Assignment 2

**Question 1:** Write a program to write a generic swap function using templates

**Code:**

#include <iostream>

template <typename T>

void swap(T &a, T &b)

{

T tmp = a;

a = b;

b = tmp;

}

int main()

{

std::string a, b;

std::cin>>a>>b;

std::cout<<"Values before swapping: a="<<a<<" b="<<b<<'\n';

swap(a, b);

std::cout<<"Values before swapping: a="<<a<<" b="<<b<<'\n';

}

**Output:**

78 36

Values before swapping: a=78 b=36

Values before swapping: a=36 b=78

**Question 2:** Write a program to implement a stack using vectors

**Code:**

#include <vector>

#include <iostream>

template <typename T>

class Stack

{

std::vector<T> data;

public:

void push(const T &x)

{

std::cout<<"Pushing "<<x<<'\n';

data.push\_back(x);

}

void pop()

{

if(data.empty())

std::cout<<"Stack is empty!!! Nothing to pop.\n";

else

{

std::cout<<"Popping "<<data.back()<<'\n';

data.pop\_back();

}

}

void display()

{

std::cout<<"Current Stack: ";

for(auto i = data.rbegin(); i != data.rend(); i++)

std::cout<<\*i<<' ';

std::cout<<'\n';

}

};

int main()

{

Stack<int> obj;

obj.push(2);

obj.push(5);

obj.pop();

obj.display();

obj.pop();

obj.pop();

}

**Output:**

Pushing 2

Pushing 5

Popping 5

Current Stack: 2

Popping 2

Stack is empty!!! Nothing to pop.

**Question 3:** Write a program to implement a Complex number class with three constructors for initialising, add two Complex numbers and also displaying them

**Code:**

#include <iostream>

template <typename T>

class Complex

{

T real, img;

public:

Complex() : real(0), img(0) {}

Complex(const T &x) : real(x), img(x) {}

Complex(const T &x, const T &y) : real(x), img(y) {}

static Complex add(const Complex &x, const Complex &y)

{

return Complex(x.real + y.real, x.img + y.img);

}

void display()

{

std::cout<<real<<" + "<<img<<"j\n";

}

};

int main()

{

int x, y; std::cin>>x>>y;

Complex<int> a(x, y);

std::cin>>x>>y;

Complex<int> b(x, y);

std::cout<<"a = "; a.display();

std::cout<<"b = "; b.display();

auto c = Complex<int>::add(a, b);

std::cout<<"c = "; c.display();

}

**Output:**

2 5

9 6

a = 2 + 5j

b = 9 + 6j

c = 11 + 11j