Assignment 5: Nested loops

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In the previous exercise, you used while, do-while and for loops. You should read following topics before starting this exercise

1. Different types of loop structures in C.
2. Syntax for these statements.
3. Usage of each loop structure

Nested loop means a loop that is contained within another loop. Nesting can be done upto any levels. However the inner loop has to be completely enclosed in the outer loop. No overlapping of loops is allowed.

Sr. No	Format	Sample Program

1.	**Nested for loop**
	
	for(exp1; exp2 ; exp3)
	{.....
	for(exp11; exp12 ; exp13)
	{.....
	}
	.....
	}
		/* Program to display triangle of numbers*/
		
		#include <stdio.h>
		void main( )
		{
		int n , line_number , number;
		printf("How many lines: ");
		scanf("%d",&n);
		for(line_number =1 ;line_number <=n;
		line_number++)
		{
		for(number = 1; number <= line_number;
		number++)
		printf ("%d\t", number);
		printf ("\n");
		}
		}

2.	**Nested while loop / do while loop**
	
	while(condition1)
	{.....
	while(condition2)
	{.....
	}
	.....
	}
	
	do
	{ .....
	while(condition1)
	{ .....
	}
	.....
	} while (condition2);
		/* Program to calculate sum of digits till
		sum is a single digit number */
		
		#include <stdio.h>
		void main( )
		{
		int n , sum;
		printf("Give any number ");
		scanf("%d",&n);
		do
		{
		sum =0;
		printf("%d --->",n);
		while (n>0)
		{ sum +=n%10;
		n= n/10;
		}
		n=sum;
		} while(n >9);
		printf (" %d" , n);
		}

Note: It is possible to nest any loop within another. For example, we can have a for loop inside a while or do while or a while loop inside a for.

Set A . Write C programs for the following problems.

1. Write a program to display all prime numbers between____and __.
2. Write a program to display multiplication tables from to having n multiples each. The output should be displayed in a tabular format. For example, the multiplication tables of 2 to 9 having 10 multiples each is shown below.

   2 * 1=2 3 * 1 = 3 .....9 * 1 =9
   2 * 2=4 3 * 2 = 6.....9 * 2 =18
   .....
   2 * 10=20 3 *10 = 30..... 9 * 10 =90

3. Modify the sample program 1 to display n lines as follows (here n=4).

   AA
   BB CC
   DD EE FF
   GG HH II JJ
   KK LL MM NN OO

Signature of instructor [ ] Date [/ /]

Set B. Write C programs for the following problems.

1. Write a program to display all Armstrong numbers between 1 and 500. (An Armstrong number is a number such that the sum of cube of digits=number itself Ex.153=1*1*1+5*5*5+3*3*3

2. Accept characters till the user enters EOF and count the number of lines entered. Also display the length of the longest line. (Hint: A line ends when the character is \n)

3. Displayallperfectnumbersbelow500.[Aperfectnumberisanumber,suchthatthesu mof itsfactorsisequaltothenumberitself].Example:6(1+2+3),28(1+2+4+7+14)

4. Accept a number. Count number of digits in it and also find the sum of its digits. (Ex. N=1988 then count=4 sum=26)

5. Accept a number to calculate sum of digits of a number, till the sum reaches single digit. (Ex. N=3456 -> 3+4+5+6=18 ->1+8=9)

6. Write a C program to find the answer of following series.

Signature of instructor [ ] Date [/ /]

Assignment Evaluation

0: Not done [ ] 2: Late Complete [ ] 4: Complete [ ]
1: Incomplete [ ] 3: Needs improvement [ ] 5: Well Done [ ]

Signature