Q1. Write a C++ program to demonstrate the addition of multiple types of data using generic functions or templates.

#include <iostream>

#include <fstream>

#include <conio.h>

using namespace std;

template <typename A, typename B, typename C>

C add(A a, B b);

template <typename T>

T ans;

int main()

{

ans<int> = add<int, int, int>(5, 4);

cout<<"Addition (int) = "<<ans<int><<endl;

ans<float> = add<float, float, float>(5.5f, 5.2f);

cout<<"Addition (float) = "<<ans<float><<endl;

ans<double> = add<int, float, double>(7, 5.1);

cout<<"Addition (double) = "<<ans<double><<endl;

}

template <typename A, typename B, typename C>

C add(A a, B b)

{

C c = a + b;

return c;

}

Q2. Write a C++ Program to find Largest among two numbers using function template.

#include <iostream>

using namespace std;

template <typename X>

X Large(X a, X b);

int main()

{

cout<<"float = "<<Large<float>(5, 5.6f)<<endl;

cout<<"int = "<<Large<int>(5.5f, 6);

}

template <typename X>

X Large(X a, X b)

{

return (a>b)? a: b;

}

Q3. Write a C++ program to find the largest of three elements using a template.

#include <iostream>

using namespace std;

template <typename A = int, typename B = int, typename C = int, typename X = int>

X Large(A a, B b, C c)

{

if(a > b)

{

if(a > c)

{

return a;

}

else

{

return c;

}

}

else

{

if(b > c)

{

return b;

}

else

{

return c;

}

}

}

int main()

{

cout<<"int float double = "<<Large<int, float, double, double>(5, 6.5f, 7.5)<<endl;

cout<<"int float double = "<<Large<int, float, double, int>(5, 6.5f, 7.5)<<endl;

cout<<"int float double = "<<Large(5, 6.5f, 7.5)<<endl;

}

Q4. Write a C++ Program to Swap data using function template.

#include <iostream>

using namespace std;

template <typename T>

void Swap(T a, T b)

{

cout<<"Before swap"<<endl<<"a = "<<a<<endl<<"b = "<<b<<endl;

T c;

c = a;

a = b;

b = c;

cout<<"After swap"<<endl<<"a = "<<a<<endl<<"b = "<<b<<endl;

}

int main()

{

Swap<int>(10, 20);

Swap<float>(50.5f, 60.9f);

}

Q5. Write a C++ Program to Add two numbers using function template.

#include <iostream>

using namespace std;

template <typename T>

T add( T a, T b);

int main()

{

cout<<"int = "<<add<int>(5, 5)<<endl<<endl;

cout<<"float = "<<add<float>(5.5f, 5)<<endl<<endl;

cout<<"double = "<<add<double>(5.6, 5.6)<<endl<<endl;

}

template <typename T>

T add( T a, T b)

{

return a + b;

}

Q6. Write a C++ Program to find Sum of Array using function template.

#include <iostream>

#include <vector>

using namespace std;

int main()

{

int n = 0, sum = 0, p = 0;

cout<<"How many elements you want to enter = ";

cin>>n;

vector<int> v(n);

cout<<"Enter element in v"<<endl<<endl;

for(int i = 0; i < n; i++)

{

cout<<i<<") position = ";

cin>>p;

v.insert(v.begin()+i, p);

}

for(int i = 0; i < v.size(); i++)

{

sum = sum + v.at(i);

}

cout<<"Addition = "<<sum;

}

Q7. Write a C++ Program of Templated class derived from Non-templated class.

#include <iostream>

using namespace std;

class Parent

{

public:

int number()

{

return 5;

}

};

template <typename T>

class Child: public Parent

{

public:

void addition(T num)

{

cout<<"Addition = "<<number() + num;

}

};

int main()

{

Child<float> c;

c.addition(10.2);

}

Q8. Write a C++ Program to implement push and pop methods from stack using template.

#include <iostream>

#include <conio.h>

#include <vector>

using namespace std;

int main()

{

vector<int> v = {10, 20, 30, 40, 50, 60};

int ch = 0;

while(ch != 3 )

{

cout<<"1. Push element"<<endl;

cout<<"2. Pop element"<<endl;

cout<<"3. Exit"<<endl<<endl;

cout<<"Enter choice >>> ";

cin>>ch;

switch(ch)

{

case 1:

{

int n = 0;

cout<<"Enter element to push = ";

cin>>n;

v.push\_back(n);

cout<<"Push Successfull"<<endl<<endl;

for(int n:v)

cout<<n<<" ";

getch();

break;

cout<<endl<<endl;

}

case 2:

{

v.pop\_back();

for(int n:v)

cout<<n<<" ";

cout<<"Pop Successfull"<<endl<<endl;

getch();

break;

cout<<endl<<endl;

}

}

}

}

Q9. Write a C++ Program to Perform Simple Addition Function Using Templates.

#include <iostream>

using namespace std;

template <typename T>

void add()

{

T num1, num2, ans;

cout<<"Enter two number = ";

cin>>num1>>num2;

ans = num1 + num2;

cout<<"Answer = "<<ans;

}

int main()

{

cout<<endl<<"Int data type"<<endl;

add<int>();

cout<<endl<<"Float data type"<<endl;

add<float>();

}

Q10. Write a C++ program to implement Hash Table using Template Class.

#include <iostream>

#include <map>

#include <iterator>

using namespace std;

int main()

{

map <int, string> m;

m.insert({3, "Ramteke"});

m[1] = "yash";

m.insert({2, "vrushabh"});

cout<<"size = "<<m.size()<<endl;

for(map<int, string>::iterator i = m.begin(); i != m.end(); i++)

{

cout<<i->first<<" : "<<i->second<<endl;

}

}