The goal of this assignment is to use an evolutionary algorithm (EVA) to evolve simple pictures. You may implement your own EVA in the programming language of your choice or you may use any existing implementation, including TSearch. Configure your EVA to only use mutation (no crossover). You should turn in a fully-commented listing of all of the code that you write for this assignment. If you make use of an existing EVA, I do not need to see its code.

Assuming pictures are represented as $16 \times 16$ bitmaps, you can concatenate each row of this bitmap to form a 256-element binary vector. Use the number of bit positions (blue) at which a given individual (black) is the same as a target picture (red) as your performance measure:

Using your EVA, study the effect of mutation size on the evolution of a target picture of your choice. You may need to experiment with different EVA parameters (e.g., population size and number of generations) until you find a set that works well. Then fix these EVA parameters and do ten runs each with five different mutation sizes, using different random seeds for each run.

For the best run across all of your experiments, display the best individual at a sample of generations (e.g., generation 0, 100, 200, etc.). In addition, for each of the five mutation sizes, turn in a plot showing the performance of the best individual in the population vs. generation for all ten runs. Discuss any interesting trends that you see in the plots. Which mutation size seems to be the best? Why do you think that is?