Universidad Del Valle de Guatemala
Computación Paralela
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Laboratorio MPI

a. Preguntas

i. Check_for_error()

Esta función tiene como objetivo detectar errores del programa, devolviendo 0 si hay error y 1 si no lo hay. Hace uso de ReduceAll y evalúa todos los resultados haciendo un MIM. En el caso que este sea 0 significa que existen errores dentro de los resultados arrojados.

ii. Read_n()

Esta función define que el proceso 0 recibirá todos los inputs requeridos y realizará un MPI_Bcast para la repartición de ellos. Hace uso de la función anterior para validar que el número de partición de datos sea válido.

iii. Read_data()

Esta función recibe el vector donde se encuentra la data. Hace uso de la primera función mencionada para verificar que el vector se pueda almacenar en memoria.

iv. Print_vector()

Esta función imprime el vector donde se encuentra la data. Hace uso de la primera función mencionada para verificar que el vector se pueda leer de la memoria e imprimirla.

c.

secuencial 1

```
mario@DESKTOP-BL3KA26:/mnt/c/wsl/lab3$ ./vector_add
What's the order of the vectors?
100000
Generating vector x
Generating vector y
x ->
41.000000 12.000000 12.000000 38.000000 22.000000 51.000000 27.000000 93.000000 3.000000 75.000000
y ->
38.000000 57.000000 87.000000 26.000000 62.000000 30.000000 45.000000 41.000000 16.000000 6.000000
The sum is
79.000000 69.000000 99.000000 64.000000 84.000000 81.000000 72.000000 134.000000 19.000000 81.000000
Vector sum took 0.000384 seconds
```

secuencial 2

```
mario@DESKTOP-BL3KA26:/mnt/c/wsl/lab3$ ./vector_add
What's the order of the vectors?
100000
Generating vector x
Generating vector y
x ->
41.000000 12.000000 12.000000 38.000000 22.000000 51.000000 27.000000 93.000000 3.000000 75.000000
y ->
38.000000 57.000000 87.000000 26.000000 62.000000 30.000000 45.000000 41.000000 16.000000 6.000000
The sum is
79.000000 69.000000 99.000000 64.000000 84.000000 81.000000 72.000000 134.000000 19.000000 81.000000
Vector sum took 0.000383 seconds
```

secuencial 3

```
mario@DESKTOP-BL3KA26:/mnt/c/wsl/lab3$ ./vector_add
What's the order of the vectors?
100000
Generating vector x
Generating vector y
x ->
41.000000 12.000000 12.000000 38.000000 22.000000 51.000000 27.000000 93.000000 3.000000 75.000000
y ->
38.000000 57.000000 87.000000 26.000000 62.000000 30.000000 45.000000 41.000000 16.000000 6.000000
The sum is
79.000000 69.000000 99.000000 64.000000 84.000000 81.000000 72.000000 134.000000 19.000000 81.000000
Vector sum took 0.000369 seconds
```

secuencial 4

```
mario@DESKTOP-BL3KA26:/mnt/c/wsl/lab3$ ./vector_add
What's the order of the vectors?
100000
Generating vector x
Generating vector y
x ->
41.000000 12.000000 12.000000 38.000000 22.000000 51.000000 27.000000 93.000000 3.000000 75.000000
y ->
38.000000 57.000000 87.000000 26.000000 62.000000 30.000000 45.000000 41.000000 16.000000 6.000000
The sum is
79.000000 69.000000 99.000000 64.000000 84.000000 81.000000 72.000000 134.000000 19.000000 81.000000
Vector sum took 0.000402 seconds
```

secuencial 5

```
mario@DESKTOP-BL3KA26:/mnt/c/wsl/lab3$ ./vector_add
What's the order of the vectors?
100000
Generating vector x
Generating vector y
x ->
41.000000 12.000000 12.000000 38.000000 22.000000 51.000000 27.000000 93.000000 3.000000 75.000000
y ->
38.000000 57.000000 87.000000 26.000000 62.000000 30.000000 45.000000 41.000000 16.000000 6.000000
The sum is
79.000000 69.000000 99.000000 64.000000 84.000000 81.000000 72.000000 134.000000 19.000000 81.000000
Vector sum took 0.000372 seconds
```

paralelo 1

```
mario@DESKTOP-BL3KA26:/mnt/c/wsl/lab3$ mpiexec -n 5  ./mpi_vector_add
What's the order of the vectors?
100000
Generating vector x
x is
41.000000 12.000000 12.000000 38.000000 22.000000 51.000000 27.000000 93.000000 3.000000 75.000000
Generating vector y
y is
38.000000 57.000000 87.000000 26.000000 62.000000 30.000000 45.000000 41.000000 16.000000 6.000000
Parallel vector sum took 0.000094 seconds
Parallel vector sum took 0.000071 seconds
Parallel vector sum took 0.000074 seconds
Parallel vector sum took 0.000094 seconds
The sum is
79.000000 69.000000 99.000000 64.000000 84.000000 81.000000 72.000000 134.000000 19.000000 81.000000
Parallel vector sum took 0.000074 seconds
```

paralelo 2

```
mario@DESKTOP-BL3KA26:/mnt/c/wsl/lab3$ mpiexec -n 5  ./mpi_vector_add
What's the order of the vectors?
100000
Generating vector x
x is
41.000000 12.000000 12.000000 38.000000 22.000000 51.000000 27.000000 93.000000 3.000000 75.000000
Generating vector y
y is
38.000000 57.000000 87.000000 26.000000 62.000000 30.000000 45.000000 41.000000 16.000000 6.000000
Parallel vector sum took 0.000072 seconds
Parallel vector sum took 0.000072 seconds
Parallel vector sum took 0.000074 seconds
Parallel vector sum took 0.000071 seconds
The sum is
79.000000 69.000000 99.000000 64.000000 84.000000 81.000000 72.000000 134.000000 19.000000 81.000000
Parallel vector sum took 0.000076 seconds
```

paralelo 3

```
mario@DESKTOP-BL3KA26:/mnt/c/wsl/lab3$ mpiexec -n 5  ./mpi_vector_add
What's the order of the vectors?
100000
Generating vector x
x is
41.000000 12.000000 12.000000 38.000000 22.000000 51.000000 27.000000 93.000000 3.000000 75.000000
Generating vector y
y is
38.000000 57.000000 87.000000 26.000000 62.000000 30.000000 45.000000 41.000000 16.000000 6.000000
Parallel vector sum took 0.000098 seconds
Parallel vector sum took 0.000099 seconds
Parallel vector sum took 0.000072 seconds
Parallel vector sum took 0.000072 seconds
The sum is
79.000000 69.000000 99.000000 64.000000 84.000000 81.000000 72.000000 134.000000 19.000000 81.000000
Parallel vector sum took 0.000094 seconds
```

paralelo 4

```
mario@DESKTOP-BL3KA26:/mnt/c/wsl/lab3$ mpiexec -n 5  ./mpi_vector_add
What's the order of the vectors?
100000
Generating vector x
x is
41.000000 12.000000 12.000000 38.000000 22.000000 51.000000 27.000000 93.000000 3.000000 75.000000
Generating vector y
y is
38.000000 57.000000 87.000000 26.000000 62.000000 30.000000 45.000000 41.000000 16.000000 6.000000
Parallel vector sum took 0.000072 seconds
Parallel vector sum took 0.000072 seconds
Parallel vector sum took 0.000071 seconds
Parallel vector sum took 0.000078 seconds
The sum is
79.000000 69.000000 99.000000 64.000000 84.000000 81.000000 72.000000 134.000000 19.000000 81.000000
Parallel vector sum took 0.000072 seconds
```

paralelo 5

```
mario@DESKTOP-BL3KA26:/mnt/c/wsl/lab3$ mpiexec -n 5  ./mpi_vector_add
What's the order of the vectors?
100000
Generating vector x
x is
41.000000 12.000000 12.000000 38.000000 22.000000 51.000000 27.000000 93.000000 3.000000 75.000000
Generating vector y
y is
38.000000 57.000000 87.000000 26.000000 62.000000 30.000000 45.000000 41.000000 16.000000 6.000000
Parallel vector sum took 0.000088 seconds
Parallel vector sum took 0.000088 seconds
Parallel vector sum took 0.000083 seconds
Parallel vector sum took 0.000078 seconds
The sum is
79.000000 69.000000 99.000000 64.000000 84.000000 81.000000 72.000000 134.000000 19.000000 81.000000
Parallel vector sum took 0.000077 seconds
```

Speedups

Corrida	Tiempo (s)
1	5.18
2	5.03
3	3.92
4	5.58
5	4.83