מחשוב מקבילי ומבוזר

תרגיל #2

The purpose of this exercise is to practice MPI and OpenMP integration

You are given a two-dimensional integer matrix A of size N × M.

Define B(K, i, j) as a K × K submatrix of A, where the element at the top-left corner of B is A[i][j]. The submatrix must lie entirely within the bounds of A.

Your task is to find the position (i, j) of the submatrix B(K, i, j) for which the product of all odd elements in the submatrix is maximized. *Note*: Instead of comparing product of numbers you may want to compare the sum of their logarithms (to avoid overflow).

Requirements:

- The matrix A of random integer values, N, M, K are initially known to Process 0. This process will display the result as well.
- Write an effective parallel program. Use exactly two processes and two computers with four cores each.
- Run, measure execution time, explain the results. The table with the time measurement is to be placed in the separate Word file named **results.doc** in the root directory of the solution.

Number of Computers	Computation time	Explanation
1		
2		

Grading Policy:

- **10 points** for code quality:
  a. The code must be divided into small functions (not more than 40 lines of code).
  b. Use meaningful names for variables, functions, files, constants.
  c. Place enough comments to understand the code
  d. No unused lines of code. Don't repeat the code – use functions!
  e. Write README.TXT file if special instructions are needed to run the solution. The file must be in the root folder of the solution.
- **70 points** – for proper implementation of the requirements.
- **20 points** – for final results explanation and for time measurement.

Important:

- The Homework has to be tested under Ubuntu OS in VLAB with compilation and run from Terminal.
- Perform time measurement on VLAB. Make a few runs and use an average value.
- The Homework must be delivered in time. No delay will be accepted. It may be performed in pairs. *Only one member of pair* submits the solution through the Moodle.
- The whole solution must be zipped and named as

111111111_222222222.zip

Where **111111111** is ID of the one student and **222222222** is ID of another student

בהצלחה!