IAP LAB 10

BY

ENG. JOUD KHATTAB

LOOP STATEMENT

In C++

FOR STATEMENT

- The general form of the for statement is:

  for (initial statement ; loop condition ; update statement)

  {

         statements

  }

- Example:

```cpp
for (int counter = 1; counter <= 10; counter++)
{
    cout << counter << endl;
}
```

FOR STATEMENT

- The for loop executes as follows:
  1. The initial statement executes:
     - The initial statement initializes a variable.
     - The initial statement is the first to be, executed and is executed only once.
  2. The loop condition is evaluated:
     - If the loop condition evaluates to true:
       - Execute the for loop statement then Execute the update statement.
  3. Repeat the previous step until the loop condition evaluates to false.

EXERCISES

FACTORIAL

The factorial function is defined by the product

$$n! = 1 \cdot 2 \cdot 3 \cdots (n-2) \cdot (n-1) \cdot n,$$

1! = 1 = 1

2! = 2 x 1 = 2

3! = 3 x 2 x 1 = 6

4! = 4 x 3 x 2 x 1 = 24

5! = 5 x 4 x 3 x 2 x 1 = 120

6! = 6 x 5 x 4 x 3 x 2 x 1 = 720

7! = 7 x 6 x 5 x 4 x 3 x 2 x 1 = 5,040

8! = 8 x 7 x 6 x 5 x 4 x 3 x 2 x 1 = 40,320

9! = 9 x 8 x 7 x 6 x 5 x 4 x 3 x 2 x 1 = 362,880

10! = 10 x 9 x 8 x 7 x 6 x 5 x 4 x 3 x 2 x 1 = 3,628,800

FACTOR EXAMPLE WHILE VERSION 1

```cpp
int factor=1,n;
cin >> n;
int counter = 1;
while (counter <= n)
{
    factor = factor * counter;
    counter++;
}
cout << "The Factor is " << factor << endl;
```

8 **FACTOR EXAMPLE WHILE VERSION 2**

```cpp
int factor=1,n;
cin >> n;
int counter = n;
while (counter >= 1)
{
    factor = factor * counter;
    counter--;
}
cout << "The Factor is " << factor << endl;
```

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FACTOR EXAMPLE FOR VERSION 1

```cpp
int factor=1,n;
cin >> n;
for (int counter = 1; counter <= n; counter++)
{
    factor = factor * counter;
}
cout << "The Factor is " << factor << endl;
```

FACTOR EXAMPLE
FOR VERSION 2

```cpp
int factor=1,n;
cin >> n;
for (int counter = n; counter >= 1; counter--)
{
    factor = factor * counter;
}
cout << "The Factor is " << factor << endl;
```

POWER EXAMPLE

$$x^n = \underbrace{x * x * \cdots * x}_{n}$$

POWER EXAMPLE
WHILE VERSION

```cpp
int power = 1, x, n;
cin >> x >> n;
int counter = 1;
while (counter <= n)
{
    power = power * x;
    counter++;
}
```

POWER EXAMPLE
FOR VERSION

```cpp
int power = 1, x, n;
cin >> x >> n;
for (int counter = 1; counter <= n; counter++)
{
    power = power * x;
}
```

MULTIPLE LOOPS
TOTAL LOOPS NUMBER

5

+

3

=

8

```cpp
for (int counter = 1; counter <= 5; counter++)
{
    cout << "Hi" << endl;
}


for (int counter = 1; counter <= 3; counter++)
{
    cout << "Hi" << endl;
}
```

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MULTIPLE LOOPS
TOTAL LOOPS NUMBER

5 * 3

```cpp
for (int counter = 1; counter <= 5; counter++)
{
    for (int counter = 1; counter <= 3; counter++)
    {
        cout << "Hi" << endl;
    }
}
```

=

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HOME WORK 1

Write a program that prints the Multiplication table, the user must enter the limit of the table

EXTRA EXERCISES 1

Write a program that finds if a number is prime or not.

EXTRA EXERCISES 2

Write a program that finds list of prime numbers between range of numbers.