Knapsack Problem with genetic Algoritam.

Item	weight	value. Prob
1	5kg	$12
2	3kg	$5
3	7kg	$10
4	2kg	$7.

Knapsack.

In this Case we have $2^4 = 16$ Possibilities

There are 16 encoding options.

I have selected 4 Populations

$C_1 \rightarrow$ 0 1 1 0

$C_2 \rightarrow$ 0 1 0 1

$C_3 \rightarrow$ 1 1 0 1

$C_4 \rightarrow$ 1 1 1 1

From these Population we have to Select the Parents and from that Parents we have to Generate chromosomes (Offsprings).

Calculation of fitness

Weight for 0 1 1 0 → 0+3+7+0 = 10kg.

Value for 0 1 1 0 → $5+$10 = $15.

$C_2 \rightarrow$ 0 1 0 1

weights = 0 + 3 + 0 + 2 = 5 kg.

values = 0 + $5 + 0 + $7 = $12

$C_3 \rightarrow$ 1 1 0 1

weights → 5 + 3 + 0 + 2 = 10 kg

values → 12 + 5 + 0 + 7 = $24.

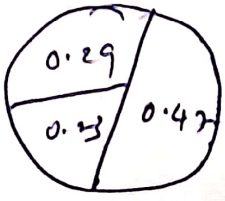
$C_4 \rightarrow$ 1 1 1 1

weights → 5 + 3 + 7 + 2 = 17 kg.

values → $12 + $5 + $10 + $7 = $34

Here in the last Case the weight value is 17 kg which the knapsack cannot hold so we can eliminate the last formation

			Profit	Expected Cost	
$C_1 \rightarrow$	0 1 1 0	→ 15	15/51	0.29	1.2 1
$C_2 \rightarrow$	0 1 0 1	→ 12	12/51	0.23	0.92 1
$C_3 \rightarrow$	1 1 0 1	→ 24/51	24/51	0.47	1.88 2



So we have to select 1101 for 2 times ②

0 1 1 0 | 0 1 0 1

1 1 0 1 | 1 1 0 1

Next Crossover select the crossover point.

3

0 1 1 | 0 → 0 1 1 1

1 0 1 | 1 → 1 1 0 0.

Check the validity of them | No change

Parents

(1) 0 1 1 1

Weights → 3+7+2 = 12kg

value → $5+$10+$7 = $22

1 1 0 0

weights → 5+3+0+0 = 8kg

value → $12+$5+0+0 = $17.

Both are valid ✓