

Họ và tên: Đỗ Hữu Thiên

MSSV: 625104C071

Lớp: CQ.62.KTCĐT

BÁO CÁO BÀI TẬP LAB2



PHẦN II: Bài tập thực hành về biến con trỏ và cấp phát động trong mảng 1 chiều

Câu 9:

❖ Source code hàm void nhapMang(int*& arr, int& n);

```
void nhapMang(int* a, int& n) {  
    for (int i = 0; i < n; ++i) {  
        cout << "Nhap phan tu thu a[" << i + 1 << "]= ";  
        cin >> *(a + i);  
    }  
}
```

❖ Source code hàm xuấtMang(int* a, int& n);

```
void xuấtMang(int* a, int n) {  
    for (int i = 0; i < n; ++i) {  
        cout << *(a + i) << "\\t ";  
    }  
    cout << endl;  
}
```

❖ Source code hàm hoanvi(int* a, int n);

```
void hoanvi(int* x, int* y){  
    int temp = *x;  
    *x=*y;  
    *y=temp;  
}
```

❖ Source code hàm SelectionSort(int* a, int n);

```
void SelectionSort(int* a, int n){  
    int doicho;  
    for (int i=0; i<n-1; i++){  
        doicho=i;  
        for (int j=i+1; j<n; j++){  
            if (a[j]<a[doicho])  
                doicho = j;  
            hoanvi(&a[doicho], &a[i]);  
        }  
    }  
}
```

❖ *Source code hàm main cho Câu 9:*

```

int main(){
    int n;
    cout << "Nhap so luong phan tu cua mang: ";
    cin >> n;
    int* a = new int[n];
    nhapMang(a,n);
    cout << "Mang da nhap la:\n";
    xuatMang(a,n);
    cout << "\n-----";
    SelectionSort(a, n);
    cout << "\nSap xep mang da cho: " << endl;
    for (int i = 0; i < n; i++) {
        cout << a[i] << " ";
    }
    cout << endl;
    // Sử dụng hàm getenv để lấy tên máy tính từ biến môi trường COMPUTERNAME
    char computerName[MAX_COMPUTERNAME_LENGTH + 1];
    DWORD size = sizeof(computerName);

    if (GetComputerNameA(computerName, &size)) {
        cout << "\nTen may tinh la: " << computerName << endl;
    }
    else {
        cout << "\nKhong the lay ten may tinh." << endl;
    }
    return 0;
}

```

❖ *Hình chụp kết quả*

```

Microsoft Visual Studio Debug Console
Nhap so luong phan tu cua mang: 5
Nhap phan tu thu a[1]= 7
Nhap phan tu thu a[2]= 3
Nhap phan tu thu a[3]= 2
Nhap phan tu thu a[4]= 5
Nhap phan tu thu a[5]= 3
Mang da nhap la:
7 3 3 5 3
-----
Sap xep mang da cho:
2 3 3 5 7
Ten may tinh la: LAPTOP-SIEMB251
C:\Users\huy20\OneDrive\Máy tính\Project\VSCode\C++\NopBTLAB\LABWeek2\T\II_Cau9\x64\Debug\II_Cau9.exe (process 21016) exited with code 0.
Press any key to close this window . . .

```

Câu 10:❖ *Source code hàm nhapMang(int*& arr, int& n);*

```
void nhapMang(int* a, int& n) {
    for (int i = 0; i < n; ++i) {
        cout << "Nhap phan tu thu a[" << i + 1 << "]= ";
        cin >> *(a + i);
    }
}
```

❖ *Source code hàm xuatMang(int* a, int& n);*

```
void xuatMang(int* a, int n) {
    for (int i = 0; i < n; ++i) {
        cout << *(a + i) << "\t ";
    }
    cout << endl;
}
```

❖ *Source code hàm timKiem(int *a, int n, int x);*

```
void timKiem(int* a, int n, int x) {
    int kiemtra = 0;
    for (int i = 0; i < n; i++) {
        if (a[i] == x) {
            cout << "Vi tri cua " << x << " la: [" << i+1 << "]" << endl;
            kiemtra = 1;
        }
    }
    if (kiemtra == 0) {
        cout << "Khong tim thay " << x << " trong mang da nhap" << endl;
    }
}
```

❖ *Source code hàm main.*

```
int main() {
    int n, x;
    cout << "Nhap so luong phan tu cua mang: ";
    cin >> n;
    int* a = new int[n];
    nhapMang(a, n);
    cout << "Mang da nhap la:\n";
    xuatMang(a, n);
    cout << "\n-----";
    cout << "Nhap x can tim: " << endl;
    cin >> x;
    timKiem(a, n, x);
    delete[] a;
    char computerName[MAX_COMPUTERNAME_LENGTH + 1];
    DWORD size = sizeof(computerName);
    if (GetComputerNameA(computerName, &size)) {
        cout << "\nTen may tinh la: " << computerName << endl;
    }
    else {
        cout << "\nKhong the lay ten may tinh." << endl;
    }
    system("pause");
    return 0;
}
```

❖ Hình chụp kết quả:

```

C:\Users\huay20\OneDrive\Máy tính\Project\VSCode\C++\Nop8TLAB\LAB\Week2\TV\IL_Cau10\Debug\IL_Cau10.exe
Nhap so luong phan tu cua mang: 5
Nhap phan tu thu a[1]= 1
Nhap phan tu thu a[2]= 2
Nhap phan tu thu a[3]= 3
Nhap phan tu thu a[4]= 4
Nhap phan tu thu a[5]= 4
Mang da nhap la:
1 2 3 4 4
-----Nhap x can tim:
4
Vi tri cua 4 la: [4]
Vi tri cua 4 la: [5]
Ten may tinh la: LAPTOP-SIENB251
Press any key to continue . . .

```

Câu 11:

❖ Source code hàm void nhapMang(int*& arr, int& n);

```

void nhapMang(int* a, int& n) {
    for (int i = 0; i < n; ++i) {
        cout << "Nhap phan tu thu a[" << i + 1 << "]= ";
        cin >> *(a + i);
    }
}

```

❖ Source code hàm xuấtMang(int* a, int& n);

```

void xuấtMang(int* a, int n) {
    for (int i = 0; i < n; ++i) {
        cout << *(a + i) << "\t ";
    }
    cout << endl;
}

```

❖ Source code hàm int timChanCuoiCung(int* arr, int n);

```

int timChanCuoiCung(int* a, int n) {
    int kiemtra = 0;
    for (int i = 0; i < n; i++) {
        if (a[i] % 2 == 0) {
            kiemtra = a[i];
        }
    }
    if (kiemtra == 0) {
        return 0;
    }
    return kiemtra;
}

```

❖ *Soucre code hàm main();*

```

int main() {
    int n;
    cout << "Nhap so luong phan tu cua mang: ";
    cin >> n;
    int* a = new int[n];
    nhapMang(a, n);
    cout << "Mang da nhap la:\n";
    xuatMang(a, n);
    cout << "\n-----";
    int kiemtra = timChanCuoiCung(a, n);
    if (kiemtra != 0) {
        cout << "So chan cuoi cung cua mang la: " << kiemtra << endl;
    }
    else {
        cout << "Khong co gia tri chan trong mang." << endl;
    }
    delete[] a;
    char computerName[MAX_COMPUTERNAME_LENGTH + 1];
    DWORD size = sizeof(computerName);
    if (GetComputerNameA(computerName, &size)) {
        cout << "\nTen may tinh la: " << computerName << endl;
    }
    else {
        cout << "\nKhong the lay ten may tinh." << endl;
    }
    system("pause");
    return 0;
}

```

❖ Hình chụp kết quả

```

C:\Users\huy20\OneDrive\Máy tính\Project\VSCode\c++\Nop8TLAB\LABWeek2\TVL_Cau1\TV64\Debug\TVL_Cau11.exe
Nhap so luong phan tu cua mang: 5
Nhap phan tu thu a[1]= 1
Nhap phan tu thu a[2]= 2
Nhap phan tu thu a[3]= 3
Nhap phan tu thu a[4]= 4
Nhap phan tu thu a[5]= 6
Mang da nhap la:
1 2 3 4 6

-----
So chan cuoi cung cua mang la: 6
Ten may tinh la: LAPTOP-SIEM251
Press any key to continue . . .

```

Câu 12:❖ *Source code hàm void nhapMang(int*& arr, int& n);*

```
void nhapMang(int* a, int& n) {
    for (int i = 0; i < n; ++i) {
        cout << "Nhap phan tu thu a[" << i + 1 << "]= ";
        cin >> *(a + i);
    }
}
```

❖ *Source code hàm xuấtMang(int* a, int& n);*

```
void xuấtMang(int* a, int n) {
    for (int i = 0; i < n; ++i) {
        cout << *(a + i) << "\t ";
    }
    cout << endl;
}
```

❖ *Source code hàm int timsoduong(int* a, int n);*

```
int timsoduong(int* a, int n) {
    int min = 0;
    for (int i = 0; i < n; i++) {
        if (a[i] > 0) {
            if (a[i] < a[i + 1]) {
                min = a[i];
            }
        }
    }
    if (min == 0) {
        return -1;
    }
    return min;
}
```

❖ *Source code hàm main();*

```
int main() {
    int n;
    cout << "Nhap so luong phan tu cua mang: ";
    cin >> n;
    int* a = new int[n];
    nhapMang(a, n);
    cout << "Mang da nhap la:\n";
    xuấtMang(a, n);
    cout << "\n-----";
    int kiemtra = timsoduong(a, n);
    if (kiemtra != -1) {
        cout << "\n So duong nho nhat cua mang la: " << kiemtra << endl;
    }
    else {
        cout << "Khong co gia tri duong. Suy ra " << kiemtra << endl;
    }
    delete[] a;
    char computerName[MAX_COMPUTERNAME_LENGTH + 1];
    DWORD size = sizeof(computerName);
    if (GetComputerNameA(computerName, &size)) {
        cout << "\nTen may tinh la: " << computerName << endl;
    }
    else {

```

```

        cout << "\nKhong the lay ten may tinh." << endl;
    }
    system("pause");
    return 0;
}

```

❖ *Hình chụp kết quả*

The screenshot shows a Windows command prompt window titled "C:\Users\huy20\OneDrive\Máy tính\Project\VSCode\C++\Nop8TLAB\LAB_Week2\LAB_Week2\IL_Cau12\y64\Debug\IL_Cau12.exe". The program prompts the user to enter the number of elements in the array (5), then prompts for each element (a[1] to a[5]). The user enters the values -1, 2, 4, 1, and -6. The program then displays the array: "Mang da nhap la: -1 2 4 1 -6". It also shows the minimum value: "So duong nho nhat cua mang la: 2" and the computer name: "Ten may tinh la: LAPTOP-SIENB251". The prompt "Press any key to continue" is visible at the bottom.

Câu 13:

❖ *Source code hàm void nhapMang(int*& arr, int& n);*

```

void nhapMang(int* a, int& n) {
    for (int i = 0; i < n; ++i) {
        cout << "Nhap phan tu thu a[" << i + 1 << "]= ";
        cin >> *(a + i);
    }
}

```

❖ *Source code hàm xuấtMang(int* a, int& n);*

```

void xuấtMang(int* a, int n) {
    for (int i = 0; i < n; ++i) {
        cout << *(a + i) << "\t ";
    }
    cout << endl;
}

```

❖ *Source code hàm kiểm tra số nguyên tố (int n);*

```

bool kiểmtraSNT(int n) {
    int b[8] = {2, 3, 4, 5, 6, 7, 8, 9};
    int kiểmtra{};
    if (n < 2) {
        return false;
    }
    if (n > 2 && n < 9) {
        int arr[] = { 2, 3, 5, 7 };
        for (int i = 0; i < 4; i++)

```

```

        if (n == arr[i]) return true;
        return false;
    }
    else if (n > 9) {
        for (int i = 1; i < 9; i++) {
            if (n % b[i] == 0) {
                kiểmtra = false;
                return false;
            }
        }
    }
    else if (kiểmtra != false) {
        return true;
    }
}

```

❖ Source code hàm tìmSốNguyênTôDầuTien(int* a, int n);

```

int tìmSốNguyênTôDầuTien(int* a, int n) {
    for (int i = 0; i < n; i++) {
        if (kiểmtrasont(a[i]) == true) {
            return a[i];
        }
    }
    return -1;
}

```

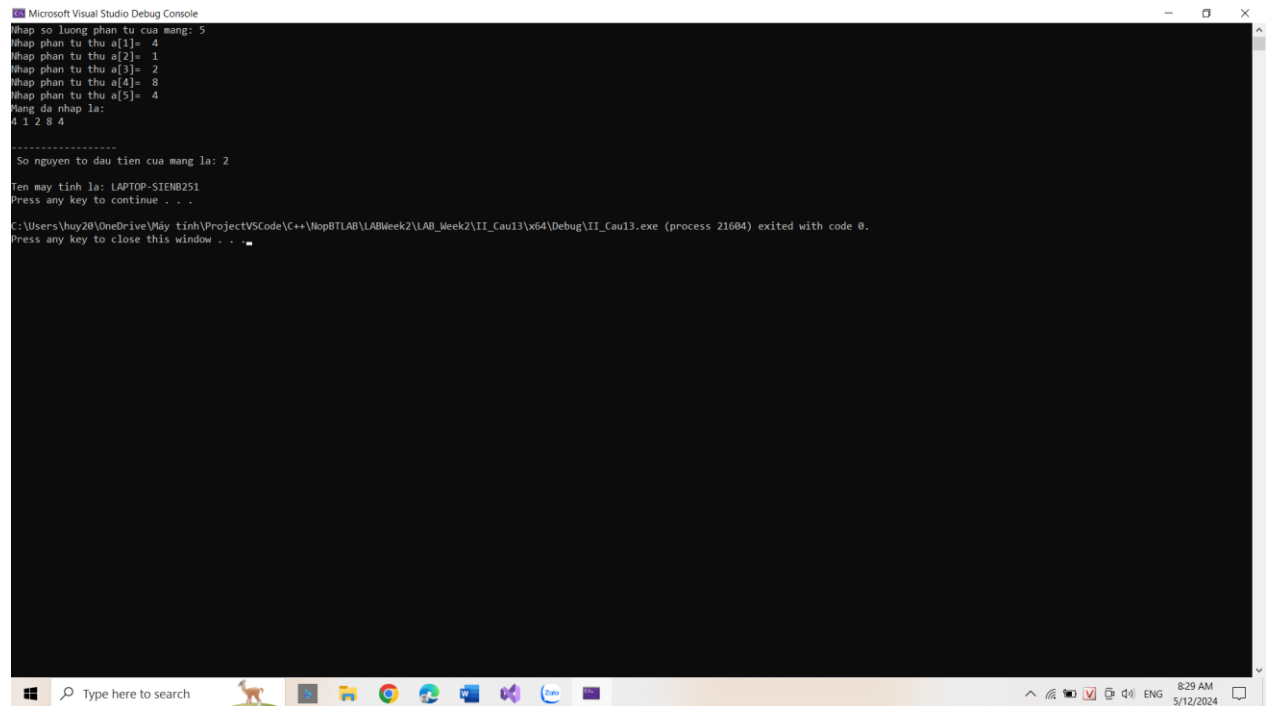
❖ Source code hàm main();

```

int main() {
    int n;
    cout << "Nhập số lượng phần tử của mảng: ";
    cin >> n;
    int* a = new int[n];
    nhậpMang(a, n);
    cout << "Mảng đã nhập là:\n";
    xuấtMang(a, n);
    cout << "\n-----";
    int kiểmtra = tìmSốNguyênTôDầuTien(a, n);
    if (kiểmtra != -1) {
        cout << "\n Số nguyên tố đầu tiên của mảng là: " << kiểmtra << endl;
    }
    else {
        cout << "Không có số nguyên tố trong mảng.Suy ra " << kiểmtra << endl;
    }
    delete[] a;
    char computerName[MAX_COMPUTERNAME_LENGTH + 1];
    DWORD size = sizeof(computerName);
    if (GetComputerNameA(computerName, &size)) {
        cout << "\nTên máy tính là: " << computerName << endl;
    }
    else {
        cout << "\nKhông thể lấy tên máy tính." << endl;
    }
    system("pause");
    return 0;
}

```

❖ Hình chụp kết quả:



```

Microsoft Visual Studio Debug Console
Nhap so luong phan tu cua mang: 5
Nhap phan tu thu a[1]= 4
Nhap phan tu thu a[2]= 1
Nhap phan tu thu a[3]= 2
Nhap phan tu thu a[4]= 8
Nhap phan tu thu a[5]= 4
Mang da nhap la:
4 1 2 8 4

-----
So nguyen to dau tien cua mang la: 2
Ten may tinh la: LAPTOP-SIENB251
Press any key to continue . . .
C:\Users\huy29\OneDrive\Máy tính\Project\VSCode\C++\NopBTLAB\LABWeek2\LAB_Week2\II_Cau13\Debug\II_Cau13.exe (process 21604) exited with code 0.
Press any key to close this window . . .

```

Câu 14:❖ *Source code hàm void nhapMang(int*& arr, int& n);*

```

void nhapMang(int* a, int& n) {
    for (int i = 0; i < n; ++i) {
        cout << "Nhap phan tu thu a[" << i + 1 << "]= ";
        cin >> *(a + i);
    }
}

```

❖ *Source code hàm xuấtMang(int* a, int& n);*

```

void xuấtMang(int* a, int n) {
    for (int i = 0; i < n; ++i) {
        cout << *(a + i) << "\t ";
    }
    cout << endl;
}

```

❖ *Source code hàm int timPhanTuItNhat(int* arr, int n);*

```

int timPhanTuItNhat(int* arr, int n) {
    int phantucantim = arr[0];
    int tansuat = n;
    for (int i = 1; i < n; i++) {
        int soLanXuatHien = 0;
        for (int j = 0; j < n; j++) {
            if (arr[i] == arr[j]) {
                soLanXuatHien++;
            }
        }
        if (soLanXuatHien < tansuat) {
            phantucantim = arr[i];
            tansuat = soLanXuatHien;
        }
    }
}

```

```

    }
    return phantucantim;
}
❖ Source code hàm main();

```

```

int main() {
    int n;
    cout << "Nhap so luong phan tu cua mang: ";
    cin >> n;
    int* a = new int[n];
    nhapMang(a,n);
    cout << "Mang da nhap la:\n";
    xuatMang(a,n);
    cout << "\n-----";
    int phanTuItNhat = timPhanTuItNhat(a,n);
    cout << "\n Phan tu co tan suat xuất hiện ít nhất trong mang la: " <<
phanTuItNhat << endl;
    delete[] a;
    char computerName[MAX_COMPUTERNAME_LENGTH + 1];
    DWORD size = sizeof(computerName);
    if (GetComputerNameA(computerName, &size)) {
        cout << "\nTen may tinh la: " << computerName << endl;
    }
    else {
        cout << "\nKhong the lay ten may tinh." << endl;
    }
    system("pause");
    return 0;
}

```

❖ Hình chụp kết quả:

```

C:\Users\huyn20\OneDrive\Máy tính\Project\VCCode\C++\Nop8TLAB\LABWeek2\LAB_Week2\IL_Cau14\Debug\IL_Cau14.exe
Nhap so luong phan tu cua mang: 6
Nhap phan tu thu a[1]= 1
Nhap phan tu thu a[2]= 2
Nhap phan tu thu a[3]= 8
Nhap phan tu thu a[4]= 2
Nhap phan tu thu a[5]= 1
Nhap phan tu thu a[6]= 2
Mang da nhap la:
1 2 8 2 1 2
-----
Phan tu co tan suat xuất hiện ít nhất trong mang la: 1
Ten may tinh la: LAPTOP-SIENB251
Press any key to continue . . .

```

PHẦN III: Bài tập thực hành về lớp và đối tượng, nạp chồng toán tử trong C++

Câu 2: Viết chương trình nhập dữ liệu vào từ bàn phím để tạo hai đối tượng số phức x, y. Tính và in ra tổng, hiệu 2 số phức đó.

❖ *Source code Complex.h*

```
#pragma once
#include<iostream>
using namespace std;
class Complex
{
private:
    double pt;
    double pa;
public:
    Complex();
    Complex(double p_thuc, double p_ao);
    void NhapSoPhuc();
    void InSoPhuc();
    Complex operator+(const Complex& x);
};
```

❖ *Source code Complex.cpp*

```
#include "Complex.h"
Complex::Complex()
{
    pt = 0.0;
    pa = 0.0;
}

Complex::Complex(double p_thuc, double p_ao)
{
    pt = p_thuc;
    pa = p_ao;
}

void Complex::NhapSoPhuc()
{
    cout << "Nhap phan thuc: ";
    cin >> pt;
    cout << "Nhap phan ao: ";
    cin >> pa;
}

void Complex::InSoPhuc()
{
    if (pa > 0)
        cout << pt << " + " << pa << "i";
    else cout << pt << pa << "i";
}

Complex Complex::operator+(const Complex& x)
{
    Complex temp;
    temp.pt = this->pt + x.pt;
    temp.pa = this->pa + x.pa;
}
```

```
return temp;
```

```
}
```

❖ *Source code file Main.cpp*

```
#include<iostream>
#include<cstdlib>
#include<windows.h>
using namespace std;
#include "Complex.h"
int main() {
    Complex x, y;
    cout << "\nNhap so phuc thu nhât:\n";
    x.NhapSoPhuc();
    cout << "Nhap so phuc thu hai:\n";
    y.NhapSoPhuc();
    cout << "\nCac so phuc da nhap la: ";
    x.InSoPhuc();
    cout << endl;
    y.InSoPhuc();
    cout << "\n-----";
    cout << "\nTong hai so phuc: ";
    Complex tong = x + y;
    tong.InSoPhuc();
    cout << endl;
    char computerName[MAX_COMPUTERNAME_LENGTH + 1];
    DWORD size = sizeof(computerName);

    if (GetComputerNameA(computerName, &size)) {
        cout << "\nTen may tinh la: " << computerName << endl;
    }
    else {
        cout << "\nKhong the lay ten may tinh." << endl;
    }
    system("pause");
    return 0;
}
```

❖ **Hình chụp kết quả**

```
C:\Users\huay20\OneDrive\Máy tính\Project\VCCode\C++\Nop8TLAB\LABWeek2\LAB_Week2\Jill_Cau2\Debug\Jill_Cau2.exe
Nhap so phuc thu nhât:
Nhap phan thuc: 5
Nhap phan ao: 2
Nhap so phuc thu hai:
Nhap phan thuc: 2
Nhap phan ao: 7

Cac so phuc da nhap la: 5 + 2i
2 + 7i
-----
Tong hai so phuc: 7 + 9i

Ten may tinh la: LAPTOP-SIENB251
Press any key to continue . . .
```

Câu 4:❖ *Source code PS.h*

```
#pragma once
#include <iostream>
using namespace std;
class PS{
private:
    int tu, mau;
public:
    PS();
    PS(int x, int y);
    void Nhap();
    void Xuat();
    int UCLN(int x, int y);
    void RutGon();
    PS operator+(PS);
    PS operator-(PS);
    PS operator*(PS);
    PS operator/(PS);
    bool operator>(PS);
};
```

❖ *Source code PS.cpp*

```
#include<iostream>
#include "PS.h"
using namespace std;
PS::PS() {
    tu = 0;
    mau = 1;
}
PS::PS(int a, int b){
    tu = a;
    mau = b;
}
void PS::Nhap(){
    cout << "Nhap tu so: ";
    cin >> tu;
    cout << "Nhap mau so: ";
    cin >> mau;
}
void PS::Xuat(){
    cout << tu << "/" << mau;
}
int PS::UCLN(int x, int y)
{
    for (int i = min(x, y); i > 0; i--) {
        if (x % i == 0 && y % i == 0)
            return i;
    }
}
void PS::RutGon(){
    int ucln = UCLN(tu, mau);
    tu /= ucln;
    mau /= ucln;
}
PS PS::operator+(PS a){
```

```

    PS tong;
    tong.tu = tu * a.mau + mau * a.tu;
    tong.mau = mau * a.mau;
    tong.RutGon();
    return tong;
}
PS PS::operator-(PS a){
    PS hieu;
    hieu.tu = tu * a.mau - mau * a.tu;
    hieu.mau = mau * a.mau;
    hieu.RutGon();
    return hieu;
}
PS PS::operator*(PS a){
    PS tich;
    tich.tu = tu * a.tu;
    tich.mau = mau * a.mau;
    tich.RutGon();
    return tich;
}
PS PS::operator/(PS a){
    PS thuong;
    thuong.tu = tu * a.mau;
    thuong.mau = mau * a.tu;
    thuong.RutGon();
    return thuong;
}
bool PS::operator>(PS a){
    return (float)tu / mau < (float)a.tu / a.mau;
}

```

❖ *Source code Main.cpp*

```

#include<iostream>
#include "PS.h"
#include<cstdlib>
#include<windows.h>
using namespace std;
void swap(int* a, int* b){
    int temp = *b;
    *b = *a;
    *a = temp;
}
int main() {
    int n;
    cout << "Nhap so luong phan so: ";
    cin >> n;
    PS* a = new PS[n];
    for (int i = 0; i < n; i++){
        cout << "Nhap phan so thu " << i + 1 << ": ";
        a[i].Nhap();
    }
    PS tong;
    for (int i = 0; i < n; i++){
        tong = tong + a[i];
    }
    cout << "Tong cua mang phan so: ";
    tong.Xuat();
    cout << endl;
    for (int i = 0; i < n - 1; i++){
        for (int j = i + 1; j < n; j++){

```

```

        if (a[j] > a[i]) {
            swap(a[i], a[j]);
        }
    }
}
PS min = a[1];
PS max = a[n-1];
cout << "Sap xep mang tang dan: ";
for (int i = 0; i < n; i++){
    a[i].Xuat();
    cout << " ";
}
cout << "\nPhan so lon nhat :";
max.Xuat();
cout << "\nPhan so nho nhat :";
min.Xuat();
delete[] a;
char computerName[MAX_COMPUTERNAME_LENGTH + 1];
DWORD size = sizeof(computerName);

if (GetComputerNameA(computerName, &size)) {
    cout << "\nTen may tinh la: " << computerName << endl;
}
else {
    cout << "\nKhong the lay ten may tinh." << endl;
}
system ("Pause");
return 0;
}

```

❖ *Hình chụp kết quả*

```

C:\Users\huy20\OneDrive\Máy tính\Project\VSCode\C++\Nop\BT\LAB\LAB Week2\LAB_Week2\III_Cau4\Debug\III_Cau4.exe
Nhap so luong phan so: 4
Nhap phan so thu 1: Nhap tu so: 1
Nhap mau so: 2
Nhap phan so thu 2: Nhap tu so: 3
Nhap mau so: 4
Nhap phan so thu 3: Nhap tu so: 9
Nhap mau so: 9
Nhap phan so thu 4: Nhap tu so: 4
Nhap mau so: 2
Tong cua mang phan so: 17/4
Sap xep mang tang dan: 1/2 3/4 9/9 4/2
Phan so lon nhat :4/2
Phan so nho nhat :3/4
Ten may tinh la: LAPTOP-SIEMB251
Press any key to continue . . .

```

Câu 5:❖ *Source code Student.h*

```
#pragma once
#include<iostream>
#include <format>
#include <string>
using namespace std;
class Student {
private:
    string ten;
    double diemky1, diemky2;
public:
    Student();
    Student(string, double, double);
    string laytenSV();
    void Nhap();
    void Xuat();
    bool KiemtraDTB();
};
```

❖ *Source code Student.cpp*

```
#include<iostream>
#include <format>
#include <string>
using namespace std;
#include "Student.h"
Student::Student() {
    ten = "";
    diemky1 = diemky2 = 0.0;
}

Student::Student(string n, double s1, double s2) {
    ten = n;
    diemky1 = s1;
    diemky2 = s2;
}

string Student::laytenSV()
{
    return ten;
}

void Student::Nhap() {
    cout << "Ho va Ten: ";
    getline(cin, ten);
    cout << "Nhap diem ky 1: ";
    cin >> diemky1;
    cout << "Nhap diem ky 2: ";
    cin >> diemky2;
}

void Student::Xuat() {
    cout << "Ho va Ten: " << ten << ", Diem ky 1: " << diemky1<< ", Diem ky 2: " << diemky2 << endl;
}

bool Student::KiemtraDTB() {
    return ((diemky1 + 2 * diemky2) / 3) >= 5;
}
```


❖ *Source code Main.cpp*

```

#include<iostream>
#include <format>
#include <string>
using namespace std;
#include "Student.h"
#include<cstdlib>
#include<windows.h>
int main() {
    Student students[5];
    for (int i = 0; i < 5; i++) {
        cout << "Nhap diem sinh vien thu " << i + 1 << endl;
        students[i].Nhap();
        cin.ignore();
    }
    cout << "\nDanh sách sinh viên:\n";
    for (int i = 0; i < 5; i++) {
        students[i].Xuat();
    }
    cout << "\nDanh sach SV diem trung binh >=5:\n";
    for (int i = 0; i < 5; i++) {
        if (students[i].KiemtraDTB()) {
            cout << students[i].laytenSV() << endl;
        }
    }
    delete[] students;
    char computerName[MAX_COMPUTERNAME_LENGTH + 1];
    DWORD size = sizeof(computerName);
    if (GetComputerNameA(computerName, &size)) {
        cout << "\nTen may tinh la: " << computerName << endl;
    }
    else {
        cout << "\nKhong the lay ten may tinh." << endl;
    }
    system("Pause ");
    return 0;
}

```

❖ *Ảnh chụp kết quả*

```

Microsoft Visual Studio Debug Console
Nhap diem sinh vien thu 1
Ho va Ten: A
Nhap diem ky 1: 9
Nhap diem ky 2: 9
Nhap diem sinh vien thu 2
Ho va Ten: B
Nhap diem ky 1: 8
Nhap diem ky 2: 9
Nhap diem sinh vien thu 3
Ho va Ten: C
Nhap diem ky 1: 6
Nhap diem ky 2: 7
Nhap diem sinh vien thu 4
Ho va Ten: D
Nhap diem ky 1: 2
Nhap diem ky 2: 3
Nhap diem sinh vien thu 5
Ho va Ten: E
Nhap diem ky 1: 5
Nhap diem ky 2: 6

Danh sach sinh vien:
Ho va Ten: A, Diem ky 1: 9, Diem ky 2: 9
Ho va Ten: B, Diem ky 1: 8, Diem ky 2: 9
Ho va Ten: C, Diem ky 1: 6, Diem ky 2: 7
Ho va Ten: D, Diem ky 1: 2, Diem ky 2: 3
Ho va Ten: E, Diem ky 1: 5, Diem ky 2: 6

Danh sach SV diem trung binh >=5:
A
B
C
E

Ten may tinh la: LAPTOP-SIENB251
Press any key to continue . . .
C:\Users\huyn29\OneDrive\Máy tính\Project\VSCode\C++\Nop8TILAB\LABWeek2\LAB_Week2\III_Cau5\641\debug\III_Cau5.exe (process 7924) exited with code 0.
Press any key to close this window . . .

```

Câu 8:❖ *Source code Date.h*

```
#pragma once
class Date
{
private:
    int Day, Month, Year;
public:
    Date();
    void NhapDate();
    void XuatDate();
};
```

❖ *Source code Date.cpp*

```
#include "Date.h"
#include <iostream>
using namespace std;

Date::Date()
{
    int Day(0);
    int Month(0);
    int Year(0);
}

void Date::NhapDate()
{
    cout << "Nhap ngay: ";
    cin >> Day;
    cout << "Nhap thang: ";
    cin >> Month;
    cout << "Nhap nam: ";
    cin >> Year;
}

void Date::XuatDate()
{
    cout << Day << "/" << Month << "/" << Year;
}
```

❖ *Source code Nhansu.h*

```
#pragma once
#include <iostream>
#include <string>
#include "Date.h"
using namespace std;
class Nhansu
{
private:
    string Manhansu, Hoten;
    Date NS;
public:
    Nhansu();
    void NhapNS();
    void XuatNS();
};
```

❖ *Source code Nhansu.cpp*

```

#include "Nhansu.h"
#include<iostream>
#include<string>
using namespace std;

Nhansu::Nhansu()
{
    string Nhansu();
    string Manhansu("");
    string Hoten("");
}
void Nhansu::NhapNS()
{
    cout << "Nhap ma nhan su: ";
    getline(cin, Manhansu);
    cout << "Nhap ho ten: ";
    getline(cin, Hoten);
    cout << "Nhap ngay sinh:\n";
    NS.NhapDate();
}
void Nhansu::XuatNS()
{
    cout << "Ma nhan su: " << Manhansu << endl;
    cout << "Ho ten: " << Hoten << endl;
    cout << "Ngay sinh: "; NS.XuatDate(); cout << endl;
}

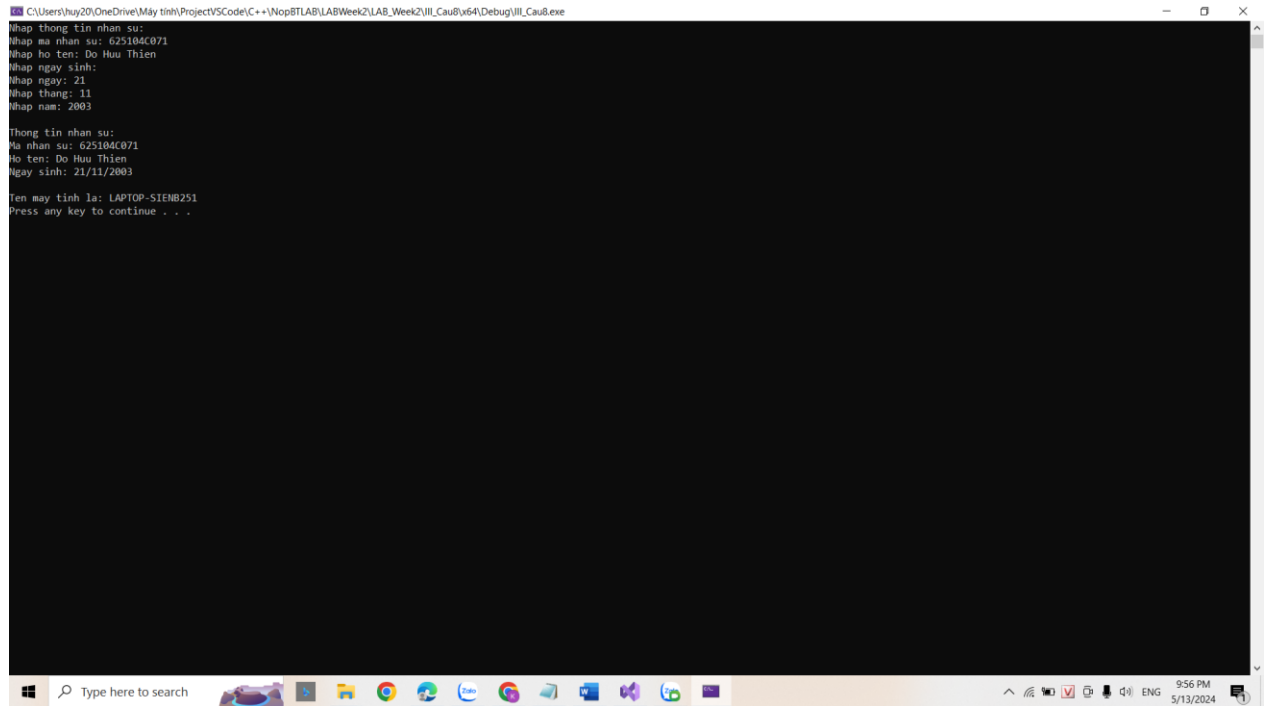
```

❖ *Source code Main.cpp*

```

#include "Nhansu.h"
#include <iostream>
using namespace std;
#include<cstdlib>
#include<windows.h>
int main() {
    Nhansu x;
    cout << "Nhap thong tin nhan su:\n";
    x.NhapNS();
    cout << "\nThong tin nhan su:\n";
    x.XuatNS();
    char computerName[MAX_COMPUTERNAME_LENGTH + 1];
    DWORD size = sizeof(computerName);
    if (GetComputerNameA(computerName, &size)) {
        cout << "\nTen may tinh la: " << computerName << endl;
    }
    else {
        cout << "\nKhong the lay ten may tinh." << endl;
    }
    system("pause");
    return 0;
}

```

❖ *Hình Chụp kết quả***PHẦN IV: Bài tập thực hành tính kế thừa của OOP trong C++****Câu 2:**❖ *Source code MyDate .h*

```

#pragma once
#include <iostream>

using namespace std;
class MyDate {
    int day, month, year;
public:
    MyDate();
    MyDate(int day, int month, int year);
    void Nhapdate();
    void Indate();
    bool operator > (MyDate& date);
};

```

❖ *Source code MyDate.cpp*

```

#include "MyDate.h"
MyDate::MyDate(){}
MyDate::MyDate(int day, int month, int year):day(day),month(month),year(year){}
void MyDate::Nhapdate()
{
    cout << "\nNhap (day month year): ";
    cin >> day >> month >> year;
}

```

```

}
void MyDate::Indate()
{
    cout << day<< "/" <<month << "/" <<year << endl;
}
bool MyDate::operator>(MyDate& date)
{
    if (year != date.year)
        return year > date.year;
    if (month != date.month)
        return month > date.month;
    return day > date.day;
}

```

❖ *Source code Person.h*

```

#pragma once
#include "MyDate.h"
class Person : public MyDate {
private:
    string name, address, phone;
public:
    Person();
    Person(string name, string address, string phone, int d, int m, int y);
    void NhapTT();
    void XuatTT();
};

```

❖ *Source code Person.cpp*

```

#include "Person.h"
#include "MyDate.h"
#include <string>
#include<iostream>
using namespace std;
Person::Person(){}
Person::Person(string name, string address, string phone, int d, int m, int y)
    :name(name),address(address),phone(phone),MyDate(d,m,y) {}
void Person::NhapTT()
{
    cout << "\nNhap ten nhan vien: ";
    cin >> name;
    cout << "\nNhap dia chi tin nhan vien: ";
    cin >> address;
    cout << "\nNhap SDT nhan vien: ";
    cin >> phone;
    MyDate::Nhapdate();
}
void Person::XuatTT()
{
    cout << "Name: " << name << ", \nAddress: " << address << ", \nPhone: "
<< phone << ", \nBirthdate: ";
    MyDate::Indate();
}

```

❖ *Source code Officer.h*

```
#pragma once
#include "Person.h"
#include "MyDate.h"
#include <string>
#include <iostream>
using namespace std;
class Officer : public Person {
private:
    float salary;
public:
    Officer();
    Officer(string name, string address, string phone, int d, int m, int y,
float s);
    void Nhapofficer();
    void Xuatofficer();
};
```

❖ *Source code Officer.cpp*

```
#include "Officer.h"
Officer::Officer() : salary(0.0) {}
Officer::Officer(string n, string a, string p, int d, int m, int y, float
salary)
    : Person(n,a,p,d,m,y), salary(salary) {}
void Officer::Nhapofficer()
{
    Person::NhapTT();
    cout << "Nhap Salary cua nhan vien:";
    cin >> salary;
}
void Officer::Xuatofficer()
{
    Person::XuatTT();
    cout << "Salary: " << salary << endl;
}
}
```

❖ *Source code Main.cpp*

```
#include "Officer.h"
#include <iostream>
using namespace std;
#include <cstdlib>
#include <windows.h>
int main() {
    int n;
    cout << "Nhap so luong nhan vien: ";
    cin >> n;
    cout << "\n-----";
    Officer* dsOfficer = new Officer[n];
    for (int i = 0; i < n; i++) {
        cout << "\nNhap thong tin nhan vien thu " << i + 1 << ":\n";
        dsOfficer[i].Nhapofficer();
    }
    cout << "\n===== ";
    for (int i = 0; i < n; i++) {
        cout << "\nThong tin nhan vien da nhap thu " << i + 1 << ":\n";
        dsOfficer[i].Xuatofficer();
    }
}
```

```

    }
    delete[] dsOfficer;
    char computerName[MAX_COMPUTERNAME_LENGTH + 1];
    DWORD size = sizeof(computerName);

    if (GetComputerNameA(computerName, &size)) {
        cout << "\nTen may tinh la: " << computerName << endl;
    }
    else {
        cout << "\nKhong the lay ten may tinh." << endl;
    }
    system("pause");
    return 0;
}

```

❖ Ảnh chụp kết quả:

```

C:\Users\huy20\OneDrive\Máy tính\Project\VCCode\C++\Nop8TLAB\LABWeek2\LAB_Week2\IV_Cau2\y64\Debug\IV_Cau2.exe
Nhap thong tin nhan vien thu 2:
Nhap ten nhan vien: NguyenVanB
Nhap dia chi tin nhan vien: LeVanViet2
Nhap SDT nhan vien: 037
Nhap (day month year): 29 1 2003
Nhap Salary cua nhan vien:6000
Nhap thong tin nhan vien thu 3:
Nhap ten nhan vien: NguyenVanC
Nhap dia chi tin nhan vien: LeVanViet3
Nhap SDT nhan vien: 012
Nhap (day month year): 21 11 2003
Nhap Salary cua nhan vien:900000
=====
Thong tin nhan vien da nhap thu 1:
Name: NguyenVanA,
Address: LeVanViet1,
Phone: 085,
Birthdate: 12/2/2003
Salary: 5000
Thong tin nhan vien da nhap thu 2:
Name: NguyenVanB,
Address: LeVanViet2,
Phone: 037,
Birthdate: 29/1/2003
Salary: 6000
Thong tin nhan vien da nhap thu 3:
Name: NguyenVanC,
Address: LeVanViet3,
Phone: 012,
Birthdate: 21/11/2003
Salary: 900000
Ten may tinh la: LAPTOP-SIENB251
Press any key to continue . . .

```

Câu 7:❖ *Source code Mytime .h*

```
#pragma once
#include <iostream>
using namespace std;
class Mytime {
protected:
    int hour;
    int min;
    int sec;
public:
    Mytime();
    Mytime(int hr, int mn, int sc);
    void Nhaptime();
    void Xuattime();
};
```

❖ *Source code Mytime .cpp*

```
#include "Mytime.h"

Mytime::Mytime()
{
    hour = 1;
    min = 1;
    sec = 1;
}

Mytime::Mytime(int hr, int mn, int sc)
{
    hour = hr;
    min = mn;
    sec = sc;
}

void Mytime::Nhaptime() {
    do {
        cout << "\nNhap gio: ";
        cin >> hour;
        if (hour < 0 || hour > 24) {
            cout << "\nNgay nhap khong dung! Nhap lai." << endl;
        }
    } while (hour < 0 || hour > 24);

    do {
        cout << "Nhap phut: ";
        cin >> min;
        if (min < 0 || min > 60) {
            cout << "\nThang nhap khong dung. Nhap lai!" << std::endl;
        }
    } while (min < 0 || min > 60);

    do {
        cout << "Nhap giay: ";
        cin >> sec;
        if (sec < 0 || sec > 60) {
            cout << "\nThang nhap khong dung. Nhap lai!" << std::endl;
        }
    } while (sec < 0 || sec > 60);
}
```



```

    }

    void Mytime::Xuattime() {
        cout << hour << ":" << min << "-" << sec << endl;
    }

```

❖ *Source code Mydate.h*

```

#pragma once
#include<iostream>
using namespace std;
class Mydate {
private:
    int day, month, year;

public:
    Mydate();
    Mydate(int d, int m, int y);
    void NhapDate();
    void XuatDate();
    bool operator>=(const Mydate& other);
};

```

❖ *Source code Mydate.cpp*

```

#include "Mydate.h"
#include <iostream>
using namespace std;
Mydate::Mydate() {
    day = 1;
    month = 1;
    year = 2000;
}

Mydate::Mydate(int d, int m, int y) {
    day = d;
    month = m;
    year = y;
}

void Mydate::NhapDate() {
    do {
        cout << "\nNhap ngay: ";
        cin >> day;
        if (day < 1 || day > 31) {
            cout << "\nNgay nhap khong dung! Nhap lai." << endl;
        }
    } while (day < 1 || day > 31);

    do {
        cout << "Nhap thang: ";
        cin >> month;
        if (month < 1 || month > 12) {
            cout << "\nThang nhap khong dung. Nhap lai!" << std::endl;
        }
    } while (month < 1 || month > 12);

    cout << "\nNhap nam: ";
    cin >> year;
}

```

```

void Mydate::XuatDate() {
    cout << day << "-" << month << "-" << year << endl;
}

bool Mydate::operator>=(const Mydate& other) {
    if (year > other.year)
        return true;
    else if (year == other.year && month > other.month)
        return true;
    else if (year == other.year && month == other.month && day >= other.day)
        return true;
    return false;
}

```

❖ *Source code Myfile .h*

```

#pragma once
#include "Mytime.h"
#include "Mydate.h"
#include <string>
using namespace std;

class Myfile : public Mytime, public Mydate {
private:
    string filename;
    int filesize;

public:
    Myfile();
    Myfile(int hr, int mn, int sc, int d, int m, int y, string name, int
size);
    void XuatThongTinFile();
    void NhapThongTinFile();
    bool operator > (const Myfile& x);
    void Xuatfilemax();
};

```

❖ *Source code Myfile .cpp*

```

#include "Myfile.h"
#include <iostream>

using namespace std;
Myfile::Myfile() {
    Mytime();
    Mydate();
    filename = "";
    filesize = 0;
}

Myfile::Myfile(int hr, int mn, int sc, int d, int m, int y, string name, int
size)
    : Mytime(hr,mn,sc), Mydate(d, m, y), filename(name), filesize(size) {}

void Myfile::NhapThongTinFile() {
    Nhaptime();
    NhapDate();
    cout << "Nhap ten file: ";
    cin >> filename;
    cout << "Nhap kích thước file: ";
}

```

```

        cin >> filesize;
    }

    bool Myfile::operator>(const Myfile& x)
    {
        return filesize > x.filesize;
    }

    void Myfile::XuatThongTinFile() {
        Xuattime();
        XuatDate();
        cout << "Filename: " << filename << endl;
        cout << "Filesize: " << filesize << " bytes" << endl;
    }

    void Myfile::Xuatfilemax() {
        cout << "\nNgay nhap: ";
        Xuattime();
        cout << "\tFilename: " << filename << "\tFilesize: " << filesize << "
        bytes";
    }
}

```

❖ *Source code Main.cpp*

```

#include <iostream>
#include "Myfile.h"
#include<cstdlib>
#include<windows.h>
using namespace std;
int main() {
    int n;
    cout << "Enter the number of files: ";
    cin >> n;

    Myfile* files = new Myfile[n];

    for (int i = 0; i < n; ++i) {
        cout << "Enter details for file " << i + 1 << ":\n";
        files[i].NhapThongTinFile();
    }

    Myfile largestFile = files[0];
    for (int i = 1; i < n; ++i) {
        if (files[i] > largestFile) {
            largestFile = files[i];
        }
    }
    cout << "File with the largest size:\n";
    cout << "Date: ";
    cout << "\nFilename: ";
    largestFile.Xuatfilemax();
    delete[] files;
    // Sử dụng hàm getenv để lấy tên máy tính từ biến môi trường
    COMPUTERTNAME
    char computerName[MAX_COMPUTERNAME_LENGTH + 1];
    DWORD size = sizeof(computerName);

    if (GetComputerNameA(computerName, &size)) {
        cout << "\nTen may tinh la: " << computerName << endl;
    }
    else {
        cout << "\nKhong the lay ten may tinh." << endl;
    }
}

```

```
    return 0;
}
```

❖ *Chụp hình kết quả:*

```
Microsoft Visual Studio Debug Console
Enter the number of files: 2
Enter details for file 1:
Nhap gio: 5
Nhap phut: 12
Nhap giay: 45
Nhap ngay: 2
Nhap thang: 12
Nhap nam: 2024
Nhap ten file: HOCTAP
Nhap kich thước file: 500000
Enter details for file 2:
Nhap gio: 12
Nhap phut: 50
Nhap giay: 20
Nhap ngay: 3
Nhap thang: 12
Nhap nam: 2024
Nhap ten file: SIMHOCAT
Nhap kich thước file: 500
File with the largest size:
Date:
Filename:
Ngày nhập: 5:12:45
Filename: HOCTAP
Filesize: 500000 bytes
Ten máy tính là: LAPTOP-SIENB251
C:\Users\huy20\OneDrive\Máy tính\Project\VSCode\C++\NopBTLAB\LABWeek2\LAB_Week2\TV_Cau7\x64\Debug\TV_Cau7.exe (process 7564) exited with code 0.
Press any key to close this window . . .
```

Câu 10:❖ *Source code Mycolor .h*

```
#pragma once
#include<iostream>
#include<string>
using namespace std;
class MyColor {
private:
    string sohieumau;
public:
    MyColor();
    MyColor(string sh);
    void Nhapsohieumau(string sh);
    void Xuatsohieumau();
};
```

❖ *Source code Mycolor.cpp*

```
#include<iostream>
#include"MyColor.h"
using namespace std;
MyColor::MyColor() {}
MyColor::MyColor(string sh) : sohieumau(sh) {}
void MyColor::Nhapsohieumau(string sh) {
    cout << "Nhap so hieu mau: ";
    cin.ignore();
    getline(cin, sohieumau);
}
```

```
void MyColor::Xuatsohieumau() {
    cout << "So hieu mau: " << sohieumau << endl;
}
```

❖ *Source code Point.h*

```
#pragma once
#include<iostream>
class Point {
private:
    int x;
    int y;
public:
    Point();
    Point(int xx, int yy);
    void thietlap(int xx, int yy);
    void Nhaptoado();
    void Xuattoado();
};
```

❖ *Source code Point.cpp*

```
#include<iostream>
#include"Point.h"
using namespace std;
Point::Point() {
    x = 0;
    y = 0;
}
Point::Point(int xx, int yy) {
    x = xx;
    y = yy;
}
void Point::thietlap(int xx, int yy) {
    x = xx;
    y = yy;
}
void Point::Nhaptoado() {
    cout << "\nNhap toa do x: ";
    cin >> x;
    cout << "\nNhap toa do y: ";
    cin >> y;
}
void Point::Xuattoado() {
    cout << " (" << x << ", " << y << ") " << endl;
}
```

❖ *Source code Circle.h*

```
#pragma once
#include<iostream>
#include<cmath>
#include"MyColor.h"
#include"Point.h"
class Circle :public MyColor {
private:
    Point toado;
    float r;
public:
    Circle() :MyColor(), toado(), r(0) {}
    Circle(string sh, int x, int y, float r) :MyColor(sh), toado(x, y),
r(r) {}
    float S();
    void thietlap(string sh, int x, int y, float r);
};
```

```

        void XuatCircle();
        bool operator > (Circle& a);
    };

```

❖ *Source code Circle.cpp*

```

#include<iostream>
#include<cmath>
#include"Circle.h"
using namespace std;
double pi = 3.14;
void Circle::thietlap(string sh, int xx, int yy, float rr) {
    MyColor::Nhapsohieumau(sh);
    toado.thietlap(xx, yy);
    r = rr;
}
float Circle::S() {
    return pi * r * r;
}
void Circle::XuatCircle() {
    Xuatsohieumau();
    cout << "\nDiem: ";
    toado.Xuattoado();
    cout << "\nBan kinh: " << r;
    cout << "\nDien tich: " << S() << endl;
}
bool Circle::operator>(Circle& c) {
    return this->S() > c.S();
}

```

❖ *Source code Main.cpp*

```

#include<iostream>
#include"Circle.h"
using namespace std;
#include<cstdlib>
#include<windows.h>
int main() {
    int n;
    cout << "\nNhap so luong duong tron: ";
    cin >> n;
    Circle* Cir = new Circle[n];
    for (int i = 0; i < n; i++) {
        int x, y;
        string shmau;
        float bankinh;
        cout << "\nNhap mau cua duong tron " << i + 1 << ": ";
        cin >> shmau;
        cout << "\nNhap toa do x cua duong tron " << i + 1 << ": ";
        cin >> x;
        cout << "\nNhap toa do y cua duong tron " << i + 1 << ": ";
        cin >> y;
        cout << "\nNhap ban kinh cua duong tron " << i + 1 << ": ";
        cin >> bankinh;
        Cir[i].thietlap(shmau, x, y, bankinh);
    }
    Circle max = Cir[0];
    for (int i = 1; i < n; i++) {
        if (Cir[i] > max) {
            max = Cir[i];
        }
    }
    cout << "\nDuong tron co ban kinh lon nhat: " << endl;
}

```

```

max.XuatCircle();
delete[] Cir;
// Sử dụng hàm getenv để lấy tên máy tính từ biến môi trường
COMPUTERNAME
char computerName[MAX_COMPUTERNAME_LENGTH + 1];
DWORD size = sizeof(computerName);

if (GetComputerNameA(computerName, &size)) {
    cout << "\nTen may tinh la: " << computerName << endl;
}
else {
    cout << "\nKhong the lay ten may tinh." << endl;
}
system("pause");
return 0;
}

```

❖ Hình chụp kết quả

```

C:\Users\huy20\OneDrive\Máy tính\Project\VSCode\C++\Nop8TLAB\LABWeek2\LAB_Week2\IV_Cau10\Debug\IV_Cau10.exe
Nhap so luong duong tron: 2
Nhap mau cua duong tron 1: Trang
Nhap toa do x cua duong tron 1: 2
Nhap toa do y cua duong tron 1: 3
Nhap ban kinh cua duong tron 1: 5
Nhap so hieu mau: 001
Nhap mau cua duong tron 2: Den
Nhap toa do x cua duong tron 2: 2
Nhap toa do y cua duong tron 2: 6
Nhap ban kinh cua duong tron 2: 3
Nhap so hieu mau: 000
Duong tron co ban kinh lon nhat:
So hieu mau: 001
Dien: (2,3)
Ban kinh: 5
Dien tich: 78.5
Ten may tinh la: LAPTOP-SIENB251
Press any key to continue . . .

```