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Section: 3

Assignment: 2

Course: CSE422

Ans to the Q:N:A

<u>(1)</u>

❦

Each chromosome will have 8 genes with the value of 0 on 1. 0 means that item is not picked and 1 means that item is picked.

Chromosomes:

(i) 0 0 0 1 0 0 0 1 ⟶ Reward = 42

(ii) 0 1 1 0 0 0 1 1 ⟶ Reward = 26

(iii) 1 0 1 0 0 0 1 0 1 ⟶ Reward = 62

(iv) 0 1 0 0 1 0 0 1 ⟶ Reward = 20

(2)

While creating the chromosomes, each chromosome weight must be less than or equal to 12. At each iteration of the fitness function, we store the maximum rewards in a variable. If the max reward is greater than the previous iterations, we replace it with the new one. After n number of iterations, the chromosome containing the max reward will be the solution. The more the rewards are, the fit the chromosomes are.

fitness function(chromosomes):

most_reward = max_reward(chromosomes)

fittest_chromosome = chromosome having (most_reward)

from this fitness function, the best

two fit chromosomes are,

(i) 0001 0001 → Reward = 47

(ii) 101 00 101 → Reward = 62

(B)

0 0 0 1 0 0 0 1 → 1 0 0 1 0 0 0 1

1 0 1 0 0 1 0 1 → 0 0 1 0 0 1 0 1

(4)

Let's mutate the second chromosome!

☐ 0 1 0 0 1 0 1 → 1 0 1 0 0 1 0 1

Fitness = 20 + 0 + 10 + 0 + 0 + 25 + 0 + 7

= 62

Ans to the Q. N. B

(1)

Chromosomes:

(i) A D G C F B E → cost = 37

(ii) A B E G D C F → cost = 59

(iii) B F A C E G D → cost = 55

(iv) D C A F B E G → cost = 57

```
def  fitness (chromosomes, p=1000, ch='',n,m):
    new _ch = [ ]
    for c in  chromosomes:

        cost = path_cost (c)

        if cost < P:
            P = cost
            ch = c
            new_ch.append (ch)

    chromosomes = crossover (new_ch)
    n = m+1
    fitness (chromosome, P, ch}, n,m)


        if n = = m:
            return ch
```

We ran this fitness function n number of times. When n number of iterations are complete, the function returns the fittest chromosome found yet.

The less the path cost, the most fitter the chromosomes are.

From this fitness function, fittest two chromosomes are,

(i) ADGCFBE → cost = 37

(ii) ABEGDCF → cost = 59

A D G C / F B E = A D G C D C F

A B E G / D C F = A B E G F B E

No, they are not eligible as solution.

We had to visit every city once, but

in this way, one city cant be visited

more than once. Also, every city is

not visited. In the second chromosome

G and F are not connected directly.

~~as at but~~ So, these are not eligible

as solution.

(4)

Usual method of a mutation would not work here. Beacaus, not every city is connected directly. Another reason is, we have to visit every city through each chromosome.

So, the usual method of mutation won't work here.