 **Download MPJ Express**

* Go to: <http://mpj-express.org/>
* Click **Downloads** > download latest version (e.g., mpj-v0.44.zip)

 **Extract the zip file**

* Put it somewhere, e.g., C:\mpj-v0.44\

 **Set Environment Variables**

* Open Environment Variables (Edit the system environment variables)
* Add to PATH:

makefile

CopyEdit

C:\mpj-v0.44\bin

* Create a new variable:

ini

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MPJ\_HOME = C:\mpj-v0.44

import mpi.\*; // import MPI library

import java.util.Random;

public class DistributedAverage {

public static void main(String[] args) throws Exception {

MPI.Init(args);

int rank = MPI.COMM\_WORLD.Rank(); // Process ID

int size = MPI.COMM\_WORLD.Size(); // Total number of processes

int totalNumbers = 12; // Total random numbers to generate

int[] numbers = null; // The array for process 0

int numbersPerProcess = totalNumbers / size;

int[] localNumbers = new int[numbersPerProcess];

if (rank == 0) {

// Only root process generates random numbers

numbers = new int[totalNumbers];

Random rand = new Random();

for (int i = 0; i < totalNumbers; i++) {

numbers[i] = rand.nextInt(100); // random number between 0-99

}

System.out.println("Generated numbers:");

for (int num : numbers) {

System.out.print(num + " ");

}

System.out.println();

}

// Scatter the numbers to all processes

MPI.COMM\_WORLD.Scatter(numbers, 0, numbersPerProcess, MPI.INT, localNumbers, 0, numbersPerProcess, MPI.INT);

// Each process calculates local average

int localSum = 0;

for (int num : localNumbers) {

localSum += num;

}

double localAverage = (double) localSum / numbersPerProcess;

// Gather all local averages at root

double[] localAvgArray = new double[1];

localAvgArray[0] = localAverage;

double[] gatheredAverages = null;

if (rank == 0) {

gatheredAverages = new double[size];

}

MPI.COMM\_WORLD.Gather(localAvgArray, 0, 1, MPI.DOUBLE, gatheredAverages, 0, 1, MPI.DOUBLE);

// Root process calculates final average

if (rank == 0) {

double finalSum = 0;

for (double avg : gatheredAverages) {

finalSum += avg;

}

double finalAverage = finalSum / size;

System.out.println("Final Average: " + finalAverage);

}

MPI.Finalize();

}

}

Powershell

Compile:

javac -cp ".;$env:MPJ\_HOME\lib\mpj.jar" DistributedAverage.java

Run:

mpjrun.bat -np 4 DistributedAverage