OLQ11

Practice and Review

Multithreading Vocabulary – be able to match terms to definitions.

Stack – Scratch memory for a thread

Heap – Memory shared by all threads for dynamic allocation

Concurrency – Performing 2 or more algorithms simultaneously

Process – A self-contained execution environment including its own memory space

Thread – An independent path of execution within a process, running concurrently with other threads within a shared memory space

Reentrant – An algorithm that can be paused while executing and then safely executed by a different thread

mutex – A mutual exclusion object that prevents two properly written threads from concurrently accessing a critical resource

Write a complete C++ program to create 1000 threads where each thread calls the function `print_it()` and passes it the for loop counter. The parts of the code in **bold red** will be provided on the quiz. Add a mutex and locks.

```cpp
#include <iostream>
#include <chrono>
#include <mutex>
#include <thread>
#include <vector>

using namespace std;
mutex MyDoor;

void Sewing(int Stitches)
{
    MyDoor.lock();
    std::cerr << Stitches++ << ",";
    this_thread::sleep_for(chrono::milliseconds(200+rand()%200));
    MyDoor.unlock();
}

int main(void)
{
    vector<thread> Numbers;

    for(int i = 0; i < 1234; ++i)
    {
        Numbers.push_back(std::thread(Sewing,(i)/2));

    }

    for(thread& it : Numbers)
    {   it.join();
    }
```

```
        return 0;
}
```

Map

Given this list of commands, show what the resulting map would look like

```
MyMap.insert(make_pair(15, "Dog"));
MyMap.insert(make_pair(30, "Cat"));
MyMap.insert(make_pair(5, "Bird"));
MyMap.insert(make_pair(10, "Tortoise"));
MyMap.insert(make_pair(25, "Hamster"));
MyMap.insert(make_pair(5, "Rat"));
MyMap.insert(make_pair(20, "Gerbil"));
MyMap.insert(make_pair(15, "Goldfish"));
```

Key	Value
5	Bird
10	Tortoise
15	Dog
20	Gerbil
25	Hamster
30	Cat

What would the same map look like if [] had been used instead of insert() make_pair()?

Key	Value
5	Rat
10	Tortoise
15	Goldfish
20	Gerbil
25	Hamster
30	Cat

Write the declaration for this map given the provided information.

```
map<int, string>MyMap;
```