

## Lời giải tham khảo

### Bài 1.

```
#include<bits/stdc++.h>
```

```
using namespace std;
```

```
class Canbo{
```

```
private:
```

```
    string macb,hoten,gioitinh;
```

```
public:
```

```
    void Nhap_Canbo();
```

```
    void Xuat_Canbo();
```

```
    string get_macb();
```

```
    string get_hoten();
```

```
    string get_gioitinh();
```

```
};
```

```
void Canbo::Nhap_Canbo()
```

```
{
```

```
    cout<<"Nhap ma can bo: ";
```

```
    fflush(stdin);
```

```
    getline(cin,macb);
```

```
    cout<<"Nhap ho ten: ";
```

```
    fflush(stdin);
```

```
    getline(cin,hoten);
```

```
    cout<<"Nhap gioi tinh: ";
```

```
    fflush(stdin);
```

```
    getline(cin,gioitinh);
```

```
}
```

```

void Canbo::Xuat_Canbo()
{

    cout<<setw(12)<<left<<macb<<setw(20)<<left<<hoten<<setw(10)<<left<<gioiti
nh;

}

string Canbo::get_macb()
{

    return macb;

}

string Canbo::get_hoten()
{

    return hoten;

}

string Canbo::get_gioitinh()
{

    return gioitinh;

}

class Congnhan : public Canbo
{
private:
    int Bac,SoNgayLamViec;
    int d,m,y;
public:
    void Nhap_Congnhan();
    void Xuat_Congnhan();
    int operator >(Congnhan b);

```

```

        long Luong();

};

void Congnhan::Nhap_Congnhan()
{
    Nhap_Canbo();
    do{
        cout<<"Nhap bac: ";
        cin>>Bac;
    }while(Bac<0 or Bac>4);
    cout<<"Nhap so ngay lam viec: ";
    cin>>SoNgayLamViec;
    cout<<"Nhap ngay ky hop dong: ";
    cin>>d>>m>>y;
}

long Congnhan::Luong()
{
    long tiencongnhat;
    if (Bac==1) tiencongnhat=300000;
    else if (Bac==2) tiencongnhat=350000;
    else tiencongnhat=400000;
    return SoNgayLamViec*tiencongnhat;
}

void Congnhan::Xuat_Congnhan()
{
    Xuat_Canbo();

```

```
        cout<<setw(10)<<left<<Bac<<setw(20)<<left<<SoNgayLamViec<<setw(10)<<left<<Luong();
```

```
    }
```

```
int Congnhan::operator >(Congnhan b)
```

```
{
```

```
    if (y>b.y) return 1;
```

```
    if ((y==b.y) and (m>b.m)) return 1;
```

```
    if ((y==b.y) and (m==b.m) and (d>b.d)) return 1;
```

```
    return 0;
```

```
}
```

```
class QuanLy
```

```
{
```

```
    private:
```

```
        int n;
```

```
        Congnhan a[50];
```

```
    public:
```

```
        void Nhap_ds();
```

```
        void Sapxep_Hienthi();
```

```
        void In_luongTB_nu();
```

```
};
```

```
void QuanLy::Nhap_ds()
```

```
{
```

```
    do{
```

```
        cout<<"Nhap so luong cong nhan: ";
```

```
        cin>>n;
```

```

    }while(n<0 or n>50);

    cin.ignore(1);

    cout<<"Nhap thong tin cho cong nhan: "<<endl;

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

        cout<<"Nhap doi tuong thu ["<<i+1<<"]: "<<endl;

        a[i].Nhap_Congnhan();

    }

}

void QuanLy::Sapxep_Hienthi()

{

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

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

            if(a[i] > a[j]){

                Congnhan temp=a[i];

                a[i]=a[j];

                a[j]=temp;

            }

        }

    }

    cout<<"\n--- DANH SACH SAU KHI SAP XEP THEO NGAY ---

"<<endl;

    cout<<setw(12)<<left<<"Ma can bo"<<setw(20)<<left<<"Ho

ten"<<setw(10)<<left<<"Gioi tinh";

    cout<<setw(10)<<left<<"Bac"<<setw(20)<<left<<"So ngay lam

viec"<<setw(5)<<left<<"Tien luong"<<endl;

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

        a[i].Xuat_Congnhan();

        cout<<endl;

```

```

        }

    }

void QuanLy::In_luongTB_nu()
{
    long S = 0; int dem=0;
    for(int i=0;i<n;i++)
        if(a[i].get_gioitinh() == "nu")
        {
            S += a[i].Luong();
            dem++;
        }

    cout<<"\n Tong luong cua nu: "<<S;
    cout<<"\n so cn nu la: "<<dem;
    cout<<"\n Luong trung binh cua nu la: "<<(long)S/dem;

}

```

```

int main()
{
    QuanLy ob;
    ob.Nhap_ds();
    ob.Sapxep_Hienthi();
    ob.In_luongTB_nu();
    return 0;
}

```

## **Bài 2.**

```
#include<iostream>
```

```
#include<iomanip>
```

```
#define namHienTai 2022
```

```
using namespace std;
```

```
class Computer
```

```
{
```

```
    private:
```

```
        string mamaytinh;
```

```
        string hangsanxuat;
```

```
        int namsx;
```

```
        long giaban;
```

```
    public:
```

```
        string get_maMayTinh();
```

```
        string get_hangSanXuat();
```

```
        int get_namSanXuat();
```

```
        long get_giaban();
```

```
        void nhap();
```

```
        void xuat();
```

```
};
```

```
string Computer::get_maMayTinh()
```

```
{
```

```
    return mamaytinh;
```

```
}
```

```
string Computer::get_hangSanXuat()
```

```
{
```

```
    return hangsanxuat;
```

```
}
```

```
int Computer::get_namSanXuat()
```

```
{  
    return namsx;  
}
```

```
long Computer::get_giaban()
```

```
{  
    return giaban;  
}
```

```
void Computer::nhap()
```

```
{  
    cin.ignore(1);  
    cout<<"\nNhap ma may tinh: ";  
    getline(cin, mamaytinh);  
    cout<<"Nhap hang san xuat: ";  
    getline(cin, hangsanxuat);  
    cout<<"Nhap nam san xuat: ";  
    cin>>namsx;  
    cout<<"Nhap gia ban: ";  
    cin>>giaban;  
}
```

```
void Computer::xuat()
```

```
{  
    cout<<left<<setw(10)<<mamaytinh;  
    cout<<left<<setw(15)<<hangsanxuat;  
    cout<<left<<setw(15)<<namsx;
```



```
        cout<<left<<setw(15)<<giaban;
    }
}
```

```
class Laptop : public Computer
```

```
{
    private:
        float kannang;
        float doday;
        float kichthuocmanhinh;
        string hedieuhanh;
    public:
        float get_cangNang();
        float get_doDay();
        float get_kichThuoc();
        string get_hedieuhanh();
        void nhap();
        long giaTriConLai();
        bool operator >(Laptop l);
        void xuat();
};
```

```
float Laptop::get_cangNang()
```

```
{
    return kannang;
}
```

```
float Laptop::get_doDay()
```

```
{  
    return doday;  
}
```

```
float Laptop::get_kichThuoc()  
{  
    return kichthuocmanhinh;  
}
```

```
string Laptop::get_hedieuhanh()  
{  
    return hedieuhanh;  
}
```

```
void Laptop::nhap()  
{  
    Computer::nhap();  
    cout<<"Nhap can nang cua may: ";  
    cin>>cannang;  
    cout<<"Nhap do day cua may: ";  
    cin>>doday;  
    cout<<"Nhap kich thuoc man hinh: ";  
    cin>>kichthuocmanhinh;  
    cin.ignore(1);  
    cout<<"Nhap he dieu hanh: ";  
    getline(cin, hedieuhanh);  
}
```

```

long Laptop::giaTriConLai()
{
    long giatri;

    if (hedieuhanh == "Windows")

        giatri = get_giaban() - (namHienTai -
get_namSanXuat())*0.1*get_giaban();

    else

        giatri = get_giaban()-(namHienTai - get_namSanXuat())*0.05*get_giaban();

    if (giatri <0)

        giatri = 0;

    return giatri;
}

```

```

bool Laptop::operator >(Laptop l)
{
    if(giaTriConLai() > l.giaTriConLai())

        return true;

    else

        return false;

}

```

```

void Laptop::xuat()
{
    Computer :: xuat();

    cout<<left<<setw(10)<<cannang;

```

```

        cout<<left<<setw(10)<<doday;

        cout<<left<<setw(20)<<kichthuocmanhinh;

        cout<<left<<setw(16)<<giaTriConLai();

        cout<<left<<setw(15)<<(namHienTai - get_namSanXuat());

        cout<<left<<setw(15)<<hedieuhanh<<endl;

    }

```

```

class quanLy{
private:
    Laptop x[50];
    int n;
public:
    void nhapDs();
    void xuatDs();
    void sapXep();
    void in_max();
};

```

```

void quanLy::nhapDs()
{
    cout<<"Nhap vao so luong laptop can quan ly: ";
    do{
        cin>>n;
        if(n<0 || n>50){
            cout<<"SO LUONG KHONG HOP LE!";
        }
    }while(n>50 || n<0);
    for(int i=0;i<n;i++)

```

```

        {
            cout<<"\n\t\t\t\t\tNHAP THONG TIN LAPTOP THU " <<i+1;
            x[i].nhap();
        }
    }
}

```

void quanLy::xuatDs()

```

{
    cout<<left<<setw(10)<<"MA MAY";
    cout<<left<<setw(15)<<"HANG SAN XUAT";
    cout<<left<<setw(15)<<"NAM SAN XUAT";
    cout<<left<<setw(15)<<"GIA BAN";
    cout<<left<<setw(10)<<"CAN NANG";
    cout<<left<<setw(10)<<"DO DAY";
    cout<<left<<setw(20)<<"KICH THUOC MAN HINH";
    cout<<left<<setw(16)<<"GIA TRI CON LAI";
    cout<<left<<setw(15)<<"NAM SU DUNG";
    cout<<left<<setw(15)<<"HE DIEU HANH"<<endl;
    for(int i=0;i<n;i++)
        x[i].xuat();
}

```

void quanLy::sapXep()

```

{
    for(int i=0;i<n-1;i++)
        for(int j=i+1;j<n;j++)
            if(x[i] > x[j])

```

```

        {
            Laptop tam;

            tam=x[i];

            x[i]=x[j];

            x[j]=tam;

        }

    }

void quanLy::in_max()
{
    int max = 0, dem = 0;

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

        if (max < (namHienTai - x[i].get_namSanXuat()))

            max = namHienTai - x[i].get_namSanXuat();

    cout<<"\n So nam su dung nhieu nhat: "<<max;

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

        if ((namHienTai - x[i].get_namSanXuat()) == max)

            ++dem;

    cout<<"\n So may tinh xach ta co nam su dung nhieu nhat: "<<dem;

    //...sinh vien in tiep

}

```

```

int main()
{
    quanLy x;

    x.nhapDs();

    cout<<"\t\t\t\tTHONG TIN CUA CAC LAPTOP\n";

    x.xuatDs();
}

```

```

        x.sapXep();

        cout<<"\n\t\t\t\tDANH SACH SAU KHI SAP XEP TANG DAN THEO GIA
TRi CON LAI\n";

        x.xuatDs();

        x.in_max();


        return 0;

    }

```

### **Bài 3**

```

#include<iostream>

#include<iomanip>

#include<string>

using namespace std;

class Media
{
    private:

        int maphuongtien;

        int namxuatban;

        long giaban;

    public:

        int get_maphuongtien();

        int get_namxuatban();

        long get_giaban();


        void nhap_media();

        void xuat_media();

};

```

```
int Media::get_maphuongtien()
{
    return maphuongtien;
}
int Media::get_namxuatban()
{
    return namxuatban;
}
long Media::get_giaban()
{
    return giaban;
}
void Media::nhap_media()
{
    cout << "Ma phuong tien: ";
    cin >> maphuongtien;
    cout << "Nam xuat ban: ";
    cin >> namxuatban;
    cout << "Gia ban: ";
    cin >> giaban;
}
void Media::xuat_media()
{
    cout << setw(10) << maphuongtien
        << setw(8) << namxuatban
        << setw(10) << giaban;
}
```



```
class Book : public Media
{
    private:
        string tensach;
        string tacgia;
        int sotrang;
    public:

        string get_tensach();
        string get_tacgia();
        int get_sotrang();

        void nhap_book();
        void xuat_book();

        bool operator > (Book b2);
};
```

```
string Book::get_tensach()
```

```
{
    return tensach;
```

```
}
```

```
string Book::get_tacgia()
```

```
{
    return tacgia;
```

```
}
```

```
int Book::get_sotrang()
```

```
{
```

```
    return sotrang;
```

```
}
```

```
void Book::nhap_book()
```

```
{
```

```
    Media::nhap_media();
```

```
    cin.ignore(1);
```

```
    cout << "Ten sach: ";
```

```
    getline(cin,tensach);
```

```
    cout << "Tac gia: ";
```

```
    getline(cin,tacgia);
```

```
    cout << "So trang: ";
```

```
    cin >> sotrang;
```

```
    cin.ignore(1);
```

```
}
```

```
void Book::xuat_book()
```

```
{
```

```
    Media::xuat_media();
```

```
    cout << setw(20) << tensach
```

```
        << setw(20) << tacgia
```

```
        << setw(10) << sotrang << endl;
```

```
}
```

```
bool Book::operator >(Book b2)
```

```
{
```

```
    if (sotrang > b2.sotrang)
```

```
        return true;
```

```

        else

            return false;

    }

class danhsach
{
    private:
        int n;
        Book data[50];
    public:
        void nhap_danhsach();
        void sapxep_hienthi();
        void giaban_max();
        void tongtrang_tonggiatri();

};

void danhsach::nhap_danhsach()
{
    cout << "NHAP DANH SACH: " << endl;
    cout << "So cuon sach: ";
    cin >> n;//sv tukiem tra dung do ...while
    cin.ignore(1);
    for (int i=0;i<n;i++)
        data[i].nhap_book();
}

void danhsach::sapxep_hienthi()
{
    cout << "\nSAP XEP DANH SACH TANG DAN THEO SO TRANG:" << endl;

```

```

        for (int i=0;i<n;i++)
            for (int j=i+1;j<n;j++)
                if (data[i]>data[j])
                {
                    Book temp;
                    temp = data[i];
                    data[i] = data[j];
                    data[j] = temp;
                }
        cout << setw(10) << "Ma pt"
            << setw(8) << "Nam xb"
            << setw(10) << "Gia ban"
            << setw(20) << "Ten sach"
            << setw(20) << "Tac gia"
            << setw(10) << "So trang" << endl;

        for (int i=0;i<n;i++)
            data[i].xuat_book();
    }

    void danhsach::giaban_max()
    {
        cout << "NHUNG CUON SACH CO GIA BAN CAO NHAT:" << endl;
        long max = data[0].get_giaban();
        for (int i=1;i<n;i++)
            if (max < data[i].get_giaban())
                max = data[i].get_giaban();

        cout << setw(10) << "Ma pt"
            << setw(8) << "Nam xb"
            << setw(10) << "Gia ban"

```

```

        << setw(20) << "Ten sach"

        << setw(20) << "Tac gia"

        << setw(10) << "So trang" << endl;

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

        if (data[i].get_giaban()==max)

            data[i].xuat_book();

    }

void danhsach::tongtrang_tonggiatri()

{

    int tongtrang = 0;

    long tonggiatri = 0;

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

    {

        tongtrang+=data[i].get_sotrang();

        tonggiatri+=data[i].get_giaban();

    }

    cout << "\nTONG SO TRANG: " << tongtrang << endl;

    cout << "TONG GIA TRI: " << tonggiatri << endl;

}

int main()

{

    danhsach ds;

    ds.nhap_danhsach();

    ds.sapxep_hienthi();

    ds.giaban_max();

    ds.tongtrang_tonggiatri();

```

```
return 0;
```

```
}
```

---

**Chú ý:** Trên mảng đối tượng sinh viên nên làm thêm các thao tác : Tìm kiếm, chèn, xóa