Michael Chillemi

0412/2021

Artificial Intelligence

Professor Cicirello

Homework 10

1. Parent 1: 00000011|10010100

Parent 2: 10110111|11111111

ANSWER:

Child 1: 0000001111111111

Child 2: 1011011110010100

2. Parent 1: 00000|00000000000

Parent 2: 11111|11111111111

ANSWER:

Child 1: 0000011111111111

Child 2:1111100000000000

3. Parent 1: 000|0000|000000000

Parent 2: 111|1111|111111111

ANSWER:

Child 1: 0001111000000000

Child 2: 1110000000000000

4. Parent 1: 000|0000|000000000

Parent 2: 111|1111|111111111

ANSWER:

Child 1:0001111000000000

Child 2:1110000111111111

5. U(0.5)

Parent 1: 0000 0 0 111 0 01 010 0

Parent 2: 1011 0 1 111 1 11 111 1

Compare:X0.2,X 0.45, X0.1, X0.48, 0.6, X0.13, 0.75, 0.68, 0.9,X 0.01, 0.51, 0.82, X0.1, X0.23, X0.32,0.66

Child 1:1011011111011110

Child 2:0000001110110101

Parent 1: 0 0 0 0 0 01 110 0 1 0 1 00

Parent 2: 1 0 1 1 0 11 111 1 1 1 1 11

Compare:0.71, X0.09, 0.99, X0.11,0.68,X 0.21,X 0.34, 0.55, 0.52, 0.56, X0.48, 0.99,X 0.43, 0.88, X0.47 ,X0.31

Child 1:1010001111010100

Child 2:000101111011100

Parent 1: 00000 0 1 110 01 0 1 0 0

Parent 2: 10110 1 1 111 11 1 1 1 1

Compare:X0.31,X 0.36,X 0.45,X 0.1,X 0.48, 0.6, X0.13, 0.75, 0.68, 0.9, X0.01, X0.09, 0.99, X0.11, 0.68, X0.2

Child 1: 1011001110110101

Child 2: 0000011111011110

6. U(0.5)

Parent 1: 0000 0 0 000 0 00 000 0

Parent 2: 1111 1 1 111 1 11 111 1

Compare:X0.2,X 0.45, X0.1, X0.48, 0.6, X0.13, 0.75, 0.68, 0.9,X 0.01, 0.51, 0.82, X0.1, X0.23, X0.32,0.66

Child 1: 1111010001001110

Child 2: 0000101110110001

Parent 1: 0 0 0 0 0 00 000 0 0 0 0 00

Parent 2: 1 1 1 1 1 11 111 1 1 1 1 11

Compare:0.71, X0.09, 0.99, X0.11,0.68,X 0.21,X 0.34, 0.55, 0.52, 0.56, X0.48, 0.99,X 0.43, 0.88, X0.47 ,X0.31

Child 1: 1010100111010100

Child 2: 0101011000101011

Parent 1: 00000 0 0 000 00 0 0 0 0

Parent 2: 11111 1 1 111 11 1 1 1 1

Compare:X0.31,X 0.36,X 0.45,X 0.1,X 0.48, 0.6, X0.13, 0.75, 0.68, 0.9, X0.01, X0.09, 0.99, X0.11, 0.68, X0.2

Child 1: 1111101000110101

Child 2:0000010111001010

7.

Population Member ID = {1,2,3,4,5,6,7,8,9,10}

Fitness = {5,5,5,12,10,8,7,20,10,6}

Total = 88

Selection Probability = {0.056, 0.056, 0.056, 0.136, 0.113, 0.090, 0.079, 0.227, 0.113, 0.068}

8.

Population Member ID = {1,2,3,4,5,6,7,8,9,10}

Fitness = {5,5,5,12,10,8,7,20,10,6}

Total = 88

Selection Probability = {0.056, 0.056, 0.056, 0.136, 0.113, 0.090, 0.079, 0.227, 0.113, 0.068}

9.

|  |  |  |
| --- | --- | --- |
| Schema | Defining Length | Order |
| 1010\*\*\*01 | 9 | 6 |
| \*\*\*11100\*\*\*1 | 9 | 6 |
| \*\*\*1\*1\*\*\*\*\*\*\*\*\* | 3 | 2 |

10.

A = 0

B = 0

C = 0

D = \*

E = 1

F = \*

G = 0

H = 0

Boolean Function: A or B or C) and (~A or ~B or ~C) and (C or D or E) and (~C or ~D or ~E) and (E or F or G) and (~E or G or H) and (G or H or A) and (F or H or B)

(A or B or C) = 0 or 0 or 0 = 0

(~A or ~B or ~C) = 1 or 1 or 1 = 1

(C or D or E) = 0 or \* or 1 = 1

(~C or ~D or ~E) = 1 or \* or 0 = 1

(E or F or G) = 1 or \* or 0 = 1

(~E or G or H) = 0 or 0 or 0 = 0

(G or H or A) = 0 or 0 or 0 = 0

(F or H or B) = \* or 0 or 0 = 0 if F is 0

1 if F is 1

A 1 means that it was satisfied

A 0 means that it was not satisfied

Final Answer: 5 clauses were satisfied and the fitness schema for 000\*1\*00 is 4 or 5 depending on the value of F in the last case.