

**CSCI 4060U – Laboratory #1**  
**Introduction to OpenMP Programming in C**  
Lab Due: Friday, January 27, 2023 at 11:00pm (Canvas)

## Introduction

The main purpose of this lab is to introduce you to writing, compiling and running OpenMP programs in C.

## Activity #1

In the first activity, we will ensure that you can compile and execute the `helloworld.c`<sup>1</sup> program from Lecture 3. To compile the program, run `gcc` as follows:

```
command$ gcc -fopenmp helloworld.c
```

If you are using Mac OSX you should use:

```
command$ gcc -Xpreprocessor -fopenmp -lomp helloworld.c
```

Next, run the program and observe the output.

## Activity #2

In the second activity, you will parallelize the program `pi_serial.c`<sup>2</sup>. This program approximates  $\pi$  as a sum of rectangles. Your goal is to parallelize the algorithm to use ***two*** threads for calculating the rectangle heights. You will need to use the following compiler directive to indicate the parallel code block:

```
#pragma omp parallel
{
    ...
}
```

You will also need the following OpenMP functions:

- `omp_set_num_threads(int x)` – sets the number of threads
- `int omp_get_num_threads()` – returns the number of threads
- `int omp_get_thread_num()` – returns the current thread ID

**Submission.** You should submit your source file for Activity #2 (`lab01_a2.c`) through the lab drop box in Canvas.

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<sup>1</sup> available at: <http://www.sqrlab.ca/exercises/csci4060u-w23/helloworld.c>

<sup>2</sup> available at: [http://www.sqrlab.ca/exercises/csci4060u-w23/pi\\_serial.c](http://www.sqrlab.ca/exercises/csci4060u-w23/pi_serial.c)