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Για την άσκηση χρησιμοποίησα τα 2 testfiles glid1-2.txt, καθώς και το παράδειγμα εισόδου της εκφώνησης. Το πρόγραμμα κάνει compile με την εντολή make all, και run με ./game_of_life input.txt generations output.txt

Ακολουθούν screenshots εκτέλεσης:

Σειριακό πρόγραμμα:

```
csd3219@kos:~/hy342/ask2$ ./game_of_life test.txt 100 output.txt
The program has been running for 0.000703 seconds, with generations=100, testfile=test.txt.

csd3219@kos:~/hy342/ask2$ ls -l
total 2008
-rw-r--r-- 1 csd3219 ugrads 5264 Mar 21 00:28 epidemicSimulator.c
-rwxr-xr-x 1 csd3219 ugrads 20752 Mar 29 17:05 game_of_life
-rw-r--r-- 1 csd3219 ugrads 3467 Mar 29 17:05 game_of_life.c
-rw-r--r-- 1 csd3219 ugrads 2002010 Mar 22 12:30 glid1.txt
-rw-r--r-- 1 csd3219 ugrads 167 Mar 28 21:51 Makefile
-rw-r--r-- 1 csd3219 ugrads 128 Mar 29 17:06 output.txt
-rw-r--r-- 1 csd3219 ugrads 132 Mar 22 23:25 test.txt
csd3219@kos:~/hy342/ask2$ nano output.txt
csd3219@kos:~/hy342/ask2$ ./game_of_life test.txt 1000 output.txt
The program has been running for 0.003847 seconds, with generations=1000, testfile=test.txt.

csd3219@kos:~/hy342/ask2$ nano output.txt
csd3219@kos:~/hy342/ask2$ ./game_of_life glid1.txt 100 output.txt
The program has been running for 4.792188 seconds, with generations=100, testfile=glid1.txt.

csd3219@kos:~/hy342/ask2$ ./game_of_life glid1.txt 1000 output.txt
The program has been running for 46.362900 seconds, with generations=1000, testfile=glid1.txt.
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```
csd3219@kos:~/hy342/ask2$ ./game_of_life /spare/csd3219/glid2.txt 100 output.txt
The program has been running for 481.086808 seconds, with generations=100, testfile=/spare/csd3219/glid2.txt.
```

```
csd3219@kos:~/hy342/ask2$ ./game_of_life test.txt 100 output.txt
The program has been running for 0.000709 seconds, with generations=100, testfile=test.txt.

csd3219@kos:~/hy342/ask2$ ./game_of_life test.txt 1000 output.txt
The program has been running for 0.004072 seconds, with generations=1000, testfile=test.txt.

csd3219@kos:~/hy342/ask2$ ./game_of_life glid1.txt 100 output.txt
The program has been running for 4.850152 seconds, with generations=100, testfile=glid1.txt.

csd3219@kos:~/hy342/ask2$ ./game_of_life glid1.txt 1000 output.txt
The program has been running for 47.742740 seconds, with generations=1000, testfile=glid1.txt.
```

Με 1 thread:

glid1.txt 100, 1000 generations.

```

csd3219@kos:~/hy342/ask2$ time ./game_of_life glid1.txt 100 output.txt
Game of life has been running for 5.251552 seconds, with generations=100, testfile=glid1.txt.

real    0m1.094s
user    0m5.222s
sys     0m0.032s
csd3219@kos:~/hy342/ask2$ time ./game_of_life glid1.txt 100 output.txt
Game of life has been running for 7.296750 seconds, with generations=100, testfile=glid1.txt.

real    0m1.417s
user    0m7.287s
sys     0m0.012s
csd3219@kos:~/hy342/ask2$ time ./game_of_life glid1.txt 100 output.txt
Game of life has been running for 7.632884 seconds, with generations=100, testfile=glid1.txt.

real    0m1.465s
user    0m7.623s
sys     0m0.012s
csd3219@kos:~/hy342/ask2$ time ./game_of_life glid1.txt 100 output.txt
Game of life has been running for 4.779893 seconds, with generations=100, testfile=glid1.txt.

real    0m0.987s
user    0m4.752s
sys     0m0.034s
csd3219@kos:~/hy342/ask2$ time ./game_of_life glid1.txt 100 output.txt
Game of life has been running for 8.923828 seconds, with generations=100, testfile=glid1.txt.

real    0m1.694s
user    0m8.891s
sys     0m0.038s

```

```

csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 1000 output.txt
Game of life has been running for 0.012493 seconds, with generations=1000, testfile=spare/csd3219/glid1.txt.

real    0m0.006s
user    0m0.015s
sys     0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 1000 output.txt
Game of life has been running for 0.020051 seconds, with generations=1000, testfile=spare/csd3219/glid1.txt.

real    0m0.008s
user    0m0.022s
sys     0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 1000 output.txt
Game of life has been running for 0.012395 seconds, with generations=1000, testfile=spare/csd3219/glid1.txt.

real    0m0.005s
user    0m0.000s
sys     0m0.014s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 1000 output.txt
Game of life has been running for 0.012267 seconds, with generations=1000, testfile=spare/csd3219/glid1.txt.

real    0m0.005s
user    0m0.011s
sys     0m0.003s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 1000 output.txt
Game of life has been running for 0.012192 seconds, with generations=1000, testfile=spare/csd3219/glid1.txt.

real    0m0.006s
user    0m0.014s
sys     0m0.000s

```

glid2.txt 100, 1000 generations.

```

csd3219@kos:~/hy342/ask2$ make
gcc -g -fopenmp game_of_life.c -o game_of_life
export OMP_NUM_THREADS=1
#gcc -g game_of_life.c -o game_of_life #for serial execution
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 100 output.txt
Game of life has been running for 0.027599 seconds, with generations=100, testfile=spare/csd3219/glid2.txt.

real    0m0.015s
user    0m0.027s
sys     0m0.003s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 100 output.txt
Game of life has been running for 0.010849 seconds, with generations=100, testfile=spare/csd3219/glid2.txt.

real    0m0.005s
user    0m0.013s
sys     0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 100 output.txt
Game of life has been running for 0.012362 seconds, with generations=100, testfile=spare/csd3219/glid2.txt.

real    0m0.006s
user    0m0.003s
sys     0m0.013s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 100 output.txt
Game of life has been running for 0.011551 seconds, with generations=100, testfile=spare/csd3219/glid2.txt.

real    0m0.005s
user    0m0.014s
sys     0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 100 output.txt
Game of life has been running for 0.010955 seconds, with generations=100, testfile=spare/csd3219/glid2.txt.

real    0m0.005s
user    0m0.007s
sys     0m0.007s

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csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 1000 output.txt
Game of life has been running for 0.013318 seconds, with generations=1000, testfile=spare/csd3219/glid2.txt.

real    0m0.006s
user    0m0.008s
sys     0m0.008s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 1000 output.txt
Game of life has been running for 0.014569 seconds, with generations=1000, testfile=spare/csd3219/glid2.txt.

real    0m0.006s
user    0m0.000s
sys     0m0.016s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 1000 output.txt
Game of life has been running for 0.034869 seconds, with generations=1000, testfile=spare/csd3219/glid2.txt.

real    0m0.012s
user    0m0.032s
sys     0m0.008s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 1000 output.txt
Game of life has been running for 0.014378 seconds, with generations=1000, testfile=spare/csd3219/glid2.txt.

real    0m0.006s
user    0m0.016s
sys     0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 1000 output.txt
Game of life has been running for 0.012171 seconds, with generations=1000, testfile=spare/csd3219/glid2.txt.

real    0m0.005s
user    0m0.007s
sys     0m0.007s

```

Me 2 threads:

glid1.txt 100, 1000 generations.

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csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 100 output.txt
Game of life has been running for 0.010716 seconds, with generations=100, testfile=spare/csd3219/glid1.txt.

real    0m0.012s
user    0m0.010s
sys      0m0.003s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 100 output.txt
Game of life has been running for 0.011584 seconds, with generations=100, testfile=spare/csd3219/glid1.txt.

real    0m0.005s
user    0m0.007s
sys      0m0.007s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 100 output.txt
Game of life has been running for 0.011130 seconds, with generations=100, testfile=spare/csd3219/glid1.txt.

real    0m0.005s
user    0m0.013s
sys      0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 100 output.txt
Game of life has been running for 0.011321 seconds, with generations=100, testfile=spare/csd3219/glid1.txt.

real    0m0.005s
user    0m0.013s
sys      0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 100 output.txt
Game of life has been running for 0.011456 seconds, with generations=100, testfile=spare/csd3219/glid1.txt.

real    0m0.005s
user    0m0.000s
sys      0m0.014s

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```

csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 1000 output.txt
Game of life has been running for 0.013494 seconds, with generations=1000, testfile=spare/csd3219/glid1.txt.

real    0m0.006s
user    0m0.015s
sys      0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 1000 output.txt
Game of life has been running for 0.014324 seconds, with generations=1000, testfile=spare/csd3219/glid1.txt.

real    0m0.006s
user    0m0.013s
sys      0m0.003s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 1000 output.txt
Game of life has been running for 0.012053 seconds, with generations=1000, testfile=spare/csd3219/glid1.txt.

real    0m0.006s
user    0m0.014s
sys      0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 1000 output.txt
Game of life has been running for 0.012740 seconds, with generations=1000, testfile=spare/csd3219/glid1.txt.

real    0m0.007s
user    0m0.015s
sys      0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 1000 output.txt
Game of life has been running for 0.013451 seconds, with generations=1000, testfile=spare/csd3219/glid1.txt.

real    0m0.006s
user    0m0.016s
sys      0m0.000s

```

glid2.txt 100, 1000 generations.

```

csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 100 output.txt
Game of life has been running for 0.023775 seconds, with generations=100, testfile=spare/csd3219/glid2.txt.

real    0m0.017s
user    0m0.023s
sys     0m0.003s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 100 output.txt
Game of life has been running for 0.010890 seconds, with generations=100, testfile=spare/csd3219/glid2.txt.

real    0m0.005s
user    0m0.006s
sys     0m0.007s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 100 output.txt
Game of life has been running for 0.018418 seconds, with generations=100, testfile=spare/csd3219/glid2.txt.

real    0m0.010s
user    0m0.020s
sys     0m0.001s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 100 output.txt
Game of life has been running for 0.010680 seconds, with generations=100, testfile=spare/csd3219/glid2.txt.

real    0m0.005s
user    0m0.000s
sys     0m0.013s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 100 output.txt
Game of life has been running for 0.010911 seconds, with generations=100, testfile=spare/csd3219/glid2.txt.

real    0m0.005s
user    0m0.012s
sys     0m0.000s

```

```

csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 1000 output.txt
Game of life has been running for 0.012262 seconds, with generations=1000, testfile=spare/csd3219/glid2.txt.

real    0m0.007s
user    0m0.000s
sys     0m0.015s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 1000 output.txt
Game of life has been running for 0.011882 seconds, with generations=1000, testfile=spare/csd3219/glid2.txt.

real    0m0.006s
user    0m0.014s
sys     0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 1000 output.txt
Game of life has been running for 0.011775 seconds, with generations=1000, testfile=spare/csd3219/glid2.txt.

real    0m0.005s
user    0m0.002s
sys     0m0.011s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 1000 output.txt
Game of life has been running for 0.022652 seconds, with generations=1000, testfile=spare/csd3219/glid2.txt.

real    0m0.008s
user    0m0.016s
sys     0m0.008s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 1000 output.txt
Game of life has been running for 0.013270 seconds, with generations=1000, testfile=spare/csd3219/glid2.txt.

real    0m0.008s
user    0m0.015s
sys     0m0.000s

```

Me 4 threads:

glid1.txt 100, 1000 generations.

```

csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 100 output.txt
Game of life has been running for 0.010790 seconds, with generations=100, testfile=spare/csd3219/glid1.txt.

real    0m0.013s
user    0m0.011s
sys     0m0.003s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 100 output.txt
Game of life has been running for 0.010816 seconds, with generations=100, testfile=spare/csd3219/glid1.txt.

real    0m0.005s
user    0m0.000s
sys     0m0.012s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 100 output.txt
Game of life has been running for 0.024724 seconds, with generations=100, testfile=spare/csd3219/glid1.txt.

real    0m0.008s
user    0m0.027s
sys     0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 100 output.txt
Game of life has been running for 0.010941 seconds, with generations=100, testfile=spare/csd3219/glid1.txt.

real    0m0.005s
user    0m0.013s
sys     0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 100 output.txt
Game of life has been running for 0.026523 seconds, with generations=100, testfile=spare/csd3219/glid1.txt.

real    0m0.011s
user    0m0.000s
sys     0m0.029s

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```

csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 1000 output.txt
Game of life has been running for 0.012402 seconds, with generations=1000, testfile=spare/csd3219/glid1.txt.

real    0m0.006s
user    0m0.005s
sys     0m0.010s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 1000 output.txt
Game of life has been running for 0.012337 seconds, with generations=1000, testfile=spare/csd3219/glid1.txt.

real    0m0.006s
user    0m0.014s
sys     0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 1000 output.txt
Game of life has been running for 0.012447 seconds, with generations=1000, testfile=spare/csd3219/glid1.txt.

real    0m0.006s
user    0m0.014s
sys     0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 1000 output.txt
Game of life has been running for 0.012453 seconds, with generations=1000, testfile=spare/csd3219/glid1.txt.

real    0m0.006s
user    0m0.014s
sys     0m0.001s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid1.txt 1000 output.txt
Game of life has been running for 0.012569 seconds, with generations=1000, testfile=spare/csd3219/glid1.txt.

real    0m0.006s
user    0m0.014s
sys     0m0.001s

```

glid2.txt 100, 1000 generations.

```

csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 100 output.txt
Game of life has been running for 0.010764 seconds, with generations=100, testfile=spare/csd3219/glid2.txt.

real    0m0.012s
user    0m0.013s
sys      0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 100 output.txt
Game of life has been running for 0.010790 seconds, with generations=100, testfile=spare/csd3219/glid2.txt.

real    0m0.005s
user    0m0.013s
sys      0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 100 output.txt
Game of life has been running for 0.011077 seconds, with generations=100, testfile=spare/csd3219/glid2.txt.

real    0m0.005s
user    0m0.013s
sys      0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 100 output.txt
Game of life has been running for 0.010918 seconds, with generations=100, testfile=spare/csd3219/glid2.txt.

real    0m0.005s
user    0m0.013s
sys      0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 100 output.txt
Game of life has been running for 0.020236 seconds, with generations=100, testfile=spare/csd3219/glid2.txt.

real    0m0.008s
user    0m0.017s
sys      0m0.006s

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csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 1000 output.txt
Game of life has been running for 0.012254 seconds, with generations=1000, testfile=spare/csd3219/glid2.txt.

real    0m0.006s
user    0m0.002s
sys      0m0.013s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 1000 output.txt
Game of life has been running for 0.017658 seconds, with generations=1000, testfile=spare/csd3219/glid2.txt.

real    0m0.010s
user    0m0.020s
sys      0m0.000s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 1000 output.txt
Game of life has been running for 0.024305 seconds, with generations=1000, testfile=spare/csd3219/glid2.txt.

real    0m0.010s
user    0m0.027s
sys      0m0.001s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 1000 output.txt
Game of life has been running for 0.011885 seconds, with generations=1000, testfile=spare/csd3219/glid2.txt.

real    0m0.006s
user    0m0.008s
sys      0m0.006s
csd3219@kos:~/hy342/ask2$ time ./game_of_life spare/csd3219/glid2.txt 1000 output.txt
Game of life has been running for 0.011792 seconds, with generations=1000, testfile=spare/csd3219/glid2.txt.

real    0m0.009s
user    0m0.011s
sys      0m0.003s

```