"Heaven's Light is Our Guide"

Department of Computer Science & Engineering

RAJSHAHI UNIVERSITY OF ENGINEERING & TECHNOLOGY

Programming in C

Lab Manual

Lab 3

Control Statements - while loop, for loop and do-while loop

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Lab Objectives:

- Explain the basic of **for** loop and **while** loop,
- To apply the syntax of loop structure,
- Design program using loop structure.

Background:

The loop can be used to do repetitive calculations. For example, in order to compute the sum of 1 to 100 (i.e., 1 + 2 + 3 + ... + 100), we can do easily using the following code segment:

```
int sum = 0;
for (int j = 1; j <= 100; j++)
sum += j;
```

There are two control structures used often: the 'for' loop and the 'while' loop (and 'do while' as a different way of while). The syntaxes of these loop structures are as follows:

```
for( initialize loop variables ; loop terminator ; loop variable update )
{
statements in the block or one statement
}
```

```
while(condition){
statements in the block or one statement
}
```

```
do{
statements in the block or one statement
}while(condition);
```

.

Some Examples:

1. Write a program that adds two numbers repeatedly.

Program code:

```
#include<stdio.h>
int main()
{
int a, b, c; char ch;
```

```
while(1) {
        printf("Enter values of a and b\n");
        scanf("%d%d",&a,&b);
        c = a + b;
        printf("a + b = %d\n", c);
        printf("Do you wish to add more numbers(y/n):  ");
        scanf(" %c",&ch);
        if ( ch == 'y' || ch == 'Y' ) continue;
        else
        break;
        }
return 0;
}
```

2. Write a program to find the summation 1+2+3+4+……. +100.

Program code:

```
#include<stdio.h>
int main()
{
int sum = 0, number;
for(number= 1; number <= 100 ; number++)
sum += number;
printf("1+2+3+.....+100= %d",sum);
return 0;
}
```

3. Write a program to add n numbers.

Program code:

```
#include <stdio.h>
int main() {
int noOfIntegers, sum, count, value;
printf("Enter the number of integers you want to add: ");
scanf("%d", &noOfIntegers);
printf("Enter %d integers: \n",noOfIntegers);

sum = 0;
for(count = 1; count <= noOfIntegers; count++){
        scanf("%d",&value);
        sum = sum + value;
}
printf("Sum of the entered integers = %d\n",sum);
return 0;        }
```

4. Write a program that accepts the number of rows from the user and generates the following output:

Sample Input: Enter the number of rows: **5** ***Sample Output:*** * * * * * * * * * * * * * * *	***Sample Input:*** Enter the number of rows: **3** ***Sample Output:*** * * * * * *

Program code:

```
#include<stdio.h>
int main(){
   int n, line, star;
   printf("\n Enter the number of rows: ");
   scanf("%d",&n);
   for(line=1; line<=n; line++){
      for(star=1; star<= line; star++){
         printf(" * ");
         }
       printf("\n");
   }
   return 0;
}
```

Exercise:

1. **Write a program to find the factorial of a given number.**
   [CLUE**:** 5! = 1*2*3*4*5; 8! = 1*2*3*4*5*6*7*8]
2. **Write a program to find the minimum of N numbers.**
3. **Write a program that will take a lower limit (x1) and an upper limit (x2) of a range from the user and find the summation of all the integer numbers which are between x1 & x2 and divisible by 3.**
4. **Write three different programs that will accept the number of rows from the user and generate the following outputs:**

(a)

Sample Input:
Enter the number of rows: **5**
Sample Output:
* * * * *
* * * *
* * *
* *
*

(b)

Sample Input:
Enter the number of rows: **5**
Sample Output:
1
2 2
3 3 3
4 4 4 4
5 5 5 5 5

(c)

Sample Input:
Enter the number of rows: **5**
Sample Output:
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1