Name : Md . Jawadul Hasan , ID : 20-41958-1

2 f(x)- x² = 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]