**CTDLGT - Lab01b - Con trỏ cho đối tượng và mảng 1 chiều**

**Bài 1:**

#include<iostream>

#include<cmath>

using namespace std;

int main() {

float a,b,c,delta, \*x1,\*x2;

x1 = new float;

x2 = new float;

cout << "Nhap he so a b c: ";

cin >> a >> b >> c;

if (a == 0) {

if (b == 0) {

cout << "Phuong trinh vo nghiem!";

}

else {

cout << "Phuong trinh co 1 nghiem: x = " << -c / b;

}

}

else {

delta = b \* b - 4 \* a \* c;

if (delta < 0) {

cout << "Phuong trinh vo nghiem ";

}

else if (delta == 0) {

\*x1 = -b / (2 \* a ) ;

cout << "Phuong trinh co 1 nghiem kep: x = " << \*x1;

}

else {

\*x1 = (-b + sqrt(delta)) / (2 \* a);

\*x2 = (-b + sqrt(delta)) / (2 \* a);

cout << "Phuong trinh co 2 nghiem: x1 = " <<\*x1 << ", x2 = " << \*x2;

}

}

delete x1;

delete x2;

return 0;

}

**Bài 2:**

#include<iostream>

using namespace std;

bool kiem\_tra\_xen\_ke\_chan\_le(int \*a, int n) {

for(int i = 1; i < n; i++) {

if (((\*a + i) % 2 ) == (\*(a + i - 1 ) % 2)) {

return false;

}

}

return true;

}

bool kiem\_tra\_toan\_chan(int \*a , int n) {

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

if(\*(a + i ) % 2 != 0) {

return false;

}

}

return true;

}

int main() {

int n;

cout <<"Moi ban nhap so luong phan tu: ";

cin >> n;

int \*a = new int[n];

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

cout << "Phan tu: " << i << ": " ;

cin >> \*(a + i);

}

if(kiem\_tra\_xen\_ke\_chan\_le(a,n))

cout << "Day co tinh chat chan le \n ";

else

cout << "Day khong co tinh chan le \n ";

if (kiem\_tra\_toan\_chan(a,n))

cout << "Day co tinh chat toan chan \n ";

else

cout << "Day khogn co tinh chat toan chan \n ";

delete[] a;

return 0;

}

Mở bằng GPT Workspace

**Bài 3:**

#include<iostream>

using namespace std;

bool laNguyenAm(char c) {

return (c == 'a' || c == 'e' || c == 'i' || c == 'o' || c == 'u' ||

c == 'A' || c == 'E' || c == 'I' || c == 'O' || c == 'U');

}

int main() {

int n;

cout << "Moi ban nhap so luong phan tu: ";

cin >> n;

char \*a = new char[n];

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

cout << "Phan tu " << i << ": ";

cin >> \*(a + i);

}

char \*nguyenAm = new char[n];

int count = 0;

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

if (laNguyenAm(\*(a + i))) {

\*(nguyenAm + count) = \*(a + i);

count++;

}

}

cout << "Cac nguyen am trong day: ";

for (int i = 0; i < count; i++) {

cout << \*(nguyenAm + i) << " ";

}

cout << endl;

delete[] a;

delete[] nguyenAm;

return 0;

}

**Bài 4:**

#include <iostream>

using namespace std;

void tang\_dan(float \*a, int n, float \*b, int m, float \*c, int &p) {

float \*pa = a, \*pb = b, \*pc = c;

p = 0;

while (pa < a + n && pb < b + m) {

if (\*pa < \*pb) {

\*pc++ = \*pa++;

} else {

\*pc++ = \*pb++;

}

p++;

}

while (pa < a + n) {

\*pc++ = \*pa++;

p++;

}

while (pb < b + m) {

\*pc++ = \*pb++;

p++;

}

}

int main() {

int n, m, p;

float a[100], b[100], c[200];

cout << "Moi ban nhap so luong phan tu cua day a: ";

cin >> n;

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

cout << "Phan tu " << i << ": ";

cin >> \*(a + i);

}

cout << "Moi ban nhap so luong phan tu cua day b: ";

cin >> m;

for (int i = 0; i < m; i++) {

cout << "Phan tu " << i << ": ";

cin >> \*(b + i);

}

tang\_dan(a, n, b, m, c, p);

cout << "+ Day so c\n";

cout << "Day so co " << p << " phan tu: ";

for (int i = 0; i < p; i++) {

cout << \*(c + i) << " ";

}

cout << endl;

return 0;

}

**Bài 5:**

#include <iostream>

using namespace std;

void Chan\_Le(int \*a, int n, int \*b, int &m, int \*c, int &p) {

int \*pa = a, \*pb = b, \*pc = c;

m = p = 0;

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

if (\*(pa + i) % 2 == 0) {

\*(pb + m) = \*(pa + i);

m++;

} else {

\*(pc + p) = \*(pa + i);

p++;

}

}

}

int main() {

int n, m, p;

int a[100], b[100], c[100];

cout << "+ Day so a\n";

cout << "Moi ban nhap so luong phan tu: ";

cin >> n;

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

cout << "Phan tu " << i << ": ";

cin >> \*(a + i);

}

Chan\_Le(a, n, b, m, c, p);

cout << "+ Day so b chua so chan\n";

cout << "Day so co " << m << " phan tu: ";

for (int i = 0; i < m; i++) {

cout << \*(b + i) << " ";

}

cout << endl;

cout << "+ Day so c\n";

cout << "Day so co " << p << " phan tu: ";

for (int i = 0; i < p; i++) {

cout << \*(c + i) << " ";

}

cout << endl;

return 0;

}

**CTDLGT - Lab01c**

**Bài 1:**

#include <iostream>

#include <cstring>

using namespace std;

#define MAX 100

struct nhan\_vien {

char ma\_so[11];

char ho[11];

char ten[51];

int phai;

int tham\_nien;

};

struct phong\_ban {

nhan\_vien anhan\_vien[MAX];

int so\_luong;

};

void nhap\_phong\_ban(phong\_ban &pb) {

cout << "Nhap so luong nhan vien: ";

cin >> pb.so\_luong;

if (pb.so\_luong > MAX || pb.so\_luong <= 0) {

cout << "So luong nhan vien khong hop le!" << endl;

return;

}

for (int i = 0; i < pb.so\_luong; i++) {

cout << "\nNhap thong tin nhan vien thu " << i + 1 << ":\n";

cout << "Ma so: ";

cin >> pb.anhan\_vien[i].ma\_so;

cin.ignore();

cout << "Ho: ";

cin.getline(pb.anhan\_vien[i].ho, 11);

cout << "Ten: ";

cin.getline(pb.anhan\_vien[i].ten, 51);

do {

cout << "Phai (0: Nu, 1: Nam): ";

cin >> pb.anhan\_vien[i].phai;

} while (pb.anhan\_vien[i].phai != 0 && pb.anhan\_vien[i].phai != 1);

do {

cout << "Tham nien (>= 0): ";

cin >> pb.anhan\_vien[i].tham\_nien;

} while (pb.anhan\_vien[i].tham\_nien < 0);

}

}

void xuat\_phong\_ban(phong\_ban pb) {

cout << "\nDanh sach nhan vien:\n";

for (int i = 0; i < pb.so\_luong; i++) {

cout << pb.anhan\_vien[i].ma\_so << " | " << pb.anhan\_vien[i].ho << " "

<< pb.anhan\_vien[i].ten << " | " << (pb.anhan\_vien[i].phai ? "Nam" : "Nu")

<< " | Tham nien: " << pb.anhan\_vien[i].tham\_nien << " nam\n";

}

}

void dem\_si\_so(phong\_ban ds, int &so\_nam, int &so\_nu) {

so\_nam = so\_nu = 0;

for (int i = 0; i < ds.so\_luong; i++) {

if (ds.anhan\_vien[i].phai == 1)

so\_nam++;

else

so\_nu++;

}

}

void sap\_xep\_theo\_tham\_nien(phong\_ban &pb) {

for (int i = 0; i < pb.so\_luong - 1; i++) {

for (int j = i + 1; j < pb.so\_luong; j++) {

if (pb.anhan\_vien[i].tham\_nien > pb.anhan\_vien[j].tham\_nien) {

swap(pb.anhan\_vien[i], pb.anhan\_vien[j]);

}

}

}

}

int main() {

phong\_ban pb;

int so\_nam, so\_nu;

nhap\_phong\_ban(pb);

xuat\_phong\_ban(pb);

dem\_si\_so(pb, so\_nam, so\_nu);

cout << "\nSo nhan vien nam: " << so\_nam << endl;

cout << "So nhan vien nu: " << so\_nu << endl;

sap\_xep\_theo\_tham\_nien(pb);

cout << "\nDanh sach nhan vien sau khi sap xep theo tham nien tang dan:\n";

xuat\_phong\_ban(pb);

return 0;

}

**Bài 2:**

#include <iostream>

#include <vector>

#include <string>

#include <cstring>

using namespace std;

struct loai\_hoa {

char ten[50];

int so\_luong;

char dvt[20];

double don\_gia;

};

struct danh\_sach\_loai\_hoa {

vector<loai\_hoa> ds;

};

void nhap\_danh\_sach(danh\_sach\_loai\_hoa &ds) {

int n;

cout << "Nhap so loai hoa: ";

cin >> n;

cin.ignore();

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

loai\_hoa hoa;

cout << "\nNhap ten loai hoa: ";

cin.getline(hoa.ten, 50);

cout << "Nhap so luong: ";

cin >> hoa.so\_luong;

cin.ignore();

cout << "Nhap don vi tinh: ";

cin.getline(hoa.dvt, 20);

cout << "Nhap don gia: ";

cin >> hoa.don\_gia;

cin.ignore();

ds.ds.push\_back(hoa);

}

}

void xuat\_danh\_sach(danh\_sach\_loai\_hoa ds) {

cout << "\nDanh sach loai hoa:\n";

for (size\_t i = 0; i < ds.ds.size(); i++) {

cout << "Ten: " << ds.ds[i].ten

<< ", So luong: " << ds.ds[i].so\_luong

<< ", DVT: " << ds.ds[i].dvt

<< ", Don gia: " << ds.ds[i].don\_gia << "\n";

}

}

int tim\_loai\_hoa(danh\_sach\_loai\_hoa ds, const string &ten\_loai) {

for (size\_t i = 0; i < ds.ds.size(); i++) {

if (strcmp(ds.ds[i].ten, ten\_loai.c\_str()) == 0) {

return i;

}

}

return -1;

}

void xu\_ly\_ban\_hoa(danh\_sach\_loai\_hoa &ds, const string &ten\_loai, int so\_luong) {

int index = tim\_loai\_hoa(ds, ten\_loai);

if (index == -1) {

cout << "Loai hoa khong ton tai!\n";

return;

}

if (ds.ds[index].so\_luong >= so\_luong) {

double tong\_tien = so\_luong \* ds.ds[index].don\_gia;

ds.ds[index].so\_luong -= so\_luong;

cout << "Ban thanh cong! Tong tien: " << tong\_tien << " VND\n";

} else {

cout << "Khong du so luong hoa de ban!\n";

}

}

int main() {

danh\_sach\_loai\_hoa ds;

nhap\_danh\_sach(ds);

xuat\_danh\_sach(ds);

string ten\_loai;

int so\_luong;

cout << "\nNhap ten loai hoa can mua: ";

getline(cin, ten\_loai);

cout << "Nhap so luong can mua: ";

cin >> so\_luong;

cin.ignore();

xu\_ly\_ban\_hoa(ds, ten\_loai, so\_luong);

xuat\_danh\_sach(ds);

return 0;

}

**CTDLGT - Lab01d - Xử lí chuỗi**

**Bài 1:**

#include <iostream>

using namespace std;

int main() {

string s;

cout << "Moi ban nhap chuoi s: ";

cin >> s;

int n = s.length();

for (int i = 0; i < n - 1; i++) {

for (int j = 0; j < n - i - 1; j++) {

if (s[j] > s[j + 1]) {

char temp = s[j];

s[j] = s[j + 1];

s[j + 1] = temp;

}

}

}

cout << "Chuoi sau khi sap xep: " << s << endl;

return 0;

}

**Bài 2:**

#include <iostream>

using namespace std;

int main() {

string s;

int k;

cout << "Moi ban nhap chuoi s: ";

cin >> s;

cout << "Moi ban nhap vi tri can xoa: ";

cin >> k;

if (k >= 0 && k < s.length()) {

s.erase(k, 1);

} else {

cout << "Vi tri khong hop le!" << endl;

}

cout << "Chuoi sau khi xoa ky tu tai vi tri " << k << ": " << s << endl;

return 0;

}

**Bài 3:**

#include <iostream>

using namespace std;

int main() {

string s;

int k;

char c;

cout << "Moi ban nhap chuoi s: ";

cin >> s;

cout << "Moi ban nhap vi tri can chen: ";

cin >> k;

cout << "Moi ban nhap ky tu chen: ";

cin >> c;

if (k >= 0 && k <= s.length()) {

s += ' ';

for (int i = s.length() - 1; i > k; i--) {

s[i] = s[i - 1];

}

s[k] = c;

}

cout << "Chuoi sau khi chen ky tu \"" << c << "\" vao vi tri " << k << ": " << s << endl;

return 0;

}

**CTDLGT - Lab01e - File Van Ban**

**Bài 1:**

#include <iostream>

#include <vector>

using namespace std;

int main() {

int n;

cin >> n;

vector<int> arr(n);

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

cin >> arr[i];

}

cout << "Cac so doc duoc:\n";

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

cout << arr[i] << " ";

}

cout << endl;

return 0;

}

**Bài 2:**

#include <iostream>

using namespace std;

int main() {

int n, m;

cin >> n >> m;

int\*\* matrix = new int\*[n];

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

matrix[i] = new int[m];

}

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

for (int j = 0; j < m; j++) {

cin >> matrix[i][j];

}

}

cout << "Ma tran doc duoc:\n";

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

for (int j = 0; j < m; j++) {

cout << matrix[i][j] << " ";

}

cout << endl;

}

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

delete[] matrix[i];

}

delete[] matrix;

return 0;

}

**Bài 3:**

#include <iostream>

using namespace std;

bool ktsnt(int x) {

if (x < 2) return false;

for (int i = 2; i \* i <= x; i++) {

if (x % i == 0) return false;

}

return true;

}

void sap\_xep(int arr[], int size) {

for (int i = 0; i < size - 1; i++) {

for (int j = 0; j < size - i - 1; j++) {

if (arr[j] > arr[j + 1]) {

int temp = arr[j];

arr[j] = arr[j + 1];

arr[j + 1] = temp;

}

}

}

}

int main() {

int n;

cin >> n;

int snt[10000], count = 0;

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

int x;

cin >> x;

if (ktsnt(x)) {

snt[count++] = x;

}

}

sap\_xep(snt, count);

cout << count << endl;

for (int i = 0; i < count; i++) {

cout << snt[i] << " ";

}

cout << endl;

return 0;

}

**Bài 4:**

#include<iostream>

using namespace std;

int main() {

int n, k ;

cin >> n >> k;

int arr[n];

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

cin >> arr[i];

}

bool found = false;

for(int i = 0; i < n -1 ; i++){

for(int j = i + 1 ; j < n ;j++) {

if (arr[i] + arr[j] == k) {

cout << arr[i] << " " << arr[j] << endl;

found = true;

}

}

}

if(!found ) {

cout <<"0" << endl;

}

return 0;

}

**CTDLGT - Lab01f - Cau truc 2**

**Bài 1:**

#include <iostream>

#include <string>

using namespace std;

#define MAX 100

struct dien\_thoai {

string ma;

string nhan\_hieu;

int gia;

};

dien\_thoai danh\_sach[MAX];

int n = 0;

int tim\_vi\_tri(string ma) {

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

if (danh\_sach[i].ma == ma) return i;

}

return -1;

}

void them\_dien\_thoai() {

if (n >= MAX) {

cout << "Danh sach da day!\n";

return;

}

dien\_thoai dt;

cout << "Nhap ma dien thoai: ";

cin >> dt.ma;

if (tim\_vi\_tri(dt.ma) != -1) {

cout << "Ma dien thoai da ton tai!\n";

return;

}

cin.ignore();

cout << "Nhap nhan hieu: ";

getline(cin, dt.nhan\_hieu);

cout << "Nhap gia: ";

cin >> dt.gia;

danh\_sach[n++] = dt;

cout << "Them thanh cong!\n";

}

void cap\_nhat\_gia() {

string ma;

cout << "Nhap ma dien thoai can cap nhat gia: ";

cin >> ma;

int pos = tim\_vi\_tri(ma);

if (pos == -1) {

cout << "Khong tim thay dien thoai!\n";

return;

}

cout << "Nhap gia moi: ";

cin >> danh\_sach[pos].gia;

cout << "Cap nhat thanh cong!\n";

}

void xoa\_dien\_thoai() {

string ma;

cout << "Nhap ma dien thoai can xoa: ";

cin >> ma;

int pos = tim\_vi\_tri(ma);

if (pos == -1) {

cout << "Khong tim thay dien thoai!\n";

return;

}

// Shift elements left

for (int i = pos; i < n - 1; i++) {

danh\_sach[i] = danh\_sach[i + 1];

}

n--;

cout << "Xoa thanh cong!\n";

}

void xuat\_danh\_sach() {

if (n == 0) {

cout << "Danh sach rong!\n";

return;

}

cout << "\nDANH SACH DIEN THOAI:\n";

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

cout << "Ma: " << danh\_sach[i].ma

<< ", Nhan hieu: " << danh\_sach[i].nhan\_hieu

<< ", Gia: " << danh\_sach[i].gia << " VND\n";

}

}

void menu() {

int lua\_chon;

do {

cout << "\n===== QUAN LY DIEN THOAI =====\n";

cout << "1. Them dien thoai\n";

cout << "2. Cap nhat gia\n";

cout << "3. Xoa dien thoai\n";

cout << "4. Xuat danh sach\n";

cout << "5. Thoat\n";

cout << "Nhap lua chon: ";

cin >> lua\_chon;

switch (lua\_chon) {

case 1: them\_dien\_thoai(); break;

case 2: cap\_nhat\_gia(); break;

case 3: xoa\_dien\_thoai(); break;

case 4: xuat\_danh\_sach(); break;

case 5: cout << "Thoat chuong trinh.\n"; break;

default: cout << "Lua chon khong hop le!\n";

}

} while (lua\_chon != 5);

}

int main() {

cout << "CHUONG TRINH QUAN LY DIEN THOAI\n";

cout << "--------------------------------\n";

cout << "So luong toi da: " << MAX << " dien thoai\n";

menu();

cout << "Cam on ban da su dung chuong trinh!\n";

return 0;

}

**Bài 2:**

#include <iostream>

#include <string>

using namespace std;

#define MAX 100

struct MatHang {

string MSMH;

string TenMH;

int SoLuong;

float DonGia;

};

MatHang danhSach[MAX];

int n = 0;

void nhapMatHang() {

if (n >= MAX) {

cout << "Danh sach da day!\n";

return;

}

MatHang mh;

cout << "Nhap ma so mat hang: "; cin >> mh.MSMH;

cout << "Nhap ten mat hang: "; cin.ignore(); getline(cin, mh.TenMH);

cout << "Nhap so luong: "; cin >> mh.SoLuong;

cout << "Nhap don gia: "; cin >> mh.DonGia;

danhSach[n++] = mh;

cout << "Nhap mat hang thanh cong!\n";

}

void timMatHang(const string& tenMH) {

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

if (danhSach[i].TenMH == tenMH) {

cout << "Thong tin mat hang:\n"

<< "Ma so: " << danhSach[i].MSMH << "\n"

<< "Ten mat hang: " << danhSach[i].TenMH << "\n"

<< "So luong: " << danhSach[i].SoLuong << "\n"

<< "Don gia: " << danhSach[i].DonGia << " VND\n";

return;

}

}

cout << "Khong co mat hang dang tim!\n";

}

int tinhTongSoLuong() {

int tong = 0;

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

tong += danhSach[i].SoLuong;

}

return tong;

}

void menu() {

int luaChon;

do {

cout << "\n===== QUAN LY CUA HANG =====\n";

cout << "1. Nhap mat hang\n";

cout << "2. Tim mat hang\n";

cout << "3. Tinh tong so luong mat hang\n";

cout << "4. Thoat\n";

cout << "Nhap lua chon: ";

cin >> luaChon;

switch (luaChon) {

case 1: nhapMatHang(); break;

case 2: {

string tenMH;

cout << "Nhap ten mat hang can tim: "; cin.ignore(); getline(cin, tenMH);

timMatHang(tenMH);

break;

}

case 3: {

int tong = tinhTongSoLuong();

cout << "Tong so luong mat hang: " << tong << "\n";

break;

}

case 4: cout << "Thoat chuong trinh.\n"; break;

default: cout << "Lua chon khong hop le!\n";

}

} while (luaChon != 4);

}

int main() {

cout << "CHUONG TRINH QUAN LY CUA HANG\n";

cout << "------------------------------\n";

menu();

cout << "Cam on ban da su dung chuong trinh!\n";

return 0;

}