Sheet 4 loops

1. **Write a C++ Program to find factorial of a number.**

Note: Factorial on n = 1*2*3*...*n

Sample output
Enter a positive integer: 5
Factorial of 5= 120

Answer:

```
#include <iostream>
using namespace std;
int main()
{
    int i, n, factorial = 1;
    cout << "Enter a positive integer: ";
    cin >> n;
   if(n<0)
     cout<<"enter positive number";
   else if(n==0)
          cout<<"\n factorial 0= "<<factorial;
   else
   {
    for (i = 1; i <= n; ++i) {
        factorial *= i;
    }

    cout<< "Factorial of "<<n<<" = "<<factorial;
  }
  return 0;
}
```

2. **Write a program in C++ to find the Greatest Common Divisor (GCD) of a number.**

Sample Output:
Input a number: 15
The Greatest Common Divisor is: 5

Answer:

```
#include<iostream>
using namespace std;
int main()
{
    int num, gcd;
    cout << " Input a number: ";
    cin >> num;
    for (int i = 2; i <= num/2; i++)
    {
        if (num % i == 0)
        {
            gcd = i;
```

```
        }
    }
    cout << " The Greatest Common Divisor is: " << gcd << endl;
    return 0;
}
```

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3. **Write a program in C++ to find the first and last digit of a number.**

Sample Output:

```
 Find the first and last digit of a number:
-----------------------------------------------
 Input any number: 5679
 The first digit of 5679 is: 5
The last digit of 5679 is: 9
```

Answer:

```
#include <iostream>
using namespace std;
int main()
{
   int n,first,last;
    cout << "\n\n Find the first and last digit of a number:\n";
    cout << "-----------------------------------------------\n";
    cout << " Input any number: ";
    cin >> n;
    first = n;
    last=n % 10;
    for(first=n;first>=10;first=first/10);
    cout<<" The first digit of "<<n<<" is: "<<first<<endl;
    cout<<" The last digit of "<<n<<" is: "<<last<<endl;
}
```

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4. **Write a program in C++ to display the multiplication table vertically from 1 to n.**

Sample Output:

Input the number up to: 5
Multiplication table from 1 to 5
1x1=1 2x1=2 3x1=3 4x1=4 5x1=5
1x2=2 2x2=4 3x2=6 4x2=8 5x2=10
1x3=3 2x3=6 3x3=9 4x3=12 5x3=15
1x4=4 2x4=8 3x4=12 4x4=16 5x4=20
1x5=5 2x5=10 3x5=15 4x5=20 5x5=25
1x6=6 2x6=12 3x6=18 4x6=24 5x6=30
1x7=7 2x7=14 3x7=21 4x7=28 5x7=35
1x8=8 2x8=16 3x8=24 4x8=32 5x8=40

1x9=9 2x9=18 3x9=27 4x9=36 5x9=45
1x10=10 2x10=20 3x10=30 4x10=40 5x10=50

Answer:

```
#include <iostream>

using namespace std;
int main()
{
    int j, i, n;
    cout << "Input the number up to 5: ";
    cin >> n;
    cout << "Multiplication table from 1 to " << n << endl;
    for (i = 1; i <= 10; i++)
    {
        for (j = 1; j <= n; j++)
        {
                cout << j << "x" << i << "=  " << i * j<< "  ";
        }
        cout << endl;
    }
}
```

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1. What is the output of the following C++ code?

a) int count = 1;
int y = 100;
while (count < 100){
y = y - 1;
count++; }
cout<<"y ="<<y<<"and count ="<<count<<endl;

answer:
y =1 and count =100

b) Suppose that the input is:
58 23 46 75 98 150 12 176 145 -999
What is the output of the following program?
#include <iostream>
using namespace std;
int main() {
int num;
cout<<“enter a num”; cin >> num;

```
while (num != -999) {
cout << num % 25 << " ";
cin >> num; }
cout << endl;
    return 0;}
```

answer:

8
23
21
0
23
0
12
1
20

c)

```
#include <iostream>
using namespace std;
int main() {
int x, y, z;
x = 4; y = 5;
z = y + 6;
while (((z - x) % 4) != 0) {
cout << z << " ";
z = z + 7; }
cout << endl;
return 0; }
```

Answer:

11 18 25

d)

```
int num = 5;
while (num > 5)
num = num + 2;
cout << num << endl;
```

answer:

5

e)

```
int num = 1;
while (num < 10){
```

```
        cout << num << " ";
        num = num + 2; }
              cout << endl;
```

answer:

1 3 5 7 9