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Question 1

(a)

Chromosome	fitness	fitness ratio	cum. ratio
1	8	8/20 = 0.4	0.4
2	1	1/20 = 0.05	0.45
3	2	2/20 = 0.1	0.55
4	9	9/20 = 0.45	1

random value = 0.86

0.55 < 086 < 1 chromosome 4 selected.

001100111

(b)

100|00001

010|00110

r = 0.59 N = 4

⌈2.36⌉ ≈ 3

100100110

010000001

(c)

1

10|1010

= 101101010

r = 0.67

N = 5

⌈2.85⌉ ≈ 3

(d)

Elitism is the preserving of best solutions from one generation to the next without modification. It ensures high quality are preserved as on the premise that it has a higher probability of containing genes of the optimal solution.

(e)

i. Chromosome would be an array of 10 binary numbers. Each would represent its place from either set 1 or set 0.

ii. $[1, 2, 3, 4, 5, 6, 7, 8, 9, 10]$

Chromosome = $[0, 1, 1, 1, 0, 0, 0, 0, 0, 1]$

iii. $\left[\sum_{i=1}^{10} x[i] \text{ ; where } c[i] == 0\right] + \left[\sum_{i=1}^{10} c[i] * x[i]\right]$