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Hoàn thành 5/5

Bài1/

khaibaops.c

```c
#include<stdio.h>
typedef struct ps{
        int tu,mau,honso;
}ps;
void nhap(ps *a){
        printf("nhap theo thu tu:tu so - mau so - hon so \n");
        scanf("%d %d %d",&a->tu,&a->mau,&a->honso);
}
void xuat(ps *a){
        printf("tu %d\n",a->tu);
        printf("mau %d\n",a->mau);
}
```

tinhtoanps.c

```c
#include<stdio.h>
typedef struct ps{
        int tu,mau,honso;
}ps;
int uoc(int a,int b){
        int temp;
        while(b!=0){
                temp=a%b;
                a=b;
                b=temp;
        }
return a;
}
void congps(ps a,ps b){
        ps s;
        s.tu=a.tu*b.mau+a.mau*b.tu;
        s.mau=a.mau*b.mau;
        int k=uoc(s.tu,s.mau);
        s.tu /=k;
        s.mau /=k;
        printf("tong 2 phan so la %d/%d\n",s.tu,s.mau);
}
void trups(ps a,ps b){
        ps d;
        d.tu=a.tu*b.mau-a.mau*b.tu;
        d.mau=a.mau*b.mau;
        int k=uoc(d.tu,d.mau);
        d.tu /=k;
        d.mau /=k;
        printf("hieu 2 phan so la %d/%d\n",d.tu,d.mau);
}
```

```c
void nhanps(ps a,ps b){
        ps p;
        p.tu=a.tu*b.tu;
        p.mau=a.mau*b.mau;
        int k=uoc(p.tu,p.mau);
        p.tu /=k;
        p.mau /=k;
        printf("tich 2 phan so la %d/%d\n",p.tu,p.mau);
}
void chiaps(ps a,ps b){
        ps q;
        q.tu=a.tu*b.mau;
        q.mau=a.mau*b.tu;
        int k=uoc(q.tu,q.mau);
        q.tu /=k;
        q.mau /=k;
        printf("hieu 2 phan so la %d/%d\n",q.tu,q.mau);
}
```

xulyps.c ×

```c
#include<stdio.h>
typedef struct ps{
        int tu,mau,honso;
}ps;
void main(int argc,char **argv){
        ps a,b;
        nhap(&a);nhap(&b);
        xuat(&a);xuat(&b);
        if(argc!=2)
                printf("nhap sai input\n");
        else {
                if(strcmp(argv[1],"+")==0)
                        congps(a,b);
                else if(strcmp(argv[1],"-")==0)
                        trups(a,b);
                else if(strcmp(argv[1],"x")==0)
                        nhanps(a,b);
                else if(strcmp(argv[1],"/")==0)
                        chiaps(a,b);
                else printf("khong hop le\n");
        }
}
```

Xử lý phân số tĩnh

```
duong@ubuntu:~$ cd Desktop/baitap/lab3/bai1/phanso
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ gcc -c khaibaops.c tinhtoanps.c
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ ar cr pstinh.a khaibaops.o tinht
oanps.o
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ gcc -c xulyps.c
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ gcc -o xulyps xulyps.o pstinh.a
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ ./xulyps +
nhap theo thu tu:tu so - mau so - hon so
1 2 0
nhap theo thu tu:tu so - mau so - hon so
3 2 0
tu 1
mau 2
tu 3
mau 2
tong 2 phan so la 2/1
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ ./xulyps -
nhap theo thu tu:tu so - mau so - hon so
4 2 0
nhap theo thu tu:tu so - mau so - hon so
3 2 0
tu 4
mau 2
tu 3
mau 2
hieu 2 phan so la 1/2
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ ./xulyps x
nhap theo thu tu:tu so - mau so - hon so
1 2 0
nhap theo thu tu:tu so - mau so - hon so
3 2 0
tu 1
mau 2
tu 3
mau 2
tich 2 phan so la 3/4
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ ./xulyps /
nhap theo thu tu:tu so - mau so - hon so
1 1 0
nhap theo thu tu:tu so - mau so - hon so
3 2 0
tu 1
mau 1
tu 3
mau 2
hieu 2 phan so la 2/3
```

Xử lý phân số động

```
duong@ubuntu:~$ cd Desktop/baitap/lab3/bai1/phanso
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ gcc -c -fPIC khaibaops.c tinhtoa
nps.c
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ gcc -shared -fPIC -o psdong.a kh
aibaops.o tinhtoanps.o
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ sudo cp psdong.a /lib
[sudo] password for duong:
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ gcc -c xulyps.c
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ gcc -o xulys xulyps.o psdong.a
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ ./xulys
nhap theo thu tu:tu so - mau so - hon so
1 2 3
nhap theo thu tu:tu so - mau so - hon so
1 2 3
tu 1
mau 2
tu 1
mau 2
nhap sai input
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ ./xulys +
nhap theo thu tu:tu so - mau so - hon so
1 2 0
nhap theo thu tu:tu so - mau so - hon so
3 2 0
tu 1
mau 2
tu 3
mau 2
tong 2 phan so la 2/1
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$
```

Xử lý hỗn số tĩnh

xulyhonso.c

```c
#include<stdio.h>
typedef struct ps{
        int tu,mau,honso;
}ps;
void xulyhonso(ps *a){
        if(a->honso!=0){
                a->tu+=a->honso*a->mau;
                a->honso=0;
        }
}
void main(int argc,char **argv){
        ps a,b;
        nhap(&a);xulyhonso(&a);
        nhap(&b);xulyhonso(&b);
        xuat(&a);xuat(&b);

        if(argc!=2)
                printf("nhap sai input\n");
        else {
                if(strcmp(argv[1],"+")==0)
                        congps(a,b);
                else if(strcmp(argv[1],"-")==0)
                        trups(a,b);
                else if(strcmp(argv[1],"x")==0)
                        nhanps(a,b);
                else if(strcmp(argv[1],"/")==0)
                        chiaps(a,b);
                else printf("khong hop le\n");
        }
}
```

```
duong@ubuntu:~$ cd Desktop/baitap/lab3/bai1/phanso
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ gcc -c khaibaops.c tinhtoanps.c
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ ar cr pstinh.a khaibaops.o tinht
oanps.o
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ cd ..
duong@ubuntu:~/Desktop/baitap/lab3/bai1$ cd honso
duong@ubuntu:~/Desktop/baitap/lab3/bai1/honso$ gcc -c xulyhonso.c
duong@ubuntu:~/Desktop/baitap/lab3/bai1/honso$ gcc -o xulyhonso.out xulyhonso.o
/home/duong/Desktop/baitap/lab3/bai1/phanso/pstinh.a
duong@ubuntu:~/Desktop/baitap/lab3/bai1/honso$ ./xulyhonso.out +
nhap theo thu tu:tu so - mau so - hon so
1 2 1
nhap theo thu tu:tu so - mau so - hon so
3 2 1
tu 3
mau 2
tu 5
mau 2
tong 2 phan so la 4/1
```

Xử lý hỗn số động

```
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ gcc -c -fPIC khaibaops.c tinhtoanps.c
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ gcc -shared -fPIC -o psdong.a tinhtoanps.o khaibaops.o
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ sudo cp psdong.a /lib
[sudo] password for duong:
duong@ubuntu:~/Desktop/baitap/lab3/bai1/phanso$ cd ..
duong@ubuntu:~/Desktop/baitap/lab3/bai1$ cd honso
duong@ubuntu:~/Desktop/baitap/lab3/bai1/honso$ gcc -o xulyhonso.out xulyhonso.c /lib/psdong.a
duong@ubuntu:~/Desktop/baitap/lab3/bai1/honso$ ./xulyhonso.out +
nhap theo thu tu:tu so - mau so - hon so
1 1 2
nhap theo thu tu:tu so - mau so - hon so
3 2 1
tu 3
mau 1
tu 5
mau 2
tong 2 phan so la 11/2
```

Bài 2/

Khi có wait(NULL);

```
duong@ubuntu:~$ cd Desktop/baitap/lab3/bai2
duong@ubuntu:~/Desktop/baitap/lab3/bai2$ gcc -c bai2.c
duong@ubuntu:~/Desktop/baitap/lab3/bai2$ gcc -o bai2 bai2.o
duong@ubuntu:~/Desktop/baitap/lab3/bai2$ ./bai2
ID cua tien trinh hien tai 3011
 ID cua tien trinh cha 2991
From parent with ID 3011
From parent with PID 2991
From child with ID 3012
From child with parent PID 3011
```

Khi không có wait(NULL);

```
duong@ubuntu:~/Desktop/baitap/lab3/bai2$ gcc -c bai2.c
duong@ubuntu:~/Desktop/baitap/lab3/bai2$ gcc -o bai2 bai2.o
duong@ubuntu:~/Desktop/baitap/lab3/bai2$ ./bai2
ID cua tien trinh hien tai 3023
 ID cua tien trinh cha 2991
From parent with ID 3023
From parent with PID 2991
From child with ID 3024
From child with parent PID 1737
duong@ubuntu:~/Desktop/baitap/lab3/bai2$
```

bai2.c

```c
#include<stdio.h>
#include<sys/wait.h>
#include<unistd.h>

void main(){
        printf("ID cua tien trinh hien tai %d\n ",getpid());
        printf("ID cua tien trinh cha %d\n",getppid());
        if(fork()==0){
                printf("From child with ID %d\n",getpid());
                printf("From child with parent PID %d\n",getppid());
                sleep(10);
        }
        else{
                printf("From parent with ID %d\n",getpid());
                printf("From parent with PID %d\n",getppid());
                //wait(NULL);
        }
}
```

Bài 3/

bai3.c

```c
#include<stdio.h>
#include<unistd.h>
#include <stdlib.h>
void in(pid_t p){
        printf("ID cua toi la %d \n",getpid());
        printf("ID cua process con la %d \n\n",p);
        printf("\n");
}
void main(){
        printf("Current process: %d \n",getpid());
        pid_t pidAB;
        pidAB=fork();//A sinh B
if(pidAB>0)// dang trong process cua A
{       printf("AB>0\n");
        in(pidAB);
        pid_t pidAC;
        pidAC=fork();//A sinh C
        if(pidAC>0){//dang trong process cua A
                printf("AC>0\n");
                in(pidAC);
        }
        else if(pidAC==0){//dang trong process cua C
                pid_t pidCH;
                pidCH=fork();//C sinh H
                        if(pidCH>0){//dang trong process C
                                printf("CH>0\n");
                                in(pidCH);
                        }
                        else if(pidCH==0){//dang trong process H
                                exit(0);
                        }
        }
}
else if(pidAB==0)//dang trong process cua B
```

```
else if(pidAB==0)//dang trong process cua B
{       pid_t pidBD;
        pidBD=fork();//B sinh D
        if(pidBD>0){//dang trong process B
                printf("BD>0\n");
                in(pidBD);
                pid_t pidBE;
                pidBE=fork();//B sinh E
                if(pidBE>0){//dang trong process B
                        printf("BE>0\n");
                        in(pidBE);
                }
                else if(pidBE==0){//dang trong process E
                        exit(0);
                }
        }
        else if(pidBD==0){//dang trong process D
                exit(0);
        }
}
else{//khong nhan doi tien trinh AB duoc
        printf("error\n");
}
}
```

```
duong@ubuntu:~/Desktop/baitap/lab3/bai3$ gcc -c bai3.c
duong@ubuntu:~/Desktop/baitap/lab3/bai3$ gcc -o bai3 bai3.o
duong@ubuntu:~/Desktop/baitap/lab3/bai3$ ./bai3
Current process: 3046
AB>0
ID cua toi la 3046
ID cua process con la 3047


AC>0
ID cua toi la 3046
ID cua process con la 3048


duong@ubuntu:~/Desktop/baitap/lab3/bai3$ CH>0
ID cua toi la 3048
ID cua process con la 3049


BD>0
ID cua toi la 3047
ID cua process con la 3050


BE>0
ID cua toi la 3047
ID cua process con la 3051
```

Bài 4/

bai4.c

```c
#include<stdio.h>
#include<unistd.h>
#include <stdlib.h>
void main(){
        int n;
        printf("nhap n= ");scanf("%d",&n);
        pid_t pidAB;
        pidAB=fork();
        if(pidAB>0){
                int s1=0,i;
                for(i=0;i<=n;i++)
                        s1+=i;
                printf("tien trinh cha chay xong voi tong la %d\n",s1);
                //wait(NULL);
        }
        else if(pidAB==0){
                int s2=0,i;
                for(i=1;i<=n;i++){
                        if(n%i==0){
                                s2+=i;
                                printf("%d ",i);
                        }
                }
                printf("\ntien trinh co chay xong voi tong cac uoc so la %d\n",s2);
        }
}
```

```
duong@ubuntu:~/Desktop/baitap/lab3/bai4$ gcc -c bai4.c
duong@ubuntu:~/Desktop/baitap/lab3/bai4$ gcc -o bai4 bai4.o
duong@ubuntu:~/Desktop/baitap/lab3/bai4$ ./bai4
nhap n= 10
tien trinh cha chay xong voi tong la 55
1 2 5 10
tien trinh co chay xong voi tong cac uoc so la 18
duong@ubuntu:~/Desktop/baitap/lab3/bai4$
```

Bài 5/

bai5.c

```c
#include<stdio.h>
#include<unistd.h>
#include <stdlib.h>
void main(int argc,char**argv){
        pid_t pidAB;
        pidAB=fork();
        if(pidAB>0){
                if(argc!=2)
                        printf("thieu input\n");
                else{
                        if(atoi(argv[1])<=0)
                                printf("input bi sai ,input phai la chu so va >0 \n");
                        else
                                printf("input chinh xac !\n");
                }
                wait(NULL);
        }
        else if(pidAB==0){
                int k=1,n,i;
                int *a = (int *)malloc(k*sizeof(int));
                n=atoi(argv[1]);
                a[0]=n;
                while(n!=1){
                        if(n%2==0){
                                a[k++]=n/2;
                                n=n/2;
                        }
                        else if(n%2!=0){
                                a[k++]=3*n+1;
                                n=3*n+1;
                        }
                }
        for(i=0;i<k;i++)
                printf("%d ",a[i]);
                printf("\n");
        }
}
```

```
duong@ubuntu:~/Desktop/baitap/lab3/bai5$ gcc -c bai5.c
duong@ubuntu:~/Desktop/baitap/lab3/bai5$ gcc -o bai5 bai5.o
duong@ubuntu:~/Desktop/baitap/lab3/bai5$ ./bai5
thieu input
duong@ubuntu:~/Desktop/baitap/lab3/bai5$ ./bai5 35
input chinh xac !
35 106 53 160 80 40 20 10 5 16 8 4 2 1
duong@ubuntu:~/Desktop/baitap/lab3/bai5$
```