

Genetic Algorithms

Expressing hypotheses as logic functions & genomes

IF $a_1 = T \wedge a_2 = F$ THEN $c = T$

a_1	a_2	c
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Modelling Problems & Defining Fitness Functions

A company owns 3 buses & employs 5 drivers. Only one driver can drive any bus on a single day. Each driver cannot work for more than two consecutive days in a week. Company uses buses every day. Make a weekly schedule (7 days) denoting drivers assigned to each of three buses. Provide encoding & fitness function.

Genes (Drivers) $\rightarrow A, B, C, D, E$

Occupied drivers for a given day \rightarrow

ABC CDE ABD ABE CDE ABC CDE

ABC
ABD

CDE

\rightarrow can be modeled with idleness

ABC \rightarrow 11100

CDE

Fitness: How many days each crew has left before a day off.

$$F = d_1 + d_2 + \dots + d_m = \sum_{i=1}^m d_i$$

$d =$ # Days an employee has before a day off

$m =$ # employees

Assuming bus order is ignored

ABC
ABD
ABE
ACD
ACE
ADE
BCD
BCE
BDE
CDE

10