

## Parameter Initialization

Here as you can see I did not change default parameters that were given to me in Homework file.

I implemented the algorithm provided in our lecture slides **Lecture13\_GeneticAlgorithms**.

Of course achieving image with 0.95 **rate of fitness**, in 9999 **Maximum populations** took me huge

amount of time. I could get results very quickly by manipulating these parameters but since I had nothing else to do, I did not change them and waited for program to do it's job. Also I wanted to get good results so decreasing those parameters will not lead perfect result.

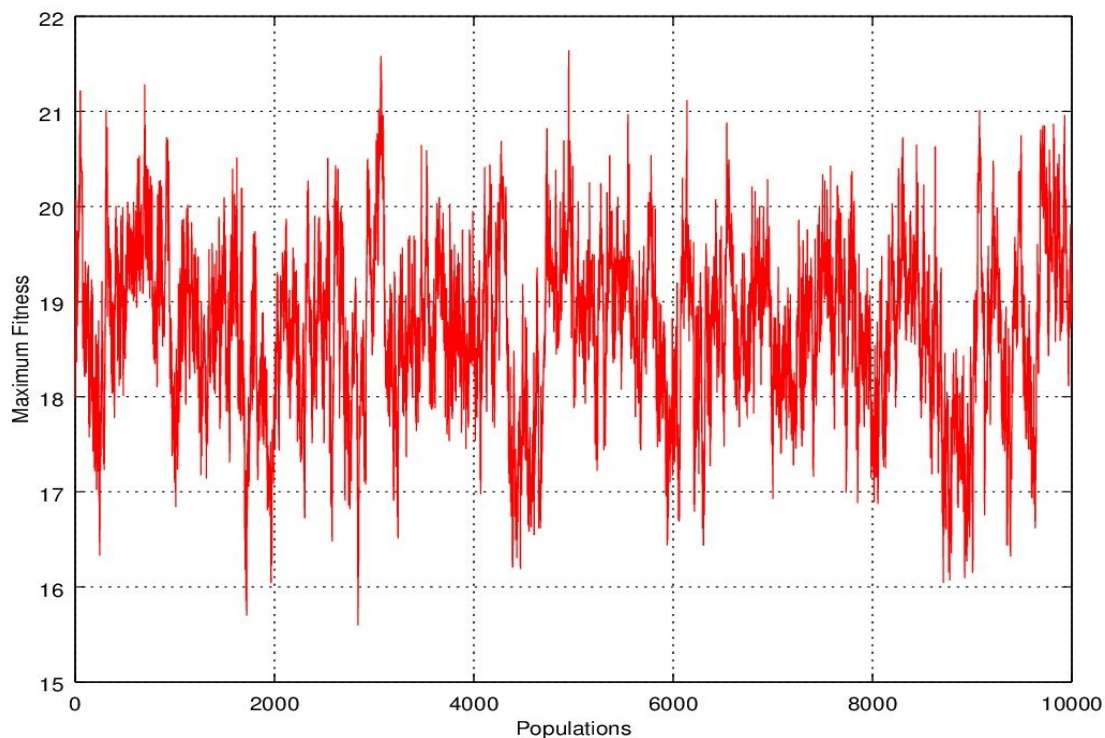
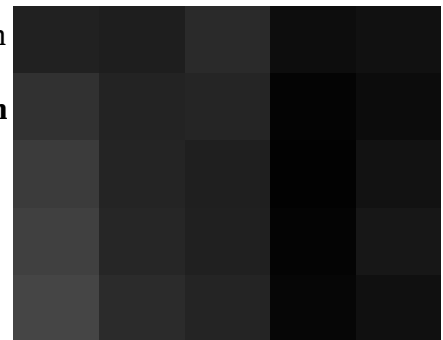
```
13 global h = 8 ; % Image height
14 global w = 8 ; % Image width
15 global p = 10 ; % Population size
16 global r = 0.90 ; % Mutation probability
17 global t = 0.95 ; % Acceptable rate of fitness
18 global f = 9999 ; % Maximum populations
19
```

I conducted 5 experiments which are 5x5 size, 8x8 size, 10x10 size, 15x15 size, 20x20 size. And their results are provided below.

### Experiment with 5x5 size.

Here as you can see image with 5x5 pixels, each pixel's value can be perfectly seen. It took 13 minut for program to finish it.

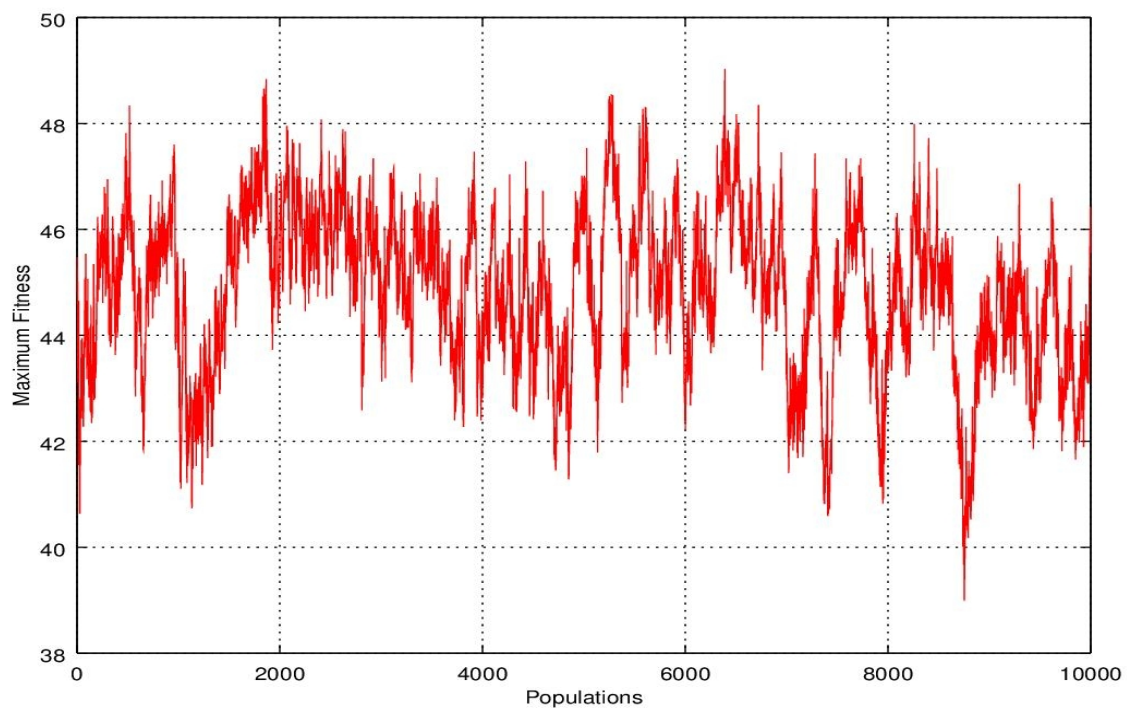
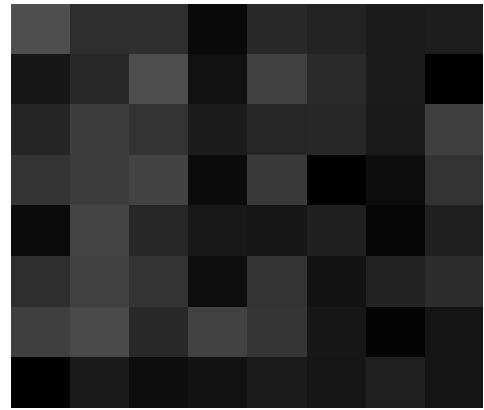
Below graph for **Maximum Fitness** obtained in **each population** is provided. As you can see Population ranges from 0 to 10000 and my maximum fitness is 25 which is equal to  $5 \times 5$ . But as you can see algorithm **could not** achieve it. So I had to wait all 9999 iterations to complete.



## Experiment with 8x8 size.

Time taken for algorithm to complete 32 minutes.

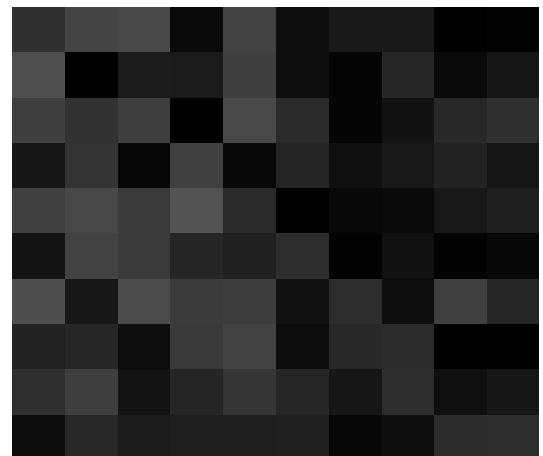
Maximum possible fitness  $8 \times 8 = 64$ ;

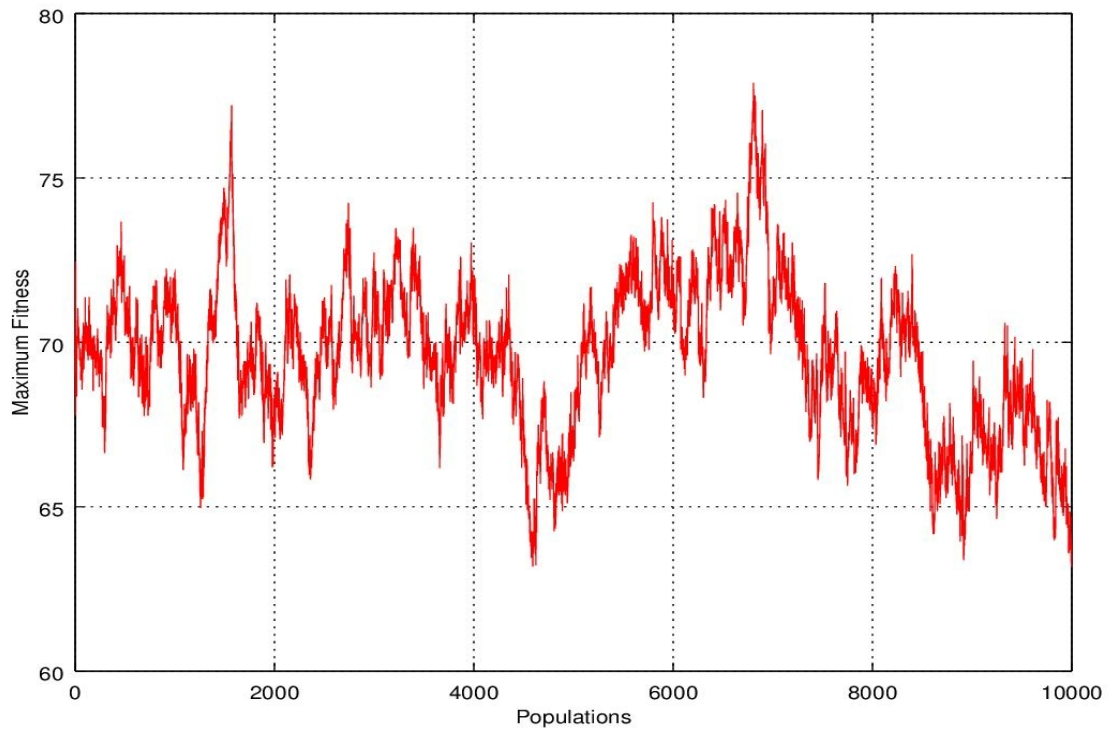


## Experiment with 10x10 size.

Time taken for algorithm to complete 49 minutes.

Maximum possible fitness  $10 \times 10 = 100$ ;





## Experiment with 15x15 size.

Time taken for algorithm to complete 90 minutes.  
Maximum possible fitness  $15 \times 15 = 225$ ;

**Guess: I think it has something circle with square pattern background.**

