

محمد بسيوني رمضان داود D4

The image shows a Visual Studio Code editor with a C++ file named `HPC.cpp` and a terminal window displaying the output of the program.

Code in `HPC.cpp`:

```
1 // محمد بسيوني رمضان داود D4
2
3 #include <iostream>
4 #include "mpi.h"
5
6 using namespace std;
7
8 int main() {
9     int rank, size, data = 1;
10
11     // Initialize the MPI environment
12     MPI_Init(NULL, NULL);
13
14     // Get the rank of the process
15     MPI_Comm_rank(MPI_COMM_WORLD, &rank);
16
17     // Get the number of processes
18     MPI_Comm_size(MPI_COMM_WORLD, &size);
19
20     // Define the next and previous ranks in a circular manner
21     int next = (rank + 1) % size;
22     int prev = (rank - 1 + size) % size;
23
24     // Send data to the next process and receive data from the previous process
25     MPI_Send(&data, 1, MPI_INT, next, 0, MPI_COMM_WORLD);
26     MPI_Recv(&data, 1, MPI_INT, prev, 0, MPI_COMM_WORLD, MPI_STATUS_IGNORE);
27
28     // Output the received data
29     printf("Rank %d received data %d from Rank %d\n", rank, data, prev);
30
31     // Finalize the MPI environment
32     MPI_Finalize();
33
34     return 0;
35 }
```

Terminal Output:

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.22631.4317]
(c) Microsoft Corporation. All rights reserved.

E:\C# Learn\HPC\Debug>mpiexec -n 4 HPC.exe
Rank 1 received data 1 from Rank 0
Rank 2 received data 1 from Rank 1
Rank 0 received data 1 from Rank 3
Rank 3 received data 1 from Rank 2

E:\C# Learn\HPC\Debug>
```

<https://github.com/Mohamed-Dawood/HPC-Project>