1 to 5 instead. We would need to modify the starting case and end condition to make it fit with what we need.

Example: What are the starting and ending values for the following ranges?

1. 1 – 5

```
int x = ____;

while ( x ____ ) {
    System.out.println("X="+x);

    x ____;
}
```
2. 0 – 5

```
int x = ____;

while ( x ____ ) {
    System.out.println("X="+x);

    x ____;
}
```
3. 5 – 1

```
int x = ____;

while ( x ____ ) {
    System.out.println("X="+x);

    x ____;
}
```

CECS 174 – Lecture 13 Worksheet –

1. Write a loop that will print out a string vertically (each letter on a separate line).

```
String phrase = in.nextLine();  
_____  
while (_____) {  
    System.out.println(_____) ;  
    _____  
}
```

2. Write a loop that will print out the string backwards.

```
String phrase = in.nextLine();  
_____  
while (_____) {  
    System.out.print(_____) ;  
    _____  
}
```

3. Write a loop that will print out the first x number of squares on separate lines.

```
int x = in.nextInt();  
_____  
while (_____) {  
    System.out.println(_____) ;  
    _____  
}
```

4. Modify the above loop so that it will print out 5 results per line.