

```
import numpy as np
from numpy.random import choice
from numpy import random

def fitness_func(chromosome):
    x = int(chromosome, 2)
    return((x**3) - 2 * (x**2) + x)

def main():
    inp = []
    alphabets = '01*'
    for i in range(5):
        schema = ''
        for j in range(5):
            randinteger = random.randint(0, 3)
            schema = schema + alphabets[randinteger]
        if(schema in inp):
            i -= 1
        else:
            inp.append(schema)

    print(inp)
    prev_gen_max = 0
    strongest_gene = []
    strike = 0
    j = 0
    while(strike < 100):
        # strike += 1
        j += 1
        print("\n\n\nGen {}".format(j))
        print("Current Schemas : ", inp)
        current_population = dict()

        for schema in inp:
            current_population[schema] = gen_pop(schema)

        fit = []
        f = 0
        for i in range(len(inp)):
            for chromosome in current_population[inp[i]]:
                f += fitness_func(chromosome)

            fit.append(f/len(current_population[inp[i]]))
        print("Fitness : ", fit)
        s = np.array(fit).sum()

        current_gen_max = max(fit)
        if(prev_gen_max > current_gen_max):
            strike += 1
        else:
            prev_gen_max = current_gen_max
```

```

strike = 0
strongest_gene = inp.copy()
p = []
for i in range(len(fit) - 1):
    frac = float("{0:.3f}".format(float(fit[i]/s)))
    p.append(frac)

frac = 1 - np.array(p).sum()
p.append(frac)

print("Probability : ", p)

child = choice(a = inp, size = len(inp), p = p)
print("Candidates in reproduction pool : ", child)
mating_partners = []
a = [0, 1, 2, 3, 4]
for i in range(int(len(inp)/2)):
    partner = choice(a = a, size = 2)
    mating_partners.append(partner)
    a = set(a) - set(partner)
    a = list(a)
# mating_partners_1 = choice(a = [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10], size = 2)
# mating_partners_2 = list(set([0, 1, 2, 3]) - set(mating_partners_1))
print("mating partners are : ", mating_partners)

for partner in mating_partners:
    print("Mating partners are : {} and {}".format(child[partner[0]], child[partner[1]]))
    if(len(set(partner)) == 1):
        continue
    else:
        inp[partner[0]], inp[partner[1]] = reproduce(child[partner[0]], child[partner[1]])

# inp[0], inp[1] = reproduce(child[mating_partners_1[0]], child[mating_partners_1[1]])
# inp[2], inp[3] = reproduce(child[mating_partners_2[0]], child[mating_partners_2[1]])
print("The Offsprings are : ", inp)
inp = mutation(inp)

print("The strongest gene is : ", strongest_gene)
print()
main()

```



```
[ '1*011', '1*110', '1*0*0', '1*1*0', '10**0' ]
```

**Gen 1**

```
Current Schemas : [ '1*011', '1*110', '1*0*0', '1*1*0', '10**0' ]
Fitness : [12204.0, 29670.0, 24272.0, 39913.0, 46344.0]
Probability : [0.08, 0.195, 0.159, 0.262, 0.3039999999999994]
Candidates in reproduction pool : [ '10**0' '1*110' '10**0' '1*0*0' '1*0*0' ]
mating partners are : [array([2, 2]), array([3, 4])]
Mating partners are : 10**0 and 10**0
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 3
a and b is 1*0*0 1*0*0
The Offsprings are : [ '1*011', '1*110', '1*0*0', '1*0*0', '1*0*0' ]
```

**Gen 2**

```
Current Schemas : [ '1*011', '1*110', '1*0*0', '1*0*0', '1*0*0' ]
Fitness : [12204.0, 29670.0, 24272.0, 33709.0, 43146.0]
Probability : [0.085, 0.207, 0.17, 0.236, 0.3020000000000005]
Candidates in reproduction pool : [ '1*0*0' '1*0*0' '1*0*0' '1*011' '1*0*0' ]
mating partners are : [array([2, 4]), array([0, 3])]
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 3
a and b is 1*0*0 1*0*0
Mating partners are : 1*0*0 and 1*011
Breaking point is : 2
a and b is 1*0*0 1*011
The Offsprings are : [ '1*011', '1*110', '1*0*0', '1*0*0', '1*0*0' ]
```

**Gen 3**

```
Current Schemas : [ '1*011', '1*110', '1*0*0', '1*0*0', '1*0*0' ]
Fitness : [12204.0, 29670.0, 24272.0, 33709.0, 43146.0]
Probability : [0.085, 0.207, 0.17, 0.236, 0.3020000000000005]
Candidates in reproduction pool : [ '1*0*0' '1*110' '1*0*0' '1*0*0' '1*0*0' ]
mating partners are : [array([0, 1]), array([2, 3])]
Mating partners are : 1*0*0 and 1*110
Breaking point is : 2
a and b is 1*0*0 1*110
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 2
a and b is 1*0*0 1*0*0
The Offsprings are : [ '1*110', '1*0*0', '1*0*0', '1*0*0', '1*0*0' ]
```

**Gen 4**

```
Current Schemas : [ '1*110', '1*0*0', '1*0*0', '1*0*0', '1*0*0' ]
Fitness : [17466.0, 18170.0, 27607.0, 37044.0, 46481.0]
Probability : [0.119, 0.124, 0.188, 0.252, 0.3169999999999995]
Candidates in reproduction pool : [ '1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0' ]
mating partners are : [array([2, 1]), array([3, 0])]
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 2
a and b is 1*0*0 1*0*0
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 3
```

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a and b is 1*0*0 1*0*0
The Offsprings are : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
```

Gen 5

```
Current Schemas : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness : [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are : [array([0, 0]), array([4, 3])]
Mating partners are : 1*0*0 and 1*0*0
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 3
a and b is 1*0*0 1*0*0
The Offsprings are : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
```

Gen 6

```
Current Schemas : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness : [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are : [array([2, 1]), array([4, 3])]
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 1
a and b is 1*0*0 1*0*0
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 3
a and b is 1*0*0 1*0*0
The Offsprings are : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
```

Gen 7

```
Current Schemas : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness : [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are : [array([1, 0]), array([2, 4])]
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 3
a and b is 1*0*0 1*0*0
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 3
a and b is 1*0*0 1*0*0
The Offsprings are : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
```

Gen 8

```
Current Schemas : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness : [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are : [array([2, 0]), array([4, 1])]
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 2
a and b is 1*0*0 1*0*0
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 2
```

```
Breaking point is : 2
a and b is 1*0*0 1*0*0
The Offsprings are : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
```

Gen 9

```
Current Schemas : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness : [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are : [array([4, 1]), array([2, 3])]
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 2
a and b is 1*0*0 1*0*0
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 2
a and b is 1*0*0 1*0*0
The Offsprings are : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
```

Gen 10

```
Current Schemas : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness : [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are : [array([1, 1]), array([2, 0])]
Mating partners are : 1*0*0 and 1*0*0
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 3
a and b is 1*0*0 1*0*0
The Offsprings are : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
```

Gen 11

```
Current Schemas : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness : [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are : [array([1, 1]), array([2, 3])]
Mating partners are : 1*0*0 and 1*0*0
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 1
a and b is 1*0*0 1*0*0
The Offsprings are : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
```

Gen 12

```
Current Schemas : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness : [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are : [array([4, 0]), array([3, 3])]
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 2
a and b is 1*0*0 1*0*0
Mating partners are : 1*0*0 and 1*0*0
The Offsprings are : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
```

Gen 13

```

Current Schemas : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness : [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are : [array([0, 0]), array([3, 4])]
Mating partners are : 1*0*0 and 1*0*0
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 1
a and b is 1*0*0 1*0*0
The Offsprings are : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']

```

Gen 14

```

Current Schemas : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness : [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are : [array([1, 3]), array([2, 0])]
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 1
a and b is 1*0*0 1*0*0
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 1
a and b is 1*0*0 1*0*0
The Offsprings are : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']

```

Gen 15

```

Current Schemas : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness : [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are : [array([0, 2]), array([4, 3])]
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 2
a and b is 1*0*0 1*0*0
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 3
a and b is 1*0*0 1*0*0
The Offsprings are : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']

```

Gen 16

```

Current Schemas : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness : [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are : [array([1, 1]), array([0, 2])]
Mating partners are : 1*0*0 and 1*0*0
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 2
a and b is 1*0*0 1*0*0
The Offsprings are : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']

```

Gen 17

```

Current Schemas : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness : [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are : [array([3, 4]), array([0, 1])]
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 1
a and b is 1*0*0 1*0*0
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 2
a and b is 1*0*0 1*0*0
The Offsprings are : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']

```

Gen 18

```

Current Schemas : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness : [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are : [array([2, 1]), array([3, 3])]
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 2
a and b is 1*0*0 1*0*0
Mating partners are : 1*0*0 and 1*0*0
The Offsprings are : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']

```

Gen 19

```

Current Schemas : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness : [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are : [array([4, 0]), array([1, 3])]
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 3
a and b is 1*0*0 1*0*0
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 1
a and b is 1*0*0 1*0*0
The Offsprings are : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']

```

Gen 20

```

Current Schemas : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness : [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are : [array([4, 3]), array([1, 2])]
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 2
a and b is 1*0*0 1*0*0
Mating partners are : 1*0*0 and 1*0*0
Breaking point is : 3
a and b is 1*0*0 1*0*0
The Offsprings are : ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']

```

Gen 21

```

Current Schemas :  ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness :  [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability :  [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool :  ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are :  [array([1, 3]), array([2, 0])]
Mating partners are : 1*0*0 and 1*0*0
Breaking point is :  3
a and b is  1*0*0 1*0*0
Mating partners are : 1*0*0 and 1*0*0
Breaking point is :  1
a and b is  1*0*0 1*0*0
The Offsprings are :  ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']

```

Gen 22

```

Current Schemas :  ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']
Fitness :  [9437.0, 18874.0, 28311.0, 37748.0, 47185.0]
Probability :  [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool :  ['1*0*0' '1*0*0' '1*0*0' '1*0*0' '1*0*0']
mating partners are :  [array([1, 1]), array([0, 0])]
Mating partners are : 1*0*0 and 1*0*0
Mating partners are : 1*0*0 and 1*0*0
The Offsprings are :  ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*0*0']

```

Gen 23

```

Current Schemas :  ['1*0*0', '1*0*0', '1*0*0', '1*0*0', '1*1*0']
Fitness :  [9437.0, 18874.0, 28311.0, 37748.0, 53389.0]
Probability :  [0.064, 0.128, 0.192, 0.255, 0.361]
Candidates in reproduction pool :  ['1*0*0' '1*1*0' '1*1*0' '1*1*0' '1*0*0']
mating partners are :  [array([3, 2]), array([1, 1])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is :  3
a and b is  1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are :  ['1*0*0', '1*0*0', '1*1*0', '1*1*0', '1*1*0']

```

Gen 24

```

Current Schemas :  ['1*0*0', '1*0*0', '1*1*0', '1*1*0', '1*1*0']
Fitness :  [9437.0, 18874.0, 34515.0, 50156.0, 65797.0]
Probability :  [0.053, 0.106, 0.193, 0.281, 0.367]
Candidates in reproduction pool :  ['1*1*0' '1*1*0' '1*0*0' '1*1*0' '1*1*0']
mating partners are :  [array([1, 3]), array([4, 4])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is :  1
a and b is  1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are :  ['1*0*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

Gen 25

```

Current Schemas :  ['1*0*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness :  [9437.0, 25078.0, 40719.0, 56360.0, 72001.0]
Probability :  [0.046, 0.123, 0.2, 0.277, 0.354]
Candidates in reproduction pool :  ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']

```

```
mating partners are : [array([1, 4]), array([3, 0])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 26

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([0, 3]), array([1, 1])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 27

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([2, 3]), array([4, 0])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 28

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([2, 1]), array([4, 3])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 29

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
```

```
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([0, 4]), array([2, 3])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 30

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([4, 1]), array([0, 2])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 31

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([0, 1]), array([4, 4])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 32

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([2, 1]), array([4, 4])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 33

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([3, 0]), array([4, 2])]
```

```
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 34

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([4, 1]), array([0, 0])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 35

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*1']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 80106.0]
Probability : [0.066, 0.132, 0.198, 0.265, 0.3389999999999997]
Candidates in reproduction pool : ['1*1*0' '1*1*1' '1*1*1' '1*1*1' '1*1*0']
mating partners are : [array([4, 1]), array([3, 3])]
Mating partners are : 1*1*0 and 1*1*1
Breaking point is : 3
a and b is 1*1*0 1*1*1
Mating partners are : 1*1*1 and 1*1*1
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*1']
```

Gen 36

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*1']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 80106.0]
Probability : [0.066, 0.132, 0.198, 0.265, 0.3389999999999997]
Candidates in reproduction pool : ['1*1*0' '1*1*1' '1*1*0' '1*1*0' '1*1*1']
mating partners are : [array([4, 3]), array([2, 1])]
Mating partners are : 1*1*1 and 1*1*0
Breaking point is : 1
a and b is 1*1*1 1*1*0
Mating partners are : 1*1*0 and 1*1*1
Breaking point is : 2
a and b is 1*1*0 1*1*1
The Offsprings are : ['1*1*0', '1*1*0', '1*1*1', '1*1*1', '1*1*0']
```

Gen 37

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*1', '1*1*1', '1*1*0']
Fitness : [15641.0, 31282.0, 48824.0, 66366.0, 82007.0]
Probability : [0.064, 0.128, 0.2, 0.272, 0.3359999999999997]
Candidates in reproduction pool : ['1*1*1' '1*1*0' '1*1*1' '1*1*0' '1*1*0']
mating partners are : [array([2, 3]), array([4, 1])]
Mating partners are : 1*1*1 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*1', '1*1*1', '1*1*0']
```

```

Breaking point is : 2
a and b is 1*1*1 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*1', '1*1*0']

```

```

Gen 38
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*1', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 64465.0, 80106.0]
Probability : [0.066, 0.131, 0.197, 0.27, 0.33599999999999997]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*1' '1*1*0' '1*1*1']
mating partners are : [array([2, 3]), array([0, 4])]
Mating partners are : 1*1*1 and 1*1*0
Breaking point is : 1
a and b is 1*1*1 1*1*0
Mating partners are : 1*1*0 and 1*1*1
Breaking point is : 2
a and b is 1*1*0 1*1*1
The Offsprings are : ['1*1*1', '1*1*0', '1*1*0', '1*1*1', '1*1*0']

```

```

Gen 39
Current Schemas : ['1*1*1', '1*1*0', '1*1*0', '1*1*1', '1*1*0']
Fitness : [17542.0, 33183.0, 48824.0, 66366.0, 82007.0]
Probability : [0.071, 0.134, 0.197, 0.268, 0.3299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*1' '1*1*1' '1*1*1']
mating partners are : [array([0, 4]), array([3, 3])]
Mating partners are : 1*1*0 and 1*1*1
Breaking point is : 2
a and b is 1*1*0 1*1*1
Mating partners are : 1*1*1 and 1*1*1
The Offsprings are : ['1*1*1', '1*1*0', '1*1*0', '1*1*1', '1*1*0']

```

```

Gen 40
Current Schemas : ['1*1*1', '1*1*0', '1*1*0', '1*1*1', '1*1*0']
Fitness : [17542.0, 33183.0, 48824.0, 66366.0, 82007.0]
Probability : [0.071, 0.134, 0.197, 0.268, 0.3299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([0, 1]), array([4, 3])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

```

Gen 41
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([1, 3]), array([4, 0])]
Mating partners are : 1*1*0 and 1*1*0

```

```

Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

```

Gen 42
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([4, 1]), array([2, 2])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

```

Gen 43
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([4, 2]), array([0, 1])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

```

Gen 44
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([1, 4]), array([2, 0])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

```

Gen 45
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([2, 0]), array([3, 1])]
Mating partners are : 1*1*0 and 1*1*0

```

```

mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

Gen 46

```

Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([4, 4]), array([2, 3])]
Mating partners are : 1*1*0 and 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

Gen 47

```

Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([4, 0]), array([3, 2])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

Gen 48

```

Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([4, 3]), array([1, 1])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

Gen 49

```

Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([2, 4]), array([0, 0])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1

```

```
a and b is  1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 50

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([3, 2]), array([4, 0])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is  1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is  1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 51

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([0, 4]), array([3, 3])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is  1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 52

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([0, 4]), array([3, 2])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is  1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is  1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 53

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([4, 3]), array([0, 1])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is  1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
```

mating partners are : [array([1, 3]), array([2, 4])]  
 Breaking point is : 1  
 a and b is 1\*1\*0 1\*1\*0  
 The Offsprings are : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']

Gen 54

Current Schemas : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']  
 Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]  
 Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]  
 Candidates in reproduction pool : ['1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0']  
 mating partners are : [array([1, 3]), array([2, 4])]  
 Mating partners are : 1\*1\*0 and 1\*1\*0  
 Breaking point is : 3  
 a and b is 1\*1\*0 1\*1\*0  
 Mating partners are : 1\*1\*0 and 1\*1\*0  
 Breaking point is : 3  
 a and b is 1\*1\*0 1\*1\*0  
 The Offsprings are : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']

Gen 55

Current Schemas : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']  
 Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]  
 Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]  
 Candidates in reproduction pool : ['1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0']  
 mating partners are : [array([0, 1]), array([4, 3])]  
 Mating partners are : 1\*1\*0 and 1\*1\*0  
 Breaking point is : 2  
 a and b is 1\*1\*0 1\*1\*0  
 Mating partners are : 1\*1\*0 and 1\*1\*0  
 Breaking point is : 2  
 a and b is 1\*1\*0 1\*1\*0  
 The Offsprings are : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']

Gen 56

Current Schemas : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']  
 Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]  
 Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]  
 Candidates in reproduction pool : ['1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0']  
 mating partners are : [array([3, 0]), array([1, 1])]  
 Mating partners are : 1\*1\*0 and 1\*1\*0  
 Breaking point is : 3  
 a and b is 1\*1\*0 1\*1\*0  
 Mating partners are : 1\*1\*0 and 1\*1\*0  
 The Offsprings are : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']

Gen 57

Current Schemas : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']  
 Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]  
 Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]  
 Candidates in reproduction pool : ['1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0']  
 mating partners are : [array([2, 2]), array([0, 4])]  
 Mating partners are : 1\*1\*0 and 1\*1\*0  
 Mating partners are : 1\*1\*0 and 1\*1\*0  
 Breaking point is : 3

```
a and b is  1*1*0 1*1*0
The Offsprings are :  ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

```
Gen 58
Current Schemas :  ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness :  [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability :  [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool :  ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are :  [array([3, 3]), array([1, 0])]
Mating partners are : 1*1*0 and 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is  1*1*0 1*1*0
The Offsprings are :  ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

```
Gen 59
Current Schemas :  ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness :  [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability :  [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool :  ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are :  [array([3, 1]), array([2, 4])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is  1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is  1*1*0 1*1*0
The Offsprings are :  ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

```
Gen 60
Current Schemas :  ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness :  [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability :  [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool :  ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are :  [array([3, 2]), array([4, 4])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is  1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are :  ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

```
Gen 61
Current Schemas :  ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness :  [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability :  [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool :  ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are :  [array([0, 3]), array([2, 4])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is  1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is  1*1*0 1*1*0
The Offsprings are :  ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
```

```
THE OFFSPRINGS ARE . [ 1*1*0 , 1*1*0 , 1*1*0 , 1*1*0 , 1*1*0 ]
```

Gen 62

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([0, 1]), array([4, 3])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 63

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([0, 1]), array([2, 2])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 64

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([3, 0]), array([1, 1])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 65

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([1, 3]), array([0, 2])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 66

```

Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([0, 1]), array([3, 2])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

Gen 67

```

Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([4, 2]), array([0, 3])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

Gen 68

```

Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([1, 3]), array([0, 4])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

Gen 69

```

Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([1, 0]), array([2, 4])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0

```

```
a and b is 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 70

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([2, 0]), array([1, 3])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 71

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([4, 0]), array([2, 3])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 72

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([1, 4]), array([2, 3])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 73

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([2, 3]), array([0, 1])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
```

```
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

```
Gen 74
Current Schemas : ['1*1*0', '0*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 16642.0, 32283.0, 47924.0, 63565.0]
Probability : [0.089, 0.095, 0.183, 0.272, 0.361]
Candidates in reproduction pool : ['1*1*0' '0*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([4, 4]), array([0, 2])]
Mating partners are : 1*1*0 and 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '0*1*0', '1*1*0', '1*1*0', '1*1*0']
```

```
Gen 75
Current Schemas : ['1*1*0', '0*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 16642.0, 32283.0, 47924.0, 63565.0]
Probability : [0.089, 0.095, 0.183, 0.272, 0.361]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '0*1*0' '1*1*0']
mating partners are : [array([1, 4]), array([0, 0])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

```
Gen 76
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([4, 4]), array([3, 0])]
Mating partners are : 1*1*0 and 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

```
Gen 77
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([0, 3]), array([4, 4])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 78

Current Schemas : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']  
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]  
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]  
Candidates in reproduction pool : ['1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0']  
mating partners are : [array([4, 3]), array([1, 1])]  
Mating partners are : 1\*1\*0 and 1\*1\*0  
Breaking point is : 2  
a and b is 1\*1\*0 1\*1\*0  
Mating partners are : 1\*1\*0 and 1\*1\*0  
The Offsprings are : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']

Gen 79

Current Schemas : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']  
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]  
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]  
Candidates in reproduction pool : ['1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0']  
mating partners are : [array([4, 2]), array([1, 3])]  
Mating partners are : 1\*1\*0 and 1\*1\*0  
Breaking point is : 2  
a and b is 1\*1\*0 1\*1\*0  
Mating partners are : 1\*1\*0 and 1\*1\*0  
Breaking point is : 3  
a and b is 1\*1\*0 1\*1\*0  
The Offsprings are : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']

Gen 80

Current Schemas : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']  
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]  
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]  
Candidates in reproduction pool : ['1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0']  
mating partners are : [array([0, 1]), array([2, 4])]  
Mating partners are : 1\*1\*0 and 1\*1\*0  
Breaking point is : 3  
a and b is 1\*1\*0 1\*1\*0  
Mating partners are : 1\*1\*0 and 1\*1\*0  
Breaking point is : 3  
a and b is 1\*1\*0 1\*1\*0  
The Offsprings are : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']

Gen 81

Current Schemas : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']  
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]  
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]  
Candidates in reproduction pool : ['1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0']  
mating partners are : [array([4, 0]), array([2, 2])]  
Mating partners are : 1\*1\*0 and 1\*1\*0  
Breaking point is : 2  
a and b is 1\*1\*0 1\*1\*0  
Mating partners are : 1\*1\*0 and 1\*1\*0  
The Offsprings are : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']

Gen 82

Current Schemas : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']  
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]  
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]  
Candidates in reproduction pool : ['1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0']  
mating partners are : [array([0, 3]), array([4, 4])]  
Mating partners are : 1\*1\*0 and 1\*1\*0  
Breaking point is : 1  
a and b is 1\*1\*0 1\*1\*0  
Mating partners are : 1\*1\*0 and 1\*1\*0  
The Offsprings are : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']

Gen 83

Current Schemas : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']  
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]  
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]  
Candidates in reproduction pool : ['1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0']  
mating partners are : [array([4, 4]), array([1, 2])]  
Mating partners are : 1\*1\*0 and 1\*1\*0  
Mating partners are : 1\*1\*0 and 1\*1\*0  
Breaking point is : 2  
a and b is 1\*1\*0 1\*1\*0  
The Offsprings are : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']

Gen 84

Current Schemas : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']  
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]  
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]  
Candidates in reproduction pool : ['1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0']  
mating partners are : [array([3, 2]), array([1, 1])]  
Mating partners are : 1\*1\*0 and 1\*1\*0  
Breaking point is : 3  
a and b is 1\*1\*0 1\*1\*0  
Mating partners are : 1\*1\*0 and 1\*1\*0  
The Offsprings are : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']

Gen 85

Current Schemas : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']  
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]  
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]  
Candidates in reproduction pool : ['1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0']  
mating partners are : [array([1, 0]), array([4, 4])]  
Mating partners are : 1\*1\*0 and 1\*1\*0  
Breaking point is : 1  
a and b is 1\*1\*0 1\*1\*0  
Mating partners are : 1\*1\*0 and 1\*1\*0  
The Offsprings are : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']

Gen 86

Current Schemas : ['1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0', '1\*1\*0']  
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]  
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]  
Candidates in reproduction pool : ['1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0' '1\*1\*0']  
mating partners are : [array([4, 0]), array([3, 1])]

```
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 87

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([4, 2]), array([1, 3])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 88

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([4, 1]), array([3, 2])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 89

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([3, 3]), array([2, 1])]
Mating partners are : 1*1*0 and 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 90

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
```

```

mating partners are : [array([2, 4]), array([3, 1])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

Gen 91

```

Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([1, 0]), array([2, 4])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

Gen 92

```

Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([0, 1]), array([3, 4])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

Gen 93

```

Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([1, 4]), array([0, 2])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

Gen 94

```

Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]

```

```

Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([3, 4]), array([1, 1])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

Gen 95

```

Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([3, 0]), array([1, 1])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

Gen 96

```

Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([2, 3]), array([1, 4])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

Gen 97

```

Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([2, 0]), array([4, 3])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

Gen 98

```

Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]

```

```
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([4, 1]), array([2, 3])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 99

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([1, 1]), array([2, 0])]
Mating partners are : 1*1*0 and 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 100

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([0, 1]), array([2, 2])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 101

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([3, 0]), array([2, 2])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 102

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([1, 0]), array([2, 3])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
```

```
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

```
Gen 103
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([0, 4]), array([1, 3])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

```
Gen 104
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([0, 0]), array([4, 1])]
Mating partners are : 1*1*0 and 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

```
Gen 105
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([0, 3]), array([2, 1])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

```
Gen 106
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([4, 0]), array([1, 3])]
Mating partners are : 1*1*0 and 1*1*0
```

```

Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

```

Gen 107
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*0*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 72001.0]
Probability : [0.068, 0.137, 0.205, 0.274, 0.3159999999999995]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*0*0' '1*1*0' '1*1*0']
mating partners are : [array([1, 0]), array([2, 4])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 2
a and b is 1*1*0 1*1*0
Mating partners are : 1*0*0 and 1*1*0
Breaking point is : 2
a and b is 1*0*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*0*0']

```

```

Gen 108
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*0*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 72001.0]
Probability : [0.068, 0.137, 0.205, 0.274, 0.3159999999999995]
Candidates in reproduction pool : ['1*1*0' '1*0*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([1, 4]), array([2, 2])]
Mating partners are : 1*0*0 and 1*1*0
Breaking point is : 3
a and b is 1*0*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*0*0', '1*1*0', '1*1*0', '1*1*0']

```

```

Gen 109
Current Schemas : ['1*1*0', '1*0*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 25078.0, 40719.0, 56360.0, 72001.0]
Probability : [0.075, 0.12, 0.194, 0.269, 0.3419999999999997]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*0*0' '1*1*0' '1*1*0']
mating partners are : [array([3, 3]), array([0, 1])]
Mating partners are : 1*1*0 and 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']

```

```

Gen 110
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([3, 0]), array([1, 1])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0

```

```
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 111

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 62564.0, 78205.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '1*1*0' '1*1*0']
mating partners are : [array([2, 4]), array([0, 3])]
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 3
a and b is 1*1*0 1*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '1*1*0', '1*1*0']
```

Gen 112

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '0*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 47924.0, 63565.0]
Probability : [0.076, 0.152, 0.229, 0.233, 0.3100000000000005]
Candidates in reproduction pool : ['1*1*0' '0*1*0' '1*1*0' '0*1*0' '0*1*0']
mating partners are : [array([4, 3]), array([2, 2])]
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 3
a and b is 0*1*0 0*1*0
Mating partners are : 1*1*0 and 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '1*1*0', '0*1*0', '0*1*0']
```

Gen 113

```
Current Schemas : ['1*1*0', '1*1*0', '1*1*0', '0*1*0', '0*1*0']
Fitness : [15641.0, 31282.0, 46923.0, 47924.0, 48925.0]
Probability : [0.082, 0.164, 0.246, 0.251, 0.257]
Candidates in reproduction pool : ['1*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([3, 2]), array([0, 4])]
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 1
a and b is 0*1*0 0*1*0
Mating partners are : 1*1*0 and 0*1*0
Breaking point is : 1
a and b is 1*1*0 0*1*0
The Offsprings are : ['1*1*0', '1*1*0', '0*1*0', '0*1*0', '0*1*0']
```

Gen 114

```
Current Schemas : ['1*1*0', '1*1*0', '0*1*0', '0*1*0', '0*1*0']
Fitness : [15641.0, 31282.0, 32283.0, 33284.0, 34285.0]
Probability : [0.107, 0.213, 0.22, 0.227, 0.2329999999999998]
Candidates in reproduction pool : ['0*1*0' '1*1*0' '0*1*0' '0*1*0' '1*1*0']
mating partners are : [array([0, 3]), array([1, 4])]
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 2
a and b is 0*1*0 0*1*0
Mating partners are : 1*1*0 and 1*1*0
```

```
Breaking point is : 2
a and b is 1*1*0 1*1*0
The Offsprings are : ['0*1*0', '1*1*0', '0*1*0', '0*1*0', '1*1*0']
```

Gen 115

```
Current Schemas : ['0*1*0', '1*1*0', '0*1*0', '0*1*0', '1*1*0']
Fitness : [1001.0, 16642.0, 17643.0, 18644.0, 34285.0]
Probability : [0.011, 0.189, 0.2, 0.211, 0.389]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '1*1*0' '0*1*0' '0*1*0']
mating partners are : [array([0, 3]), array([4, 1])]
Mating partners are : 1*1*0 and 0*1*0
Breaking point is : 1
a and b is 1*1*0 0*1*0
Mating partners are : 0*1*0 and 1*1*0
Breaking point is : 1
a and b is 0*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '0*1*0', '0*1*0', '0*1*0']
```

Gen 116

```
Current Schemas : ['1*1*0', '1*1*0', '0*1*0', '0*1*0', '0*1*0']
Fitness : [15641.0, 31282.0, 32283.0, 33284.0, 34285.0]
Probability : [0.107, 0.213, 0.22, 0.227, 0.23299999999999998]
Candidates in reproduction pool : ['1*1*0' '0*1*0' '1*1*0' '0*1*0' '0*1*0']
mating partners are : [array([1, 1]), array([3, 3])]
Mating partners are : 0*1*0 and 0*1*0
Mating partners are : 0*1*0 and 0*1*0
The Offsprings are : ['1*1*0', '1*1*0', '0*1*0', '0*1*0', '0*1*0']
```

Gen 117

```
Current Schemas : ['1*1*0', '1*1*0', '0*1*0', '0*1*0', '0*1*0']
Fitness : [15641.0, 31282.0, 32283.0, 33284.0, 34285.0]
Probability : [0.107, 0.213, 0.22, 0.227, 0.23299999999999998]
Candidates in reproduction pool : ['1*1*0' '1*1*0' '0*1*0' '0*1*0' '1*1*0']
mating partners are : [array([2, 2]), array([1, 0])]
Mating partners are : 0*1*0 and 0*1*0
Mating partners are : 1*1*0 and 1*1*0
Breaking point is : 1
a and b is 1*1*0 1*1*0
The Offsprings are : ['1*1*0', '1*1*0', '0*1*0', '0*1*0', '0*1*0']
```

Gen 118

```
Current Schemas : ['1*1*0', '1*1*0', '0*0*0', '0*1*0', '1*1*0']
Fitness : [15641.0, 31282.0, 31583.0, 32584.0, 48225.0]
Probability : [0.098, 0.196, 0.198, 0.205, 0.3029999999999994]
Candidates in reproduction pool : ['0*1*0' '0*0*0' '0*0*0' '0*1*0' '0*0*0']
mating partners are : [array([0, 1]), array([3, 4])]
Mating partners are : 0*1*0 and 0*0*0
Breaking point is : 2
a and b is 0*1*0 0*0*0
Mating partners are : 0*1*0 and 0*0*0
Breaking point is : 2
a and b is 0*1*0 0*0*0
The Offsprings are : ['0*0*0', '0*1*0', '0*0*0', '0*0*0', '0*1*0']
```

```

Gen 119
Current Schemas : ['0*0*0', '0*1*0', '0*0*0', '0*0*0', '0*1*0']
Fitness : [301.0, 1302.0, 1603.0, 1904.0, 2905.0]
Probability : [0.038, 0.162, 0.2, 0.238, 0.362]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([2, 0]), array([1, 3])]
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 1
a and b is 0*1*0 0*1*0
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 2
a and b is 0*1*0 0*1*0
The Offsprings are : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']

```

```

Gen 120
Current Schemas : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2002.0, 3003.0, 4004.0, 5005.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([4, 1]), array([3, 0])]
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 1
a and b is 0*1*0 0*1*0
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 2
a and b is 0*1*0 0*1*0
The Offsprings are : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']

```

```

Gen 121
Current Schemas : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2002.0, 3003.0, 4004.0, 5005.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([2, 1]), array([3, 0])]
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 2
a and b is 0*1*0 0*1*0
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 3
a and b is 0*1*0 0*1*0
The Offsprings are : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']

```

```

Gen 122
Current Schemas : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2002.0, 3003.0, 4004.0, 5005.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([1, 4]), array([3, 2])]
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 1
a and b is 0*1*0 0*1*0
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 3
a and b is 0*1*0 0*1*0

```

```
a diu u is a t
The Offsprings are : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
```

Gen 123

```
Current Schemas : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2002.0, 3003.0, 4004.0, 5005.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([2, 1]), array([3, 3])]
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 1
a and b is 0*1*0 0*1*0
Mating partners are : 0*1*0 and 0*1*0
The Offsprings are : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
```

Gen 124

```
Current Schemas : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2002.0, 3003.0, 4004.0, 5005.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([1, 4]), array([0, 2])]
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 2
a and b is 0*1*0 0*1*0
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 3
a and b is 0*1*0 0*1*0
The Offsprings are : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
```

Gen 125

```
Current Schemas : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2002.0, 3003.0, 4004.0, 5005.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([2, 2]), array([0, 3])]
Mating partners are : 0*1*0 and 0*1*0
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 2
a and b is 0*1*0 0*1*0
The Offsprings are : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
```

Gen 126

```
Current Schemas : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2002.0, 3003.0, 4004.0, 5005.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([4, 4]), array([3, 1])]
Mating partners are : 0*1*0 and 0*1*0
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 2
a and b is 0*1*0 0*1*0
The Offsprings are : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
```

Gen 127

```
Current Schemas : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2002.0, 3003.0, 4004.0, 5005.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([3, 1]), array([2, 0])]
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 1
a and b is 0*1*0 0*1*0
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 3
a and b is 0*1*0 0*1*0
The Offsprings are : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
```

Gen 128

```
Current Schemas : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2002.0, 3003.0, 4004.0, 5005.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([2, 0]), array([1, 1])]
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 1
a and b is 0*1*0 0*1*0
Mating partners are : 0*1*0 and 0*1*0
The Offsprings are : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
```

Gen 129

```
Current Schemas : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2002.0, 3003.0, 4004.0, 5005.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([4, 2]), array([0, 0])]
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 2
a and b is 0*1*0 0*1*0
Mating partners are : 0*1*0 and 0*1*0
The Offsprings are : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
```

Gen 130

```
Current Schemas : ['0*1*0', '0*1*0', '0*0*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2002.0, 2303.0, 3304.0, 4305.0]
Probability : [0.078, 0.155, 0.178, 0.256, 0.3329999999999996]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*0*0' '0*1*0' '0*1*0']
mating partners are : [array([1, 1]), array([4, 3])]
Mating partners are : 0*1*0 and 0*1*0
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 3
a and b is 0*1*0 0*1*0
The Offsprings are : ['0*1*0', '0*1*0', '0*0*0', '0*1*0', '0*1*0']
```

Gen 131

```
Current Schemas : ['0*1*0', '0*1*0', '0*0*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2002.0, 2203.0, 3204.0, 4205.0]
```

```

Fitness : [1001.0, 2002.0, 2303.0, 3304.0, 4305.0]
Probability : [0.078, 0.155, 0.178, 0.256, 0.33299999999999996]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([2, 2]), array([3, 1])]
Mating partners are : 0*1*0 and 0*1*0
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 1
a and b is 0*1*0 0*1*0
The Offsprings are : ['0*1*0', '0*1*0', '0*0*0', '0*1*0', '0*1*0']

```

Gen 132

```

Current Schemas : ['0*1*0', '0*1*0', '0*0*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2002.0, 2303.0, 3304.0, 4305.0]
Probability : [0.078, 0.155, 0.178, 0.256, 0.33299999999999996]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([3, 4]), array([1, 0])]
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 3
a and b is 0*1*0 0*1*0
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 3
a and b is 0*1*0 0*1*0
The Offsprings are : ['0*1*0', '0*1*0', '0*0*0', '0*1*0', '0*1*0']

```

Gen 133

```

Current Schemas : ['0*1*0', '0*1*0', '0*0*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2002.0, 2303.0, 3304.0, 4305.0]
Probability : [0.078, 0.155, 0.178, 0.256, 0.33299999999999996]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*0*0' '0*1*0']
mating partners are : [array([3, 2]), array([0, 1])]
Mating partners are : 0*0*0 and 0*1*0
Breaking point is : 1
a and b is 0*0*0 0*1*0
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 2
a and b is 0*1*0 0*1*0
The Offsprings are : ['0*1*0', '0*1*0', '0*0*0', '0*1*0', '0*1*0']

```

Gen 134

```

Current Schemas : ['0*1*0', '0*1*1', '0*0*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2287.0, 2588.0, 3589.0, 4590.0]
Probability : [0.071, 0.163, 0.184, 0.255, 0.32699999999999996]
Candidates in reproduction pool : ['0*1*0' '0*0*0' '0*1*1' '0*1*0' '0*1*0']
mating partners are : [array([3, 1]), array([0, 4])]
Mating partners are : 0*1*0 and 0*0*0
Breaking point is : 3
a and b is 0*1*0 0*0*0
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 2
a and b is 0*1*0 0*1*0
The Offsprings are : ['0*1*0', '0*0*0', '0*0*0', '0*1*0', '0*1*0']

```

Gen 135

```
Current Schemas : ['0*1*0', '0*0*0', '0*0*0', '0*1*0', '0*1*0']
```

```

Fitness : [1001.0, 1302.0, 1603.0, 2604.0, 3605.0]
Probability : [0.099, 0.129, 0.158, 0.257, 0.357]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([3, 1]), array([4, 0])]
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 3
a and b is 0*1*0 0*1*0
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 1
a and b is 0*1*0 0*1*0
The Offsprings are : ['0*1*0', '0*1*0', '0*0*0', '0*1*0', '0*1*0']

```

Gen 136

```

Current Schemas : ['0*1*0', '0*1*0', '0*0*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2002.0, 2303.0, 3304.0, 4305.0]
Probability : [0.078, 0.155, 0.178, 0.256, 0.3329999999999996]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([4, 2]), array([0, 0])]
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 3
a and b is 0*1*0 0*1*0
Mating partners are : 0*1*0 and 0*1*0
The Offsprings are : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']

```

Gen 137

```

Current Schemas : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2002.0, 3003.0, 4004.0, 5005.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([2, 1]), array([4, 3])]
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 3
a and b is 0*1*0 0*1*0
Mating partners are : 0*1*0 and 0*1*0
Breaking point is : 1
a and b is 0*1*0 0*1*0
The Offsprings are : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']

```

Gen 138

```

Current Schemas : ['0*1*0', '0*1*0', '0*1*0', '0*1*0', '0*1*0']
Fitness : [1001.0, 2002.0, 3003.0, 4004.0, 5005.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['0*1*0' '0*1*0' '0*1*0' '0*1*0' '0*1*0']
mating partners are : [array([2, 1]), array([0, 3])]

----- 0*1*0 and 0*1*0

```

```

:def reproduce(a, b):
    k = random.randint(1, 4)
    print("Breaking point is : ", k)
    # a = "{0:b}".format(a)
    # b = "{0:b}".format(b)
    # while(not(len(a) == 5)):
    #     a = '0' + a
    # while(not(len(b) == 5)):
    #     b = '0' + b

```

```

print("a and b is ", a, b)

a1 = (a[0 : k] + b[k : len(b)])
b1 = (b[0 : k] + a[k : len(b)])

return(a1, b1)

print(reproduce('1****', '01*0*'))

⇒ Breaking point is : 1
a and b is 1**** 01*0*
('11*0*', '0****')

def mutation(inp):
    mutated_inp = []
    s = ''
    for schema in inp:
        a = choice([0, 1], p = [0.02, 0.98])
        if(a == 0):
            pos = random.randint(0, 5)
            if(schema[pos] == '*'):
                s = schema
                pass
            else:
                s = schema[0 : pos] + str(int(not(int(schema[pos])))) + schema[pos + 1 : len(schema)]
        mutated_inp.append(s)
    else:
        mutated_inp.append(schema)
    return(mutated_inp)

print(mutation(['0*000', '01**0', '*00*1', '110*1', '0*011', '11***', '0111*', '0100*', '**']))

⇒ ['0*000', '01**0', '*00*1', '110*1', '0*011', '11***', '0111*', '0100*', '*****', '**']

inp = []
alphabets = '01*'
for i in range(10):
    schema = ''
    for j in range(5):
        randinteger = random.randint(0, 3)
        schema = schema + alphabets[randinteger]
    if(schema in inp):
        i -= 1
    else:
        inp.append(schema)

print(inp)

⇒ ['0*000', '01**0', '*00*1', '110*1', '0*011', '11***', '0111*', '0100*', '*****', '**']

def gen_pop(schema):

```

```

pop = []
for bit in schema:
    if(bit == '*'):
        pop.extend(pop)
    temp = []
    for i in range(len(pop)):
        if(i < len(pop)/2):
            temp.append(pop[i] + '0')
        else:
            temp.append(pop[i] + '1')
    if(len(pop) == 0):
        pop.append('0')
        pop.append('1')
    else:
        pop = temp
else:
    if(len(pop) == 0):
        pop.append(bit)
    else:
        pop = list(map(lambda x : x + bit, pop))
return(pop)

```

```

for schema in ['0*000', '01**0', '*00*1', '110*1', '0*011', '11***', '0111*', '0100*', '**0*1']:
    print("The schema is : ", schema)
    print("The generated population is : ", gen_pop(schema), "length : ", len(set(gen_pop(sc

```

↳ The schema is : 0\*000  
 The generated population is : ['00000', '01000'] length : 2  
 The schema is : 01\*\*0  
 The generated population is : ['01000', '01100', '01010', '01110'] length : 4  
 The schema is : \*00\*1  
 The generated population is : ['00001', '10001', '00011', '10011'] length : 4  
 The schema is : 110\*1  
 The generated population is : ['11001', '11011'] length : 2  
 The schema is : 0\*011  
 The generated population is : ['00011', '01011'] length : 2  
 The schema is : 11\*\*\*  
 The generated population is : ['11000', '11100', '11010', '11110', '11001', '11101', '11111'] length : 7  
 The schema is : 0111\*  
 The generated population is : ['01110', '01111'] length : 2  
 The schema is : 0100\*  
 The generated population is : ['01000', '01001'] length : 2  
 The schema is : \*\*\*\*\*  
 The generated population is : ['00000', '10000', '01000', '11000', '00100', '10100', '11100'] length : 7  
 The schema is : \*\*\*0\*  
 The generated population is : ['00000', '10000', '01000', '11000', '00100', '10100', '11100'] length : 7

```

def main_2():
    inp = []
    alphabets = '01*'
    k = 0
    while(k < 5):
        schema = ''
        for j in range(5):
            randinteger = random.randint(0, 3)

```

```

schema = schema + alphabets[randinteger]
if(schema in inp):
    k -= 1
else:
    inp.append(schema)
k += 1

print(inp)
prev_gen_avg = 0
strongest_gene = []
strike = 0
j = 0
while(strike < 50):
    # strike += 1
    j += 1
    print("\n\n\nGen {}".format(j))
    print("Current Schemas : ", inp)
    current_population = dict()

    for schema in inp:
        current_population[schema] = gen_pop(schema)

    fit = []
    f = 0
    for i in range(len(inp)):
        for chromosome in current_population[inp[i]]:
            f += fitness_func(chromosome)

    fit.append(f/len(current_population[inp[i]]))
    print("Fitness : ", fit)
    s = np.array(fit).sum()

    current_gen_avg = np.array(fit).mean()
    if(prev_gen_avg > current_gen_avg):
        strike += 1
    else:
        prev_gen_avg = current_gen_avg
        strike = 0
        strongest_gene = inp.copy()
p = []
for i in range(len(fit) - 1):
    frac = float("{0:.3f}".format(float(fit[i]/s)))
    p.append(frac)

frac = 1 - np.array(p).sum()
p.append(frac)

print("Probability : ", p)

child = choice(a = inp, size = len(inp), p = p)
print("Candidates in reproduction pool : ", child)
mating_partners = []
a = [0, 1, 2, 3, 4]
for i in range(int(len(inp)/2)):
    partner = choice(a = a, size = 2)
    mating_partners.append([child[i], partner])

```

```
mating_partners.append(partner)
a = set(a) - set(partner)
a = list(a)
# mating_partners_1 = choice(a = [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10], size = 2)
# mating_partners_2 = list(set([0, 1, 2, 3]) - set(mating_partners_1))
print("mating partners are : ", mating_partners)

for partner in mating_partners:
    print("Mating partners are : {} and {}".format(child[partner[0]], child[partner[1]]))
    if(len(set(partner)) == 1):
        continue
    else:
        inp[partner[0]], inp[partner[1]] = reproduce(child[partner[0]], child[partner[1]])

# inp[0], inp[1] = reproduce(child[mating_partners_1[0]], child[mating_partners_1[1]])
# inp[2], inp[3] = reproduce(child[mating_partners_2[0]], child[mating_partners_2[1]])
print("The Offsprings are : ", inp)
inp = mutation(inp)

print("The strongest gene is : ", strongest_gene)
print()
main_2()
```



```
[ '**1**', '*11**', '1**00', '100*1', '011*0' ]
```

## Gen 1

```
Current Schemas : [ '**1**', '*11**', '1**00', '100*1', '011*0' ]
Fitness : [8867.5, 30848.5, 72679.0, 150612.0, 152521.0]
Probability : [0.021, 0.074, 0.175, 0.362, 0.368]
Candidates in reproduction pool : [ '100*1' '011*0' '100*1' '1**00' '100*1' ]
mating partners are : [array([3, 4]), array([1, 2])]
Mating partners are : 1**00 and 100*1
Breaking point is : 1
a and b is 1**00 100*1
Mating partners are : 011*0 and 100*1
Breaking point is : 3
a and b is 011*0 100*1
The Offsprings are : [ '**1**', '011*1', '100*0', '100*1', '1**00' ]
```

## Gen 2

```
Current Schemas : [ '**1**', '011*1', '100*0', '100*1', '1**00' ]
Fitness : [8867.5, 73346.0, 77747.0, 83001.0, 52482.5]
Probability : [0.03, 0.248, 0.263, 0.281, 0.17799999999999994]
Candidates in reproduction pool : [ '100*0' '011*1' '011*1' '100*0' '100*1' ]
mating partners are : [array([2, 2]), array([4, 4])]
Mating partners are : 011*1 and 011*1
Mating partners are : 100*1 and 100*1
The Offsprings are : [ '**1**', '011*1', '100*0', '100*1', '1**00' ]
```

## Gen 3

```
Current Schemas : [ '**1**', '011*1', '100*0', '100*1', '1**00' ]
Fitness : [8867.5, 73346.0, 77747.0, 83001.0, 52482.5]
Probability : [0.03, 0.248, 0.263, 0.281, 0.17799999999999994]
Candidates in reproduction pool : [ '100*0' '100*1' '011*1' '011*1' '100*1' ]
mating partners are : [array([2, 2]), array([1, 0])]
Mating partners are : 011*1 and 011*1
Mating partners are : 100*1 and 100*0
Breaking point is : 2
a and b is 100*1 100*0
The Offsprings are : [ '100*1', '100*0', '100*0', '100*1', '1**00' ]
```

## Gen 4

```
Current Schemas : [ '100*1', '100*0', '100*0', '100*1', '1**00' ]
Fitness : [5254.0, 9655.0, 14056.0, 19310.0, 20637.0]
Probability : [0.076, 0.14, 0.204, 0.28, 0.2999999999999993]
Candidates in reproduction pool : [ '100*1' '1**00' '100*1' '100*1' '100*1' ]
mating partners are : [array([1, 3]), array([2, 4])]
Mating partners are : 1**00 and 100*1
Breaking point is : 2
a and b is 1**00 100*1
Mating partners are : 100*1 and 100*1
Breaking point is : 2
a and b is 100*1 100*1
The Offsprings are : [ '100*1', '1*0*1', '100*1', '10*00', '100*1' ]
```

Gen 5

```

Current Schemas : ['100*1', '1*0*1', '100*1', '00*00', '100*1']
Fitness : [5254.0, 13417.0, 32088.0, 32106.0, 37360.0]
Probability : [0.044, 0.112, 0.267, 0.267, 0.3099999999999994]
Candidates in reproduction pool : ['00*00' '100*1' '1*0*1' '100*1' '100*1']
mating partners are : [array([0, 4]), array([1, 3])]
Mating partners are : 00*00 and 100*1
Breaking point is : 1
a and b is 00*00 100*1
Mating partners are : 100*1 and 100*1
Breaking point is : 3
a and b is 100*1 100*1
The Offsprings are : ['000*1', '100*1', '100*1', '100*1', '10*00']

```

Gen 6

```

Current Schemas : ['000*1', '100*1', '100*1', '100*1', '10*00']
Fitness : [6.0, 5260.0, 10514.0, 15768.0, 21178.0]
Probability : [0.0, 0.1, 0.199, 0.299, 0.4019999999999999]
Candidates in reproduction pool : ['100*1' '100*1' '100*1' '100*1' '100*1']
mating partners are : [array([1, 1]), array([0, 0])]
Mating partners are : 100*1 and 100*1
Mating partners are : 100*1 and 100*1
The Offsprings are : ['000*1', '100*1', '100*1', '100*1', '10*00']

```

Gen 7

```

Current Schemas : ['000*1', '100*1', '100*1', '100*1', '10*00']
Fitness : [6.0, 5260.0, 10514.0, 15768.0, 21178.0]
Probability : [0.0, 0.1, 0.199, 0.299, 0.4019999999999999]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '100*1' '10*00']
mating partners are : [array([4, 4]), array([0, 2])]
Mating partners are : 10*00 and 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
The Offsprings are : ['10*00', '100*1', '10*00', '100*1', '10*00']

```

Gen 8

```

Current Schemas : ['10*00', '100*1', '10*00', '100*1', '10*00']
Fitness : [5410.0, 10664.0, 16074.0, 21328.0, 26738.0]
Probability : [0.067, 0.133, 0.2, 0.266, 0.3339999999999996]
Candidates in reproduction pool : ['100*1' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([3, 3]), array([0, 4])]
Mating partners are : 10*00 and 10*00
Mating partners are : 100*1 and 10*00
Breaking point is : 2
a and b is 100*1 10*00
The Offsprings are : ['10*00', '100*1', '10*00', '100*1', '100*1']

```

Gen 9

```

Current Schemas : ['10*00', '100*1', '10*00', '100*1', '100*1']
Fitness : [5410.0, 10664.0, 16074.0, 21328.0, 26582.0]
Probability : [0.068, 0.133, 0.201, 0.266, 0.3319999999999996]
Candidates in reproduction pool : ['10*00' '100*1' '10*00' '100*1' '10*00']

```

```
mating partners are : [array([0, 4]), array([1, 3])]
Mating partners are : 10*00 and 10*00
Breaking point is : 3
a and b is 10*00 10*00
Mating partners are : 100*1 and 100*1
Breaking point is : 1
a and b is 100*1 100*1
The Offsprings are : ['10*00', '100*1', '10*00', '100*1', '10*00']
```

Gen 10

```
Current Schemas : ['10*00', '100*1', '10*00', '100*1', '10*00']
Fitness : [5410.0, 10664.0, 16074.0, 21328.0, 26738.0]
Probability : [0.067, 0.133, 0.2, 0.266, 0.33399999999999996]
Candidates in reproduction pool : ['100*1' '10*00' '100*1' '10*00' '10*00']
mating partners are : [array([4, 2]), array([1, 3])]
Mating partners are : 10*00 and 100*1
Breaking point is : 1
a and b is 10*00 100*1
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '100*1']
```

Gen 11

```
Current Schemas : ['10*00', '10*00', '10*00', '10*00', '100*1']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 26894.0]
Probability : [0.067, 0.134, 0.2, 0.267, 0.33199999999999996]
Candidates in reproduction pool : ['10*00' '100*1' '100*1' '100*1' '10*00']
mating partners are : [array([0, 4]), array([1, 2])]
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
Mating partners are : 100*1 and 100*1
Breaking point is : 2
a and b is 100*1 100*1
The Offsprings are : ['10*00', '100*1', '100*1', '10*00', '10*00']
```

Gen 12

```
Current Schemas : ['10*00', '100*1', '100*1', '10*00', '10*00']
Fitness : [5410.0, 10664.0, 15918.0, 21328.0, 26738.0]
Probability : [0.068, 0.133, 0.199, 0.266, 0.33399999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '100*1' '10*00']
mating partners are : [array([4, 1]), array([2, 2])]
Mating partners are : 10*00 and 10*00
Breaking point is : 3
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
The Offsprings are : ['10*00', '10*00', '100*1', '10*00', '10*00']
```

Gen 13

```
Current Schemas : ['10*00', '10*00', '100*1', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16074.0, 21484.0, 26894.0]
Probability : [0.067, 0.134, 0.199, 0.266, 0.33399999999999996]
```

```
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([2, 2]), array([0, 1])]
Mating partners are : 10*00 and 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '100*1', '10*00', '10*00']
```

Gen 14

```
Current Schemas : ['11*00', '10*00', '100*1', '10*00', '10*00']
Fitness : [16554.0, 21964.0, 27218.0, 32628.0, 38038.0]
Probability : [0.121, 0.161, 0.2, 0.239, 0.2789999999999999]
Candidates in reproduction pool : ['10*00' '10*00' '100*1' '10*00' '10*00']
mating partners are : [array([2, 4]), array([0, 3])]
Mating partners are : 100*1 and 10*00
Breaking point is : 1
a and b is 100*1 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 3
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '100*1']
```

Gen 15

```
Current Schemas : ['10*00', '10*00', '10*00', '10*00', '100*1']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 26894.0]
Probability : [0.067, 0.134, 0.2, 0.267, 0.3319999999999996]
Candidates in reproduction pool : ['10*00' '100*1' '100*1' '10*00' '100*1']
mating partners are : [array([3, 3]), array([1, 0])]
Mating partners are : 10*00 and 10*00
Mating partners are : 100*1 and 10*00
Breaking point is : 3
a and b is 100*1 10*00
The Offsprings are : ['10**1', '10000', '10*00', '10*00', '100*1']
```

Gen 16

```
Current Schemas : ['10**1', '10000', '10*00', '10*00', '100*1']
Fitness : [7510.0, 33640.0, 22230.0, 27640.0, 32894.0]
Probability : [0.061, 0.271, 0.179, 0.223, 0.266]
Candidates in reproduction pool : ['10*00' '100*1' '10*00' '10*00' '10*00']
mating partners are : [array([1, 4]), array([2, 2])]
Mating partners are : 100*1 and 10*00
Breaking point is : 1
a and b is 100*1 10*00
Mating partners are : 10*00 and 10*00
The Offsprings are : ['10**1', '10*00', '10*00', '10*00', '100*1']
```

Gen 17

```
Current Schemas : ['10**1', '10*00', '10*00', '10*00', '110*1']
Fitness : [7510.0, 20430.0, 25840.0, 31250.0, 47576.0]
Probability : [0.057, 0.154, 0.195, 0.236, 0.358]
Candidates in reproduction pool : ['110*1' '10*00' '110*1' '110*1' '10*00']
mating partners are : [array([2, 2]), array([4, 0])]
Mating partners are : 110*1 and 110*1
Mating partners are : 10*00 and 110*1
```

```
Breaking point is : 2
a and b is 10*00 110*1
The Offsprings are : ['11*00', '10*00', '10*00', '10*00', '100*1']
```

```
Gen 18
Current Schemas : ['11*00', '10*00', '10*00', '10*00', '100*1']
Fitness : [16554.0, 21964.0, 27374.0, 32784.0, 38038.0]
Probability : [0.121, 0.161, 0.2, 0.24, 0.278]
Candidates in reproduction pool : ['10*00' '10*00' '100*1' '10*00' '10*00']
mating partners are : [array([2, 0]), array([4, 3])]
Mating partners are : 100*1 and 10*00
Breaking point is : 1
a and b is 100*1 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 1
a and b is 10*00 10*00
The Offsprings are : ['100*1', '10*00', '10*00', '10*00', '10*00']
```

```
Gen 19
Current Schemas : ['100*1', '10*00', '10*00', '10*00', '10*00']
Fitness : [5254.0, 10664.0, 16074.0, 21484.0, 26894.0]
Probability : [0.065, 0.133, 0.2, 0.267, 0.3349999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '100*1' '10*00' '10*00']
mating partners are : [array([1, 0]), array([2, 2])]
Mating partners are : 10*00 and 10*00
Breaking point is : 1
a and b is 10*00 10*00
Mating partners are : 100*1 and 100*1
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']
```

```
Gen 20
Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([1, 2]), array([0, 4])]
Mating partners are : 10*00 and 10*00
Breaking point is : 3
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']
```

```
Gen 21
Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([1, 3]), array([4, 2])]
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
```

```
Mating partners are : 10*00 and 10*00
Breaking point is : 3
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']
```

Gen 22

```
Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([4, 3]), array([1, 2])]
Mating partners are : 10*00 and 10*00
Breaking point is : 1
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']
```

Gen 23

```
Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([2, 2]), array([4, 3])]
Mating partners are : 10*00 and 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 1
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']
```

Gen 24

```
Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([4, 3]), array([2, 2])]
Mating partners are : 10*00 and 10*00
Breaking point is : 1
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']
```

Gen 25

```
Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([1, 3]), array([4, 4])]
Mating partners are : 10*00 and 10*00
Breaking point is : 3
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']
```

Gen 26

```

Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([1, 3]), array([4, 0])]
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 1
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']

```

Gen 27

```

Current Schemas : ['10*01', '10*00', '10*00', '10*00', '10*00']
Fitness : [6376.0, 11786.0, 17196.0, 22606.0, 28016.0]
Probability : [0.074, 0.137, 0.2, 0.263, 0.3259999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([3, 2]), array([4, 4])]
Mating partners are : 10*00 and 10*00
Breaking point is : 3
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
The Offsprings are : ['10*01', '10*00', '10*00', '10*00', '10*00']

```

Gen 28

```

Current Schemas : ['10*01', '10*00', '10*00', '10*00', '10*00']
Fitness : [6376.0, 11786.0, 17196.0, 22606.0, 28016.0]
Probability : [0.074, 0.137, 0.2, 0.263, 0.3259999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([1, 0]), array([2, 3])]
Mating partners are : 10*00 and 10*00
Breaking point is : 1
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 1
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']

```

Gen 29

```

Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([1, 3]), array([0, 4])]
Mating partners are : 10*00 and 10*00
Breaking point is : 1
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 1
a and b is 10*00 10*00

```

```
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']
```

Gen 30

```
Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([3, 1]), array([2, 4])]
Mating partners are : 10*00 and 10*00
Breaking point is : 1
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']
```

Gen 31

```
Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([3, 4]), array([1, 1])]
Mating partners are : 10*00 and 10*00
Breaking point is : 3
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']
```

Gen 32

```
Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([2, 2]), array([0, 1])]
Mating partners are : 10*00 and 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']
```

Gen 33

```
Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([2, 4]), array([0, 0])]
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']
```

Gen 34

```

Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([3, 2]), array([0, 0])]
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']

```

Gen 35

```

Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([2, 0]), array([3, 1])]
Mating partners are : 10*00 and 10*00
Breaking point is : 1
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']

```

Gen 36

```

Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([1, 2]), array([3, 3])]
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']

```

Gen 37

```

Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([2, 1]), array([3, 3])]
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']

```

Gen 38

```

Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]

```

```

Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([2, 3]), array([1, 1])]
Mating partners are : 10*00 and 10*00
Breaking point is : 1
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']

```

Gen 39

```

Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([3, 2]), array([0, 4])]
Mating partners are : 10*00 and 10*00
Breaking point is : 3
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']

```

Gen 40

```

Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([2, 1]), array([0, 3])]
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']

```

Gen 41

```

Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.3329999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([0, 1]), array([4, 3])]
Mating partners are : 10*00 and 10*00
Breaking point is : 3
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 1
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']

```

Gen 42

```

Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]

```

```
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([1, 1]), array([2, 2])]
Mating partners are : 10*00 and 10*00
Mating partners are : 10*00 and 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']
```

Gen 43

```
Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([0, 2]), array([4, 4])]
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']
```

Gen 44

```
Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([0, 1]), array([2, 3])]
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 3
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']
```

Gen 45

```
Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([3, 1]), array([2, 4])]
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 3
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']
```

Gen 46

```
Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([4, 0]), array([3, 2])]
```

```

Mating partners are : ۱۰۰۰۰ ۱۰۰۰۰
Breaking point is : 1
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 3
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']

```

Gen 47

```

Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([4, 4]), array([2, 1])]
Mating partners are : 10*00 and 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 1
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']

```

Gen 48

```

Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([3, 2]), array([1, 1])]
Mating partners are : 10*00 and 10*00
Breaking point is : 3
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']

```

Gen 49

```

Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([3, 3]), array([0, 2])]
Mating partners are : 10*00 and 10*00
Mating partners are : 10*00 and 10*00
Breaking point is : 2
a and b is 10*00 10*00
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']

```

Gen 50

```

Current Schemas : ['10*00', '10*00', '10*00', '10*00', '10*00']
Fitness : [5410.0, 10820.0, 16230.0, 21640.0, 27050.0]
Probability : [0.067, 0.133, 0.2, 0.267, 0.33299999999999996]
Candidates in reproduction pool : ['10*00' '10*00' '10*00' '10*00' '10*00']
mating partners are : [array([4, 3]), array([0, 2])]
Mating partners are : 10*00 and 10*00
Breaking point is : 3
a and b is 10*00 10*00
Mating partners are : 10*00 and 10*00

```

```
Breaking point is : 2  
a and b is 10*00 10*00
```

```
The Offsprings are : ['10*00', '10*00', '10*00', '10*00', '10*00']
```