

Parallel Programming HW1 Write Up

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1 Description

For this assignment we needed to write a program using MPI, where each process sends its rank number to rank+1*size and prints out both its own rank as well as the data it received, and then execute it and show the output.

2 Implementation

The implementation of this program is simple as it was shown in class. First we initialize the variables rank, size and data. Then we call `MPI_Init()` using the addresses of the `argc` and `argv` variables of the main function. Next we call `MPI_Comm_rank()` with the address of rank and `MPI_Comm_size()` using the address of size. Then we use `MPI_Send()` to send the rank number to the process and use `MPI_Recv()` To have the process receive the sent data. Then we finally have a `cout` statement that prints out the current process's rank and the data that it received.

3 Specs

My system is a AMD Ryzen 5800x processor running Windows 10.

4 Installation

To install OpenMPI I had to first install Ubuntu and run it with WSL. Then I ran the command **`sudo apt install openmpi-bin`** to install OpenMPI and **`sudo apt-get install g++`** to install the linux c++ compiler.

5 Compile and Run

To compile my code I moved into the directory containing `HW1.cpp` and ran the command **`mpic++ HW1.cpp`**. Then to run the code I used the command **`mpirun -n 4 a.out`** to run the code with 4 processes.

6 Output

The output of my code is shown below.

```
afrobudha@DESKTOP-2EELANU: /mnt/c/Users/Sankokura/Documents/School/Parallel Program/HW1
afrobudha@DESKTOP-2EELANU:~$ cd /mnt/c/Users/Sankokura/
afrobudha@DESKTOP-2EELANU:/mnt/c/Users/Sankokura$ cd Documents/School/Parallel\ Program/Day\ 1\ MPI\ Intro/
afrobudha@DESKTOP-2EELANU:/mnt/c/Users/Sankokura/Documents/School/Parallel Program/Day 1 MPI Intro$ cd ../../
afrobudha@DESKTOP-2EELANU:/mnt/c/Users/Sankokura/Documents/School$ cd Parallel\ Program/HW1/
afrobudha@DESKTOP-2EELANU:/mnt/c/Users/Sankokura/Documents/School/Parallel Program/HW1$ mpic++ HW1.cpp
afrobudha@DESKTOP-2EELANU:/mnt/c/Users/Sankokura/Documents/School/Parallel Program/HW1$ mpirun -n 4 a.out
-----
WARNING: Linux kernel CMA support was requested via the
btl_vader_single_copy_mechanism MCA variable, but CMA support is
not available due to restrictive ptrace settings.

The vader shared memory BTL will fall back on another single-copy
mechanism if one is available. This may result in lower performance.

Local host: DESKTOP-2EELANU
-----
I am 1 of 4; got a message from 0
I am 2 of 4; got a message from 1
I am 3 of 4; got a message from 2
I am 0 of 4; got a message from 3
[DESKTOP-2EELANU:00139] 3 more processes have sent help message help-btl-vader.txt / cma-permission-denied
[DESKTOP-2EELANU:00139] Set MCA parameter "orte_base_help_aggregate" to 0 to see all help / error messages
afrobudha@DESKTOP-2EELANU:/mnt/c/Users/Sankokura/Documents/School/Parallel Program/HW1$
```