**LABSHEET 11**

Template and exception handling:

1. To be familiar with class template and function template.
2. To be familiar with exception handling and implementing wherever necessary.

1.SOURCE CODE:

#include <iostream>

using namespace std;

template<class T>

T addition(T a, T b){

return (a + b);

}

int main(){

int i1=10,i2=8;

float f1=3.33,f2=33.64;

cout<<"The sum of integers value:"<<endl;

cout<<addition(i1,i2)<<endl;

cout<<"The sum of float values:"<<endl;

cout<<addition(f1,f2)<<endl;

return 0;

}

OUTPUT:

The sum of integers value:

18

The sum of float values:

36.97

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Process exited after 0.05948 seconds with return value 0

Press any key to continue . . .

2.SOURCE CODE:

#include <iostream>

using namespace std;

template<class T>

T max(T &a, T &b){

return (a>b?a:b);

}

int main(){

int i1=5, i2=23;

float f1=8.24, f2=14.37;

char c1='k', c2='c';

cout<<"The largest integer value is:"<<endl;

cout<<max(i1,i2)<<endl;

cout<<"The largest float value is:"<<endl;

cout<<max(f1,f2)<<endl;

cout<<"The largest charecter value is:"<<endl;

cout<<max(c1,c2)<<endl;

return 0;

}

OUTPUT:

The largest integer value is:

23

The largest float value is:

14.37

The largest charecter value is:

k

--------------------------------

Process exited after 0.05137 seconds with return value 0

Press any key to continue . . .

3.SOURCE CODE:

#include<iostream>

using namespace std;

template <class T>

void swapvar(T &a,T &b){

T temp;

temp = a;

a = b;

b = temp;

}

int main(){

int i1=78, i2=23;

float f1=28.393, f2=56.96;

cout<<"BEFORE SWAPPING:"<<endl;

cout<<"i1="<<i1<<" i2="<<i2<<endl;

cout<<"f1="<<f1<<" f2="<<f2<<endl;

cout<<"AFTER SWAPPING:"<<endl;

swapvar(i1,i2);

swapvar(f1,f2);

cout<<"i1="<<i1<<" i2="<<i2<<endl;

cout<<"f1="<<f1<<" f2="<<f2<<endl;

return 0;

}

OUTPUT:

BEFORE SWAPPING:

i1=78 i2=23

f1=28.393 f2=56.96

AFTER SWAPPING:

i1=23 i2=78

f1=56.96 f2=28.393

--------------------------------

Process exited after 0.06927 seconds with return value 0

Press any key to continue . . .

4.SOURCE CODE:

#include <iostream>

#include <math.h>

using namespace std;

template <class z>

void calculate(z a, z b, z c){

z d = ((b\*b)-(4\*a\*c));

if(d>0){

cout<<"Real and equal...."<<endl;

float r1=(-b+sqrt(d))/(2\*a);

float r2=(-b-sqrt(d))/(2\*a);

cout<<"R1="<<r1<<endl;

cout<<"R2="<<r2<<endl;

}

else if(d=0){

cout<<"Roots are equal....."<<endl;

cout<<"R1=R2="<<(-b/(2\*a))<<endl;

}

else{

cout<<"Roots are imaginary...."<<endl;

}

}

int main(){

int a1,b1,c1;

float a2,b2,c2;

cout<<"Enter the integer coefficient:"<<endl;

cin>>a1>>b1>>c1;

calculate(a1,b1,c1);

cout<<"Enter the float coefficient:"<<endl;

cin>>a2>>b2>>c2;

calculate(a2,b2,c2);

return 0;

}

OUTPUT:

Enter the integer coefficient:

5

3

6

Roots are imaginary....

Enter the float coefficient:

9

4.098

2.87

Roots are imaginary....

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Process exited after 29.31 seconds with return value 0

Press any key to continue . . .

5.SOURCE CODE:

#include<iostream>

using namespace std;

template <class T>

class calculate{

private:

T a,b, sum, product;

public:

calculate(T x, T y){

a = x;

b = y;

}

void calculations(){

sum = a + b;

product = a\*b;

}

void display(){

cout<<"Sum => "<<sum<<endl;

cout<<"Product => "<<product<<endl;

}

};

int main(){

calculate<int> c1(7,2);

calculate<float> c2(8.28, 3.98);

cout<<"For integers value..."<<endl;

c1.calculations();

c1.display();

cout<<"For float value...."<<endl;

c2.calculations();

c2.display();

return 0;

}

OUTPUT:

For integers value...

Sum => 9

Product => 14

For float value....

Sum => 12.26

Product => 32.9544

--------------------------------

Process exited after 0.06874 seconds with return value 0

Press any key to continue . . .

6.SOURCE CODE:

#include <iostream>

using namespace std;

template <class T>

class scalar{

private:

T a, b, c;

public:

scalar(T x,T y, T z){

a = x;

b = y;

c = z;

}

T operator \*(scalar s){

T sum;

a = a\*s.a;

b = b\*s.b;

c = c\*s.c;

sum = a+b+c;

return sum;

}

void display(){

cout<<a<<"i+"<<b<<"j+"<<c<<"k"<<endl;

}

};

int main(){

scalar<int> s1(7,3,7), s2(2,9,5);

cout<<"Values of first integer vectors:"<<endl;

s1.display();

cout<<"Values of second integer vectors:"<<endl;

s2.display();

cout<<"Scalar product of the given two integer vectors => "<<s1\*s2<<endl;

scalar<float> s3(1.67,9.67,4.876), s4(5.34, 3.54, 8.97);

cout<<"Values of first float vectors: "<<endl;

s3.display();

cout<<"Values of second float vectors:"<<endl;

s4.display();

cout<<"Scalar product of the given two float vectors => "<<s3\*s4<<endl;

return 0;

}

OUTPUT:

Values of first integer vectors:

7i+3j+7k

Values of second integer vectors:

2i+9j+5k

Scalar product of the given two integer vectors => 76

Values of first float vectors:

1.67i+9.67j+4.876k

Values of second float vectors:

5.34i+3.54j+8.97k

Scalar product of the given two float vectors => 86.8873

--------------------------------

Process exited after 0.07866 seconds with return value 0

Press any key to continue . . .

7.SOURCE CODE:

#include<iostream>

using namespace std;

int main(){

int a, b, x;

cout<<"Enter values of a and b:"<<endl;

cin>>a>>b;

x=a-b;

try

{

if (x!=0){

cout<<"Divide (a/x)"<<a/x<<endl;

}

else {

throw(x);

}

}

catch(int i){

cout<<"Exception caught : DIVIDE BY ZERO"<<endl;

}cout<<"END";

return 0;

}

OUTPUT:

Enter values of a and b:

3

5

Divide (a/x)-1

END

--------------------------------

Process exited after 3.846 seconds with return value 0

Press any key to continue . . .

8.SOURCE CODE:

#include <iostream>

using namespace std;

void test(int x){

try {

if(x==1)

throw x;

else if(x==0)

throw 'x';

else if(x==-1)

throw 1.0;

cout<<"End of try block."<<endl;

}

catch(char c){

cout<<"Caught an character"<<endl;

}

catch(int m){

cout<<"Caught an integer"<<endl;

}

catch(double d){

cout<<"Caught a double"<<endl;

}

cout<<"End of try catch system"<<endl;

}

int main(){

cout<<"Testing multiple catches"<<endl;

test(1);

cout<<"x == 0"<<endl;

test(0);

cout<<"x==-1"<<endl;

test(-1);

cout<<"x==2"<<endl;

test(2);

return 0;

}

8.SOURCE CODE:

#include <iostream>

using namespace std;

void test(int x){

try {

if(x==1)

throw x;

else if(x==0)

throw 'x';

else if(x==-1)

throw 1.0;

cout<<"End of try block."<<endl;

}

catch(char c){

cout<<"Caught an character"<<endl;

}

catch(int m){

cout<<"Caught an integer"<<endl;

}

catch(double d){

cout<<"Caught a double"<<endl;

}

cout<<"End of try catch system"<<endl;

}

int main(){

cout<<"Testing multiple catches"<<endl;

test(1);

cout<<"x == 0"<<endl;

test(0);

cout<<"x==-1"<<endl;

test(-1);

cout<<"x==2"<<endl;

test(2);

return 0;

}

OUTPUT:

Testing multiple catches

Caught an integer

End of try catch system

x == 0

Caught an character

End of try catch system

x==-1

Caught a double

End of try catch system

x==2

End of try block.

End of try catch system

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Process exited after 0.07948 seconds with return value 0

Press any key to continue . . .