

Evolutionary
Genetic Algorithm

→ Search Algo based on mechanics of natural selection and natural genetics
→ Based on the survival of the fittest

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self repair, self-guidance, & reproduction are there in Biologically to make the system robust

Example

fitness function $y = f(x) = 0.2x^2 + 450/x$ // We want to minimize this function
 $0.5 < x < 25.5$
here no. of variable is = 1 (single variable)

We have to generate random numbers

$$y = \frac{0.2(4.2)^2}{3.528} + \frac{450}{4.2} =$$

Iteration: 1

string no	Initial Population	Binary	y_i	$\frac{y_i}{\sum y_i}$	count	Mating Pool
1	4.2	00101010	110.67	0.286	1	01100101
2	10.1	01100101	64.45	0.168	2	01100101
3	23.5	11101011	129.59	0.335	0	00101010
4	16.4	10100100	81.23	0.210	1	10100100
			$\sum y_i = 386.44$	$\bar{y} = \frac{386.44}{4} = 98.61 = \text{Avg}$	$\sum = 4$	

Mating Pool	Mate	Crossover site	New Population	y_i	$\frac{y_i}{\sum y_i}$	count	Mating Pool
0110 0101	4	4	0110 0100	10.0	0.20	2	0110 0100
0110 0101	3	5	0110 0101	9.8	0.206	1	0110 0101
0010 1010	2	5	* 0010 1010	4.5	0.329	0	0110 0101
1010 0100	1	4	1010 0101	16.5	0.259	1	1010 0101
				$\sum y_i = 315.89$	$\bar{y} = 78.97$	4	