

COMSM0302 - WEEK 4 EXERCISES

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1. EXERCISE 1 - GP FOR THE MULTIPLEXER

Implement a simple GP system for solving the 11-multiplexer. Make use of a selection method from your GA implementation, or implement a new one. The function and terminal sets for the problem should be as in the lecture notes, i.e. $F = \{\vee, \wedge, \neg, IF\}$ and $T = \{0, 1\}$.

2. EXERCISE 2 - NUMBER OF POSSIBLE n -BIT BOOLEAN FUNCTIONS

Derive an expression for the number of possible boolean functions operating on n variables and returning one boolean value as the result. Evaluate this for $n = 11$ to calculate the probability of finding the 11-multiplexer function by random search in that function space.

3. EXERCISE 3 - SUFFICIENT SETS FOR THE MULTIPLEXER

Determine analytically the minimum subset(s) of F that are sufficient to solve the multiplexer problem. Run your GP system on the 11-multiplexer, experimenting with the various sufficient subsets of the function set F and examining the best-of-run individuals produced.