**Bài 10: Một số ứng dụng thuật toán**

**Ứng dụng thuật toán sắp xếp ngoài**

#include"stdio.h"

#include"conio.h"

#include"string.h"

#include"time.h"

#include"stdlib.h"

typedef struct

{

char Maso[10];

char HoTen[40];

} SinhVien;

FILE \*f0,\*f1,\*f2;

int m,n,Eor;

SinhVien x1,x2,x,y;

int kiemtra(char \*FileName,char maso[10])

{

FILE \*f;

int Found=0;

SinhVien sv;

fflush(stdin);

f=fopen(FileName,"rb");

while (!feof(f) && Found==0)

{

fread(&sv,sizeof(sv),1,f);

if (strcmp(sv.Maso,maso)==0)

Found=1;

}

fclose(f);

return (Found);

}

void WriteFile(char \*FileName)

{

FILE \*f;

int n,i;

SinhVien sv;

f=fopen(FileName,"ab");

printf("Nhap bao nhieu sinh vien? ");

scanf("%d",&n);

fflush(stdin);

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

{

printf("Sinh vien thu %i\n",i);

printf(" - MSSV: ");

gets(sv.Maso);

if(kiemtra(FileName,sv.Maso)==1||strcmp(sv.Maso," ")==0)

printf("\nMa so bi trung hoac rong!!!");

else

{

printf(" - Ho ten: ");

gets(sv.HoTen);

fwrite(&sv,sizeof(sv),1,f);

fflush(stdin);

}

}

fclose(f);

printf("\nBam phim bat ky de tiep tuc\n");

getch();

}

void ReadFile(char \*FileName)

{

FILE \*f;

SinhVien sv;

f=fopen(FileName,"rb");

printf(" MSSV | Ho va ten\n");

fread(&sv,sizeof(sv),1,f);

while (!feof(f))

{

printf(" %s | %s\n",sv.Maso,sv.HoTen);

fread(&sv,sizeof(sv),1,f);

}

fclose(f);

printf("\nBam phim bat ky de tiep tuc\n");

//getch();

}

void Search(char \*FileName)

{

char MSSV[10];

FILE \*f;

int Found=0;

SinhVien sv;

fflush(stdin);

printf("Ma so sinh vien can tim: ");

gets(MSSV);

f=fopen(FileName,"rb");

while (!feof(f) && Found==0)

{

fread(&sv,sizeof(sv),1,f);

if (strcmp(sv.Maso,MSSV)==0)

Found=1;

}

fclose(f);

if (Found == 1)

printf("Tim thay SV co ma %s. Ho ten la: %s",sv.Maso,sv.HoTen);

else

printf("Tim khong thay sinh vien co ma %s",MSSV);

printf("\nBam phim bat ky de tiep tuc!!!\n");

getch();

}

void Delete(char \*FileName)

{

FILE \*f1,\*f2;

int Found=0;

char MSSV[10];

SinhVien sv;

fflush(stdin);

printf("Ma so sinh vien can xoa:");

gets(MSSV);

f1=fopen(FileName,"rb");

f2=fopen("e:\\Tam.Dat","wb");

fread(&sv,sizeof(sv),1,f1);

while (!feof(f1))

{

if(strcmp(sv.Maso,MSSV)!=0)

fwrite(&sv,sizeof(sv),1,f2);

else

Found=1;

fread(&sv,sizeof(sv),1,f1);

}

fclose(f1); fclose(f2);

f1=fopen(FileName,"wb");

f2=fopen("e:\\Tam.Dat","rb");

fread(&sv,sizeof(sv),1,f2);

while(!feof(f2))

{

fwrite(&sv,sizeof(sv),1,f1);

fread(&sv,sizeof(sv),1,f2);

}

fclose(f1); fclose(f2);

remove("e:\\Tam.Dat");

/\*remove("e:\\Sinhvien.Dat");//xoa file goc

rename("e:\\Tam.Dat","d:\\Sinhvien.Dat");// doi ten file Tam thanh file Sinhvien\*/

if(Found==1)

printf("\n Da xoa sinh vien ma so %s",MSSV);

else

printf("\n Khong tim thay ma sinh vien");

printf("\n Nhan phim bat ki de tiep tuc");

}

// Sap xep tap tin

void copy(FILE \*fi,FILE \*fj)

{

fread(&x,sizeof(x),1,fi);

fwrite(&x,sizeof(x),1,fj);

if(!feof(fi))

{

fread(&y,sizeof(y),1,fi);

if(!feof(fi))

{

long curpos=ftell(fi)-sizeof(y);

fseek(fi,curpos,0);

}

else

Eor=1;

}

if(feof(fi))

{

Eor=1;

}

else

{

if(atoi(x.Maso)>atoi(y.Maso))

{

Eor=1;

}

else

{

Eor=0;

}

}

}

void copyRun(FILE \*fi,FILE \*fj)

{

do

{

copy(fi,fj);

}

while(!Eor);

}

void phanbo()

{

do

{

copyRun(f0,f1);

if(!feof(f0))

copyRun(f0,f2);

}

while(!feof(f0));

fclose(f0);

fclose(f1);

fclose(f2);

}

void tronRun()

{

do

{

fread(&x1,sizeof(x1),1,f1);

long curpos=ftell(f1)-sizeof(x1);

fseek(f1,curpos,0);

fread(&x2,sizeof(x2),1,f2);

curpos=ftell(f2)-sizeof(x2);

fseek(f2,curpos,0);

if(atoi(x1.Maso)<=atoi(x2.Maso))

{

copy(f1,f0);

if(Eor)

copyRun(f2,f0);

}

else

{

copy(f2,f0);

if(Eor)

copyRun(f1,f0);

}

}

while(!Eor);

}

void tron()

{

while((!feof(f1)) && (!feof(f2)))

{

tronRun();

m++;

}

while(!feof(f1))

{

copyRun(f1,f0);

m++;

}

while(!feof(f2))

{

copyRun(f2,f0);

m++;

}

fclose(f0);

fclose(f1);

fclose(f2);

}

void sort(char \*FileName)

{

f0=fopen("e:\\SinhVien.Dat","rb");

f1=fopen("e:\\SinhVien1.Dat","wb");

copyRun(f0,f1);

if(feof(f0))

{

printf("\n Danh sach da co thu tu");

fclose(f0);

fclose(f1);

}

else

{

do

{

f0=fopen("e:\\SinhVien.Dat","rb");

f1=fopen("e:\\SinhVien1.Dat","wb");

f2=fopen("e:\\SinhVien2.Dat","wb");

phanbo();

f0=fopen("e:\\SinhVien.Dat","wb");

f1=fopen("e:\\SinhVien1.Dat","rb");

f2=fopen("e:\\SinhVien2.Dat","rb");

m=0;

tron();

}

while(m!=1);

printf("\n Da sap xep xong danh sach");

remove("e:\\SinhVien1.Dat");

remove("e:\\SinhVien2.Dat");

}

printf("\nBam phim bat ky de tiep tuc!!!\n");

}

int main()

{

int c;

for (;;)

{

printf("1. Nhap DSSV\n");

printf("2. In DSSV\n");

printf("3. Tim kiem\n");

printf("4. Xoa sinh vien\n");

printf("5. Sap Xep\n");

printf("6. Thoat\n");

printf("Ban chon 1, 2, 3, 4, 5, 6:");

scanf("%d",&c);

if(c==1)

WriteFile((char\*)"e:\\SinhVien.Dat");

else

if (c==2)

ReadFile((char\*)"e:\\SinhVien.Dat");

else

if (c==3)

Search((char\*)"e:\\SinhVien.Dat");

else

if(c==4)

Delete((char\*)"e:\\SinhVien.Dat");

else

if(c==5)

sort((char\*)"e:\\SinhVien.Dat");

else

break;

}

return 0;

}

**Ứng dụng ngăn xếp để tính tổ hợp**

#include <stdio.h>

#include <conio.h>

typedef struct Trangthai

{

int n;

int k;

}Trangthai;

typedef struct node

{

Trangthai data;

node \*link;

}node;

typedef struct stack

{

node \*top;

}stack;

void Init(stack &s)

{

s.top=NULL;

}

int Empty(stack s)

{

return s.top==NULL?1:0;

}

void Push(stack &s,Trangthai x)

{

node \*p;

p=new(node);

p->data=x;

p->link=s.top;

s.top=p;

}

Trangthai Pop(stack &s)

{

node \*p;

if(!Empty(s))

p=s.top;

s.top=p->link;

return p->data;

}

long Combo(int n,int k)

{

stack st; long TH=0;

Trangthai tt, tt1,tt2;

Init(st);

tt={n,k};

Push(st,tt);

while (!Empty(st))

{

tt=Pop(st);

if(tt.k==0 || tt.n==tt.k)

TH = TH + 1;

if(tt.k>0 && tt.n>tt.k)

{

printf("A");

tt1={tt.n-1,tt.k-1};

Push(st,tt1);

tt2={tt.n-1,tt.k};

Push(st,tt2);

}

}

return TH;

}

int main()

{

int n, k;

printf("\n Nhap vao n:"); scanf("%d",&n);

printf("\n Nhap vao k:"); scanf("%d",&k);

printf("\n Ket qua:%d",Combo(n,k));

getch();

}

**Ứng dụng hàng đợi để duyệt danh sách**

#include<stdio.h>

#include<conio.h>

#include <string.h>

# define N 20

typedef struct sinhvien

{

char Ma[10];

char Hoten[40];

char Phai[3];

} Sinhvien;

typedef struct node

{

sinhvien data;

node \*link;

}node;

typedef struct queu

{

node \*front;

node \*rear;

}queu;

void khoitao(queu &q)

{

q.front=q.rear=NULL;

}

int empty(queu q)

{

if(q.front==NULL)

return 1;

else

return 0;

}

void enqueu(queu &q, sinhvien x)

{ node \* new\_ele;

new\_ele=new(node);

new\_ele->data=x;

new\_ele->link=NULL;

if(q.front==NULL)

{

q.front=new\_ele;

q.rear=q.front;

}

else

{

q.rear->link=new\_ele;

q.rear=new\_ele;

}

}

sinhvien dequeu(queu &q)

{

node \*p;sinhvien x;

if(!empty(q))

{

p=q.front;

x=p->data;

q.front=p->link;

delete(p);

}

return x;

}

void WriteFile(char \*FileName)

{

FILE \*f; int n,i; Sinhvien sv;

f=fopen(FileName,"wb");

printf("\nNhap bao nhieu sinh vien? ");

scanf("%d",&n);

fflush(stdin);

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

{

printf("Sinh vien thu %i\n",i);

printf(" - MSSV: ");

gets(sv.Ma);

printf(" - Ho ten: ");

gets(sv.Hoten);

printf(" - Phai: ");

gets(sv.Phai);

fwrite(&sv,sizeof(sv),1,f);

fflush(stdin);

}

fclose(f);

printf("\nBam phim bat ky de tiep tuc");

getch();

}

void ReadFile(char \*FileName)

{

FILE \*f; Sinhvien sv; f=fopen(FileName,"rb");

printf(" MSSV | Ho va ten | Phai \n");

fread(&sv,sizeof(sv),1,f);

while (!feof(f))

{

printf(" %s | %s | %s\n",sv.Ma,sv.Hoten, sv.Phai);

fread(&sv,sizeof(sv),1,f);

}

fclose(f);

printf("\nBam phim bat ky de tiep tuc!!!");

getch();

}

int main()

{

int n; sinhvien x; queu q1, q2;

printf("\nTao tap tin sinh vien!");

WriteFile((char \*)"e:\\sinhvien.dat");

FILE \*f0,\*f1,\*f2;

khoitao(q1); khoitao(q2);

f0=fopen("e:\\sinhvien.dat","rb");

fread(&x,sizeof(x),1,f0);

while (!feof(f0))

{

if(strcmp(x.Phai,"nu")==0)

enqueu(q1,x);

else

enqueu(q2,x);

fread(&x,sizeof(x),1,f0);

}

fclose(f0);

f1=fopen("e:\\sinhviennu.dat","wb");

while (!empty(q1))

{

x=dequeu(q1);

fwrite(&x,sizeof(x),1,f1);

}

fclose(f1);

f2=fopen("e:\\sinhviennam.dat","wb");

while (!empty(q2))

{

x=dequeu(q2);

fwrite(&x,sizeof(x),1,f2);

}

fclose(f2);

printf("\nDanh sach sinh vien da nhap:");

ReadFile((char \*)"e:\\sinhvien.dat");

printf("\nDanh sach sinh vien nu:");

ReadFile((char \*)"e:\\sinhviennu.dat");

printf("\nDanh sach sinh vien nam:");

ReadFile((char \*)"e:\\sinhviennam.dat");

}