

ECE449, Intelligent Systems Engineering

Fall 2019

a) Individual and Population: Individual is a single candidate solution, while population is a group of individuals that collectively explore the solution space.

c) Genotype and Phenotype: Genotype is the genetic makeup of an individual (inside), while phenotype represents its actual physical properties (outside).

Selection

[001010, 010000, 011100, 011000, 110010, 100001, 111101, 000101, 000010, 100011]

Determine the intermediate population (i.e. population after selection but before crossover and mutation) using fitness proportional and ranked selection.

[illegible]

Ranked

BIN	DE C	fitnes s	rank	cumm ul	0.231 9	0.239 3	0.049 8	0.078 4	0.640 8	0.190 9	0.843 9	0.173 9	0.170 8	0.994 3
10000 1	33	0.500	10.00 0	0.182			*	*				*	*	
10001 1	35	0.100	9.000	0.345	*	*				*				
11100	28	0.059	8.000	0.491										
11000	24	0.015	7.000	0.618										
10000	16	0.004	6.000	0.727					*					
11001 0	50	0.003	5.000	0.818										
1010	10	0.002	4.000	0.891							*			
101	5	0.001	3.000	0.945										
11110 1	61	0.001	2.000	0.982										
10	2	0.001	1.000	1.000										*

Discussion: The problem of a strong individual (100001) taking over the population is alleviated by using ranked selection taking over the population is alleviated by using ranked selection.