Problem 1 – Biological Genetics.

Suppose a diploid organism with three chromosomes. Further suppose that crossover and mutation did not occur. How many genetically different offspring could be produced ?

Problem 2 – Biological Genetics.

Consider the example on page 25 of the lecture set 1. Suppose that the genes for seed shape and color were on the same chromosome. What would the final result be ?

Problem 3 – Canonical Genetic Algorithms.

It is desired to minimize the function

$$g(x_1, x_2) = (x_1 - 1)^2 + 3(x_2 - 4)^2 - 200$$

What is a possible fitness function (the answer is not unique) if using a canonical GA ?

Problem 4 – Canonical Genetic Algorithms.

The fitness values of the members of a population are: 23, 96, 42, 12, 8, 7, 47
What is the expected number of times the individual with a fitness of 42 will appear in the mating pool ?

Problem 5 – Schema Theorem.

Consider the individual 101. List all schema to which this individual belongs.
Consider the schema 1**100**. What is the order ? What is the defining length ?

Problem 6 – Schema Theorem.

Consider the population of individuals on page 25 of the Lecture 2 notes. What is the minimum bound on the expected number of times the schema 01*** will appear in the next generation ?
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