ECE 559 Project #1

You are to find the minimum of the following function.

$$f\left(\vec{x}\right) = \sum_{j=1}^{30}\left[\left(x_j - \Delta\right)^2 - 10\cos\left(2\pi\left(x_j - \Delta\right)\right) + 10\right]$$

where $\Delta = 3.5$ and $x_j \in [-5.12, 5.12]$
using

1. A GA with a population size of 100. Each individual x_j is encoded as a 12-bit binary string. Use 1-pt crossover with bit-flipping for mutation. Use elitism with roulette-wheel selection, $p_c = 0.6$ and $p_m = 0.01$. Terminate the GA after 400 generations. Plot the fitness per generation averaged over 10 independent GA runs[1].

2. Same as problem 1 except use 2-pt crossover.

3. Same as problem 1 except use uniform crossover.

4. Same as problem 1 except use uniform crossover and increase p_c to 0.9.

5. Which GA versions performs the best? Why do you think that is?

---

[1]That means each run uses a different seed for the random number generators.