Unit 5 L1 Control Structures- For Loop (Repetitions)

Many activities we do are repetitive such as sleep -wake cycle, fitness exercises etc.
"Do the same thing over and over.." is not only part of human activities but often used or necessary in programming. To enable repetition a specific syntax is provided in Processing.
A **For loop** is often used in problems where certain lines of code need to be repeated pre-determined (known) number of times.

Syntax:
            for(Initialization; Boolean_Expression; Modifier) {
              loop body;
            }
         for (int count=0;count<=10;count++)
           loop body;

Explanation of execution sequence:
1. *Initialization -* ***executes only the first iteration of the loop***
2. *Boolean_Expression -* the loop test
3. *loop body* - execute only if loop test is *true*
4. *Modifier -* typically changes the loop counter
5. *Boolean_Expression -* ***Repeat the loop test (step 2), etc.***

An important part of the loop is the Boolean expression. If incorrectly constructed the loop may never work or become infinite.
Computers do not have the ability to think (yet), however are able to evaluate mathematical and logical expressions for being True/False. This is done with the help of comparison where 2 sides of an expression are compared with the help of comparison signs.

Math notation	Meaning	Processing notation	Syntax Example
=	Equal to	==	x==0; answer = 'y'
≠	Not equal to	!=	x !=0 answer != 'y'
>	Greater than	>	x > 0
≥	Greater than or equal to	>=	x>=0
<	Less than	<	x < 0
≤	Less than or equal to	<=	x <= 0

Practice: Test each loop below and describe the output

Sorry, I don't know how I did that ∨

for(int y =1; y<=100; y++)
    {
        total=total+y;
    }
Total cannot be resolved to a variable
	for(int count = 9; count >= 0; count--)
	  {
	    print("T = " + count);
	    println(" and counting");
	  }
	println("Blast off!"); **It prints all at once and shows**
		for (char letter = 'A'; letter <= 'C'; letter++)
		
		     println ("I know my " + letter);

Loop Lesson   Assignments   **/70 T/A**

The assignments should be completed in pairs.

A. Complete the code on paper. NO COMPUTER!
B. Submit prior to computer work for approval.
C. Once approved, write a Processing program for each problem.

1. Ask the user to enter a number. Write a **for loop** which will add all values between 1 and the number entered by the user.

2. Write a for loop which will count by 2s from a number entered by the user to another number entered by the user (i.e. from 10 to 20). You can use variables in the loop conditions.

3.   Modify the program to have a loop counting down from a number entered by the user. Inside the loop output the loop count.

4. Write a for loop which will take 2 numbers from the user – start and stop number.
    Then it will print in a table format
    a)the loop counter value
    b)the current value of the loop counter multiplied by itself,
    c) the square root of the loop counter multiplied by 2 plus 5
    d) the result of the square root as a fraction (1/x).

the loop counter value	the current value of the loop counter multiplied by itself	the square root of the loop counter multiplied by 2 plus 5	the result of the square root as a fraction (1/x).
5	5 x 5	√5 x2 +5	1/√5

5. Create a graphics program which will draw a house with a picket fence. The fence must be drawn with line command inside a loop.

6. Create graphics program which will draw balloons using loops. Balloons of few different sizes should be created. A string suspended from the balloon may be included. Bonus marks for having the balloons filled not with a fill command but with stroke.

    Submission instructions:

    1. _Submit all plans as picture or word/pdf format._
    2. _Save each assignment as a separate Processing file. Place in a folder **(folder name YourName_LoopsLesson)   and submit.**_