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BE Comp 2

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SCOA Assignment 4

1) Enlist basic steps of Genetic Algorithm with Flowchart.

Ans. Basic steps of genetic algorithm.

a. Initialize a population with randomly generated individuals and evaluate the fitness value of each.

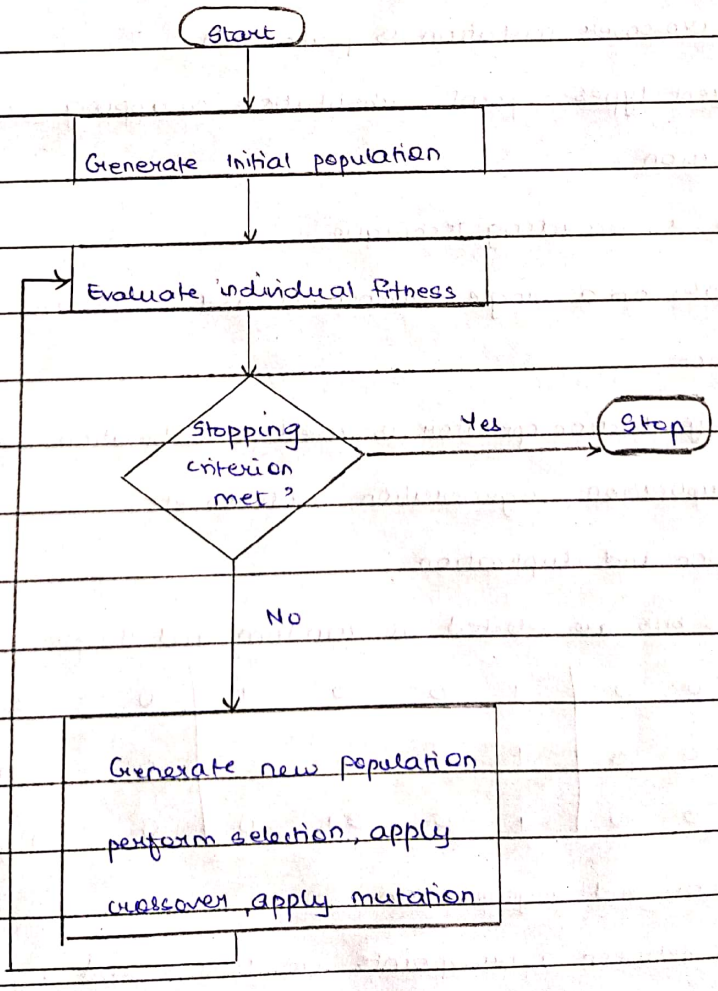
b. Select 2 individuals from the population with probability proportional to their respective fitness value.

c. Apply crossover on the 2 individuals selected with a probability equal to crossover rate.

d. Apply mutation with a probability equal to mutation rate.

e. Repeat from b to d until enough members are generated to form the next generation.

f. Continue till stopping criteria is met.



Q. Explain genetic operators.

Ans. Different genetic operators are :-

a) Crossover

- After selection phase, crossover is performed.
- It is performed on the best chromosomes which are selected as parents.
- This operation produces offsprings.
- Crossover is applied to get a better string.
- Different crossover operators are :
  - Single point crossover
  - two point crossover
  - multipoint crossover
  - uniform crossover
  - matrix crossover.

b) Mutation

- It is a permanent image in the sequence of DNA.
- After crossover, mutation is performed.
- Different types - point, substitution, swapping, scramble.

c) Immersion

- It is a recording technique.
- Operates on a single chromosomes and inverts the order of element.

d) Deletion

- Usually, deletion operator is used in combination with other operators like duplication, regeneration, addition, etc.

e) Deletion and duplication :

- 2 or 3 bits are selected at random and the previous bits are duplicated.

0	0	1	0	0	1	0	Before
0	0	1	0	–	–	0	At
0	0	1	0	1	0	0	After.

f) Deletion and regeneration

- Bits between 2 crosspoints are deleted and regenerated randomly.

1	1	0	1	0	1	1	0
1	1	–	–	–	–	–	0 Deletion
1	1	1	0	1	0	1	0 Regeneration

Regenerated bits