

REPORT
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ASSIGNMENT 9.

Task

Write an MPI program in which the global vector addition operation is modeled by a doubling (cascade) scheme using point-to-point data transfers. Compare the execution time of such a simulation using the MPI_Reduce procedure on as many processes as possible. Each process stores an array of 1,000,000 elements equal to '1'.

Implementation

Source code and data gathered are available on <https://github.com/DmitryPogrebnoy/Parallel-algorithms-of-data-analysis-and-synthesis/blob/master/OmpiTasks/Task9/Task9.cpp>

The description of the code is described in the comments.

Output example:



```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

Result of sum is 1048576
Elapsed time of cascade model is 0.00889278

Reduce sum of array is 1048576
Elapsed time is 0.00284754
[1] + Done          "/usr/bin/gdb" --interpreter=mi --tty=${DbgTerm} 0<"/tmp/Microsoft-M
p/Microsoft-MIEngine-Out-3zxwzet4.byb"
Dmitry.Pogrebnoy@UNIT-1700:~/Desktop/Parallel-algorithms-of-data-analysis-and-synthesis/OmpiTasks$
```

ASSIGNMENTS 10.

Task

Complete the program Assignment10.c. Compile and run it. Study the code carefully and explain how it works.

Implementation

Source code and data gathered are available on <https://github.com/DmitryPogrebnoy/Parallel-algorithms-of-data-analysis-and-synthesis/blob/master/OmpiTasks/Task10/Assignment10.cpp>

The description of the code is described in the comments.

Output example:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

Rank 3. Message from prev process is 2. Message from next process is 0
Rank 0. Message from prev process is 3. Message from next process is 1
Rank 1. Message from prev process is 0. Message from next process is 2
Rank 2. Message from prev process is 1. Message from next process is 3
[1] + Done      "/usr/bin/gdb" --interpreter=mi --tty=${DbgTerm} 0<"/tmp/Microsoft-M
p/Microsoft-MIEngine-Out-tw2gvlnp.g0h"
Dmitry.Pogrebnoy@UNIT-1700:~/Desktop/Parallel-algorithms-of-data-analysis-and-synthesis/OmpiTasks$
```

ASSIGNMENT 11.

Task

Based on Assignment 10, write a program for ring topology exchange using the MPI_Sendrecv() function.

Implementation

Source code and data gathered are available on
<https://github.com/DmitryPogrebnoy/Parallel-algorithms-of-data-analysis-and-synthesis/blob/master/OmpiTasks/Task11/Task11.cpp>.

The description of the code is described in the comments.

Output example:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

Rank 0. Message from prev process is 3. Message from next process is 1
Rank 1. Message from prev process is 0. Message from next process is 2
Rank 2. Message from prev process is 1. Message from next process is 3
Rank 3. Message from prev process is 2. Message from next process is 0
[1] + Done      "/usr/bin/gdb" --interpreter=mi --tty=${DbgTerm} 0<"/tmp/Microsoft-M
p/Microsoft-MIEngine-Out-jm3dzk4d.ohq"
Dmitry.Pogrebnoy@UNIT-1700:~/Desktop/Parallel-algorithms-of-data-analysis-and-synthesis/OmpiTasks$
```