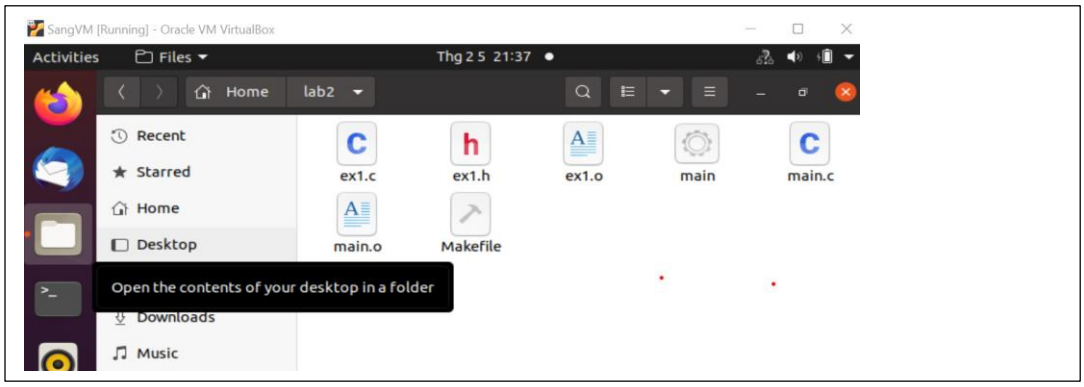
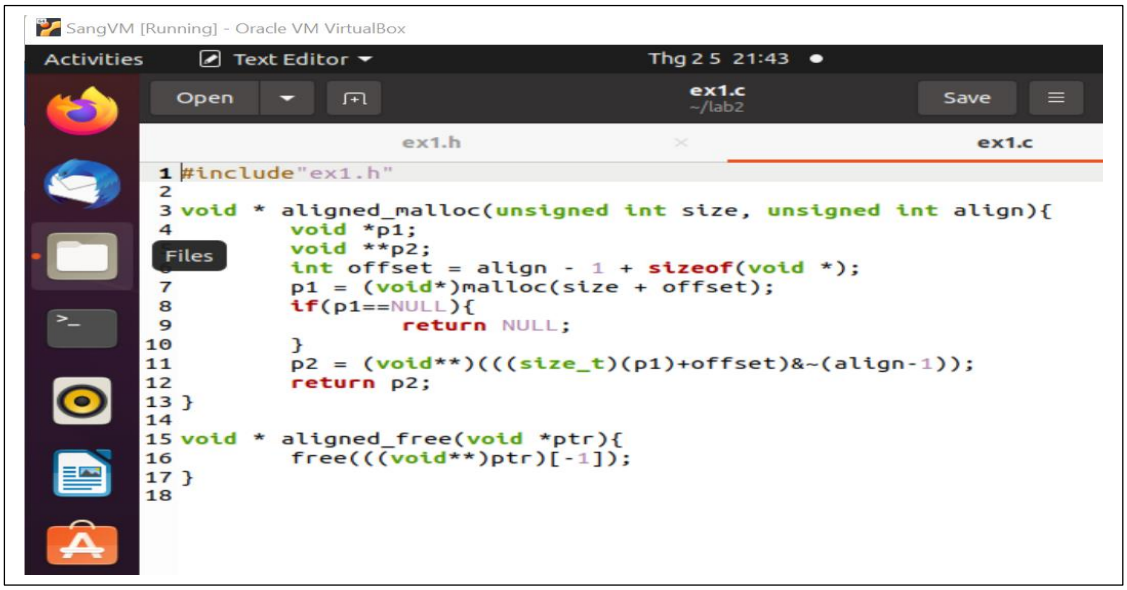
Problem 1:

Folder prob1:

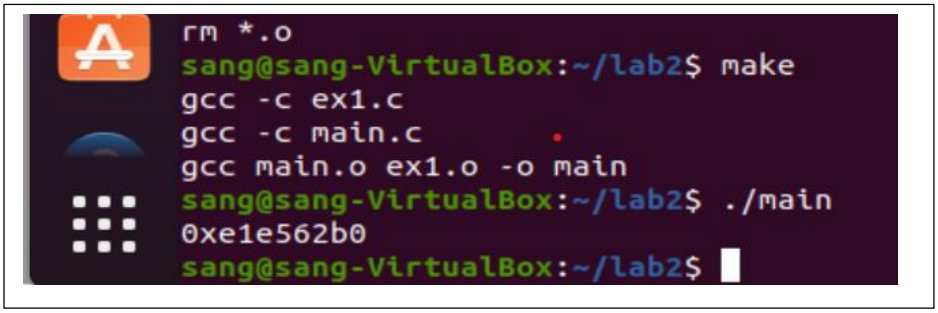


Code file ex1.h:

Code file ex1.c:

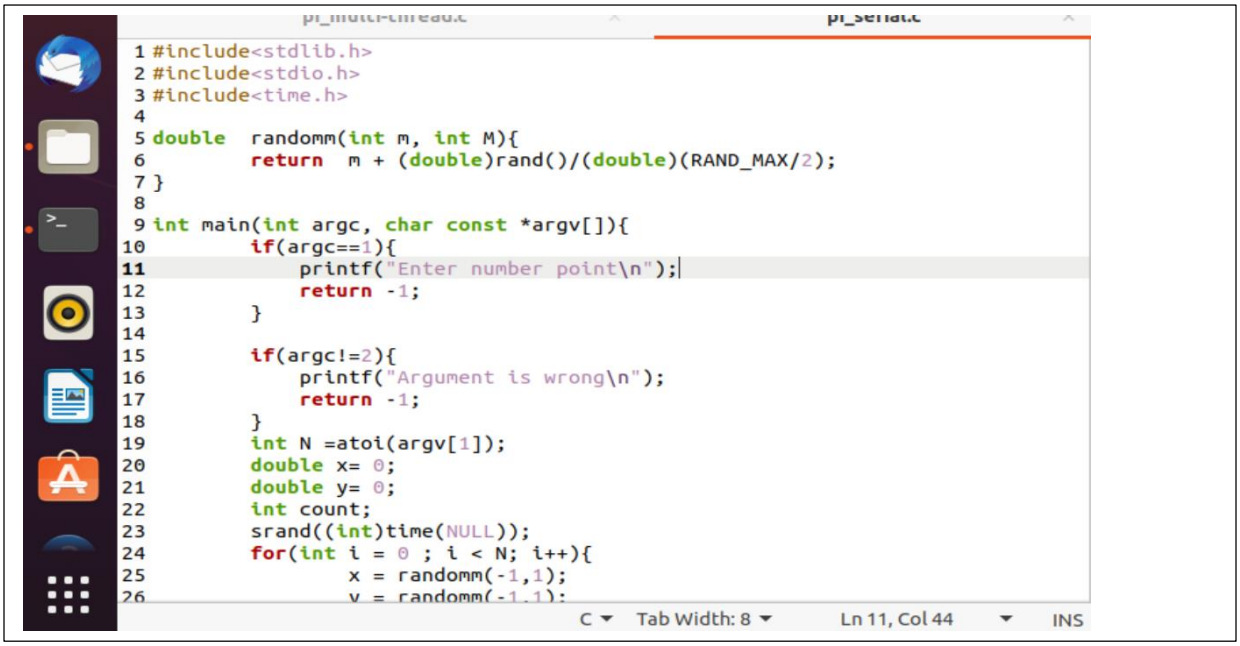


Kết quả chạy thử:



Problem 2:

Source code hàm serial.c



```
                x = randomm(-1,1);
                y = randomm(-1,1);
                if(x*x+y*y<=1)count++;
        }
        double result =(double) 4.0*count/(double)N;
        printf("PI: %lf\n",result);

}
```

C Tab Width: 8 Ln 11, Col 44 INS

Source code hàm pi_multi-thread.c

SangVM [Running] - Oracle VM VirtualBox

Activities Text Editor Thg 2 12 22:30

Open pi_multi-thread.c ~/lab2/problem2 Save

pi_multi-thread.c pi_serial.c

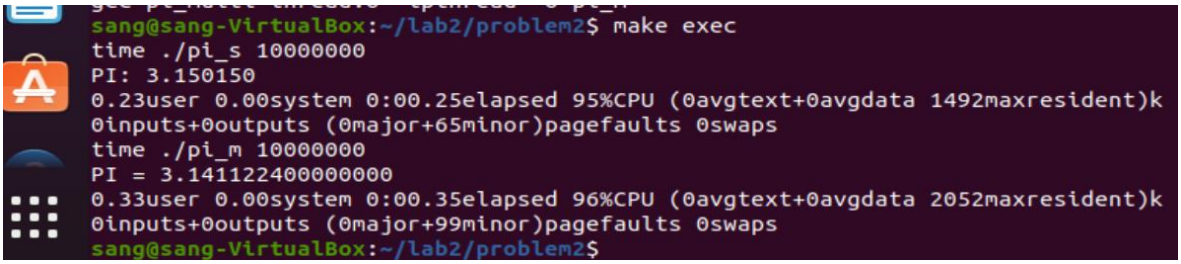
```c
#include <stdio.h>
#include <stdlib.h>
#include <time.h>
#include <math.h>
#include <pthread.h>

#define NUM_THREAD 4


pthread_t tid[NUM_THREAD]={0};
int count[NUM_THREAD]={0};
clock_t start_time, end_time;
static long int total_point;
static long int count_circle=0;

void* circle_point(void *param){
    int *pcount= (int*)param;
    int i;
    for(i=0; i<total_point;i++){
        double x= (double)rand()/(double)RAND_MAX;
        double y=(double)rand()/(double)RAND_MAX;
        double r= x*x+y*y;
        if(r<=1) *pcount=*pcount+1;
      }
    pthread_exit(0);
}
```

C Tab Width: 8 Ln 48, Col 5 INS

```c
int main(int argc, char const *argv[]){
    if(argc==1){
        printf("Enter number point\n");
        return -1;
       }

    if(argc!=2){
        printf("Argument is wrong\n");
        return -1;
     }
    total_point=atoll(argv[1])/NUM_THREAD;

    srand(time(NULL));
    static int i;
    for(i=0; i<NUM_THREAD;i++)
    pthread_create(&tid[i],NULL,circle_point,&count[i]);
    for(i=0;i<NUM_THREAD;i++){
        pthread_join(tid[i],NULL);
        count_circle+=count[i];
     }
    double pi=4.0*(double)count_circle/(double)total_point/-
  (double)NUM_THREAD;

    printf("PI = %17.15f\n",pi);
    return 0;
}
```

C Tab Width: 8 Ln 48, Col 5 INS

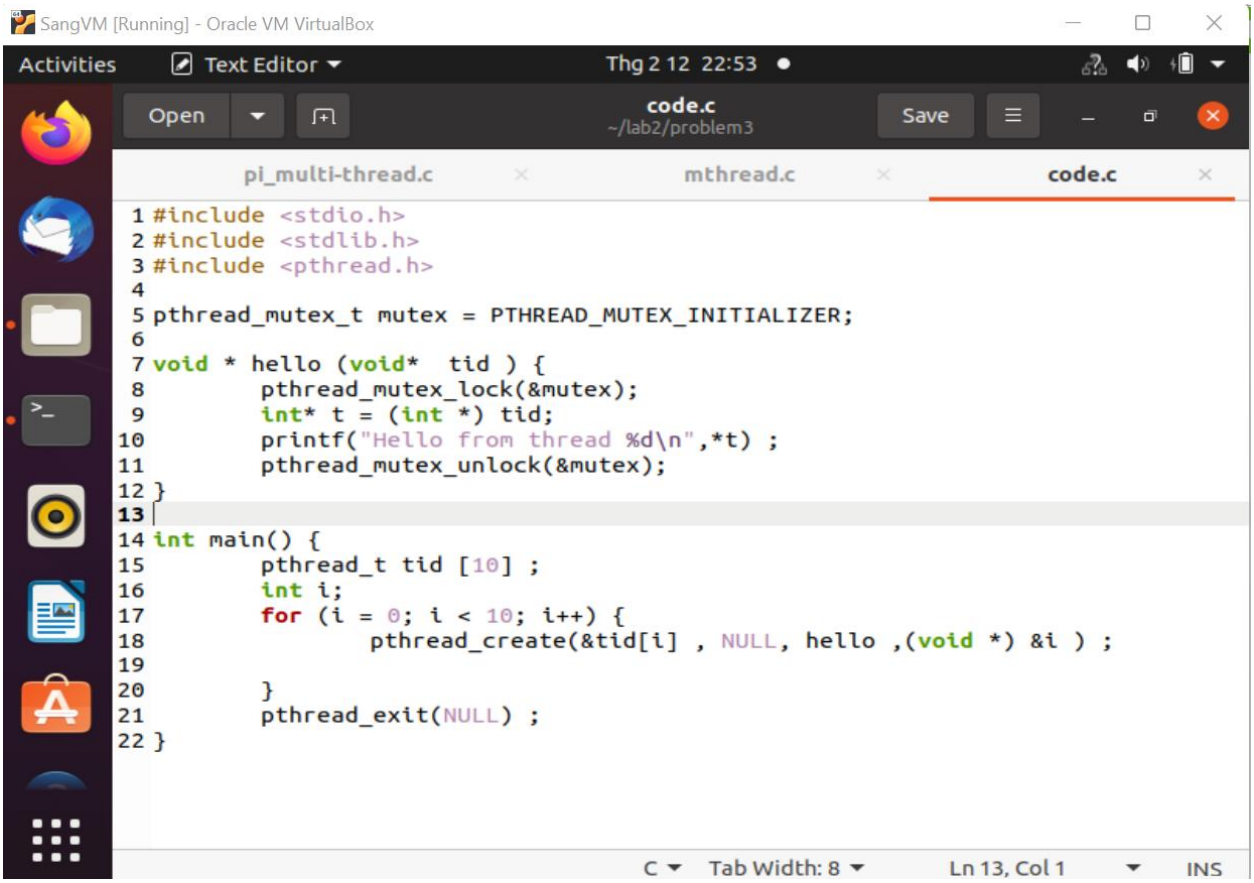
Kết quả chạy thử:



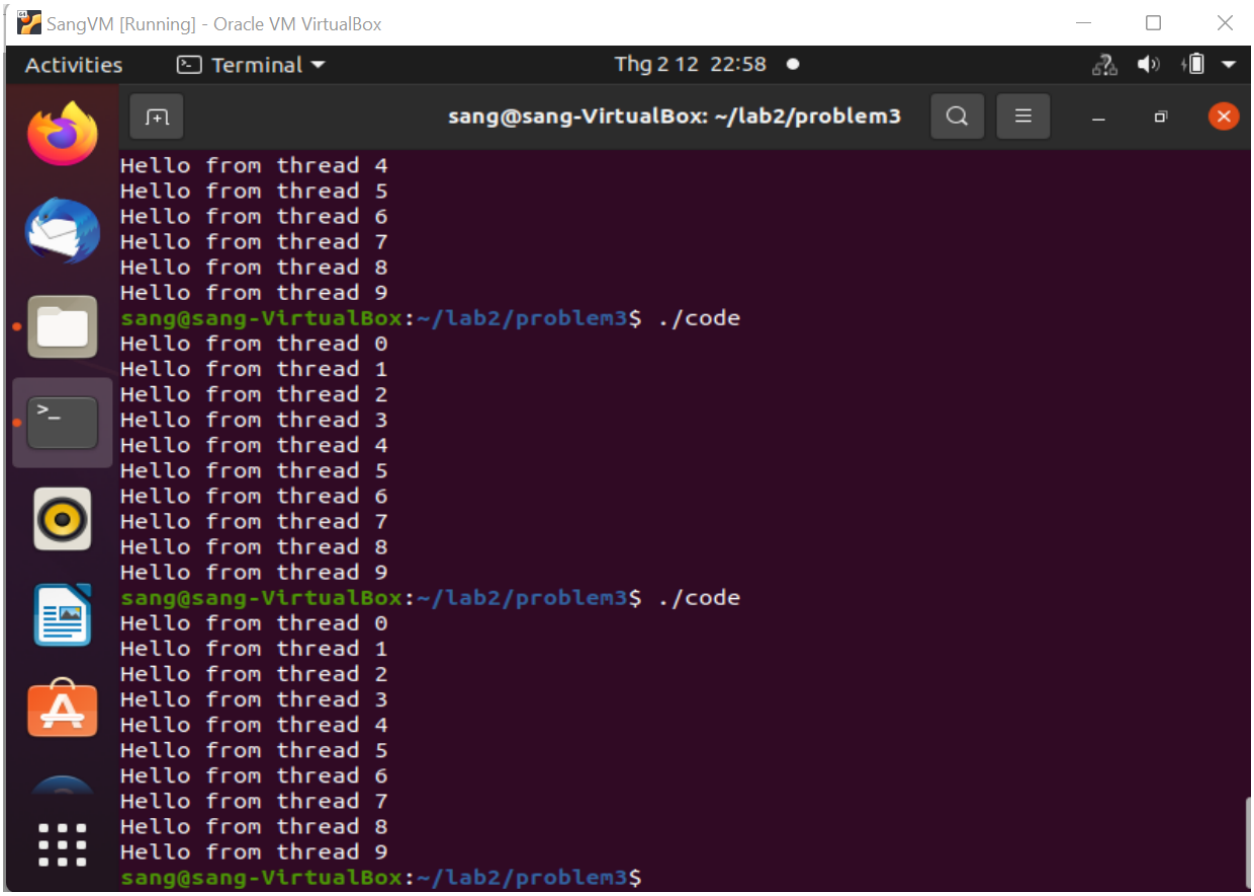
Speed up: pi_serial nhanh hơn khoảng 1.4 lần

Problem 3:

Source code sau khi update:



Kết quả chạy thử:


SangVM [Running] - Oracle VM VirtualBox
Activities
Terminal
Thg 2 12 22:58
sang@sang-VirtualBox: ~/lab2/problem3
Hello from thread 4
Hello from thread 5
Hello from thread 6
Hello from thread 7
Hello from thread 8
Hello from thread 9
sang@sang-VirtualBox:~/lab2/problem3$ ./code
Hello from thread 0
Hello from thread 1
Hello from thread 2
Hello from thread 3
Hello from thread 4
Hello from thread 5
Hello from thread 6
Hello from thread 7
Hello from thread 8
Hello from thread 9
sang@sang-VirtualBox:~/lab2/problem3$ ./code
Hello from thread 0
Hello from thread 1
Hello from thread 2
Hello from thread 3
Hello from thread 4
Hello from thread 5
Hello from thread 6
Hello from thread 7
Hello from thread 8
Hello from thread 9
sang@sang-VirtualBox:~/lab2/problem3$