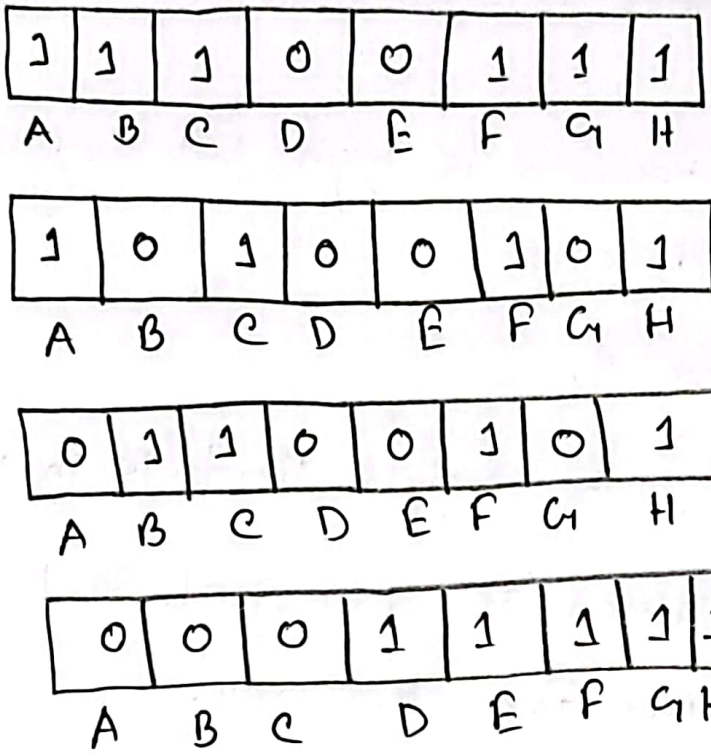
1 NO Ques Ans

1]



2] The appropriate fitness function ~~solve~~ would be a function that can check if the ~~function~~ chromosome's ~~bags~~ is in the weight limit and the reward is ~~is~~ higher than the others. Also the It node should be present.

for 1 → weight = 17 and Reward = 71

for 2 → weight = 10 and Reward = 62

for 3 → weight = 11 and Reward = 47

for 4 → weight = 26 and Reward = 91

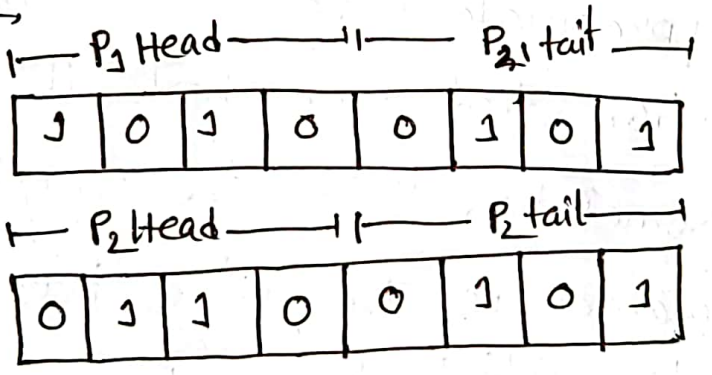
From the 4 chromosomes, we can find out the ~~best~~ fittest 2 chromosome.

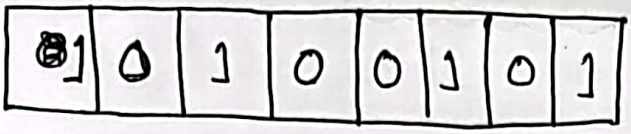
For 1 & 4, the Reward is high but weight limit got exceeded.

Same goes for 4.

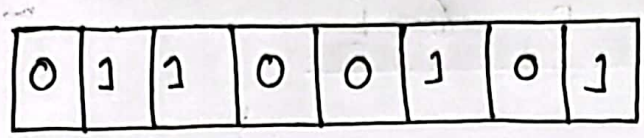
For 2 and 3, the weight limit is in range and the reward is also good. So, this two are the fittest for crossover.

3] From 2,





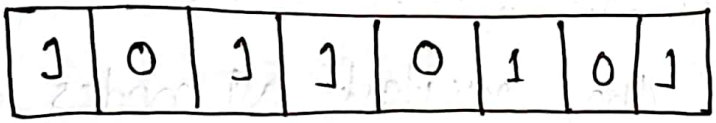
→ child 1



→ child 2

4] To perform mutation we can assume that child 1 will go through the mutation and the 3rd index would change.

So, after mutation the child chromosome would be



↳ changed 0 to 1 because of mutation.

the final weight = 18
the final reward = 10%

the reward has gotten higher than the parents but it casted the weight limit more making the child chromosome unfit.

2 NO Ques Ans

1)

A	F	B	C	D	G	E

B	E	G	D	C	F	A

D	A	F	B	C	G	E

F	A	C	B	E	G	D

2) The appropriate fitness function would select the best chromosome by checking if they visited all nodes and also visiting in minimum cost.

For 1 the cost is → 49

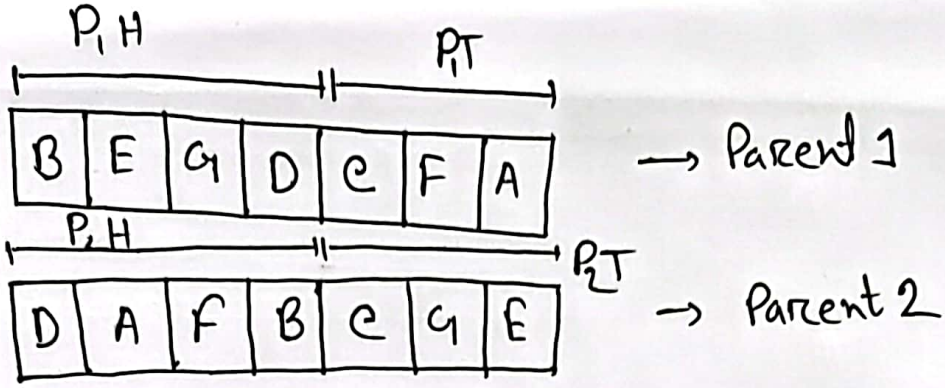
For 2 the cost is → 40

for 3 the cost is → 33

for 4 the cost is → 53

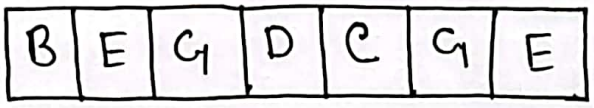
So, the two fittest chromosome are 2 and 3.

3)

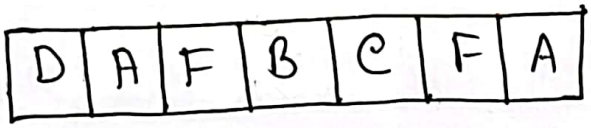


→ Parent 1

→ Parent 2



→ child 1



→ child 2

the both children are not eligible as a solution because they are missing some nodes and also has repeatation.

4) No, the usual mutation will not work because in this case from child we will not always get the all nodes are visited. Also, sometimes it will not have the path the children has.

3 NO Ques Ans

GBFS

A_{10}

A_{10} | F_6 B_8

F_6 | H_3 G_5 B_8 A_{10}

H_3 | I_1 G_5 F_6 B_8 A_{10}

I_1 | J_0 H_3 E_3 G_5 G_5 F_6 B_8 A_{10}

J_0 | H_3 E_3 G_5 G_5 F_6 B_8 A_{10}

The optimal Path:

$A \rightarrow F \rightarrow H \rightarrow I \rightarrow J$

Path cost : $3+7+2+3 = 15$

A*

A_{10}

A_{10} | F_9 B_{14}

F_9 | G_5 H_{13} B_{14} A_{16}

G_5 | I_8 F_{11} H_{13} B_{14} A_{16}

I_8 | J_{10} F_{11} H_{13} B_{14} G_{15} E_{15} A_{16} A_{17}

J_{10} | F_{11} H_{13} B_{14} I_{14} G_{15} E_{15} A_{16} H_{17} E_{18}

$JI = 14$

$JE = 18$

$A = 10+0 = 10$

$AB = 6+8 = 14$

$AF = 3+6 = 9$

$FA = 3+3+10 = 16$

$FG = 4+5 = 9$

$FH = 10+3 = 13$

$GF = 5+6 = 11$

$GI = 7+1 = 8$

$IG = 10+5 = 15$

$IH = 14+3 = 17$

$IE = 12+3 = 15$

$IJ = 10+0 = 10$

Total path cost = 10

Path : A → F → G → I → J

4 NO Ques Ans

GBFS

A9

A9	C2 B4

C2	C0 B4

C0	B4

total path : 10+4 = 14

Path : A → C → G

A*

A9

A9	B9 C12

B9	E9 C9 C12

E9	G9 C9 C12

G9	C9 C12

A = 9+0 = 9

AB = 5+4 = 9

AC = 10+2 = 12

BC = 7+2 = 9

BE = 6+3 = 9

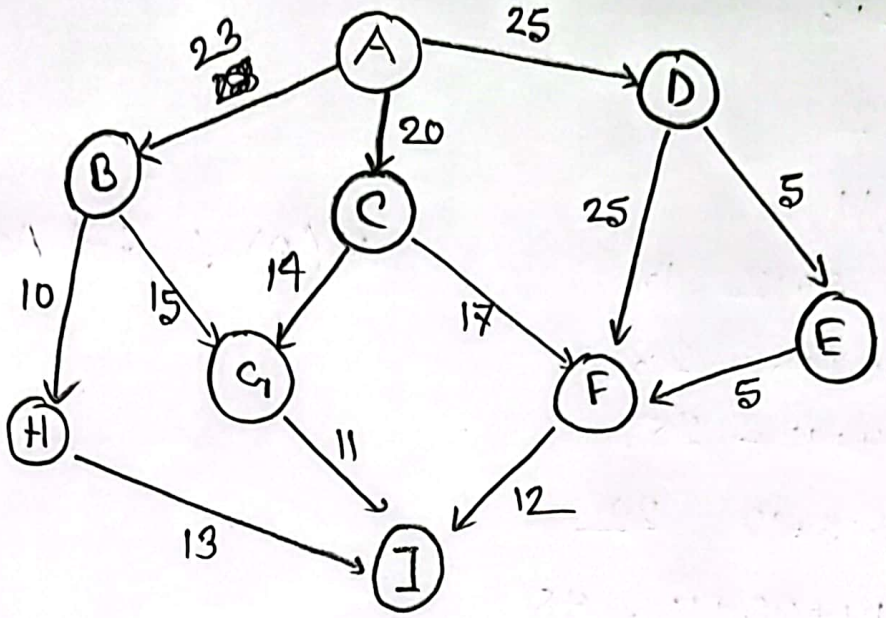
EG = 9+0 = 9

Total cost = 9

Path = A → B → E → G

5 NO Ques Ans

a)



I = 0

H = 13 + 0 = 13

G = 11 + 0 = 11

F = 12 + 0 = 12

E = 5 + 12 = 17

B = 10 + 13 = 23

D = 5 + 17 = 22

C = 14 + 11 = 25

A = 20 + 25 = 45

$H(A) \leq$ ~~H(A)~~ $Cost(A,G) + H(G)$

For this Heuristics, the graph is consistent.

b) I = 0

H = 13

F = 12

G = 11

E = 5+12 = 17

B = 10+13 = 23

C = 14+11 = 25

D = 5+5+12 = 22

A = 14+20+11 = 45

$H(A) \leq$ ~~tot~~ Actual cost

for this value the graph is admissable

c) ~~fore~~ from a,

we know

H = 13, G = 11, F = 12 are consistent.

for B,

$H(B) \leq 10+13 = 23$ -①

$H(B) \leq 15+11 = 26$ -⑪

if $H(G) = 11-4 = 7$

then $H(B) \leq 15+7 = 22$

$23 \not\leq 22$

∴ if $H(G) = 7$ the graph will be admissable but not consistent.