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Hoàn thành 4/4

Bài 1/

```
bai1.c x
#include<stdio.h>
#include<stdlib.h>
#include<pthread.h>
#include<sys/types.h>
#include<math.h>
#include<limits.h>
struct arr{
    int n;
    int a[100];
};
int max=0;
int min=INT_MAX;
int tb;
void* thr1(void *ar){
    int count;int sum=0;
    struct arr* ap=(struct arr*) ar;
    for(count=0;count<ap->n;count++){
        sum+=ap->a[count];
        printf("%d ",ap->a[count]);
    }
    printf("\n");
    tb = sum / ap->n;
    printf("Gia tri trung binh: %d\n",tb);
}
void* thr2(void *ar){
    int i;
    struct arr* ap=(struct arr*) ar;
    for(i=0;i<ap->n;i++){
        if(ap->a[i]>max)
            max=ap->a[i];
    }
    printf("Gia tri lon nhat: %d\n",max);
}
void* thr3(void *ar){
    int i;
    struct arr* ap=(struct arr*) ar;
    for(i=0;i<ap->n;i++){
        if(ap->a[i]<min)
            min=ap->a[i];
    }
    printf("Gia tri nho nhat: %d\n",min);
}
```

```

int main(int argc, char*argv[]){
    struct arr ar;
    ar.n=argc-1; int i;
    for(i=0; i<ar.n; i++){
        ar.a[i]=atoi(argv[i+1]);
    }
    pthread_t tid[3];
    pthread_create(&tid[0], NULL, &thr1, &ar);
    //sleep(2); bo di de 3 luong chay song song
    pthread_create(&tid[1], NULL, &thr2, &ar);
    //sleep(2);
    pthread_create(&tid[2], NULL, &thr3, &ar);
    sleep(2);
    return 0;
}

```

```

duong@ubuntu:~/Desktop/baitap/lab5/bai1$ gcc -c bai1.c
duong@ubuntu:~/Desktop/baitap/lab5/bai1$ gcc -o bai1.out bai1.o -lpthread
duong@ubuntu:~/Desktop/baitap/lab5/bai1$ ./bai1.out 90 81 78 95 79 72 85
90 81 78 95 79 72 85
Gia tri trung binh: 82
Gia tri lon nhat: 95
Gia tri nho nhat: 72
duong@ubuntu:~/Desktop/baitap/lab5/bai1$

```

Bài 2/

Cách 1

```

duong@ubuntu:~/Desktop/baitap/lab5/bai2$ gcc -c bai21.c
duong@ubuntu:~/Desktop/baitap/lab5/bai2$ gcc -o bai21.out bai21.o -lpthread -lm
duong@ubuntu:~/Desktop/baitap/lab5/bai2$ ./bai21.out 100
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97
duong@ubuntu:~/Desktop/baitap/lab5/bai2$

```

```

bai21.c x
#include<stdio.h>
#include<stdlib.h>
#include<pthread.h>
#include<sys/types.h>
#include<math.h>
struct arr{
    int n;
    int a[100];
};
int snt(int n){
    int k=sqrt(n),i;
    if(n<2)return 0;
    for(i=2;i<=k;i++)
        if(n%i==0)return 0;
    return 1;
}
void *thr(void *ar){
    struct arr* ap=(struct arr*) ar;
    if(snt(ap->n))printf("%d ",ap->n);
}
int main(int argc,char *argv[]){
int main(int argc,char *argv[]){
    struct arr ar;
    ar.n=atoi(argv[1]);
    int i=2,j;
    pthread_t tid[4];
    if (argc != 2) {
        printf("nhap sai input%s\n", argv[0]);
        return -1;}
    if (ar.n < 2) {
        printf("Khong co so nguyen to nao <2\n");
        return -1;}
    while(i<ar.n){
        if(i<=ar.n){//ktra de i++ 4 lan khong vuot qua ar.n
            pthread_create(&tid[0],NULL,&thr,(void*)&i);
            if(pthread_join(tid[0],NULL)==0 && i<ar.n){
                i++;
                pthread_create(&tid[1],NULL,&thr,(void*)&i);
                if(pthread_join(tid[1],NULL)==0 && i<ar.n){
                    i++;
                    pthread_create(&tid[2],NULL,&thr,(void*)&i);
                    if(pthread_join(tid[2],NULL)==0 && i<ar.n){
                        i++;
                        pthread_create(&tid[3],NULL,&thr,(void*)&i);
                        if(pthread_join(tid[3],NULL)==0 && i<ar.n)
                            i++;
                    }
                }
            }
        }
    }
    printf("\n");
    return 0;
}

```

Cách 2

```
bai22.c x
#include <pthread.h>
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/types.h>
#include <math.h>
struct array {
    int *a;
    int n;
};
struct point {
    struct array a;
    int start;
    int end;
};
int snt(int n) {
    if(n<2) return 0;
    int k=sqrt(n),i;
    for(i=2;i<=k;i++)
        if(n%i==0)
            return 0;
    return 1;
}
void* thr(void* ar){
    struct point *ap=(struct point*)ar;
    int i;
    for(i=ap->start;i<=ap->end;i++)
        if(snt(i))
            printf("%d ",i);
}
int main(int argc, char *argv[]) {
    if(argc != 2) {
        printf("Nhap sai input%s\n", argv[0]); // %s va argv[0] de goi lai ham thuc thi bai22.out
        return -1;
    }
    int num = atoi(argv[1]);
    if (num < 2) {
        printf("Khong co so nguyen to nao <2\n");
        return -1;
    }
}
```

```

pthread_t tid[2];
struct point p;
p.a.n = num;

p.start = 2;
p.end = num / 2;
pthread_create(&tid[0], NULL, thr, (void*)&p);
pthread_join(tid[0], NULL);

p.start=p.end+ 1;
p.end=num;
pthread_create(&tid[1], NULL, thr, (void*)&p);
pthread_join(tid[1], NULL);
printf("\n");
return 0;
}

```

```

duong@ubuntu:~/Desktop/baitap/lab5/bai2$ gcc -c bai22.c
duong@ubuntu:~/Desktop/baitap/lab5/bai2$ gcc -o bai22.out bai22.o -lpthread -lm
duong@ubuntu:~/Desktop/baitap/lab5/bai2$ ./bai22.out 100
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97
duong@ubuntu:~/Desktop/baitap/lab5/bai2$

```

Bài3/

-Dòng `if(pthread_create(&tid[1],NULL,thr2,(void*) &ar)==0)` nên thay bằng `if(pthread_join(tid[1],NULL)==0)` để chắc chắn luồng thứ 2 sẽ được hoàn thành và hàm `pthread_create` đã được gọi 1 lần rồi gọi lần nữa sẽ bị dư thừa.

```

bai3.c x
#include <pthread.h>
#include <stdio.h>
#include <stdlib.h>
#include <sys/types.h>
#include <unistd.h>
struct arr{
    int n;
    int a[10];
};
struct file {
    struct arr ar;
    char* filename;
};
static int sum =0;
void* thr1(void* ar){
    struct arr* ap = (struct arr*) ar;
    ap->n=3;
    int i=0;
    for(i=0;i<ap->n;i++)
        ap->a[i] = i+1;
}
void* thr2(void* ar){
    struct arr *ap = (struct arr*) ar;
    int i, s=0;
    for(i=0;i<ap->n;i++)
        s=s + ap->a[i];
    sum=s;
}
void* thr3 (void* ar){
    struct file *fi = (struct file*) ar;
    FILE *out; int count;
    out= fopen(fi->filename,"wb");
    fprintf(out,"number element or array: %d\n", fi->ar.n);
    for(count=0; count<fi->ar.n; count++){
        fprintf(out,"%d\t",fi->ar.a[count]);
    }
    fprintf(out,"\n");
    fprintf(out,"sum=%d\n",sum);
    fclose(out);
}
int main (int argc,char * argv[]){

```

```

int main (int argc, char * argv[]){
    int i;
    pthread_t tid[3];
    struct arr ar;
    int status, *pstatus= &status;
    pthread_create(&tid[0], NULL, thr1, (void*) &ar);
    sleep(1);
    if(pthread_join(tid[0], (void**) pstatus)==0){
        pthread_create(&tid[1], NULL, thr2, (void*) &ar);
        //if(pthread_create(&tid[1], NULL, thr2, (void*) &ar)==0){
        if(pthread_join(tid[1], NULL)==0){
            struct file arf;
            arf.ar=ar;
            arf.filename=argv[1];
            pthread_create(&tid[2], NULL, thr3, (void*) &arf);
        }
    }
    sleep(2);
    return 0;
}

```

```

duong@ubuntu:~/Desktop/baitap/lab5/bai3$ gcc -c bai3.c
duong@ubuntu:~/Desktop/baitap/lab5/bai3$ gcc -o bai3.out bai3.o -lpthread
duong@ubuntu:~/Desktop/baitap/lab5/bai3$ ./bai3.out tf1
duong@ubuntu:~/Desktop/baitap/lab5/bai3$ cat tf1
number element or array: 3
1      2      3
sum=6
duong@ubuntu:~/Desktop/baitap/lab5/bai3$

```

Bài 4/

File input.txt

```

input.txt x
10
4 5 7 8 11 9 20 13 2 3

```

*bai4.c x

```
#include<pthread.h>
#include<stdlib.h>
#include<stdio.h>
#include<sys/types.h>
#include<unistd.h>
#include<math.h>
struct arr{
    int *a,*b,*c;//c la mang copy tu b de sap xep theo thu tu tang dan.k sap xep mang b
                //luon vi mang b can luu lai va ghi vao file
    int n,m;//n la so phan tu mang a ,m la so phan tu mang b,mang b la mang snt tu mang a
};
struct file{
    struct arr ar;
    char* filename;
};
int snt(int n) {
    if(n<2)return 0;
    int k=sqrt(n);
    int i;
    for(i=2;i<=k;i++)
        if(n%i==0)return 0;
    return 1;
}
void swap(int*a,int*b){
    int temp=*a;*a=*b;*b=temp;
}
```



```

void *thr1(void*ar){//doc va in ra cac phan tu tu file
    struct file *ap=(struct file*)ar;
    int i;
    FILE*f=fopen(ap->filename,"rt");
    fscanf(f,"%d",&ap->ar.n);
    ap->ar.a=(int*)malloc(ap->ar.n*sizeof(int));//cap phat dong cho mang a
    for(i=0;i<ap->ar.n;i++)
        fscanf(f,"%d",&ap->ar.a[i]);
    printf("So phan tu cua mang :%d\n",ap->ar.n);
    for(i=0;i<ap->ar.n;i++)
        printf("%d ",ap->ar.a[i]);
    printf("\n");
    //free(ap->ar.a);de mang a tiep tục sử dụng ở thr2 thì k nên free a luôn
    fclose(f);
}

void *thr2(void *ar){//in ra va tinh tong cac so nguyen to
    struct arr *ap=(struct arr*)ar;
    int i;ap->m=0;
    int s=0;
    ap->b=(int *)malloc(ap->n*sizeof(int));//cap phat dong cho mang b bang so luong mang a
    for(i=0;i<ap->n;i++)
        if(snt(ap->a[i]))
            ap->b[ap->m++]=ap->a[i];
    printf("Mang cac so nguyen to: ");
    for(i=0;i<ap->m;i++){
        s+=ap->b[i];
        printf("%d ",ap->b[i]);
    }
    printf("\nTong cac so nguyen to : %d\n",s);
    //free(ap->b);
}

void *thr3(void*ar){//sap xep cac so nguyen to theo thu tu giam dan
    struct arr*ap=(struct arr*)ar;
    int i,j;
    ap->c=(int*)malloc(ap->m*sizeof(int));
    for(i=0;i<ap->m;i++)ap->c[i]=ap->b[i];
    for(i=0;i<ap->m-1;i++)//swap
        for(j=i+1;j<ap->m;j++)
            if(ap->c[i]>ap->c[j])
                swap(&(ap->c[i]),&(ap->c[j]));//mang b kieu int* nen swap int k dc
    for(i=0;i<ap->m;i++)
        printf("%d ",ap->c[i]);
    printf("\n");
}

void*thr4(void*ar){// ket qua vao file result.txt
    struct arr *ap=(struct arr*)ar;
    int i,sum=0;
    FILE*f=fopen("result.txt","wt");
    fprintf(f,"So phan tu mang : %d\n",ap->n);
    for(i=0;i<ap->n;i++)
        fprintf(f,"%d ",ap->a[i]);
    fprintf(f,"\nMang cac so nguyen to:\n");
    for(i=0;i<ap->m;i++){
        sum+=ap->b[i];
        fprintf(f,"%d ",ap->b[i]);
    }
    fprintf(f,"\nTong cac so nguyen to: %d",sum);
    fprintf(f,"\nMang sau khi sap xep:\n");
    for(i=0;i<ap->m;i++)
        fprintf(f,"%d ",ap->c[i]);
    fclose(f);
}

```

```

int main(int argc, char*argv[]){
    pthread_t tid[4];
    struct file arf; //struct file de lay doi so ten file
    arf.filename=argv[1]; //lay ten file input
    pthread_create(&tid[0], NULL, thr1, (void*) &arf);
    pthread_join(tid[0], NULL);

    struct arr ar;
    ar=arf.ar; //lay lai mang luu o arf tren
    pthread_create(&tid[1], NULL, thr2, (void*) &ar); //luong 2 va 3 dang chay song song
    pthread_create(&tid[2], NULL, thr3, (void*) &ar);

    pthread_join(tid[1], NULL);
    pthread_join(tid[2], NULL);

    pthread_create(&tid[3], NULL, thr4, (void*) &ar);
    pthread_join(tid[3], NULL);

    free(arf.ar.a); //giai phong o day chu giai phong o trong thr1 thi se
    // xoa luon mang a k su dung lai duoc
    free(ar.b);
    free(ar.c);
return 0;

```

```

duong@ubuntu:~/Desktop/baitap/lab5/bai4$ gcc -c bai4.c
duong@ubuntu:~/Desktop/baitap/lab5/bai4$ gcc -o bai4.out bai4.o -lpthread -lm
duong@ubuntu:~/Desktop/baitap/lab5/bai4$ ./bai4.out input.txt
So phan tu cua mang :10
4 5 7 8 11 9 20 13 2 3
Mang cac so nguyen to: 5 7 11 13 2 3
Tong cac so nguyen to : 41
2 3 5 7 11 13
duong@ubuntu:~/Desktop/baitap/lab5/bai4$ cat result.txt
So phan tu mang : 10
4 5 7 8 11 9 20 13 2 3
Mang cac so nguyen to:
5 7 11 13 2 3
Tong cac so nguyen to: 41
Mang sau khi sap xep:
2 3 5 7 11 13 duong@ubuntu:~/Desktop/baitap/lab5/bai4$

```