Programme Name: **BCS HONS**

Course Code: **CSC 2624**

Course Name: **Distributed And Parallel Computing**

Assignment / Lab Sheet / Project / Case Study No. **1**

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Submitted By:

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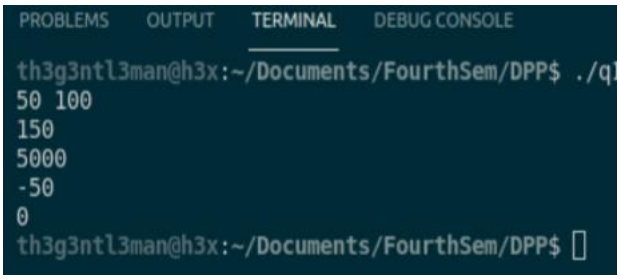
1. **Write a C++ thread based program that implements FOUR (4) threads such that each thread run FOUR (4) different functions add(int a, int b), sub(int a, int b), divide(int a, int b) and multiply(int a, int b). And waits for the main thread before terminating and also implement MUTEX to avoid the race condition for IO.**

Code:

```
#include<bits/stdc++.h>
using namespace std;

int ans=0;
mutex mu;
void print(int result)
{
    mu.lock();
    cout<<result<<endl;
    mu.unlock();
}

void add(int a, int b)
{
    int ans=a+b;
    print(ans);
}
void sub(int a, int b)
{
    int ans=a-b;
    print(ans);
}
void multiply(int a, int b)
{
    int ans=a*b;
    print(ans);
}
void divide(int a, int b)
{
    int ans=a/b;
    print(ans);
}

int main(int argc, char const *argv[])
{
```

```
    int a,b;
    cin>>a>>b;

    thread t1(add,a,b);
    thread t2(sub,a,b);
   thread t3(divide,a,b);
   thread t4(multiply,a,b);

    t1.join();
    t2.join();
    t3.join();
    t4.join();

    return 0;
}
```

Output:



2. Write a C++ threaded program to compute the sum of 10 Billon (10000000000) natural number using For loop. You should split the For loops into FOUR (4) different threads and compute the sum independently. Use Main thread to compute the total sum from four different thread and print the result.

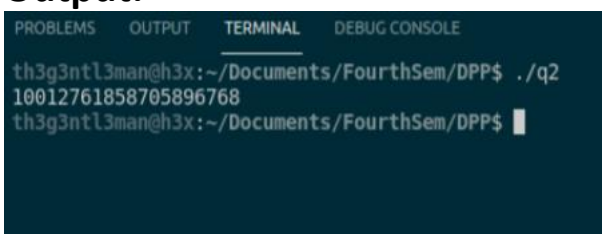
Hint: Use shared memory variable to access the result of child threads from main threads.

Code:

```cpp
#include<bits/stdc++.h>
typedef unsigned long long int ull ;
using namespace std;

//ull sum=0;
ull bigSum=0;
mutex mu;
void print(ull result)
{
    mu.lock();
    bigSum=bigSum+result;
    mu.unlock();

}
void loop1()
{
    ull sum1=0;
     for(ull i=1;i<250000000;i++)
    {
        sum1=sum1+i;
    }
   print(sum1);
}

void loop2()
{
    ull sum2=0;
    for(ull i=2500000000;i<5000000000;i++)
    {
        sum2=sum2+i;
    }
    print(sum2);

}


void loop3()
{
    ull sum3=0;
    for(ull i=5000000000;i<7500000000;i++)
    {
        sum3=sum3+i;
    }
    print(sum3);
```

```
}


void loop4()
{
    ull sum4=0;
    for(ull i=7500000000;i<=10000000000;i++)
    {
        sum4=sum4+i;
    }
    print(sum4);

}
int main(int argc, char const *argv[])
{
    thread t1(loop1);
    thread t2(loop2);
    thread t3(loop3);
     thread t4(loop4);


    t1.join();
    t2.join();
    t3.join();
    t4.join();

    cout<<bigSum<<endl;
    return 0;
}
```

Output:



Thank you