	SVKM's NMIMS Mukesh Patel School of Technology Management & Engineering / School of Technology Management & Engineering	
B. Tech/MBA Tech	**Workbook**	**Academic Year- 2024-25**
Year:-First	**Subject:-** Programming for Problem Solving	**Semester: - First**

Experiment: 5

PART A

(PART A: TO BE REFERRED BY STUDENTS)

Aim: Programming using nested loops

Learning Outcomes: The learner would be able to

1. Understand the syntax of nested loop
2. Use nested to solve problems by writing programs

Theory:

Nested Loop (loop inside loop):

- A loop within another loop is known as nested loop.
- Combinations of any loops are possible.

Syntax:-

Nested For	**Nested While**	**Nested Do While**

for (initialization; condition; update)
{
for (initialization; condition; update)
{
// body of inner loop
}
// body of outer loop
}
	while (condition)
	{
	while (condition)
	{
	// body of inner loop
	}
	// body of outer loop
	}
		do
		{
		do
		{
		// body of inner loop
		}while (condition);
		// body of outer loop
		}while (condition);

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Nested Loop

Loop to displays 12345

O/P

```
1
2
3
4
5
```

```
for( i=1 ; i<=5 ; i++){
        cout<<i;

        cout<<endl;
}
```

Loop to displays *****

```
for( j=1 ; j<=5 ; j++){
        cout<<"*";
}
```

Output:-

*****

Nested Loop: Ex1

```
for( i=1 ; i<=5 ; i++){
        for( j=1 ; j<=5 ; j++){
                cout<<"*";
        }
        cout<<endl;
}
```

Values of j	12345 (for every value of i)
Values of i	Actual Output:-
1	*****
2	*****
3	*****
4	*****
5	*****

Nested Loop: Ex2

```
for( i=1 ; i<=5 ; i++){
        for( j=1 ; j<= i ; j++){
                cout<<"*";
        }
        cout<<endl;
}
```

i	Output:-	j
1	*	12
2	**	123
3	***	1234
4	****	12345
5	*****	123456

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Nested Loop: Ex3

```
for( i=1 ; i<=5 ; i++){
        for( j=1 ; j<= i ; j++){
                cout<<j;
        }
        cout<<endl;
}
```

i
1
2
3
4
5

Output:-

```
1
12
123
1234
12345
```

j
12
123
1234
12345
123456

Nested Loop: Ex4

```
for( i=1 ; i<=5 ; i++){
        for( j=1 ; j<= i ; j++){
                cout<<i;
        }
        cout<<endl;
}
```

i
1
2
3
4
5

Output:-

```
1
22
333
4444
55555
```

j
12
123
1234
12345
123456

Nested Loop: Ex5

```
char ch = 'A' ;
for( i=1 ; i<=5 ; i++){
        for( j=1 ; j<= i ; j++){
                cout<<ch;
        }
        cout<<endl;
        ch++;
}
```

i
1
2
3
4
5

Output:-

```
A
BB
CCC
DDDD
EEEEE
```

j
12
123
1234
12345
123456

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***** ***** ***** ***** *****	* ** *** **** *****	* ** *** **** *****	* * * * * * * * * * * * * * *	

int main( )
{
int i,j;
for(i=1;i<=5;i++){
for(j=1;j<=5;j++){
cout<<"*";
}
cout<<"\n";
}
return 0;
}
	int main( )
	{
	int i,j;
	for(i=1;i<=5;i++){
	for(j=1;j<=i;j++){
	cout<<"*";
	}
	cout<<"\n";
	}
	return 0;
	}
		void main( )
		{
		int i,j,k;
		for(i=1;i<=5;i++){
		for(k=1;k<=5-i;k++)
		cout<<" ";
		for(j=1;j<=i;j++){
		cout"*";
		}
		cout<<"\n";
		}
		}
			int main( )
			{
			int i,j,k;
			for(i=1;i<=5;i++){
			for(k=1;k<=5-i;k++)
			cout<<" ";
			for(j=1;j<=i;j++){
			cout<<" *";
			}
			cout<<"\n";
			} return 0;
			}
				int main( )
				{
				int i,j,k;
				for(i=1;i<=5;i++){
				for(k=1;k<=40-3*i;k++)
				cout<<" ";
				for(j=1;j<=i;j++){
				cout<< " *";
				}
				cout<<"\n";
				} return 0;
				}

***** **** *** ** *			1 22 333 4444 55555	1 00 111 0000 11111

int main( )
{
int i,j,k;
for(i=5;i>=1;i--){
for(j=i;j>=1;j--){
cout<<"*");
}
cout<<"\n";
}
return 0;
}
	int main( )
	{
	int i,j,k;
	for(i=5;i>=1;i--){
	for(k=5;k>=i;k--)
	cout<<" ";
	for(j=i;j>=1;j--){
	cout<<"*";
	}
	cout<<"\n";
	}return 0;
	}
		int main( )
		{
		int i,j,k;
		for(i=1;i<=5;i++){
		for(j=1;j<=5;j++){
		if(i==1||j==1||i==5||j==5)
		cout<<"*";
		else cout<<" ";
		}
		cout<<"\n";
		}return 0;
		}
			int main( )
			{
			int i,j;
			for(i=1;i<=5;i++){
			for(j=1;j<=i;j++){
			cout<<i;
			}
			cout<<"\n";
			}
			return 0;
			}
				int main( )
				{
				int i,j;
				for(i=1;i<=5;i++){
				for(j=1;j<=i;j++){
				cout<<i%2;
				}
				cout<<"\n";
				}
				return 0;
				}

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Tasks:

Write programs to print the following patterns using nested loop, your all program should read number of lines to be displayed from user.

Sr. No.	Pattern To Be Printed Using Nested Loop	Flow chart
1	***** **** *** ** *	√
2	????* ???** ??*** ?**** *****	
3	@ @ @ @ @ @	
4	A A B A B C C B A B A A	
5	A bc DEF ghij KLMNO	
6	54321 4321 321 21 1	
7	1 10 101 1010 10101	
8.	Write a program to check entered number is strong number or not.	

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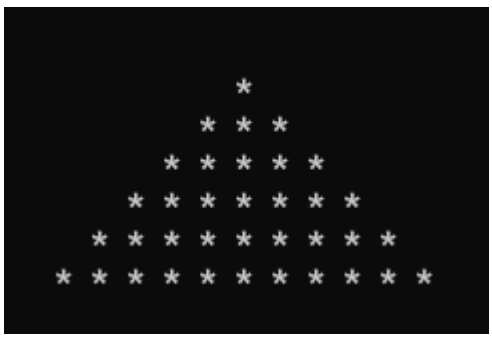
Additional Questions: -

1. Write a program to print tables from 1 to 10
2. WAP to generate all combinations of 1, 2 & 3 using for loop.
3. Write a C++ program to print Armstrong numbers between N_1 to N_2, where $N_2 > N_1$.
4. Write a C++ program to print prime numbers between N_1 to N_2, where $N_2 > N_1$.
5. Write a program in C++ to calculate the series (1) + (1+2) + (1+2+3) + (1+2+3+4) + ... + (1+2+3+4+...+n).

//Program to print following pattern using nested loop




```
#include<iostream>
using namespace std;
int main(){
      int i,j,n;
      cout<<"Enter no of lines"<<endl;
      cin>>n;
      for(i=0;i<n;i++){   //No of lines
            for(int k=0;k<=40-2*i+1;k++)   // No of spaces
                  cout<<" ";
            for(j=1;j<=i*2+1;j+=1){    // Printing *
                  cout<<" *";
            }
            cout<<endl;
      }
}
```