2022-CS-36

Task 1

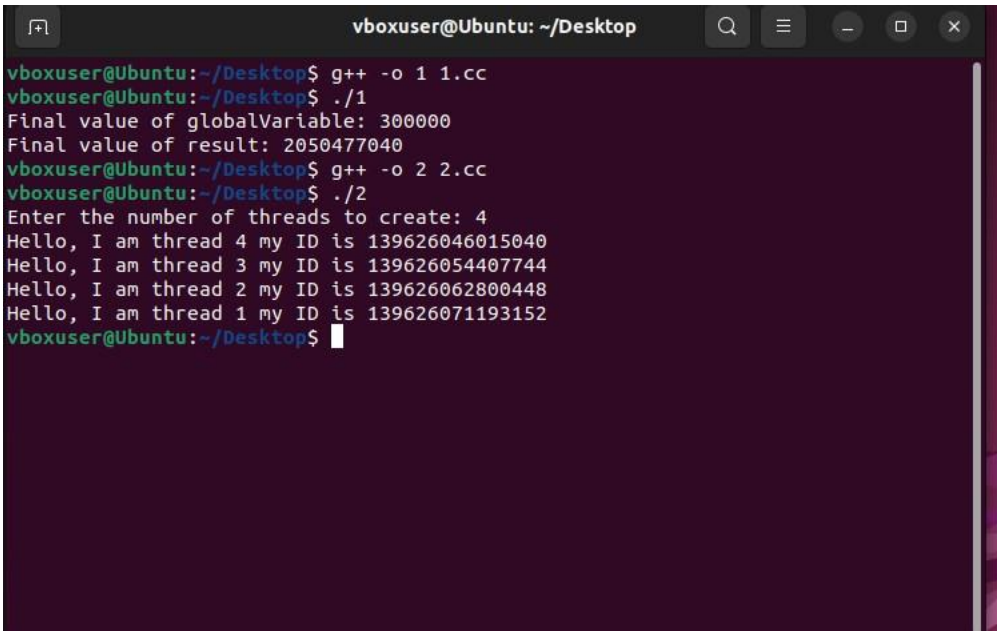
```
#include <iostream>
#include <thread>
#include <mutex>
using namespace std;
int globalVariable = 0;
int result = 0;
mutex mtx;
void threadFunction(int id)
 {
    for (int i = 0; i < 100000; ++i) {
        mtx.lock();
        globalVariable++;
        result += globalVariable;
        mtx.unlock();
    }
}

int main() {
    thread t1(threadFunction, 1);
    thread t2(threadFunction, 2);
    thread t3(threadFunction, 3);

    t1.join();
    t2.join();
    t3.join();
    cout << "Final value of globalVariable: " << globalVariable << endl;
    cout << "Final value of result: " << result << endl;

    return 0;
}
```

```
vboxuser@Ubuntu: ~/Desktop
vboxuser@Ubuntu:~/Desktop$ g++ -o 1 1.cc
vboxuser@Ubuntu:~/Desktop$ ./1
Final value of globalVariable: 300000
Final value of result: 2050477040
vboxuser@Ubuntu:~/Desktop$
```

Task 2:

```
#include <iostream>
#include <pthread.h>
using namespace std;
void *print(void *arg)
{
    pthread_t id = pthread_self();
    cout << "Hello, I am thread " << *((int *)arg) << " my ID is " << id << endl;
    pthread_exit(NULL);
}

int main()
{
    int numThreads;
    cout << "Enter the number of threads to create: ";
    cin >> numThreads;

    pthread_t threads[numThreads];
    int threadArgs[numThreads];
    for (int i = 0; i < numThreads; ++i)
    {
        threadArgs[i] = i + 1;
        pthread_create(&threads[i], NULL, print, (void *)&threadArgs[i]);
    }
    for (int i = 0; i < numThreads; ++i)
```

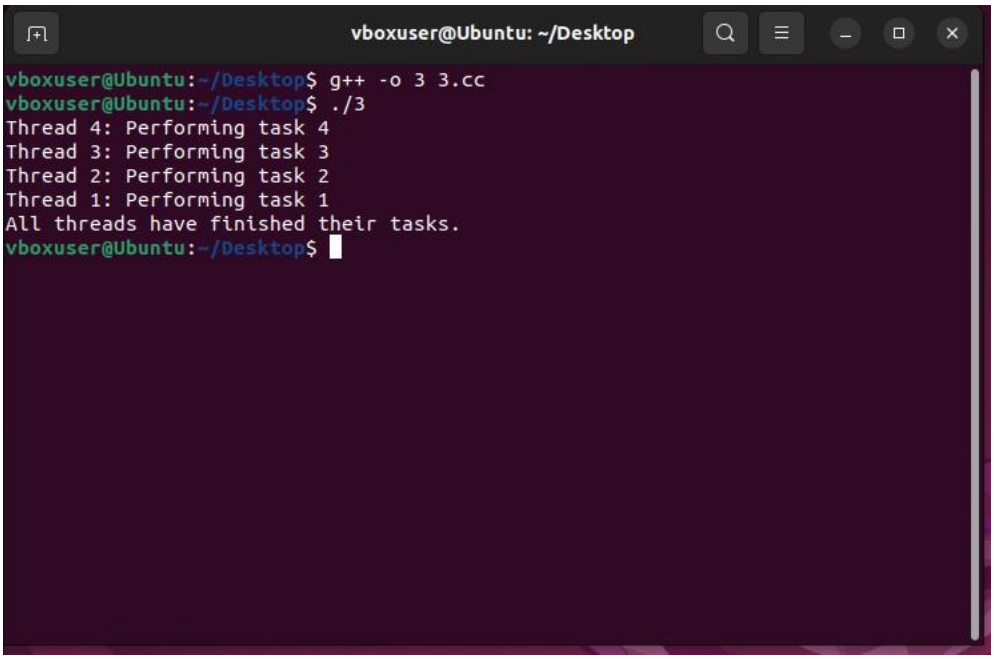
```
    {
        pthread_join(threads[i], NULL);
    }

    exit(0);
}
```



Task3:

```
#include <iostream>
#include <pthread.h>
using namespace std;
void *task1(void *)
{
    cout << "Thread 1: Performing task 1" << endl;
    pthread_exit(NULL);
}

void *task2(void *)
{
    cout << "Thread 2: Performing task 2" << endl;
```

```
    pthread_exit(NULL);
}

void *task3(void *)
{
    cout << "Thread 3: Performing task 3" << endl;
    pthread_exit(NULL);
}

void *task4(void *)
{
    cout << "Thread 4: Performing task 4" << endl;
    pthread_exit(NULL);
}

int main()
{
    pthread_t thread1, thread2, thread3, thread4;
    pthread_create(&thread1, NULL, task1, NULL);
    pthread_create(&thread2, NULL, task2, NULL);
    pthread_create(&thread3, NULL, task3, NULL);
    pthread_create(&thread4, NULL, task4, NULL);
    pthread_join(thread1, NULL);
    pthread_join(thread2, NULL);
    pthread_join(thread3, NULL);
    pthread_join(thread4, NULL);

    cout << "All threads have finished their tasks." << endl;

    return 0;
}
```



Task4:

```
#include <iostream>
#include <pthread.h>
#include <unistd.h>
using namespace std;
void *threadFunction(void *arg)
{
    long thread_id = (long)arg;
    pid_t process_id = getpid();
    cout << "Thread " << thread_id << ": Thread ID: " << pthread_self()<< ",
Process ID: " << process_id << endl;
    pthread_exit(NULL);
}

int main()
{
    const int numThreads = 4;
    pthread_t threads[numThreads];
    for (long i = 0; i < numThreads; ++i)
    {
        pthread_create(&threads[i], NULL, threadFunction, (void *)i);
    }

    for (int i = 0; i < numThreads; ++i)
```

```
    {
        pthread_join(threads[i], NULL);
    }

    return 0;
}
```