Data Races Exercises

Data Races 1

- Write a task function with a loop that prints out the thread's ID and sleeps
- Write a program which runs this task function in three threads
- Run the program and explain the output

Data Races 2

- Can a data race occur in the following code sample, when func1 and func2 are run as concurrent threads? Explain your answer

```
const int x{5};

int func1() {
    return 2*x;
}

int func2() {
    return 3*x;
}
```

- Write a program to exercise this code

Data Races 3

- Can a data race occur in the following code sample, when func1 and func2 are run as concurrent threads? Explain your answer

```
int x{0}, y{0};

void func1() {
   if (x)
      y = 1;
}

void func2() {
   if (y)
      x = 1;
}
```

- Write a program to exercise this code
- Add print statements to func1 and func2 to show the final values of x and y. What output do you expect?

Data Races 4

- Can a data race occur in the following code sample, when func1 and func2 are run as concurrent threads? Explain your answer

```
int x{0}, y{0};

void func1() {
   x = 1;
   int r1 = y;
}

void func2() {
   y = 1;
   int r2 = x;
}
```

Data Races 5

- Can a data race occur in the following code sample, when func1 and func2 are run as concurrent threads? Explain your answer

```
int x{0};
bool done;

void func1() {
   std::this_thread::sleep_for(50ms);
   x = 42;
   done = true;
}

void func2() {
   std::this_thread::sleep_for(50ms);
   while (!done) {}
   std::cout << x << std::endl;
}
```

Data Races 5

- Write a program to exercise this code and run it
- Explain the result (if you do not see anything unusual, turn on optimization in the compiler)