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////////////////////////////////////////////////////////////////////////////
//                                                                        //
//            FEDERAL UNIVERSITY OF RIO GRANDE DO NORTE - UFRN            //
//                   DIGITAL METROPOLIS INSTITUTE - IMD                   //
//               BACHELOR OF INFORMATION TECHNOLOGY - BTI                 //
//           SPECIAL TOPICS ON INTERNET OF THINGS "B" - IMD0291            //
//                                                                        //
////////////////////////////////////////////////////////////////////////////
//                                                                        //
// Names: matrix.h                                                        //
//        report.h                                                        //
//        report.pdf                                                      //
//        matrix-multiplication-serial.cpp                                //
//        matrix-multiplication-serialRand.cpp                            //
//        matrix-multiplication-parallel.cpp                              //
//        calculates-serie-parallel-analysis.cpp                          //
//        shellscript_start.sh                                            //
//        README.txt                                                      //
// Date: 16/11/2020                                                       //
// Version: 1.0                                                           //
//                                                                        //
// Author: P.R.O.Lima                                                     //
//                                                                        //
// Repository: https://github.com/r4m0nl1m4/calculates-matrix-multiplicati //
// on                                                                     //
//                                                                        //
// Software: GNU Compiler Collection (gcc) 9.3.0                          //
//                                                                        //
////////////////////////////////////////////////////////////////////////////
//                                                                        //
// Description: Calculates the multiplication of two square matrices,     //
// developed for use on serie and parallel processors with local          //
// interconnections. In each matrix all numbers must be the same and in   //
// the same location as the matrix.                                       //
//                                                                        //
////////////////////////////////////////////////////////////////////////////
//                                                                        //
// To execute:                                                            //
//     ~$ bash shellscript_start.sh                                       //
//                                                                        //
////////////////////////////////////////////////////////////////////////////
```

```
/*
 * CPU Report
 */

model name      : Intel(R) Core(TM) i7-4770K CPU @ 3.50GHz
vendor_id       : GenuineIntel
cpu cores       : 4
siblings        : 8
cache size      : 8192 KB
```

```
/*
 * Problem Size Report
 */

:3:3:3:3:3
:4:4:4:4:4
:3:3:3:3:3
:4:4:4:4:4
:3:3:3:3:3
:4:4:4:4:4
:3:3:3:3:3
:4:4:4:4:4
```

```
/*
 * Serie Runtime Report In Seconds
 */

:1.80e-05:3.50e-05:2.50e-05:1.60e-05:2.20e-05
:2.40e-05:1.60e-05:2.60e-05:1.60e-05:2.40e-05
:2.30e-05:4.10e-05:2.00e-05:1.60e-05:1.90e-05
:1.90e-05:1.50e-05:2.40e-05:1.90e-05:3.40e-05
:2.40e-05:2.00e-05:2.40e-05:1.30e-05:2.70e-05
:2.60e-05:2.90e-05:1.90e-05:1.80e-05:2.20e-05
:2.30e-05:1.10e-05:2.30e-05:1.50e-05:2.20e-05
:2.30e-05:2.90e-05:4.00e-05:2.40e-05:2.50e-05
```

```
/*
 * Line Rand Matrix Serie Runtime Report In Seconds
 */

:1.58e-04:1.39e-04:1.49e-04:1.08e-04:1.42e-04
:2.13e-04:1.42e-04:1.83e-04:1.04e-04:2.38e-04
:1.35e-04:9.70e-05:1.13e-04:8.40e-05:1.40e-04
:1.02e-04:1.61e-04:1.57e-04:1.80e-04:2.12e-04
:1.94e-04:1.38e-04:1.45e-04:9.10e-05:8.60e-05
:1.87e-04:2.08e-04:1.46e-04:1.02e-04:1.51e-04
:1.95e-04:8.10e-05:2.60e-04:7.80e-05:1.65e-04
:1.04e-04:1.72e-04:2.15e-04:2.40e-04:2.21e-04
```

```
/*
 * Parallel Cores Report
 */

:2:2:2:2:2
:2:2:2:2:2
:4:4:4:4:4
:4:4:4:4:4
:6:6:6:6:6
:6:6:6:6:6
:8:8:8:8:8
:8:8:8:8:8
```

```
/*
 * Parallel Runtime Report In Seconds
 */

:3.52e-05:3.14e-05:8.62e-05:6.38e-05:3.62e-05
:9.82e-05:6.13e-05:3.09e-05:1.44e-04:3.19e-05
:1.11e-04:8.23e-05:1.52e-04:9.45e-05:9.19e-05
:1.02e-04:2.02e-04:7.83e-05:7.04e-05:1.71e-04
:1.32e-04:1.61e-04:1.25e-04:1.18e-04:8.88e-05
:1.41e-04:1.89e-04:1.17e-04:1.61e-04:9.21e-05
:1.33e-04:1.34e-04:1.72e-04:2.21e-04:2.00e-04
:1.49e-04:1.46e-04:1.98e-04:1.25e-04:1.34e-04
```

```
/*
 * Speedup Report
 */

:4.49:4.43:1.73:1.69:3.92
:2.17:2.32:5.92:0.72:7.46
:1.22:1.18:0.74:0.89:1.52
:1.00:0.80:2.01:2.56:1.24
:1.47:0.86:1.16:0.77:0.97
:1.33:1.10:1.25:0.63:1.64
:1.47:0.60:1.51:0.35:0.82
:0.70:1.18:1.09:1.92:1.65
```

```
/*
 * Efficiency Report
 */

:2.25:2.21:0.86:0.84:1.96
:1.08:1.16:2.96:0.36:3.73
:0.30:0.29:0.18:0.22:0.38
:0.25:0.20:0.50:0.64:0.31
:0.24:0.14:0.19:0.13:0.16
:0.22:0.18:0.21:0.10:0.27
:0.18:0.07:0.19:0.04:0.10
:0.09:0.15:0.14:0.24:0.21
```