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$$2 f(x) - x^2 = 5x + 100$$

Initialization of Population:

[1,1,0,0,1,1] → 51

[1,1,1,0,0,1] → 57

[1,1,0,0,0,1] → 49

[1,0,0,0,0,1] → 33

[1,0,1,0,1,0] → 42

[1,1,1,1,0,1] → 61

[1,0,1,0,0,1] → 41

[1,1,1,1,0,0] → 60

Fitness calculation:

[1,1,0,0,1,1] → 51 → 2446

[1,1,1,0,0,1] → 57 → 3064

[1,1,0,0,0,1] → 49 → 2256

[1,0,0,0,0,1] → 33 → 1024

[1,0,1,0,1,0] → 42 → 1654

[1,1,1,1,0,1] → 61 → 3516

[1,0,1,0,0,1] → 41 → 1576

[1,1,1,1,0,0] → 60 → 3400

Total : 18936

Probability:

[1,1,0,0,1,1]	→ 51	→2446/18936 =0.12
[1,1,1,0,0,1]	→57	→3064/18936 =0.16
[1,1,0,0,0,1]	→49	→2256/18936 =0.11
[1,0,0,0,0,1]	→33	→1024/18936 =0.05
[1,0,1,0,1,0]	→42	→1654/18936 =0.08
[1,1,1,1,0,1]	→ 61	→3516/18936 =0.18
[1,0,1,0,0,1]	→41	→1576/18936 =0.08
[1,1,1,1,0,0]	→60	→3400/18936 =0.22

Bin:

[1,1,0,0,1,1]	→ 0.01 - 0.12
[1,1,1,0,0,1]	→0.13 – 0.28
[1,1,0,0,0,1]	→0.29 - 0.39
[1,0,0,0,0,1]	→0.40 - 0.44
[1,0,1,0,1,0]	→0.45 - 0.52
[1,1,1,1,0,1]	→ 0.53 - 0.70
[1,0,1,0,0,1]	→0.71 -0.78
[1,1,1,1,0,0]	→0.79 -1

Random Number:

Selecting Parent 1: 0.10

[1,1,0,0,1,1]

Selecting Parent 2: 0.20

[1,1,1,0,0,1]

Selecting Parent 3: 0.34

[1,1,0,0,0,1]

Selecting Parent 4: 0.42

[1,0,0,0,0,1]

Selecting Parent 5: 0.52

[1,1,1,1,0,1]

Selecting Parent 6: 0.63

[1,1,1,1,0,1]

Selecting Parent 7: 0.31

[1,1,0,0,0,1]

Selecting Parent 8: 0.87

[1,1,1,1,0,0]

Recombination or Crossover

Crossover1:

Parent1: [1,1,0,0,1,1]

Parent2: [1,1,1,0,0,1]

→ Offspring1: [110001] Offspring2: [111011]

Crossover2:

Parent3: [1,1,0,0,0,1]

Parent4: [1,1,1,1,0,1]

→ Offspring3: [111101] Offspring4: [110001]

Crossover3:

Parent5: [1,1,1,1,0,1]

Parent6: [1,1,1,1,0,1]

→ Offspring5: [111101] Offspring6: [111101]

Crossover4:

Parent7: [1,1,0,0,0,1]

Parent8: [1,1,1,1,0,0]

→ Offspring7: [110100] Offspring8: [111001]

Mutation

1% chance (low chance)

Offspring1: [110001]

Offspring2: [111011]

Offspring3: [111101]

Offspring4: [110001]

Offspring5: [111101]

Offspring6: [111101]

Offspring7: [110100]

Offspring8: [**0**11001] → [**1**11001]

Survival

Calculate Fitness of offspring:

[110001] → 2256

[111011] → 3286

[110101] → 3644

[110001] → 2256

[111101] → 3516

[110100] → 2544

[**1**11001] → 3064

Update Population:

[1,1,0,0,1,1]

[1,1,1,0,0,1]

[1,1,0,0,0,1]

[1,0,0,0,0,1]

[1,0,1,0,1,0]

[1,1,1,1,0,1]

[1,0,1,0,0,1]

[1,1,1,1,0,0]

[1,1,1,0,1,1]

[1,1,0,1,0,1]

[1,1,1,1,0,1]