Introduction to Java
Notes Packet #3

Name: _____

Objective: By the completion of this packet, students should be able to write loops.

The Modulus Operator. The modulus operator (a.k.a. the remainder operator) is the percent sign (%). It is used to find the remainder of a division problem. For example:

```
int x = 14 % 5;        // _____
int y = 24 % 6;        // _____
int z = 8 % 10;        // _____
```

In some circumstances, the modulus operator turns out to be very useful. For example, if you need to know if one number is evenly divisible by another, use this code:

```
if ( num1 % num2 == 0 )       // then num2 is a factor of num1
```

Example 1. Suppose a store sells soft pretzels for 50 cents each and $5 for a dozen. The code below calculates the cost on *n* pretzels.

```
int n;              // n represents the number of pretzels being bought
// code that assigns n a value
double cost = 5 * ( n / 12) + 0.5 * ( n % 12 );
```

While Loops. A while loop is a control structure that allows you to write code that is executed repeatedly as long as some condition is true.

Java Code	**Flowchart**

int n = 2;
 	
while(n <= 5) {
  System.out.println(n + "cats");
  n++;
}	

Every pass through the body of a loop is called an _____.

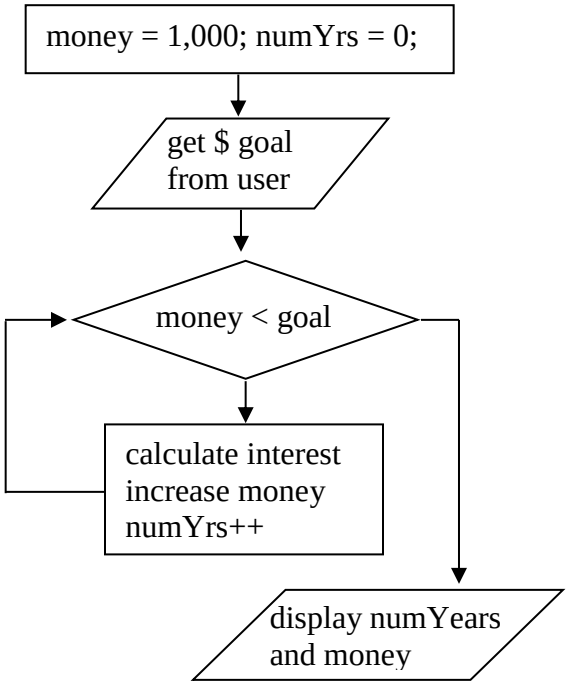
```
double money = 1000.0;
int numYears = 0;

Scanner get = new Scanner( System.in );
System.out.print( "Enter your goal: " );
double goal = get.nextDouble();

_____
_____
_____
_____
_____

System.out.println( numYears + " years ");
System.out.println( money + " dollars ");
```

You have $1,000 and a 10% interest rate. Calculate how many years must pass until your money has reached (or surpassed) some goal



There are two basic types of while loops: task/event-oriented and count-oriented.

Task/Event-Oriented While Loop. This kind of loop continues until some task is completed or some event occurs. For example:

```
Scanner read = new Scanner( System.in );
int num = 0;
int count = 0;
int total = 0;
while ( num >= 0 ) {  _____
        System.out.print("Enter a number ");        _____
        num = read.nextInt();                       _____
        if ( num >= 0 ) {                           _____
                total = total + num;                _____
                count++;
        }
}
System.out.println( "The " + count + " numbers add up to " + total );
```

If the user enters 3, 5, and -2, what is displayed? _____

Count-Oriented While Loop. This kind of loop continues for a specific number of _____ and then stops. For example:

```
int n = 1;          _____________________________________________
while ( n <= 5 ) {  _____________________________________________
    System.out.println("Hello");  _____________________________
    n++;          _____________________________________________
}
```

A count-oriented loop may count forward or backward. It may count in steps of 1 or any other value.

For Loops. A for-loop is typically used as an alternative to a count-oriented while loop.

The first statement in a for-loop contains three statements separated by semicolons:

1. _____
2. _____
3. _____

Java Code	**Flowchart**

for (int n = 1; n < 4; n++) {
  // the body of the loop
}	

Example 2. What does this loop display?	**Example 3**. What does this loop display?

for (int k = 5; k <= 8; k++){
  System.out.print(k + ", ");
}
	for (int n = 25; n >= 10; n = n - 7){
	  System.out.print(n + ", ");
	}