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Hoàn thành 3/3

Bài 1/cách fork();

bai1.c

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

struct mesg_buffer{
    long mesg_type;
    int mesg_text;
}message;

int giaithua(int n){
    if(n==1)return 1;
    return n*giaithua(n-1);}

int main(int argc,char*argv[]){
    key_t key;
    key=ftok(".",1);
    int n=atoi(argv[1]);
    int msgid;

    int id =fork();
    if(id>0){ //parent
        msgid=msgget(key,0666|IPC_CREAT);
        message.mesg_type=1;
        message.mesg_text=giaithua(n);
        msgsnd(msgid,&message,sizeof(message),0);
        printf("giai thua cua n dc gui di la %d\n",message.mesg_text);
        wait(NULL);
    }
    else if(id==0){ //child
        msgid=msgget(key,0666|IPC_CREAT);//khoi tao msgid trong tung tien trinh
        msgrcv(msgid,&message,sizeof(message),1,0);
        printf("nhan duoc giai thua cua n la %d\n",message.mesg_text);
        msgctl(msgid,IPC_RMID,NULL);
    }
    else
        printf("failed to fork\n");
return 0;
}
```

```
duong@ubuntu: ~/Desktop/baitap/lab9/bai1/cach1
duong@ubuntu:~/Desktop/baitap/lab9/bai1/cach1$ ./bai1 4
giai thua cua n dc gui di la 24
nhan duoc giai thua cua n la 24
duong@ubuntu:~/Desktop/baitap/lab9/bai1/cach1$
```

Cách 2 file riêng biệt

part1.c

```c
#include<stdio.h>
#include<sys/ipc.h>
#include<sys/msg.h>
struct mesagge_buffer{
    long mesg_type;
    int mesg_text;
}message;

int main(int argc,char*argv[]){
    key_t key;
    int n=atoi(argv[1]);
    key=ftok(".",1);
    int msgid=msgget(key,0666|IPC_CREAT);
    message.mesg_text=n;
    message.mesg_type=1;
    msgsnd(msgid,&message,sizeof(message),0);
    printf("du lieu dc gui di:%d\n",message.mesg_text);
return 0;
}
```

part2.c

```c
#include<stdio.h>
#include<sys/ipc.h>
#include<sys/msg.h>
struct message_buffer{
    long msg_type;
    int msg_text;
}message;

int giaithua(int n){
    if(n==1)return 1;
    return n*giaithua(n-1);
}
int main(int agrc,char *argv[]){
    key_t key=ftok(".",1);
    int msgid=msgget(key,0666|IPC_CREAT);
    msgrcv(msgid,&message,sizeof(message),1,0);
    printf("nhan duoc %d\n",message.msg_text);
    printf("giai thua cua %d la %d\n",message.msg_text,giaithua(message.msg_text));

return 0;
}
```

```
duong@ubuntu:~$ cd Desktop/baitap/lab9/bai1/cach2
duong@ubuntu:~/Desktop/baitap/lab9/bai1/cach2$ gcc -c part1.c
duong@ubuntu:~/Desktop/baitap/lab9/bai1/cach2$ gcc -o part1 part1.o
duong@ubuntu:~/Desktop/baitap/lab9/bai1/cach2$ ./part1 4
du lieu dc gui di:4
duong@ubuntu:~/Desktop/baitap/lab9/bai1/cach2$
duong@ubuntu:~/Desktop/baitap/lab9/bai1/cach2$ ./part1 4
du lieu dc gui di:4
duong@ubuntu:~/Desktop/baitap/lab9/bai1/cach2$
```

```
duong@ubuntu:~/Desktop/baitap/lab9/bai1/cach2$ gcc -c part2.c
duong@ubuntu:~/Desktop/baitap/lab9/bai1/cach2$ gcc -o part2 part2.o
duong@ubuntu:~/Desktop/baitap/lab9/bai1/cach2$ ./part2
nhan duoc 4
giai thua cua 4 la 24
duong@ubuntu:~/Desktop/baitap/lab9/bai1/cach2$ ./part2
nhan duoc 4
giai thua cua 4 la 24
duong@ubuntu:~/Desktop/baitap/lab9/bai1/cach2$ ./part2
nhan duoc 4
giai thua cua 4 la 24
duong@ubuntu:~/Desktop/baitap/lab9/bai1/cach2$
```

Bài 2/cách fork;

bai2.c

```c
#include<sys/ipc.h>
#include<sys/msg.h>
#include<unistd.h>
#include<stdio.h>
#include<string.h>
struct message_buffer{
    long msg_type;
    int msg_data[3];
    char msg_sign[5];
}message;
int main(int argc,char*argv[]){
    key_t key1=ftok(".",1);
    key_t key2=ftok(".",1);
    int msgid1,msgid2;
    int x1,x2;
    int childid=fork();

    if(childid>0){//parent
        msgid1=msgget(key1,0666|IPC_CREAT);//gui tu parent sang child
        msgid2=msgget(key2,0666|IPC_CREAT);//gui tu child ve parent
        message.msg_type=1;
        message.msg_data[0]=atoi(argv[1]);
        message.msg_data[1]=atoi(argv[2]);
        strcpy(message.msg_sign,argv[3]);
        msgsnd(msgid1,&message,sizeof(message),0);

        printf("data da gui la %d\n",message.msg_data[0]);
        printf("data da gui la %d\n",message.msg_data[1]);
        printf("data da gui la %s\n",message.msg_sign);

```

```c
        msgrcv(msgid2,&message,sizeof(message),2,0);
        printf("ket qua la %d\n",message.msg_data[2]);
        msgctl(msgid1,IPC_RMID,NULL);
    }
    else if(childid==0){//child
        int kq;char sign[5];
        msgid1=msgget(key1,0666|IPC_CREAT);
        msgid2=msgget(key2,0666|IPC_CREAT);
        msgrcv(msgid1,&message,sizeof(message),1,0);

        x1=message.msg_data[0];
        x2=message.msg_data[1];
        strcpy(sign,message.msg_sign);
        printf("data nhan duoc %d %d %s\n",x1,x2,sign);

        if(strcmp(sign,"+")==0)kq=x1+x2;
        else if(strcmp(sign,"-")==0)kq=x1-x2;
        else if(strcmp(sign,"x")==0)kq=x1*x2;
        else if(strcmp(sign,"/")==0)kq=x1/x2;
        else printf("loi phep tinh\n");

        message.msg_data[2]=kq;
        message.msg_type=2;
        msgsnd(msgid2,&message,sizeof(message),0);
    }
return 0;
}
```

```
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach1$ gcc -c bai2.c
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach1$ gcc -o bai2 bai2.o
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach1$ ./bai2 6 4 +
data da gui la 6
data da gui la 4
data da gui la +
data nhan duoc 6 4 +
ket qua la 10
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach1$ ./bai2 6 4 -
data da gui la 6
data da gui la 4
data da gui la -
data nhan duoc 6 4 -
ket qua la 2
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach1$ ./bai2 6 4 x
data da gui la 6
data da gui la 4
data da gui la x
data nhan duoc 6 4 x
ket qua la 24
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach1$ ./bai2 4 2 /
data da gui la 4
data da gui la 2
data da gui la /
data nhan duoc 4 2 /
ket qua la 2
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach1$
```

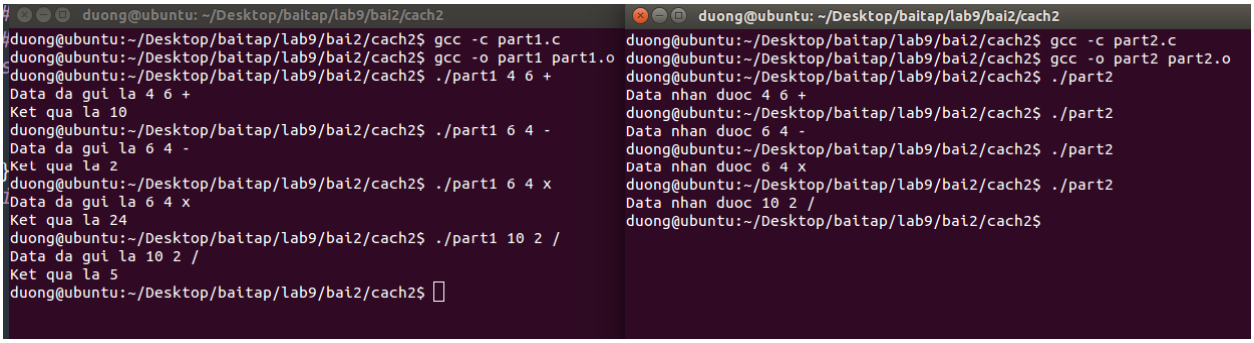
Cách 2 file riêng biệt

part1.c

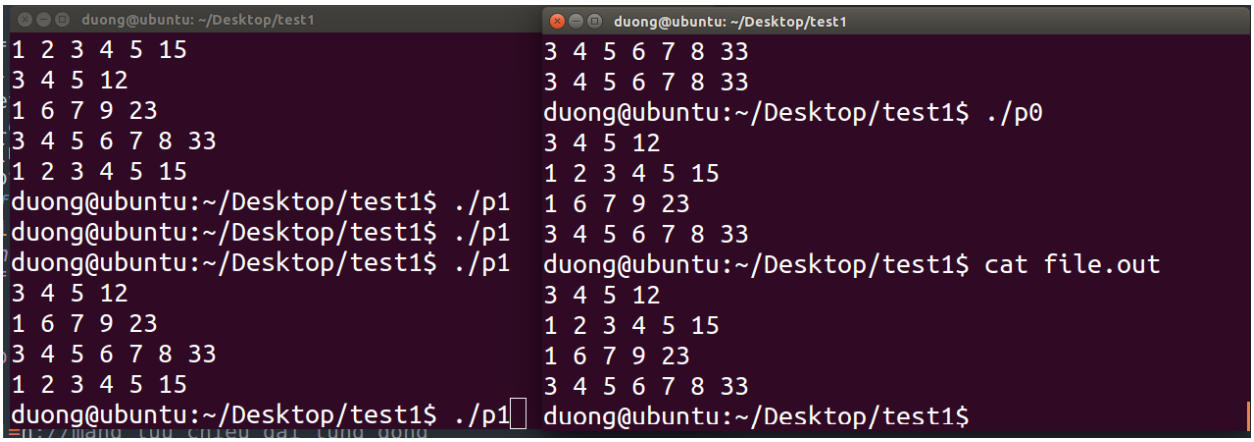
```c
#include<sys/ipc.h>
#include<sys/msg.h>
#include<unistd.h>
#include<stdio.h>
#include<string.h>
struct message_buffer{
    long msg_type;
    int msg_data[3];
    char sign[5];
}message;
int main(int argc,char*argv[]){
    key_t key1=ftok("k1",1);//1 la ky tu dinh danh project
    key_t key2=ftok("k2",2);//2 la ky tu dinh danh project

    int msgid1=msgget(key1,0666|IPC_CREAT);//msg gui tu part1->part2,gui input sang part2
    int msgid2=msgget(key2,0666|IPC_CREAT);//msg gui tu part2->part1,gui output sang part1

    message.msg_data[0]=atoi(argv[1]);
    message.msg_data[1]=atoi(argv[2]);
    strcpy(message.sign,argv[3]);
    printf("Data da gui la %d %d %s\n",message.msg_data[0],message.msg_data[1],message.sign);

    message.msg_type=1;
    msgsnd(msgid1,&message,sizeof(message),0);
    msgrcv(msgid2,&message,sizeof(message),2,0);//doi so thu 4 la msg_type

    printf("Ket qua la %d\n",message.msg_data[2]);
    msgctl(msgid2,IPC_RMID,NULL);
return 0;
}
```

part2.c

```c
#include<stdio.h>
#include<string.h>
struct message_buffer{
    long msg_type;
    int msg_data[3];
    char sign[5];
}message;
int main(int argc,char*argv[]){
    char sign[5];
    key_t key1=ftok("k1",1);
    key_t key2=ftok("k2",2);
    int msgid1=msgget(key1,0666|IPC_CREAT);
    int msgid2=msgget(key2,0666|IPC_CREAT);

    msgrcv(msgid1,&message,sizeof(message),1,0);
    strcpy(sign,message.sign);

    printf("Data nhan duoc %d %d %s\n",message.msg_data[0],message.msg_data[1],message.sign);

    if(strcmp(message.sign,"+")==0)message.msg_data[2]=message.msg_data[0]+message.msg_data[1];
    else if(strcmp(message.sign,"-")==0)message.msg_data[2]=message.msg_data[0]-message.msg_data[1];
    else if(strcmp(message.sign,"x")==0)message.msg_data[2]=message.msg_data[0]*message.msg_data[1];
    else if(strcmp(message.sign,"/")==0)message.msg_data[2]=message.msg_data[0]/message.msg_data[1];
    else printf("Loi phep tinh\n");

    message.msg_type=2;
    msgsnd(msgid2,&message,sizeof(message),0);
    msgctl(msgid1,IPC_RMID,NULL);
return 0;
}
```


duong@ubuntu: ~/Desktop/baitap/lab9/bai2/cach2
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach2$ gcc -c part1.c
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach2$ gcc -o part1 part1.o
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach2$ ./part1 4 6 +
Data da gui la 4 6 +
Ket qua la 10
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach2$ ./part1 6 4 -
Data da gui la 6 4 -
Ket qua la 2
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach2$ ./part1 6 4 x
Data da gui la 6 4 x
Ket qua la 24
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach2$ ./part1 10 2 /
Data da gui la 10 2 /
Ket qua la 5
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach2$
duong@ubuntu: ~/Desktop/baitap/lab9/bai2/cach2
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach2$ gcc -c part2.c
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach2$ gcc -o part2 part2.o
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach2$ ./part2
Data nhan duoc 4 6 +
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach2$ ./part2
Data nhan duoc 6 4 -
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach2$ ./part2
Data nhan duoc 6 4 x
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach2$ ./part2
Data nhan duoc 10 2 /
duong@ubuntu:~/Desktop/baitap/lab9/bai2/cach2$

Bài 3/


duong@ubuntu: ~/Desktop/test1
1 2 3 4 5 15
3 4 5 12
1 6 7 9 23
3 4 5 6 7 8 33
1 2 3 4 5 15
duong@ubuntu:~/Desktop/test1$ ./p1
duong@ubuntu:~/Desktop/test1$ ./p1
duong@ubuntu:~/Desktop/test1$ ./p1
3 4 5 12
1 6 7 9 23
3 4 5 6 7 8 33
1 2 3 4 5 15
duong@ubuntu:~/Desktop/test1$ ./p1
duong@ubuntu: ~/Desktop/test1
3 4 5 6 7 8 33
3 4 5 6 7 8 33
duong@ubuntu:~/Desktop/test1$ ./p0
3 4 5 12
1 2 3 4 5 15
1 6 7 9 23
3 4 5 6 7 8 33
duong@ubuntu:~/Desktop/test1$ cat file.out
3 4 5 12
1 2 3 4 5 15
1 6 7 9 23
3 4 5 6 7 8 33
duong@ubuntu:~/Desktop/test1$

```c
#include<stdio.h>
#include<stdlib.h>
#include<string.h>
#include<sys/ipc.h>
#include<sys/msg.h>
#include<sys/errno.h>
#define maxx 100
struct message_buffer{
    long mesg_type;
    int data[maxx];
    int count;
}message;
int main(){
    int a[maxx][maxx];
    int m=0,n=0;
    key_t key1=ftok(".",1);
    int msgid1=msgget(key1,0666 | IPC_CREAT);
    FILE*f=fopen("file.inp","rt");
    int i,j;
    char line[1024];
    while (fgets(line, sizeof(line), f) != NULL) {

        message.count = 0;
        char *token = strtok(line, " \t\n");
        while (token != NULL) {
                message.data[message.count] = atoi(token);
                message.count++;
            token = strtok(NULL, " \t\n");
        }
        message.mesg_type=1;
        msgsnd(msgid1,&message,sizeof(message),IPC_NOWAIT);
    }
  fclose(f);
/*-------------------------------------------------------------------
  key_t key2=ftok(".",2);
  int msgid2=msgget(key2,0666 | IPC_CREAT);
  int len[maxx]={};
  int pivot;
  FILE*g=fopen("file.out","wt");
  while (1) {
        int rc=msgrcv(msgid2,&message,sizeof(message),2,IPC_NOWAIT);
        if(rc==-1 && errno==ENOMSG)
            break;

        for(i=0;i<message.count;i++)
            a[m][n++]=message.data[i];

    len[m]=n;//mang luu chieu dai tung dong
     m++;
     n=0;
    }
    msgctl(msgid2, IPC_RMID, NULL);

    int x,y;
```

```
    int x,y;
    /*sort theo sum tung dong*/
    for(i=0;i<m-1;i++){
        for(j=i+1;j<m;j++){
            if(a[i][len[i]-1]>a[j][len[j]-1]){
                if(len[i]>len[j])pivot=len[i];
                else pivot=len[j];

                for(x=0;x<pivot;x++){//swap 2 dong
                    int tmp1=a[i][x];
                    a[i][x]=a[j][x];
                    a[j][x]=tmp1;
                }
                /*swap len[]*/
                int tmp2 = len[i];
                len[i] = len[j];
                len[j] = tmp2;
        }
    }
}
    for(i=0;i<m;i++){//in ra mang 2 chieu
        for(j=0;j<len[i];j++)
            printf("%d ", a[i][j]);
        printf("\n");
    }

    for(i=0;i<m;i++){
        for(j=0;j<len[i];j++)
```

```
    for(i=0;i<m;i++){
        for(j=0;j<len[i];j++)
            fprintf(g,"%d ",a[i][j]);
        fprintf(g,"\n");
    }
    fclose(g);
  return 0;
}
```

p0.c p1.c

```c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <sys/ipc.h>
#include <sys/msg.h>
#include<sys/errno.h>
#define maxx 100

struct message_buffer {
    long mesg_type;
    int data[maxx];
    int count;
} message;

int main() {
    int i,j,sum = 0;
    key_t key1=ftok(".",1);
    int msgid1=msgget(key1,0666 | IPC_CREAT);

    key_t key2=ftok(".",2);
    int msgid2=msgget(key2,0666 | IPC_CREAT);

    while (1) {//chu y IPC_NOWAIT nen msgrcv ko cho msgsnd
        int rc=msgrcv(msgid1,&message,sizeof(message),1,IPC_NOWAIT);
        if(rc==-1 && errno==ENOMSG)
            break;

        for(i=0;i<message.count-1;i++){//sort
            for(j=i+1;j<message.count;j++){
                if(message.data[i]>message.data[j]){
                    int tmp=message.data[i];
                    message.data[i]=message.data[j];
                    message.data[j]=tmp;
                }
            }
        }
        for(i=0;i<message.count;i++)
            sum+=message.data[i];
        message.data[message.count++]=sum;//them sum vao
        for(i=0;i<message.count;i++){
            printf("%d ",message.data[i]);
        }
        printf("\n");
        message.mesg_type=2;
        msgsnd(msgid2,&message,sizeof(message),IPC_NOWAIT);
        sum=0;
    }
    msgctl(msgid1, IPC_RMID, NULL);
    return 0;
}
```