```
////////////////////////////////////////////////////////////////////////////
//                                                                        //
//            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
 */

:1.60e-05:3.20e-05:1.70e-05:2.40e-05:2.40e-05
:2.40e-05:2.50e-05:3.10e-05:3.10e-05:2.80e-05
:3.10e-05:1.30e-05:3.40e-05:2.20e-05:2.90e-05
:3.30e-05:2.30e-05:2.00e-05:2.00e-05:2.30e-05
:1.50e-05:1.80e-05:2.10e-05:2.20e-05:2.60e-05
:2.20e-05:2.70e-05:1.70e-05:2.50e-05:3.10e-05
:2.50e-05:1.60e-05:1.30e-05:1.60e-05:2.60e-05
:1.60e-05:2.00e-05:2.10e-05:1.80e-05:1.80e-05
```

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

:1.38e-04:1.94e-04:1.18e-04:2.20e-04:1.73e-04
:3.46e-04:2.07e-04:2.41e-04:1.14e-04:1.28e-04
:1.38e-04:9.40e-05:2.03e-04:1.74e-04:1.47e-04
:1.63e-04:2.06e-04:1.38e-04:1.52e-04:2.06e-04
:1.19e-04:1.53e-04:1.86e-04:1.79e-04:1.26e-04
:1.58e-04:1.83e-04:1.15e-04:1.76e-04:1.96e-04
:8.20e-05:1.03e-04:1.08e-04:1.34e-04:7.40e-05
:1.65e-04:1.43e-04:1.42e-04:1.38e-04:1.69e-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
 */

:2.87e-05:3.33e-05:4.19e-05:3.03e-05:6.10e-05
:3.04e-05:4.65e-05:2.58e-05:2.72e-05:3.27e-05
:8.80e-05:9.76e-05:9.11e-05:8.32e-05:8.48e-05
:1.04e-04:6.87e-05:1.94e-04:9.53e-05:9.40e-05
:1.09e-04:1.25e-04:8.38e-05:9.00e-05:1.51e-04
:2.06e-04:1.25e-04:1.08e-04:9.63e-05:8.43e-05
:1.48e-04:2.79e-04:2.03e-04:1.81e-04:2.36e-04
:1.07e-04:1.97e-04:1.39e-04:2.07e-04:1.31e-04
```

```
/*
 * Speedup Report
 */

:4.81:5.83:2.82:7.26:2.84
:11.38:4.45:9.34:4.19:3.91
:1.57:0.96:2.23:2.09:1.73
:1.57:3.00:0.71:1.59:2.19
:1.09:1.22:2.22:1.99:0.83
:0.77:1.46:1.06:1.83:2.33
:0.55:0.37:0.53:0.74:0.31
:1.54:0.73:1.02:0.67:1.29
```

```
/*
 * Efficiency Report
 */

:2.40:2.92:1.41:3.63:1.42
:5.69:2.23:4.67:2.10:1.96
:0.39:0.24:0.56:0.52:0.43
:0.39:0.75:0.18:0.40:0.55
:0.18:0.20:0.37:0.33:0.14
:0.13:0.24:0.18:0.30:0.39
:0.07:0.05:0.07:0.09:0.04
:0.19:0.09:0.13:0.08:0.16
```