Parallel Programming

Intensive Programming in Linux
CS288-006 Spring 2018

OpenMP

OpenMP is an Application Program Interface (API) for writing multithreaded applications.

- An abbreviation for: **Open Multi-Processing**
- Comprised of a set of **compiler directives**, **library routines**, and **environment variables**

OpenMP Core Syntax

- Most of the constructs in OpenMP are compiler directives:
  #pragma omp parallel
  #pragma omp barrier
  #pragma omp critical
- Function prototypes and types are in a header file:
  #include <omp.h>
  int omp_get_thread_num();
  int omp_get_num_threads();
- Most OpenMP constructs apply to a "structured block", a code block with one point of entry at the top and one point of exit at the bottom.

Compiling, Linking, and Running

- Compiling and linking (GNU C/C++ version 4.4.7 or higher):

```
   C: gcc -fopenmp …
 C++: g++ -fopenmp …
```

- Environment Variables
  export OMP_NUM_THREADS=8