Object Oriented Programming lab

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Assignment #14

Umar Farooq
09-131242-088
BSE-2B

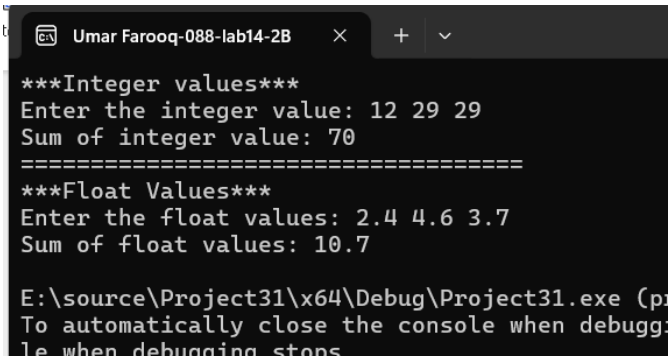
DEPARTMENT OF SOFTWARE ENGINEERING
BAHRIA UNIVERSITY ISLAMABAD CAMPUS

Task 01: Write a program to calculate and print the sum of three integer and floating-point values. Take numbers as an input from the user. Use the function template.

Code:

```
#include <iostream>
using namespace std;
template <typename M>
M sum(M x, M y, M z)
{
	return x + y + z;
}
int main()
{
	int a, b, c;
	cout << "***Integer values***" << endl;
	cout << "Enter the integer value: ";
	cin >> a >> b >> c;
	cout << "Sum of integer value: " << sum(a, b, c) << endl;
	cout << "====================================" << endl;
	cout << "***Float Values***" << endl;
	float d, e, f;
	cout << "Enter the float values: ";
	cin >> d >> e >> f;
	cout << "Sum of float values: " << sum(d, e, f) << endl;
}
```

Output:



Task 02: Write a template function that returns the average of all the elements of an array. The arguments to the function should be the array name and the size of the array (type int).

In main(), exercise the function with arrays of type int, float and double .

Code:

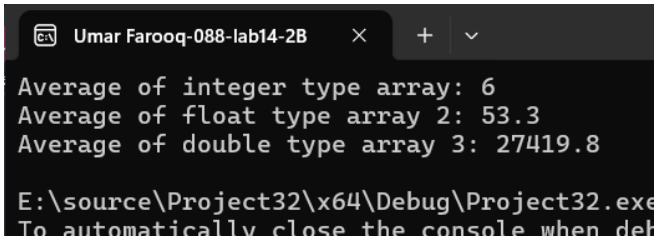
```
#include <iostream>
using namespace std;
template <typename T>
double average(T arr[], int size)
{
	T sum = 0;
	for (int i = 0; i < size; i++)
	{
		sum += arr[i];
	}
	return sum / (1.0 * size);
}
int main()
{
	int arr1[] = { 3,6,9 };
	int size1 = sizeof(arr1) / sizeof(arr1[0]);

	float arr2[] = { 3.6,33.9,122.4 };
	int size2 = sizeof(arr2) / sizeof(arr2[0]);

	double arr3[] = { 13434.4,34563.7,34261.4 };
	int size3 = sizeof(arr3) / sizeof(arr3[0]);

	cout << "Average of integer type array: " << average(arr1, size1) << endl;
	cout << "Average of float type array 2: " << average(arr2, size2) << endl;
	cout << "Average of double type array 3: " << average(arr3, size3) << endl;
	return 0;
}
```

Output:

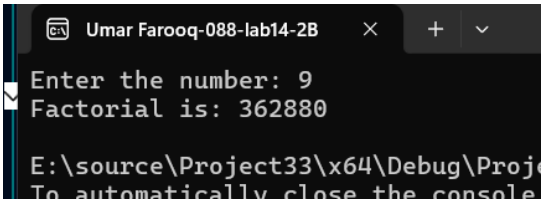


Task 03: Write a class template for the factorial class.

Code:

```
#include <iostream>
using namespace std;
template <class T>
class Factorial {
private:
	T num;
public:
	Factorial(T n)
	{
		num = n;
	}
	T calcFact()
	{
		T result = 1;
		for (int i = 1; i <= num; i++)
		{
			result *= i;
		}
		return result;
	}
};
int main()
{
	int n;
	cout << "Enter the number: ";
	cin >> n;
	Factorial<int> f(n);
	cout << "Factorial is: " << f.calcFact() << endl;
	return 0;
}
```

Output:



Task 04: Write a program to generate the Fibonacci series using class template.

Code:

```
#include <iostream>
using namespace std;
template <class T>
class Fibonacci {
private:
	T num;
public:
	Fibonacci(T n)
	{
		num = n;
	}
	void calcFibonacci()
	{
		T a = 1, b = 2, next;
		for (int i = 0; i < num; ++i)
		{
			cout << a << " ";
			next = a + b;
			a = b;
			b = next;
		}
	}
};
int main()
{
	int n;
	cout << "Enter the number: ";
	cin >> n;
	Fibonacci<int> f(n);
	f.calcFibonacci();
	return 0;
}
```

Output: