

TRƯỜNG ĐẠI HỌC MỞ HÀ NỘI
KHOA CÔNG NGHỆ THÔNG TIN



BÁO CÁO BÀI TẬP LỚN
MÔN CẤU TRÚC DỮ LIỆU VÀ GIẢI THUẬT

ĐỀ TÀI:
BÀI TOÁN “QUẢN LÝ ĐỀ TÀI NGHIÊN CỨU KHOA HỌC”

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PHÂN CÔNG VÀ KẾ HOẠCH THỰC HIỆN

HỌ VÀ TÊN	CÔNG VIỆC	THỜI GIAN THỰC HIỆN	GHI CHÚ
Nguyễn Công Minh	DS LK ĐÔI DS LK ĐƠN		(NHÓM TRƯỞNG)
Trần Văn Ngọc Bảo	QUEUE STACK		

I, MÔ TẢ BÀI TOÁN

1. Phát biểu bài toán

Quản lí đề tài nghiên cứu khoa học ở cấp khoa. Các đối tượng cần quản lý là danh sách các tên đề tài và sinh viên làm đề tài.

Mỗi đề tài sẽ có một sinh viên nhận đề và làm sẽ có số lượng câu hỏi trong đề .

Xác định đối tượng cần quản lý

Chương trình quản lí đề tài nghiên cứu khoa học gồm:

- Danh mục đề tài
 - Tên đề tài
 - Sinh Viên thực hiện
 - Số lượng câu hỏi trong đề
 - Mã đề tài

Chức năng cần thực hiện

- 1, Nhập và hiện danh sách đề
- 2, Thêm một đề bất kì vào đầu danh sách

- 3, Thêm một đề bất kì vào cuối danh sách
- 4, Hiện thông tin đề
- 5, Cập nhật thông tin vào file
- 6, Hiện đề tài có trên 5 câu hỏi
- 7, Tìm kiếm theo mã đề
- 8, Tìm kiếm theo tên sinh viên
- 9, Thống kê số lượng đề tài
- 10, Xóa đề ở đầu sách
- 11, Xóa đề ở cuối danh sách
- 12, Sắp xếp theo tên sinh viên
- 13, Sắp xếp theo tên đề
- 14, Sắp xếp theo số lượng đề tài

II, XÁC ĐỊNH CTDL CỦA BÀI TOÁN:

1, Mô tả cấu trúc dữ liệu được tổ chức cho bài toán:

a, Danh sách liên kết đơn(Nguyễn Công Minh)

- code:

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

using namespace std;

typedef struct DeTai
{
    int soLuong;
    char tenDeTai[50], SinhVien[30], maDeTai[30];
} detai;

typedef struct node
```

```

{
    DeTai data;
    struct node *next;
} qldt;
// chương trình quản lý dt
void initDeTai(qldt *&head, qldt *&tail)
{
    head = NULL;
    tail = NULL;
};
node *createNode()
{
    qldt *new_node = (qldt *) malloc(sizeof(qldt));
    cout<<"\nNhập tên De Tai: ";
    fflush(stdin);
    gets(&new_node->data.tenDeTai);
    cout<<"Nhập mã De Tai: ";
    fflush(stdin);
    cin>>&new_node->data.maDeTai;
    cout<<"Nhập tên SV làm De Tai: ";
    fflush(stdin);
    gets(&new_node->data.SinhVien);
    cout<<"Nhập số lượng: ";
    cin>>&new_node->data.soLuong;

```

```

        new_node->next = NULL;
        return new_node;
    }

//nhap
void addHead(qltdt *&head, qltdt *&tail)
{

    qltdt *add_head = createNode();
    if (head == NULL)
    {
        head = add_head;
        tail = head;
    }
    else
    {
        add_head->next = head;
        head = add_head;
    }
}

void addTail(qltdt *&head, qltdt *&tail)
{
    qltdt *add_tail = createNode();

```

```

if (tail == NULL)
{
    tail = add_tail;
    head = tail;
}
else
{
    tail->next = add_tail;
    tail = tail->next;
}
}

```

```
//nhap
```

```
void nhapHead(qldt *&head, qldt *&tail)
```

```

{
    int n;

    do
    {
        cout<<"\nNhap vao so luong De Tai: ";
        cin>>n;
    }
    while (n <= 0);
    for (int i = 0; i < n; i++)

```

```

    {
        cout<<"\nNhap thong tin De Tai: "<<i+1;
        addHead(head, tail);
    }
}

```

```

void nhapTail(qltdt *&head, qltdt *&tail)
{
    int n;

    do
    {
        cout<<"\nNhap vao so luong De Tai: ";
        cin>>n;
    }
    while (n <= 0);
    for (int i = 0; i < n; i++)
    {
        cout<<"\nNhap thong tin De Tai: "<<i+1;
        addTail(head, tail);
    }
}

```

```

//xuat

```

```

void xuat(qldt *head, qldt *tail)
{
    qldt *p;
    p = head;

    cout << setw(30) << left << "\nTen De Tai";
    cout << setw(12) << left << "Ma De Tai";
    cout << setw(30) << left << "Sinh Vien lam";
    cout << setw(8) << right << "So luong" << endl;
    while (p != NULL)
    {
        cout << setw(30) << left << p->data.tenDeTai;
        cout << setw(12) << left << p->data.maDeTai;
        cout << setw(30) << left << p->data.SinhVien;
        cout << setw(8) << right << p->data.soLuong << endl;
        p = p->next;
    }
}

```

```

void xuat5(qldt *head, qldt *tail)
{
    qldt *p;
    p = head;
    cout<<"\nDanh sach De Tai tren 5 cau hoi: ";

```



```

        cout << setw(30) << left << "\nTen De Tai";
        cout << setw(12) << left << "Ma De Tai";
        cout << setw(30) << left << "Sinh Vien lam";
        cout << setw(8) << right << "So luong" << endl;
while (p != NULL)
{
    if (p->data.soLuong > 5)
    {
        cout << setw(30) << left << p->data.tenDeTai;
        cout << setw(12) << left << p->data.maDeTai;
        cout << setw(30) << left << p->data.SinhVien;
        cout << setw(8) << right << p->data.soLuong << endl;

    }

    p = p->next;
}

}

//tim kiem
void searchMa(qldt *head, qldt *tail)
{
    char ma[50];
    cout<<"\nNhap vao ma can tim: ";
    fflush(stdin);

```

```

cin>>ma;
qldt *p = head;

    cout << setw(30) << left << "\nTen De Tai";
    cout << setw(12) << left << "Ma De Tai";
    cout << setw(30) << left << "Sinh Vien lam";
    cout << setw(8) << right << "So luong" << endl;
while (p != NULL)
{
    if (strcmp(ma, p->data.maDeTai) == 0)
    {
        cout << setw(30) << left << p->data.tenDeTai;
        cout << setw(12) << left << p->data.maDeTai;
        cout << setw(30) << left << p->data.SinhVien;
        cout << setw(8) << right << p->data.soLuong << endl;
    }
    p = p->next;
}

}

void searchSV(qldt *head, qldt *tail)
{
    char ma[50];
    cout<<"\nNhap ten SV can tim: ";

```

```

fflush(stdin);
gets(ma);
qldt *p = head;

    cout << setw(30) << left << "\nTen De Tai";
    cout << setw(12) << left << "Ma De Tai";
    cout << setw(30) << left << "Sinh Vien lam";
    cout << setw(8) << right << "So luong" << endl;


while (p != NULL)
{
    if (strcmp(ma, p->data.SinhVien) == 0)
    {
        cout << setw(30) << left << p->data.tenDeTai;
        cout << setw(12) << left << p->data.maDeTai;
        cout << setw(30) << left << p->data.SinhVien;
        cout << setw(8) << right << p->data.soLuong << endl;
    }
    p = p->next;
}

}

//dem
void thongKeSL(qldt *head, qldt *tail)

```

```

{
    qltdt *p = head;
    int i = 0, n;
    cout<<"\nNhap so luong De Tai can kiem tra: ";
    cin>>n;

    while (p != NULL)
    {
        if (p->data.soLuong > n)
            i++;
        p = p->next;
    }
    if (i == 0)
    {
        cout<<"Khong so De Tai nao co so luong tren: "<<n;
    }
    else
    {
        cout<<"So luong De Tai co so luong lon hon: "<<n<<" la: "<<i;
    }
}

void thongKeSV(qltdt *head, qltdt *tail)
{

```

```

qldt *p = head;
char SV[50];
cout<<"\nNhap ten Sinh Vien can thong ke: ";
fflush(stdin);
cin>>*&SV;
int i = 0;
while (p != NULL)
{
    if (strcmp(SV, p->data.SinhVien) == 0)
    {
        i++;
    }
    p = p->next;
}
if (i == 0)
{
    cout<<"\nKhong co De Tai nao cua Sinh Vien vua nhap!";
}
else
{
    cout<<"Tong so De Tai cua Sinh Vien: "<<SV<<" la: "<<i;
}
}

```

```
void xoaHead(qldt *&head, qldt *&tail)
{

    if (head != NULL)
    {
        qldt *p = head;
        head=head->next;
        free(p);
    }
    else
    {
        printf("\nKhong ton tai gia tri nao trong danh sach!");
    }
}
```

```
void xoaTail(qldt *&head, qldt *&tail)
{
    qldt *p, *q;
    p=head;
    q=tail;
    if (tail != NULL)
    {
        while(p->next !=tail)
        {
```

```

        p=p->next;
    }
    tail=p;
    free(q);
    tail->next=NULL;
}
else
{
    printf("\nKhong ton tai gia tri trong danh sach!");
}
}

```

```

void demDT(qltdt *head, qltdt *tail, int &i)
{
    i = 0;
    qltdt *p = head;
    while (p != NULL)
    {
        i++;
        p = p->next;
    }
    cout<<"\nTong so De Tai: "<<i;
}

void sortTenDeTai(qltdt *&head, qltdt *&tail)

```

```

{
    qlldt *p, *q;
    p = head;
    if (p != NULL)
    {
        while (p != NULL)
        {
            q = p->next;
            while (q != NULL)
            {
                if (strcmp(p->data.tenDeTai, q->data.tenDeTai) > 0)
                {
                    detai tg = p->data;
                    p->data = q->data;
                    q->data = tg;
                    //bubbleSort
                }
                q = q->next;
            }
            p = p->next;
        }
        cout<<"\nDanh sach De Tai sap xep theo ten De Tai la: ";
        xuat(head, tail);
    }
}

```



```

else
{
    printf("\nKhong co gia tri nao trong danh sach");
}
}

```

```

void sortTenSV(qldt *&head, qldt *&tail)
{
    qldt *p, *q;
    p = head;
    if (p != NULL)
    {
        while (p != NULL)
        {
            q = p->next;
            while (q != NULL)
            {
                if (strcmp(p->data.SinhVien, q->data.SinhVien) > 0)
                {
                    detai tg = p->data;
                    p->data = q->data;
                    q->data = tg;
                    //bubbleSort
                }
            }
        }
    }
}

```

```

        q = q->next;
    }
    p = p->next;
}
cout<<"\nDanh sach De Tai sap xep theo Sinh Vien: ";
xuat(head, tail);
}
else
{
    printf("\nKhong co gia tri nao trong danh sach");
}
}

```

```

void sortSoLuong(qldt *&head, qldt *&tail)
{
    qldt *p, *q;
    p = head;
    if (p != NULL)
    {
        while (p != NULL)
        {
            q = p->next;
            while (q != NULL)
            {

```

```

        if (p->data.soLuong > q->data.soLuong)
        {
            detai tg = p->data;
            p->data = q->data;
            q->data = tg;
            //bubbleSort
        }
        q = q->next;
    }
    p = p->next;
}

cout<<"\nDanh sach De Tai sap xep theo so luong cau hoi: ";
xuat(head, tail);
}

else
{
    printf("\nKhong co gia tri nao trong danh sach");
}
}

//tong so cau hoi dt
void tongSocauhoiDT(qltdt *head, qltdt *tail)
{
    qltdt *p = head;

```

```

int i = 0;
while (p != NULL)
{
    i += p->data.soLuong;
    p = p->next;
}
cout<<"\nTong so cau hoi De Tai dang co: "<<i;
}

```

```

void fileWrite(qltd *head, qltd *tail, char *&fileName)
{
    qltd *x;
    detai dt;
    if (strcmp(fileName, "detai.txt") != 0)
    {
        cout<<"\nNhap ten file can nhap(*.txt): ";
        fflush(stdin);
        cin>>fileName;
        strcat(fileName, ".txt");
    }
    FILE *f;
    f = fopen(fileName, "ab");
    x=head;

```

```

if (x == NULL)
{
    cout<<"\nDanh sach chua co gia tri, nhap truoc khi luu file!";
}
if (f == NULL)
{
    cout<<"\nLoi khi mo tep";
    exit(1);
}
else
{
    while (x != NULL)
    {
        dt=x->data;
        fwrite(&dt, sizeof(dt), 1, f);
        x = x->next;
    }

    fclose(f);
    cout<<"\nDa luu vao file! "<<fileName;
}
}

```

```

void fileRead(qltdt *&head, qltdt *&tail, char *fileName)

```

```

{
    FILE *f;
    if (strcmp(fileName, "detai.txt") != 0)
    {
        cout<<"\nNhap ten file can hien(*.txt): ";
        fflush(stdin);
        cin>>fileName;
        strcat(fileName, ".txt");
    }
    qldt *p;
    detai dt;
    f = fopen(fileName, "rb");
    int n = 0;
    if (f == NULL)
    {
        printf("\nMo file bi loi!");
    }
    else
    {
        p=head;
        while (fread(&dt, sizeof(dt), 1, f) ==1)
        {

            p=(qldt*)malloc(sizeof(qldt));

```

```

        p->data=dt;
        if(head ==NULL)
        {
            head=p;
            tail=head;
            p->next=NULL;
        }
        else
        {
            p->next=head;
            head=p;
        }
    }
    fclose(f);
}

void easeFile(qldt *&head, qldt *&tail, char *fileName)
{
    FILE *f;
    if (strcmp(fileName, "detai.txt") != 0)
    {
        cout<<"\nNhap ten file can lam sach(*.txt): ";
        fflush(stdin);
        cin>>fileName;
    }
}

```

```

        strcat(fileName, ".txt");
    }
    f = fopen(fileName, "w");
    fclose(f);

}

void menuDeTai()
{
    qldt *head, *tail;
    char *fileName;
    fileName = (char *) malloc(30);
    initDeTai(head, tail);
    int key=99;
    while (key!=0)
    {
        system("CLS");
        cout<<"-----"<<endl;
        cout<<"---      CHUONG TRINH QUAN LI DE TAI LKD      ---"
<<endl;
        cout<<"---      1.Nhap De Tai vao dau danh sach      ---"<<endl;
        cout<<"---      2.Nhap De Tai vao cuoi danh sach      ---"<<endl;
        cout<<"---      3.Hien danh sach vua nhap      ---"<<endl;
        cout<<"---      4.Cap nhat thong tin vao file      ---"<<endl;
    }
}

```



```

cout<<"---      5.Hien danh sach tu file          ---"<<endl;
cout<<"---      6.Hien danh sach De Tai tren 5 cau hoi ---"<<endl;
cout<<"---      7.Tim kiem danh sach theo ma De Tai  ---"<<endl;
cout<<"---      8.Tim kiem danh sach theo Sinh Vien  ---"<<endl;
cout<<"---      9.Thong ke so De Tai co cau hoi = X   ---"<<endl;
cout<<"---      10.Thong ke so De Tai cua Sinh Vien Y ---
"<<endl;

cout<<"---      11.Xoa thong tin De Tai o dau danh sach ---"<<endl;
cout<<"---      12.Xoa thong tin De Tai o cuoi danh sach---"<<endl;
cout<<"---      13.Sap xep theo ten De Tai           ---"<<endl;
cout<<"---      14.Sap xep theo ten Sinh Vien        ---"<<endl;
cout<<"---      15.Sap xep theo so luong De Tai      ---"<<endl;
cout<<"---      16.Tong so De Tai                    ---"<<endl;
cout<<"---      17.Tong so cau hoi De Tai            ---"<<endl;
cout<<"---      18.Lam sach du lieu                 ---"<<endl;
cout<<"---      0.Thoat khoi chuong trinh            ---"<<endl;
cout<<"NHAP LUA CHON CUA BAN: ";
cin>>*&key;
switch (key)
{
case 1:
    initDeTai(head, tail);
    nhapHead(head, tail);
    cout<<"\n";

```

```
system("PAUSE");
```

```
break;
```

case 2:

```
initDeTai(head, tail);
```

```
nhapTail(head, tail);
```

```
cout<<"\n";
```

```
system("PAUSE");
```

```
break;
```

case 3:

```
cout<<"\nDanh sach vua nhap vao!";
```

```
xuat(head, tail);
```

```
cout<<"\n";
```

```
system("PAUSE");
```

```
break;
```

case 4:

```
fileWrite(head, tail, fileName);
```

```
cout<<"\n";
```

```
system("PAUSE");
```

```
break;
```

case 5:

```
initDeTai(head, tail);
```

```
cout<<"\nDanh sach De Tai tu file: ";
```

```
fileRead(head, tail, fileName);
```

```
xuat(head, tail);
```

```
cout<<"\n";  
system("PAUSE");  
break;
```

case 6:

```
initDeTai(head, tail);  
fileRead(head, tail, fileName);  
xuat5(head, tail);  
cout<<"\n";  
system("PAUSE");  
break;
```

case 7:

```
initDeTai(head, tail);  
fileRead(head, tail, fileName);  
searchMa(head, tail);  
cout<<"\n";  
system("PAUSE");  
break;
```

case 8:

```
initDeTai(head, tail);  
fileRead(head, tail, fileName);  
searchSV(head, tail);  
cout<<"\n";  
system("PAUSE");  
break;
```

case 9:

```
initDeTai(head, tail);  
fileRead(head, tail, fileName);  
thongKeSL(head, tail);  
cout<<"\n";  
system("PAUSE");  
break;
```

case 10:

```
initDeTai(head, tail);  
fileRead(head, tail, fileName);  
thongKeSV(head, tail);  
cout<<"\n";  
system("PAUSE");  
break;
```

case 11:

```
initDeTai(head, tail);  
fileRead(head, tail, fileName);  
xoaHead(head, tail);  
cout<<"\nDanh sach vua xoa dau danh sach!";  
xuat(head, tail);  
easeFile(head, tail, fileName);  
fileWrite(head, tail, fileName);  
cout<<"\n";  
system("PAUSE");
```

break;

case 12:

initDeTai(head, tail);

fileRead(head, tail, fileName);

xoaTail(head, tail);

cout<<"\nDanh sach vua xoa cuoi danh sach!";

xuat(head, tail);

easeFile(head, tail, fileName);

fileWrite(head, tail, fileName);

cout<<"\n";

system("PAUSE");

break;

case 13:

initDeTai(head, tail);

fileRead(head, tail, fileName);

sortTenDeTai(head, tail);

cout<<"\n";

system("PAUSE");

break;

case 14:

initDeTai(head, tail);

fileRead(head, tail, fileName);

sortTenSV(head, tail);

cout<<"\n";

```
system("PAUSE");
```

```
break;
```

```
case 15:
```

```
initDeTai(head, tail);
```

```
fileRead(head, tail, fileName);
```

```
sortSoLuong(head, tail);
```

```
cout<<"\n";
```

```
system("PAUSE");
```

```
break;
```

```
case 16:
```

```
initDeTai(head, tail);
```

```
fileRead(head, tail, fileName);
```

```
int y;
```

```
demDT(head, tail, y);
```

```
cout<<"\n";
```

```
system("PAUSE");
```

```
break;
```

```
case 17:
```

```
initDeTai(head, tail);
```

```
fileRead(head, tail, fileName);
```

```
tongSocauhoiDT(head, tail);
```

```
cout<<"\n";
```

```
system("PAUSE");
```

```
break;
```

case 18:

```
    initDeTai(head, tail);  
    fileRead(head, tail, fileName);  
    easeFile(head, tail, fileName);  
    cout<<"\nlam sach thanh cong!";  
    cout<<"\n";  
    system("PAUSE");  
    break;
```

case 0:

```
    break;
```

default:

```
    cout<<"\nBan nhap sai, xin vui long nhap lai!";  
    cout<<"\n";  
    system("PAUSE");  
    break;
```

```
}
```

```
}
```

```
}
```

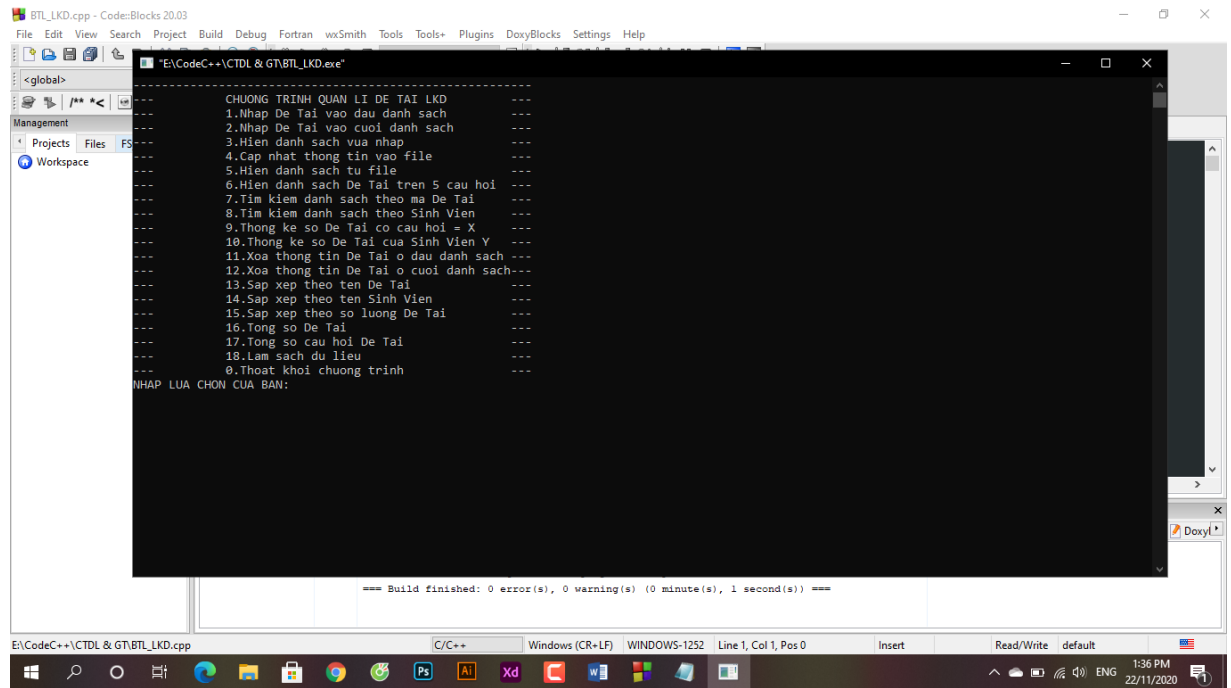
```
int main()
```

```
{
```

```
    menuDeTai();
```

```
    return 0;
```

}



b. Danh sách liên kết đôi (Nguyễn Công Minh)

- code:

```
#include <bits/stdc++.h>
using namespace std;
typedef struct DeTai
{
    int soLuong;
    char tenDeTai[50], SinhVien[30], maDeTai[30];
} detai;
typedef struct nodeDeTai
{
    DeTai data;
    struct nodeDeTai *next;
    struct nodeDeTai *prev;
} qltdt;
// chương trình quản lý dt
```



```

void initDeTai(qltd *&head, qltd *&tail)
{
    head = NULL;
    tail = NULL;
};
nodeDeTai *createNode()
{
    qltd *new_node = (qltd *) malloc(sizeof(qltd));
    cout<<"\nNhap ten De Tai: ";
    fflush(stdin);
    gets(&new_node->data.tenDeTai);
    cout<<"Nhap ma De Tai: ";
    fflush(stdin);
    cin>>&new_node->data.maDeTai;
    cout<<"Nhap ten Sinh Vien lam De Tai: ";
    fflush(stdin);
    gets(&new_node->data.SinhVien);
    cout<<"Nhap so luong: ";
    cin>>&new_node->data.soLuong;
    new_node->next = NULL;
    new_node->prev=NULL;
    return new_node;
}

```

//nhap

```

void addHead(qltd *&head, qltd *&tail)
{
    qltd *add_head = createNode();
    if (head == NULL)
    {
        head = add_head;
        tail = head;
    }
    else

```

```

    {
        head->prev = add_head;
        add_head->next=head;
        head = add_head;
    }
}

```

```

void addTail(qldt *&head, qldt *&tail)
{
    qldt *add_tail = createNode();
    if (head == NULL)
    {
        tail = add_tail;
        head = tail;
    }
    else
    {
        tail->next = add_tail;
        add_tail->prev = tail;
        tail = add_tail;
    }
}

```

```

//nhap
void nhapHead(qldt *&head, qldt *&tail)
{
    int n;

    do
    {
        cout<<"\nNhap vao so De Tai: ";
        cin>>n;
    }
    while (n <= 0);
    for (int i = 0; i < n; i++)

```

```

    {
        cout<<"\nNhap thong tin De Tai: "<<i+1;
        addHead(head, tail);
    }
}

```

```

void nhapTail(qldt *&head, qldt *&tail)

```

```

{
    int n;

    do
    {
        cout<<"\nNhap vao so De Tai: ";
        cin>>n;
    }
    while (n <= 0);
    for (int i = 0; i < n; i++)
    {
        cout<<"\nNhap thong tin De Tai: "<<i+1;
        addTail(head, tail);
    }
}

```

```

//xuat

```

```

void xuat(qldt *head, qldt *tail)

```

```

{
    qldt *p;
    p = head;
    cout << setw(30) << left << "\nTen De Tai";
    cout << setw(12) << left << "Ma De Tai";
    cout << setw(30) << left << "Sinh Vien lam";
    cout << setw(8) << right << "So luong" << endl;
    while (p != NULL)
    {
        cout << setw(30) << left << p->data.tenDeTai;
    }
}

```

```

        cout << setw(12) << left << p->data.maDeTai;
        cout << setw(30) << left << p->data.SinhVien;
        cout << setw(8) << right << p->data.soLuong << endl;
        p = p->next;
    }
}

void xuat5(qldt *head, qldt *tail)
{
    qldt *p;
    p = head;
    cout<<"\nDanh sach De Tai tren 5 cau hoi: ";
    cout << setw(30) << left << "\nTen De Tai";
    cout << setw(12) << left << "Ma De Tai";
    cout << setw(30) << left << "Sinh Vien lam";
    cout << setw(8) << right << "So luong" << endl;
    while (p != NULL)
    {
        if (p->data.soLuong > 5)
        {
            cout << setw(30) << left << p->data.tenDeTai;
            cout << setw(12) << left << p->data.maDeTai;
            cout << setw(30) << left << p->data.SinhVien;
            cout << setw(8) << right << p->data.soLuong << endl;

        }
        p = p->next;
    }
}

//tim kiem
void searchMa(qldt *head, qldt *tail)
{
    char ma[50];
    cout<<"\nNhap ma De Tai can tim: ";
    fflush(stdin);

```

```

cin>>*&ma;
qldt *p = head;
    cout << setw(30) << left << "\nTen De Tai";
    cout << setw(12) << left << "Ma De Tai";
    cout << setw(30) << left << "Sinh Vien lam";
    cout << setw(8) << right << "So luong" << endl;
while (p != NULL)
{
    if (strcmp(ma, p->data.maDeTai) == 0)
    {
        cout << setw(30) << left << p->data.tenDeTai;
        cout << setw(12) << left << p->data.maDeTai;
        cout << setw(30) << left << p->data.SinhVien;
        cout << setw(8) << right << p->data.soLuong << endl;
    }
    p = p->next;
}

}

void searchSV(qldt *head, qldt *tail)
{
    char ma[50];
    cout<<"\nNhap ten Sinh Vien can tim: ";
    fflush(stdin);
    gets(ma);
    qldt *p = head;
        cout << setw(30) << left << "\nTen De Tai";
        cout << setw(12) << left << "Ma De Tai";
        cout << setw(30) << left << "Sinh Vien lam";
        cout << setw(8) << right << "So luong" << endl;

while (p != NULL)
{
    if (strcmp(ma, p->data.SinhVien) == 0)

```

```

        {
            cout << setw(30) << left << p->data.tenDeTai;
            cout << setw(12) << left << p->data.maDeTai;
            cout << setw(30) << left << p->data.SinhVien;
            cout << setw(8) << right << p->data.soLuong << endl;
        }
        p = p->next;
    }

}

//dem
void thongKeSL(qltdt *head, qltdt *tail)
{
    qltdt *p = head;
    int i = 0, n;
    cout<<"\nNhap so luong De Tai can kiem tra: ";
    cin>>n;

    while (p != NULL)
    {
        if (p->data.soLuong > n)
            i++;
        p = p->next;
    }
    if (i == 0)
    {
        cout<<"Khong co De Tai nao co so luong tren: "<<n;
    }
    else
    {
        cout<<"So luong De Tai co so luong lon hon: "<<n<<" la: "<<i;
    }
}

```

```

void thongKeSV(qldt *head, qldt *tail)
{
    qldt *p = head;
    char SV[50];
    cout<<"\nNhap ten Sinh Vien can thong ke: ";
    fflush(stdin);
    gets(*&SV);
    int i = 0;
    while (p != NULL)
    {
        if (strcmp(SV, p->data.SinhVien) == 0)
        {
            i++;
        }
        p = p->next;
    }
    if (i == 0)
    {
        cout<<"\nKhong co De Tai nao cua Sinh Vien vua nhap!";
    }
    else
    {
        cout<<"Tong so De Tai cua Sinh Vien: "<<SV<<" la: "<<i;
    }
}

```

```

void xoaHead(qldt *&head, qldt *&tail)
{
    if (head != NULL)
    {
        qldt *p = head;
        head=head->next;
        free(p);
    }
}

```

```

else
{
    printf("\nKhong ton tai gia tri nao trong danh sach!");
}
}

```

```

void xoaTail(qldt *&head, qldt *&tail)

```

```

{
    qldt *p, *q;
    p=head;
    q=tail;
    if (tail != NULL)
    {
        tail=p;
        tail=tail->prev;
        tail->next=NULL;
        free(q);

    }
    else
    {
        printf("\nKhong ton tai gia tri trong danh sach!");
    }
}

```

```

int demDT(qldt *head, qldt *tail)

```

```

{
    int i = 0;
    qldt *p = head;
    while (p != NULL)
    {
        i++;
        p = p->next;
    }
    cout<<"\nTong so De Tai: "<<i;
}

```



```

        return i;
    }
void sortTenDeTai(qltdt *&head, qltdt *&tail)
{
    qltdt *p, *q;
    p = head;
    if (p != NULL)
    {
        while (p != NULL)
        {
            q = p->next;
            while (q != NULL)
            {
                if (strcmp(p->data.tenDeTai, q->data.tenDeTai) > 0)
                {
                    detai tg = p->data;
                    p->data = q->data;
                    q->data = tg;
                    //bubbleSort
                }
                q = q->next;
            }
            p = p->next;
        }
        cout<<"\nDanh sach De Tai sap xep theo ten De Tai la: ";
        xuat(head, tail);
    }
    else
    {
        cout<<"\nKhong co gia tri nao trong danh sach";
    }
}

void sortTenSV(qltdt *&head, qltdt *&tail)
{

```

```

qldt *p, *q;
p = head;
if (p != NULL)
{
    while (p != NULL)
    {
        q = p->next;
        while (q != NULL)
        {
            if (strcmp(p->data.SinhVien, q->data.SinhVien) > 0)
            {
                detai tg = p->data;
                p->data = q->data;
                q->data = tg;
                //bubbleSort
            }
            q = q->next;
        }
        p = p->next;
    }
    cout<<"\nDanh sach De Tai sap xep theo ten Sinh Vien :";
    xuat(head, tail);
}
else
{
    cout<<"\nKhong co gia tri nao trong danh sach";
}
}

```

```

void sortSoLuong(qldt *&head, qldt *&tail)
{
    qldt *p, *q;
    p = head;
    if (p != NULL)
    {

```

```

while (p != NULL)
{
    q = p->next;
    while (q != NULL)
    {
        if (p->data.soLuong > q->data.soLuong)
        {
            detai tg = p->data;
            p->data = q->data;
            q->data = tg;
            //bubbleSort
        }
        q = q->next;
    }
    p = p->next;
}
cout<<"\nDanh sach De Tai sap xep theo so luong: ";
xuat(head, tail);
}
else
{
    cout<<"\nKhong co gia tri nao trong danh sach";
}
}

```

```

//tong so cau hoi dt
void tongSocauhoiDT(qltdt *head, qltdt *tail)
{
    qltdt *p = head;
    int i = 0;
    while (p != NULL)
    {
        i += p->data.soLuong;
        p = p->next;
    }
}

```

```

    cout<<"\nTong so cau hoi De Tai dang co: "<<i;
}

```

```

void fileWrite(qlDt *head, qlDt *tail, char *&fileName)
{
    qlDt *x;
    detai dt;
    if (strcmp(fileName, "detai.txt") != 0)
    {
        cout<<"\nNhap ten file can nhap(*.txt): ";
        fflush(stdin);
        cin>>fileName;
        strcat(fileName, ".txt");
    }
    FILE *f;
    f = fopen(fileName, "ab");
    x=head;
    if (x == NULL)
    {
        cout<<"\nDanh sach chua co gia tri, nhap truoc khi luu file!";
    }
    if (f == NULL)
    {
        cout<<"\nLoi khi mo tep";
        exit(1);
    }
    else
    {
        while (x != NULL)
        {
            dt=x->data;
            fwrite(&dt, sizeof(dt), 1, f);
            x = x->next;
        }
    }
}

```

```

    }

    fclose(f);
    cout<<"\nDa luu vao file!"<<fileName;
}
}

void fileRead(qldt *&head, qldt *&tail, char *fileName)
{
    FILE *f;
    if (strcmp(fileName, "detai.txt") != 0)
    {
        cout<<"\nNhap ten file can hien(*.txt): ";
        fflush(stdin);
        cin>>fileName;
        strcat(fileName, ".txt");
    }
    qldt *p;
    detai dt;
    f = fopen(fileName, "rb");
    int n = 0;
    if (f == NULL)
    {
        cout<<"\nMo file bi loi!";
    }
    else
    {
        p=head;
        while (fread(&dt, sizeof(dt), 1, f) ==1)
        {

            p=(qldt*)malloc(sizeof(qldt));
            p->data=dt;
            if(head ==NULL)
            {

```

```

        head=p;
        tail=head;
        p->next=NULL;
    }
    else
    {
        p->next=head;
        head=p;
    }
}
fclose(f);
}
}
void easeFile(qldt *&head, qldt *&tail, char *fileName)
{
    FILE *f;
    if (strcmp(fileName, "detai.txt") != 0)
    {
        cout<<"\nNhap ten file can lam sach(*.txt): ";
        fflush(stdin);
        cin>>fileName;
        strcat(fileName, ".txt");
    }
    f = fopen(fileName, "w");
    fclose(f);
}
void menuDeTai()
{
    qldt *head, *tail;
    char *fileName;
    fileName = (char *) malloc(30);
    initDeTai(head, tail);
    int key=99;
    while (key!=0)

```

```

{
    system("CLS");
    cout<<"-----"<<endl;
    cout<<"---          CHUONG TRINH QUAN LI DE TAI LKDOI          --
-"<<endl;
    cout<<"---          1.Nhap De Tai vao dau danh sach          ---"<<endl;
    cout<<"---          2.Nhap De Tai vao cuoi danh sach          ---"<<endl;
    cout<<"---          3.Hien danh sach vua nhap          ---"<<endl;
    cout<<"---          4.Cap nhat thong tin vao file          ---"<<endl;
    cout<<"---          5.Hien danh sach tu file          ---"<<endl;
    cout<<"---          6.Hien danh sach De Tai tren 5 cau hoi ---"<<endl;
    cout<<"---          7.Tim kiem danh sach theo ma De Tai ---"<<endl;
    cout<<"---          8.Tim kiem danh sach theo Sinh Vien ---"<<endl;
    cout<<"---          9.Thong ke so De Tai co cau hoi = X ---"<<endl;
    cout<<"---          10.Thong ke so De Tai cua Sinh Vien Y ---
"<<endl;
    cout<<"---          11.Xoa thong tin De Tai o dau danh sach ---"<<endl;
    cout<<"---          12.Xoa thong tin De Tai o cuoi danh sach---"<<endl;
    cout<<"---          13.Sap xep theo ten De Tai          ---"<<endl;
    cout<<"---          14.Sap xep theo ten Sinh Vien          ---"<<endl;
    cout<<"---          15.Sap xep theo so luong De Tai          ---"<<endl;
    cout<<"---          16.Tong so De Tai          ---"<<endl;
    cout<<"---          17.Tong so cau hoi De Tai          ---"<<endl;
    cout<<"---          18.Lam sach du lieu          ---"<<endl;
    cout<<"---          0.Thoat khoi chuong trinh          ---"<<endl;
    cout<<"NHAP LUA CHON CUA BAN: ";
    cin>>*&key;
    switch (key)
    {
    case 1:
        initDeTai(head, tail);
        nhapHead(head, tail);
        cout<<"\n";
        system("PAUSE");
        break;

```

```
case 2:
    initDeTai(head, tail);
    nhapTail(head, tail);
    cout<<"\n";
    system("PAUSE");
    break;
case 3:
    cout<<"\nDanh sach vua nhap vao!";
    xuat(head, tail);
    cout<<"\n";
    system("PAUSE");
    break;
case 4:
    fileWrite(head, tail, fileName);
    cout<<"\n";
    system("PAUSE");
    break;
case 5:
    initDeTai(head, tail);
    cout<<"\nDanh sach De Tai tu file: ";
    fileRead(head, tail, fileName);
    xuat(head, tail);
    cout<<"\n";
    system("PAUSE");
    break;
case 6:
    initDeTai(head, tail);
    fileRead(head, tail, fileName);
    xuat5(head, tail);
    cout<<"\n";
    system("PAUSE");
    break;
case 7:
    initDeTai(head, tail);
    fileRead(head, tail, fileName);
```



```

        searchMa(head, tail);
        cout<<"\n";
        system("PAUSE");
        break;
case 8:
        initDeTai(head, tail);
        fileRead(head, tail, fileName);
        searchSV(head, tail);
        cout<<"\n";
        system("PAUSE");
        break;
case 9:
        initDeTai(head, tail);
        fileRead(head, tail, fileName);
        thongKeSL(head, tail);
        cout<<"\n";
        system("PAUSE");
        break;
case 10:
        initDeTai(head, tail);
        fileRead(head, tail, fileName);
        thongKeSV(head, tail);
        cout<<"\n";
        system("PAUSE");
        break;
case 11:
        initDeTai(head, tail);
        fileRead(head, tail, fileName);
        xoaHead(head, tail);
        cout<<"\nDanh sach vua xoa dau danh sach!";
        xuat(head, tail);
        easeFile(head, tail, fileName);
        fileWrite(head, tail, fileName);
        cout<<"\n";
        system("PAUSE");

```

```

        break;
case 12:
    initDeTai(head, tail);
    fileRead(head, tail, fileName);
    xoaTail(head, tail);
    cout<<"\nDanh sach vua xoa cuoi danh sach!";
    xuat(head, tail);
    easeFile(head, tail, fileName);
    fileWrite(head, tail, fileName);
    cout<<"\n";
    system("PAUSE");
    break;
case 13:
    initDeTai(head, tail);
    fileRead(head, tail, fileName);
    sortTenDeTai(head, tail);
    cout<<"\n";
    system("PAUSE");
    break;
case 14:
    initDeTai(head, tail);
    fileRead(head, tail, fileName);
    sortTenSV(head, tail);
    cout<<"\n";
    system("PAUSE");
    break;
case 15:
    initDeTai(head, tail);
    fileRead(head, tail, fileName);
    sortSoLuong(head, tail);
    cout<<"\n";
    system("PAUSE");
    break;
case 16:
    initDeTai(head, tail);

```

```

        fileRead(head, tail, fileName);
        cout<<"\nTong so De Tai: "<<demDT(head, tail);
        cout<<"\n";
        system("PAUSE");
        break;
    case 17:
        initDeTai(head, tail);
        fileRead(head, tail, fileName);
        tongSocauhoiDT(head, tail);
        cout<<"\n";
        system("PAUSE");
        break;
    case 18:
        initDeTai(head, tail);
        fileRead(head, tail, fileName);
        easeFile(head, tail, fileName);
        cout<<"\nLam sach thanh cong!";
        cout<<"\n";
        system("PAUSE");
        break;
    case 0:
        break;
    default:
        cout<<"\nBan nhap sai, xin vui long nhap lai!";
        cout<<"\n";
        system("PAUSE");
        break;
    }

}

}

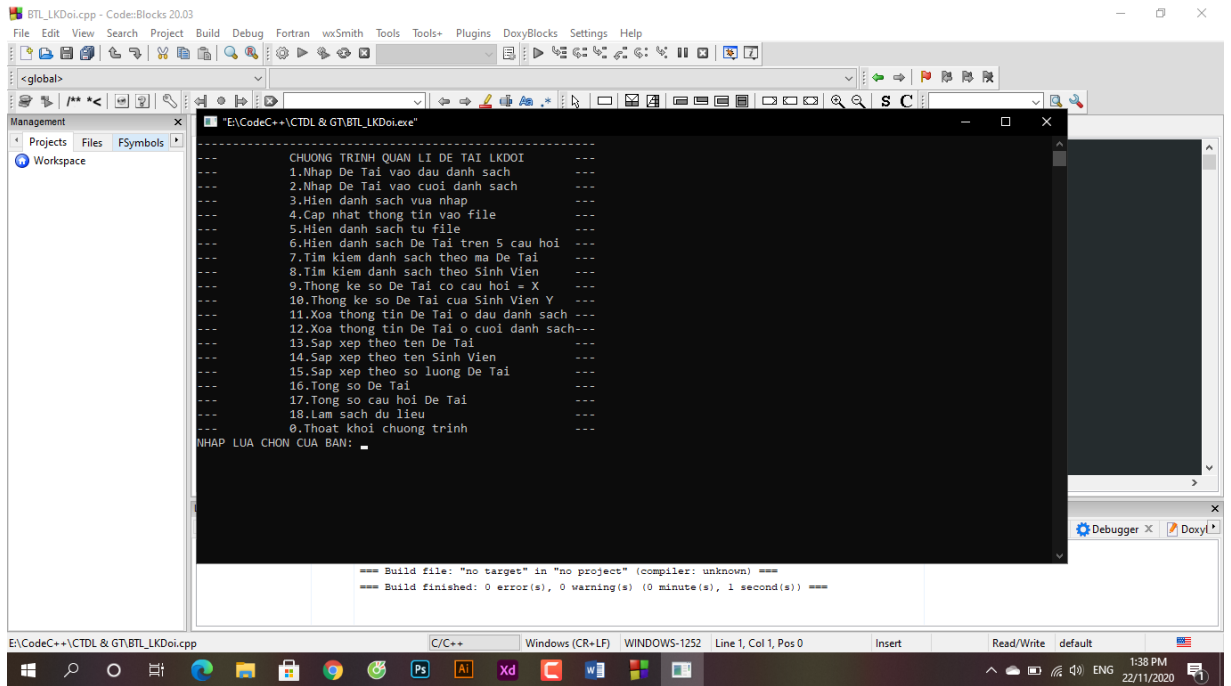
int main()
{
    menuDeTai();

```

```

    return 0;
}

```



c, Ngăn xếp (Trần Văn Ngọc Bảo)

- code:

```

#include <bits/stdc++.h>
using namespace std;
typedef struct nodeDeTai {
    int soLuong;
    char tenDeTai[50], SinhVien[30], maDeTai[30];
} detai;
typedef struct QUEUEDeTai {
    nodeDeTai data;
    QUEUEDeTai *next;
    QUEUEDeTai *prev;
} Queuedt;

void initDeTai(Queuedt *&front, Queuedt *&rear) {
    front = NULL;

```

```

    rear = NULL;
};
//
void nhapDeTai(detai &DT) {
    cout<<"\nNhap ten De Tai: ";
    fflush(stdin);
    gets(&DT.tenDeTai);
    cout<<"Nhap ma De Tai: ";
    fflush(stdin);
    cin>>&DT.maDeTai;
    cout<<"Nhap ten Sinh Vien lam De Tai: ";
    fflush(stdin);
    gets(&DT.SinhVien);
    cout<<"Nhap so luong: ";
    cin>>&DT.soLuong;
}

Queuedt *createNodeDT(detai DT) {
    Queuedt *new_node;
    new_node = (Queuedt *) malloc(sizeof(Queuedt));
    new_node->data = DT;
    new_node->next = NULL;
    new_node->prev = NULL;
    return new_node;
}

bool isEmptyDT(Queuedt *front) {
    return !front;
}

//nhap
void enqueueDT(Queuedt *&front, Queuedt *&rear, Queuedt
*createRear) {

    if (rear == NULL) {

```

```

        rear = createRear;
        front = rear;
    } else {
        rear->next = createRear;
        createRear->prev = rear;
        rear = createRear;
    }
}

```

```

void delQueueDT(Queuedt *&front) {
    if (front == NULL)
        cout<<"\nKhong co gia tri trong danh sach";
    else {
        Queuedt *q = front;
        front = front->next;
        free(q);
    }
}

```

```

//nhap
void nhapDT(Queuedt *&front, Queuedt *&rear, detai &DT) {
    int n;

    do {
        cout<<"\nNhap vao so De Tai: ";
        cin>>n;
    } while (n < 0);
    for (int i = 0; i < n; i++) {
        cout<<"\nNhap thong tin De Tai: "<<i+1;
        nhapDeTai(DT);
        enqueueDT(front, rear, createNodeDT(DT));
    }
}

```

```

//xuat

```

```

void xuatDeTai(Queuedt *front, Queuedt *rear) {
    Queuedt *p;
    p = front;
    if ((front == NULL) && (rear == NULL)) cout<<"\nKhong co gia tri
de in ra!";
    else {
        cout << setw(30) << left << "\nTen De Tai";
        cout << setw(12) << left << "Ma De Tai";
        cout << setw(30) << left << "Sinh Vien lam";
        cout << setw(8) << right << "So luong" << endl;
        while (p != NULL) {
            cout << setw(30) << left << p->data.tenDeTai;
            cout << setw(12) << left << p->data.maDeTai;
            cout << setw(30) << left << p->data.SinhVien;
            cout << setw(8) << right << p->data.soLuong << endl;
            p = p->next;
        }
    }
}

```

```

void xuat5(Queuedt *front, Queuedt *rear) {
    Queuedt *p;
    p = front;
    cout<<"\nDanh sach De Tai tren 5 cau hoi: ";
    if ((front == NULL) && (rear == NULL)) cout<<"\nKhong co gia tri
de in ra!";
    else {
        cout << setw(30) << left << "\nTen De Tai";
        cout << setw(12) << left << "Ma De Tai";
        cout << setw(30) << left << "Sinh Vien lam";
        cout << setw(8) << right << "So luong" << endl;
        while (p != NULL) {
            if (p->data.soLuong > 5) {
                cout << setw(30) << left << p->data.tenDeTai;
                cout << setw(12) << left << p->data.maDeTai;
            }
        }
    }
}

```

```

        cout << setw(30) << left << p->data.SinhVien;
        cout << setw(8) << right << p->data.soLuong << endl;
    }
    p = p->next;
}

}

void searchMa(Queuedt *front, Queuedt *rear) {
    char ma[50];
    cout<<"\nNhap ma De Tai can tim: ";
    fflush(stdin);
    cin>>ma;
    Queuedt *p = front;
    if ((front == NULL) && (rear == NULL)) cout<<"\nKhong co gia tri
de in ra!";
    else {
        cout << setw(30) << left << "\nTen De Tai";
        cout << setw(12) << left << "Ma De Tai";
        cout << setw(30) << left << "Sinh Vien lam";
        cout << setw(8) << right << "So luong" << endl;
        while (p != NULL) {
            if (strcmp(ma, p->data.maDeTai) == 0) {
                cout << setw(30) << left << p->data.tenDeTai;
                cout << setw(12) << left << p->data.maDeTai;
                cout << setw(30) << left << p->data.SinhVien;
                cout << setw(8) << right << p->data.soLuong << endl;
            }
            p = p->next;
        }
    }
}

void searchSV(Queuedt *front, Queuedt *rear) {
    char ma[50];

```



```

cout<<"\nNhap ten Sinh Vien lam De Tai: ";
fflush(stdin);
gets(ma);
Queuedt *p = front;
if ((front == NULL) && (rear == NULL)) cout<<"\nKhong co gia tri
de in ra!";
else {
    cout << setw(30) << left << "\nTen De Tai";
    cout << setw(12) << left << "Ma De Tai";
    cout << setw(30) << left << "Sinh Vien lam";
    cout << setw(8) << right << "So luong" << endl;
    while (p != NULL) {
        if (strcmp(ma, p->data.SinhVien) == 0) {
            cout << setw(30) << left << p->data.tenDeTai;
            cout << setw(12) << left << p->data.maDeTai;
            cout << setw(30) << left << p->data.SinhVien;
            cout << setw(8) << right << p->data.soLuong << endl;
        }
        p = p->next;
    }
}
}
//dem
void thongKeSL(Queuedt *front) {
    Queuedt *p = front;
    int i = 0, n;
    cout<<"\nNhap so luong De Tai cankiem tra: ";
    cin>>n;

    while (p != NULL) {
        if (p->data.soLuong > n)
            i++;
        p = p->next;
    }
    if (i == 0) {

```

```

        cout<<"Khong co De Tai nao co so luong tren: "<<n;
    } else {
        cout<<"So luong De Tai co so luong lon hon: "<<n<<" la: "<<i;
    }
}

```

```

void delRear(Queuedt *&front, Queuedt *&rear) {
    detai X;
    Queuedt *p, *q;
    initDeTai(p, q);
    if (isEmptyDT(front))
        cout<<"\nKhong ton tai gia tri trong danh sach";
    else if (front->next == NULL) {
        front = NULL;
    } else {
        while (front != NULL) {
            X = front->data;
            enqueueDT(p, q, createNodeDT(X));
            delQueueDT(front);
        }
        delQueueDT(p);
        while (p != NULL) {
            X = p->data;
            enqueueDT(front, rear, createNodeDT(X));
            delQueueDT(p);
        }
    }
}

```

```

int sizeDT(Queuedt *front) {
    int i = 0;
    Queuedt *p = front;
    while (p != NULL) {
        i++;
        p = p->next;
    }
}

```

```

    }
    return i;
}

```

```

void delMid(Queuedt *&front, Queuedt *&rear) {
    Queuedt *p, *q;
    detai DT;
    initDeTai(p, q);
    int k;
    do {
        cout<<"\nNhap vi tri can xoa: ";
        cin>>*&k;
    } while (k < 1 || k > sizeDT(front));
    if (front == NULL) {
        cout<<"\nDanh sach khong co gia tri";
    } else if (front->next == NULL) {
        front = NULL;
        free(front);
    } else {
        int z = 0;
        while (front != NULL) {
            z++;
            DT = front->data;
            enqueueDT(p, q, createNodeDT(DT));
            if (z == k) {
                delQueueDT(q);
            }
            delQueueDT(front);
        }
        while (q != NULL) {
            DT = q->data;
            enqueueDT(front, rear, createNodeDT(DT));
            delQueueDT(q);
        }
    }
}

```

```

    }

}

void sortTenDeTai(Queuedt *&front, Queuedt *&rear) {
    detai DT;
    Queuedt *p, *q;
    initDeTai(p, q);
    while (!isEmptyDT(front)) {
        DT = front->data;
        delQueueDT(front);
        while (!isEmptyDT(p) && strcmp(p->data.tenDeTai, DT.tenDeTai)
< 0) {
            enqueueDT(front, rear, createNodeDT(p->data));
            delQueueDT(p);
        }
        enqueueDT(p, q, createNodeDT(DT));

    }
    front=p;
    rear = q;
}

void sortTenSinhVien(Queuedt *&front, Queuedt *&rear) {
    detai DT;
    Queuedt *p, *q;
    initDeTai(p, q);
    while (!isEmptyDT(front)) {
        DT = front->data;
        delQueueDT(front);
        while (!isEmptyDT(p) && strcmp(p->data.SinhVien, DT.SinhVien)
< 0) {
            enqueueDT(front, rear, createNodeDT(p->data));
            delQueueDT(p);
        }
        enqueueDT(p, q, createNodeDT(DT));
    }
}

```

```

    }
    front=p;
    rear = q;
}
void fileWrite(Queuedt *front, char *&fileName) {
    Queuedt *x;
    x=front;
    detai DT;
    if (strcmp(fileName, "detai.txt") != 0) {
        cout<<"\nNhap ten file can nhap(*.txt): ";
        fflush(stdin);
        cin>>fileName;
        strcat(fileName, ".txt");
    }
    FILE *f;
    f = fopen(fileName, "ab");
    if (x == NULL) {
        cout<<"\nDanh sach chua co gia tri, nhap truoc khi luu file!";
    }
    if (f == NULL) {
        cout<<"\nLoi khi mo tep";
        exit(1);
    } else {
        while (x != NULL) {
            fwrite(&x->data, sizeof(x->data), 1, f);
            x = x->next;
        }

        fclose(f);
        cout<<"\nDa luu vao file: "<<fileName;
    }
}

void fileRead(Queuedt *&front, Queuedt *&rear, char *fileName) {

```

```

FILE *f;
initDeTai(front, rear);
if (strcmp(fileName, "detai.txt") != 0) {
    cout<<"\nNhap ten file(*.txt): ";
    fflush(stdin);
    cin>>fileName;
    strcat(fileName, ".txt");
}
Queuedt *p;
detai dt;
f = fopen(fileName, "rb");
if (f == NULL) {
    cout<<"\nMo file bi loi!";
} else {
    while (fread(&dt, sizeof(dt), 1, f) == 1) {
        p = (Queuedt *) malloc(sizeof(Queuedt));
        p->data = dt;
        p->next = NULL;
        enqueueDT(front, rear, p);
    }
    fclose(f);
}
}

void easeFile(char *fileName) {
    FILE *f;
    if (strcmp(fileName, "detai.txt") != 0) {
        cout<<"\nNhap ten file can lam sach(*.txt): ";
        fflush(stdin);
        cin>>fileName;
        strcat(fileName, ".txt");
    }
    f = fopen(fileName, "w");
    fclose(f);
}

```

```

}
void menuDeTai() {
    Queuedt *front, *rear;
    detai DT;
    char *fileName;
    fileName = (char *) malloc(30);
    initDeTai(front, rear);
    int key = 99;
    while (key != 0) {
        system("CLS");
        cout<<"-----"<<endl;
        cout<<"---          CHUONG TRINH QUAN LI DE TAI QUEUE          -
--"<<endl;
        cout<<"---          1.Nhap De Tai vao danh sach          ---"<<endl;
        cout<<"---          2.Hien danh sach vua nhap          ---"<<endl;
        cout<<"---          3.Hien danh sach De Tai tren 5 cau hoi ---"<<endl;
        cout<<"---          4.Tim kiem danh sach theo ma De Tai   ---"<<endl;
        cout<<"---          5.Tim kiem danh sach theo Sinh Vien   ---"<<endl;
        cout<<"---          6.Thong ke so De Tai co cau hoi = X    ---"<<endl;
        cout<<"---          7.Xoa thong tin De Tai o dau danh sach ---"<<endl;
        cout<<"---          8.Xoa thong tin De Tai o cuoi danh sach ---"<<endl;
        cout<<"---          9.Xoa thong tin De Tai o tri danh sach ---"<<endl;
        cout<<"---          10.Sap xep theo ten De Tai            ---"<<endl;
        cout<<"---          11.Sap xep theo ten Sinh Vien          ---"<<endl;
        cout<<"---          12.Tong so De Tai                      ---"<<endl;
        cout<<"---          13.Lam sach du lieu                   ---"<<endl;
        cout<<"---          0.Thoat khoi chuong trinh              ---"<<endl;
        cout<<"NHAP LUA CHON CUA BAN: ";
        cin>>&key;
        switch (key) {
            case 1:
                initDeTai(front, rear);
                nhapDT(front, rear, DT);
                fileWrite(front, fileName);
                cout<<"\n";

```

```
        system("PAUSE");
        break;
    case 2:
        fileRead(front,rear, fileName);
        cout<<"\nDanh sach De Tai tu file: ";
        xuatDeTai(front,rear);
        cout<<"\n";
        system("PAUSE");
        break;
    case 3:
        fileRead(front,rear, fileName);
        xuat5(front, rear);
        cout<<"\n";
        system("PAUSE");
        break;
    case 4:
        fileRead(front,rear, fileName);
        searchMa(front, rear);
        cout<<"\n";
        system("PAUSE");
        break;
    case 5:
        fileRead(front,rear, fileName);
        searchSV(front, rear);
        cout<<"\n";
        system("PAUSE");
        break;
    case 6:
        fileRead(front,rear, fileName);
        thongKeSL(front);
        cout<<"\n";
        system("PAUSE");
        break;
    case 7:
        fileRead(front,rear, fileName);
```



```

delQueueDT(front);
cout<<"\nDanh sach vua xoa dau danh sach!";
xuatDeTai(front,rear);
cout<<"\n";
system("PAUSE");
break;
case 8:
    fileRead(front,rear, fileName);
    delRear(front, rear);
    cout<<"\nDanh sach vua xoa cuoi danh sach!";
    xuatDeTai(front,rear);
    cout<<"\n";
    system("PAUSE");
    break;
case 9:
    fileRead(front,rear, fileName);
    delMid(front, rear);
    xuatDeTai(front,rear);
    cout<<"\n";
    system("PAUSE");
    break;
case 10:
    fileRead(front,rear, fileName);
    sortTenDeTai(front, rear);
    xuatDeTai(front,rear);
    cout<<"\n";
    system("PAUSE");
    break;
case 11:
    fileRead(front,rear, fileName);
    sortTenSinhVien(front, rear);
    xuatDeTai(front,rear);
    cout<<"\n";
    system("PAUSE");
    break;

```

```

        case 12:
            fileRead(front,rear, fileName);
            cout<<"\nTong so De Tai la: "<<sizeDT(front);
            cout<<"\n";
            system("PAUSE");
            break;
        case 13:
            fileRead(front,rear, fileName);
            easeFile(fileName);
            cout<<"\nLam sach thanh cong!";
            cout<<"\n";
            system("PAUSE");
            break;
        case 0:
            break;
        default:
            printf("\nBan nhap sai, xin vui long nhap lai!");
            printf("\n");
            system("PAUSE");
            break;
    }

}

}

int main() {
    menuDeTai();
    return 0;
}

```

d, Hàng đội(Trần Văn Ngọc Bảo)

- code:
#include <bits/stdc++.h>

```

using namespace std;
typedef struct NODEDeTai
{
    int soLuong;
    char tenDeTai[50], SinhVien[30], maDeTai[30];
} detai;
typedef struct STACKDeTai
{
    NODEDeTai data;
    STACKDeTai *next;
} StackDT;

```

```

void initDeTai(StackDT *&top)
{
    top = NULL;
};

```

// CHUONG TRINH QUAN LY DETAI

```

void nhapDT(detai &DT)
{
    cout<<"\nNhap ten De Tai: ";
    fflush(stdin);
    gets(&DT.tenDeTai);
    cout<<"Nhap ma De Tai: ";
    fflush(stdin);
    cin>>&DT.maDeTai;
    cout<<"Nhap ten Sinh Vien lam De Tai: ";
    fflush(stdin);
    gets(&DT.SinhVien);
    cout<<"Nhap so luong: ";
    cin>>&DT.soLuong;
}

```

```

StackDT *createNode(detai DT)

```

```

{
    StackDT *new_node;
    new_node = (StackDT *) malloc(sizeof(StackDT));
    new_node->data=DT;
    new_node->next=NULL;
    return new_node;
}

```

```

bool isEmptyS(StackDT *top)
{
    return !top;
}

```

```

//nhap
void pushDT(StackDT *&top, StackDT *createTop)
{
    if (top == NULL)
    {
        top = createTop;
    }
    else
    {
        createTop->next = top;
        top = createTop;
    }
}

```

```

void popDT(StackDT *&top)
{
    if (top == NULL)
        printf("\nKhong co gia tri trong danh detai");
    else
    {

```

```

        StackDT *q = top;
        top = top->next;
        free(q);
    }
}

//nhap
void nhapDSDT(StackDT *&top, detail &DT)
{
    int n;

    do
    {
        cout<<"\nNhap vao so De Tai: ";
        cin>>n;
    }
    while (n <= 0);
    for (int i = 0; i < n; i++)
    {
        cout<<"\nNhap thong tin De Tai: "<<i+1;
        nhapDT(DT);
        pushDT(top, createNode(DT));
    }
}

//xuat
void xuatDetail(StackDT *top)
{
    StackDT *p;
    p = top;

    cout << setw(30) << left << "\nTen De Tai";
    cout << setw(12) << left << "Ma De Tai";
    cout << setw(30) << left << "Sinh Vien lam";
    cout << setw(8) << right << "So luong" << endl;
}

```

```

while (p != NULL)
{
    cout << setw(30) << left << p->data.tenDeTai;
    cout << setw(12) << left << p->data.maDeTai;
    cout << setw(30) << left << p->data.SinhVien;
    cout << setw(8) << right << p->data.soLuong << endl;
    p = p->next;
}
}

```

```

void xuat5(StackDT *top)
{
    StackDT *p;
    p = top;
    cout<<"\nDanh sach De Tai tren 5 cau hoi: ";
    cout << setw(30) << left << "\nTen De Tai";
    cout << setw(12) << left << "Ma De Tai";
    cout << setw(30) << left << "Sinh Vien lam";
    cout << setw(8) << right << "So luong" << endl;
    while (p != NULL)
    {
        if (p->data.soLuong > 5)
        {
            cout << setw(30) << left << p->data.tenDeTai;
            cout << setw(12) << left << p->data.maDeTai;
            cout << setw(30) << left << p->data.SinhVien;
            cout << setw(8) << right << p->data.soLuong << endl;

            }
        p = p->next;
    }
}

```

```

//tim kiem
void searchMa(StackDT *top)

```

```

{
    char ma[50];
    cout<<"\nNhap ma De Tai can tim: ";
    fflush(stdin);
    cin>>ma;
    StackDT *p = top;
    cout << setw(30) << left << "\nTen De Tai";
    cout << setw(12) << left << "Ma De Tai";
    cout << setw(30) << left << "Sinh Vien lam";
    cout << setw(8) << right << "So luong" << endl;
    while (p != NULL)
    {
        if (strcmp(ma, p->data.maDeTai) == 0)
        {
            cout << setw(30) << left << p->data.tenDeTai;
            cout << setw(12) << left << p->data.maDeTai;
            cout << setw(30) << left << p->data.SinhVien;
            cout << setw(8) << right << p->data.soLuong << endl;
            p = p->next;
        }
    }
}

```

//dem

```

void thongKeSL(StackDT *top)
{
    StackDT *p = top;
    int i = 0, n;
    printf("\nNhap so luong sach cankiem tra: ");
    scanf("%d", &n);

    while (p != NULL)
    {
        if (p->data.soLuong > n)
            i++;
    }
}

```

```

        p = p->next;
    }
    if (i == 0)
    {
        printf("Khong co cuon sach nao co so luong tren %d.", n);
    }
    else
    {
        printf("So quyen sach co so luong lon hon %d la: %d", n, i);
    }
}

```

```

void delRear(StackDT *&top)
{
    detai X;
    StackDT *q;
    initDeTai(q);
    if (isEmptyS(top))
        printf("\nKhong ton tai gia tri trong danh detai");
    else if (top->next == NULL)
    {
        top = NULL;
    }
    else
    {
        while (top != NULL)
        {
            X=top->data;
            pushS(q, createNode(X));
            popS(top);
        }
        popS(q);
        while (q != NULL)
        {
            X=q->data;

```



```

        pushS(top, createNode(X));
        popS(q);
    }
}
}

```

```

int sizeS(StackDT *top)
{
    int i = 0;
    StackDT *p = top;
    while (p != NULL)
    {
        i++;
        p = p->next;
    }
    return i;
}

```

```

void delMid(StackDT *&top)
{
    StackDT *q;
    detail S;
    initDeTai(q);
    int k;
    do
    {
        printf("\nNhap vi tri can xoa: ");
        scanf("%d", &k);
    }
    while (k < 1 || k > sizeS(top));
    if (top == NULL)
    {
        printf("\nDanh detail khong co gia tri");
    }
    else if (top->next == NULL)

```

```

    {
        top = NULL;
        free(top);
    }
else
{
    int z = 0;
    while (top!=NULL)
    {
        z++;
        S = top->data;
        pushS(q, createNode(S));
        if (z == k)
        {
            popS(q);
        }
        popS(top);
    }
    while (q != NULL)
    {
        S=q->data;
        pushS(top, createNode(S));
        popS(q);
    }
}

void sortTenDeTai(StackDT *&top)
{
    detai S;
    StackDT *tmpStack;
    initDeTai(tmpStack);
    while (!isEmptyS(top))
    {

```

```

        S = top->data;
        popS(top);
        while (!isEmptyS(tmpStack) && strcmp(tmpStack->data.tenDeTai,
S.tenDeTai)<0)
        {
            pushS(top, createNode(tmpStack->data));
            popS(tmpStack);
        }
        pushS(tmpStack, createNode(S));
    }
    top = tmpStack;
}

```

```

void fileWrite(StackDT *top, char *&fileName)
{
    StackDT *x, *y;
    initDeTai(x);
    initDeTai(y);
    detai S;
    if (strcmp(fileName, "detai.txt") != 0)
    {
        printf("\nNhap ten file can nhap(*.txt): ");
        fflush(stdin);
        scanf("%s", fileName);
        strcat(fileName, ".txt");
    }
    FILE *f;
    f = fopen(fileName, "ab");
    y = top;
    while (y!=NULL)
    {
        S=y->data;
        pushS(x, createNode(S));
        popS(y);
    }
}

```

```

    }
    if (x == NULL)
    {
        printf("\nDanh detai chua co gia tri, nhap truoc khi luu file!");
    }
    if (f == NULL)
    {
        printf("\nLoi khi mo tep");
        exit(1);
    }
    else
    {
        while (x != NULL)
        {
            fwrite(&x->data, sizeof(x->data), 1, f);
            x = x->next;
        }

        fclose(f);
        printf("\nDa luu vao file \"%s\\!", fileName);
    }
}

```

```

void fileRead(StackDT *&top, char *fileName)
{
    FILE *f;
    initDeTai(top);
    if (strcmp(fileName, "detai.txt") != 0)
    {
        printf("\nNhap ten file(*.txt): ");
        fflush(stdin);
        scanf("%s", fileName);
        strcat(fileName, ".txt");
    }
    StackDT *p;

```

```

    detai sa;
    f = fopen(fileName, "rb");
    if (f == NULL)
    {
        printf("\nMo file bi loi!");
    }
    else
    {
        while (fread(&DTa, sizeof(sa), 1, f) == 1)
        {
            p = (StackDT *) malloc(sizeof(StackDT));
            p->data = sa;
            p->next = NULL;
            pushS(top, p);
        }
        fclose(f);
    }
}

```

```

void easeFile(char *fileName)
{
    FILE *f;
    if (strcmp(fileName, "detai.txt") != 0)
    {
        printf("\nNhap ten file can lam detai(*.txt): ");
        fflush(stdin);
        scanf("%s", fileName);
        strcat(fileName, ".txt");
    }
    f = fopen(fileName, "w");
    fclose(f);
}

```

```

void menuDT()

```

```

{
    StackDT *top;
    detai S;
    char *fileName;
    fileName = (char *) malloc(30);
    initDeTai(top);
    int key = 99;
    while (key != 0)
    {
        system("CLS");
        printf("%*s\n", 40,
"*****");
        printf("\n%s", "****    CHUONG TRINH QUAN LY DETAI
****");
        printf("\n%s", "****    1.Nhap detai vao dau danh detai    ****");
        printf("\n%s", "****    2.Hien danh detai tu file    ****");
        printf("\n%s", "****    3.Hien danh detai cuon detai cau >5    ****");
        printf("\n%s", "****    4.Tim kiem detai theo ma detai    ****");
        printf("\n%s", "****    5.Thong ke so dau detai gia lon hon X
****");
        printf("\n%s", "****    6.Xoa thong tin detai o dau danh detai
****");
        printf("\n%s", "****    7.Xoa thong tin detai o cuoi danh detai
****");
        printf("\n%s", "****    8.Xoa thong tin detai o vi tri bat ky    ****");
        printf("\n%s", "****    9.Sap xep theo ten detai    ****");
        printf("\n%s", "****    10.Tong so dau detai trong cua hang
****");
        printf("\n%s", "****    11.Lam detai du lieu trong file    ****");
        printf("\n%s", "****    0.Thoat khoi chuong trinh    ****");
        printf("\n%s", "****    Nhap lua chon cua ban:");
        scanf("%d", &key);
        switch (key)
        {
            case 1:

```

```
    initDeTai(top);
    nhapDSS(top, S);
    fileWrite(top, fileName);
    printf("\n");
    system("PAUSE");
    break;
case 2:
    fileRead(top, fileName);
    printf("\nDanh detai quyen detai tu file: ");
    xuatDeTai(top);
    printf("\n");
    system("PAUSE");
    break;
case 3:
    fileRead(top, fileName);
    xuat500(top);
    printf("\n");
    system("PAUSE");
    break;
case 4:
    fileRead(top, fileName);
    searchMa(top);
    printf("\n");
    system("PAUSE");
    break;
case 5:
    fileRead(top, fileName);
    thongKeSL(top);
    printf("\n");
    system("PAUSE");
    break;
case 6:
    fileRead(top, fileName);
    popS(top);
    printf("\nDanh detai vua xoa dau danh detai!");
```

```
        xuatDetai(top);
        printf("\n");
        system("PAUSE");
        break;
case 7:
    fileRead(top, fileName);
    delRear(top);
    printf("\nDanh detai vua xoa cuoi danh detai!");
    xuatDetai(top);
    printf("\n");
    system("PAUSE");
    break;
case 8:
    fileRead(top, fileName);
    delMid(top);
    xuatDetai(top);
    printf("\n");
    system("PAUSE");
    break;
case 9:
    fileRead(top, fileName);
    sortTenDeTai(top);
    xuatDetai(top);
    printf("\n");
    system("PAUSE");
    break;

case 10:
    fileRead(top, fileName);
    printf("\nTong so detai trong cua hang la: %d", sizeS(top));
    printf("\n");
    system("PAUSE");
    break;
case 11:
    fileRead(top, fileName);
```



```

        easeFile(fileName);
        printf("\nLam detai thanh cong!");
        printf("\n");
        system("PAUSE");
        break;
    case 0:
        break;
    default:
        printf("\nBan nhap sai, xin vui long nhap lai!");
        printf("\n");
        system("PAUSE");
        break;
    }

}

}

int main()
{
    menuDT();
    return 0;
}

```