Programming Laboratory-I

Assignment No-7

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1. Write C++ Program to display largest among two numbers using function templates.

Code:

1.cpp

Assignment_7 > 1.cpp > maximum<T>(T, T)

```
1   # include <bits/stdc++.h>
2   using namespace std;
3   // Definig a Templates for the function maximum
4   template<typename T>
5
6   T maximum(T a,T b){
7       return max(a,b);
8   }
9
10  int main(){
11      cout<<"The maximum of the numbers is "<<maximum<int>(2,7)<<endl;
12      cout<<"The maximum of the numbers is "<<maximum<float>(27,17)<<endl;
13      cout<<"The maximum of the numbers is "<<maximum<char>('a','A')<<endl;
14      return 0;
15  }
```

OUTPUT:

The maximum of numbers is 7.

The maximum of numbers is 27.

The maximum of numbers is a.

2. Write C++ Program to swap data using function templates.

Code:

2.cpp

Assignment_7 > 2.cpp > swaping<T>(T, T)

```
1   # include <bits/stdc++.h>
2   using namespace std;
3   // Definig a Templates
4   template<typename T>
5
6   // Swap Function
7   void swaping(T a,T b){
8       cout<<"The elements Before Swap :"<<" a= "<<a<<" b = "<<b<<endl;
9       swap(a,b);
10      cout<<"The elements After Swap :"<<" a= "<<a<<" b = "<<b<<endl;
11  }
12  // Main Function
13  int main(){
14      swaping<int>(2,7);
15      swaping<float>(27.0,17.7);
16      swaping<char>('a','A');
17      return 0;
18  }
```

OUTPUT:

1. **a=7 b=2**
2. **a=17.7 b=27.0**
3. **a=’A’ b=’a’**

3. Write C++ Program to add, subtract, multiply and divide two numbers using class template.

Code:

```cpp
# include <bits/stdc++.h>
using namespace std;
template<typename T>
// ADD Function
T add(T a,T b){
    return a+b;
}

// Subtraction Function
template<typename T>
T sub(T a,T b){
    return abs(a-b);
}

// Multiplication Function
template<typename T>
T multiply(T a,T b){
    return a*b;
}

// Divide Function
template<typename T>
T divide(T a,T b){
    return a/b;
}

// Main Function
int main(){
    cout<<" (const char [29])"Subtraction of 25 and 6 is: "
    cout<<"Subtraction of 25 and 6 is: "<<sub<int>(25,6)<<endl;
    cout<<"Multiply of 5.2 and 6.1 is: "<<multiply<float>(5.2,6.1)<<endl;
    cout<<"Division of 25.0 and 3.2 is: "<<divide<float>(25.0,3.2)<<endl;
    return 0;
}
```

OUTPUT:

1. **11**
2. **19**
3. **31.72**
4. **7.832**

4. Write C++ Program for creating a class Numbers which has two generic type variable x and y; create two objects NUM1 and NUM2 which will accept integer and float type data types.

Code:

4.cpp

Assignment_7 > 4.cpp > ...

```
1   # include <bits/stdc++.h>
2   using namespace std;
3   // Generic classes
4   template<typename T>
5   class Numbers{
6       public:
7           T x,y;
8           Numbers(T a,T b){x=a,y=b;}
9
10          void display(){
11              cout<<"Numbers are: "<<x<<" "<<y<<endl;
12          }
13  };
14
15  // Main Function
16  int main(){
17      class Numbers<int> Num1(2,3);
18      class Numbers<float> Num2(3.8,4.5);
19      Num1.display();
20      Num2.display();
21      return 0;
22  }
```

OUTPUT:

1. Numbers are: 2 and 3
2. Numbers are 3.8 and 4.5

5. Write C++ Program which will demonstrate use of function template overloading.

Code:

5.cpp

Assignment_7 > 5.cpp > ...

```cpp
# include <bits/stdc++.h>
using namespace std;
// Generic classes
// Function with 1 parameters
template<typename T>
T add(T a){return a+0;}

// Function with 2 Parameters
template<typename T>
T add(T a,T b){return a+b;}

// Function with 3 parameters
template<typename T>
T add(T a,T b,T c){return a+b+c;}

// Main Function
int main(){
    cout<<add<int>(20)<<endl;
    cout<<add<float>(20,35.4)<<endl;
    cout<<add<int>(20,23,45)<<endl;
    return 0;
}
```

OUTPUT:

1. **20**
2. **65,4**
3. **88**

6. Write C++ Program using class template to perform searching operation on generic array.

Code:

4.cpp 5.cpp 6.cpp

Assignment_7 > 6.cpp > search<T>(T, T)

```
1   # include <bits/stdc++.h>
2   using namespace std;
3
4   template<typename T>
5   T arr[100]={2,3,4,5,6,7,8,9,1,22};
6   template<typename T>
7   void search(T x,T size){
8       int j=0;
9       for(int i=0;i<size;i++){
10          if(x==arr<T>[i]){
11              cout<<"The element is present inside the array\n";
12              j=1;
13          }
14      }
15      if(j==0){cout<<"The element is not present in array\n";}
16  }
17
18  int main(){
19      search<int>(23,10);
20      return 0;
21  }
```

OUTPUT:

Ans: The Element is Not present in the array.