INF3490 exercises - week 3 2013

Problem 1

Recall all the representations that have been presented. Which mutation and recombination operators are compatible with which representations?

Problem 2

Given a binary chromosome with length 4, calculate the probability that no bits, one bit, and more than one bit will be flipped in a bit-flip mutation with $p_m = \frac{1}{4}$.

Problem 3

Given the sequences $(2, 4, 7, 1, 3, 6, 8, 9, 5)$ and $(5, 9, 8, 6, 2, 4, 1, 3, 7)$, use partially mapped crossover to create a new pair of solutions. Use 4 and 7 as the random crossover points. Repeat using order crossover and cycle crossover.

Problem 4

What is the probability of the 3rd best solution being selected with binary (i.e. $q = 2$) tournament selection out of a population of 8? In general, what is the probability of rank i being selected out of μ individuals? How does this compare to ranking selection? (Keep in mind that in the formula for ranking selection probabilities a higher rank is better, e.g. rank 4 is better than rank 3).