

COMP5112/MSBD5009 - Assignment 1

Package list

folder tree:

```
assignment1-package/
├── datasets
│   ├── input1.txt
│   └── input2.txt
├── main.cpp
├── MPI_Manual.pdf
├── mpi_push_relabel.h
├── mpi_push_relabel_skeleton.cpp
├── README.pdf
├── serial
│   ├── main.cpp
│   ├── push_relabel.h
│   └── serial_push_relabel.cpp
```

2 directories, 10 files

- assignment1.pdf: assignment1 description
- datasets: sample input files
- main.cpp: utility functions and the main function
- MPI_Manual.pdf: MPI environment setup tutorial
- mpi_push_relabel.h: header file of assignment
- mpi_push_relabel_skeleton.cpp: code skeleton, you need to fill up the function body
- README.pdf: the readme file
- serial: a serial implementation of the push-relabel algorithm (for your reference)

Please only modify ***mpi_push_relabel_skeleton.cpp*** file

Please only submit ***mpi_push_relabel_skeleton.cpp*** file to the Canvas

Check your MPI environment

Use command `which mpicc` to check your environment.

If you cannot find `mpicc` command, please add the MPI installation path to your shell environment:

- add `setenv PATH "${PATH}:/usr/local/software/openmpi/bin"` to the end of your `~/.cshrc_user` file.
- re-login (logout and login) to active your new environment
- run `which mpicc` to check your environment again

Compile and run:

serial_push_relabel

Compile:

```
$ cd serial
$ g++ -std=c++11 main.cpp serial_push_relabel.cpp -o serial_push_relabel
```

Run:

```
$ ./serial_push_relabel <input file>
```

e.g. `./serial_push_relabel input1.txt`

You can find the output on the screen.

mpi_push_relabel

Please read the ***MPI_Manual.pdf*** to find how to setup MPI environment

Compile:

```
$ mpic++ -std=c++11 main.cpp mpi_push_relabel_skeleton.cpp -o mpi_push_relabel
```

Run on a single node:

```
$ mpiexec -n <number of processes> ./mpi_push_relabel <input file>
```

Run on multiple nodes:

```
$ mpiexec --hostfile hostfile -n <number of processes> ./mpi_push_relabel <input file>
```

You can find the output on the screen.

Here is an example output of a correct execution:

```
N: 500, src: 0, sink: 499  
Elapsed Time: 3.231312259 s  
max flow:262966489813
```