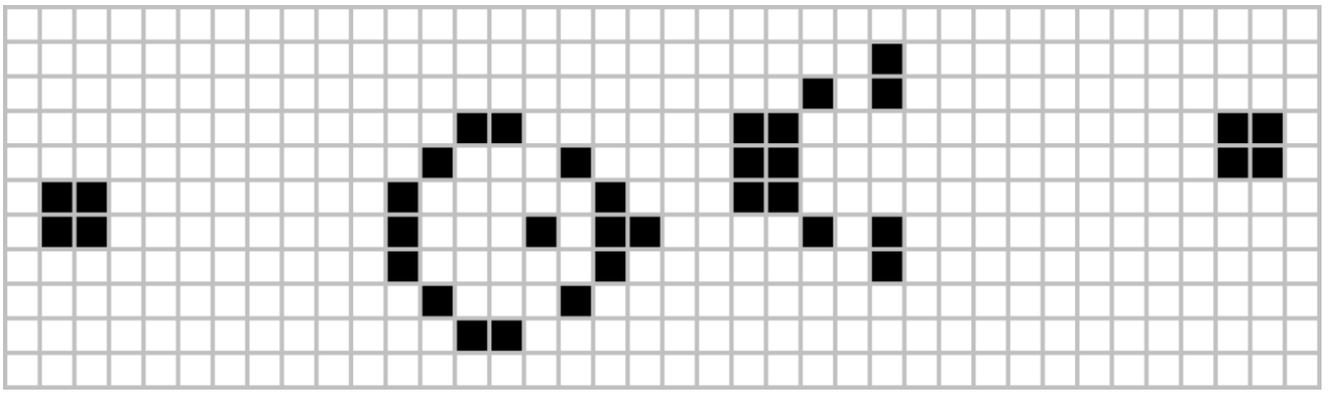
CENG 478 – Introduction to Parallel Computing
SPRING 2013-2014 Homework-4
Due to: 26.05.2014 23:55

GAME OF LIFE

In this assignment, you will implement a parallel algorithm that simulates the Conway's Game of Life

1. Construct a blank Matrix of 500 x 500

2. Fill some of the values that will construct a Gosper Glider Gun according to the following figure. (Note that the uppermost cell of the figure must fit to the uppermost value of the matrix)



3. The rules of game of life are simple:

a. Any filled cell with two or three neighbours does not change at the next step. Otherwise it turns into a blank cell

b. Any blank cell with exactly three filled neighbours turns into a filled cell at the next step.

c. For the cells near the borders or corners, think the outside neighbours of them as blank cells that can never be filled. (i.e. cell [-1,5])

3. Implement a parallel program simulating the game of life. Divide the matrix in 2D. Iterate the algorithm for 400, 800 and 1600 turns and print the number of filled cells and the total time consumed. The output should have the following format:

NumberOfFilledCells TotalTimeConsumed
NumberOfFilledCells TotalTimeConsumed
NumberOfFilledCells TotalTimeConsumed

4. Calculate the time consumed for 1,4,16 processes. Plot a *Time* vs. *Number of Processors* graph. Plot a *Speed Improvement* vs. *Number of Processors* graph. Comment on how the time and efficiency changes. What is the cause of this increase or decrease?

5. What would be the change if we would have a more complex initial sitiuation? Write your expectations.

- Upload a tar file on COW; consisting of your code (hw4.c) , your Makefile to compile your code, outputs of your codes for each execution of your program (i.e. 1.out, 4.out, 16.out) and your report in pdf format.