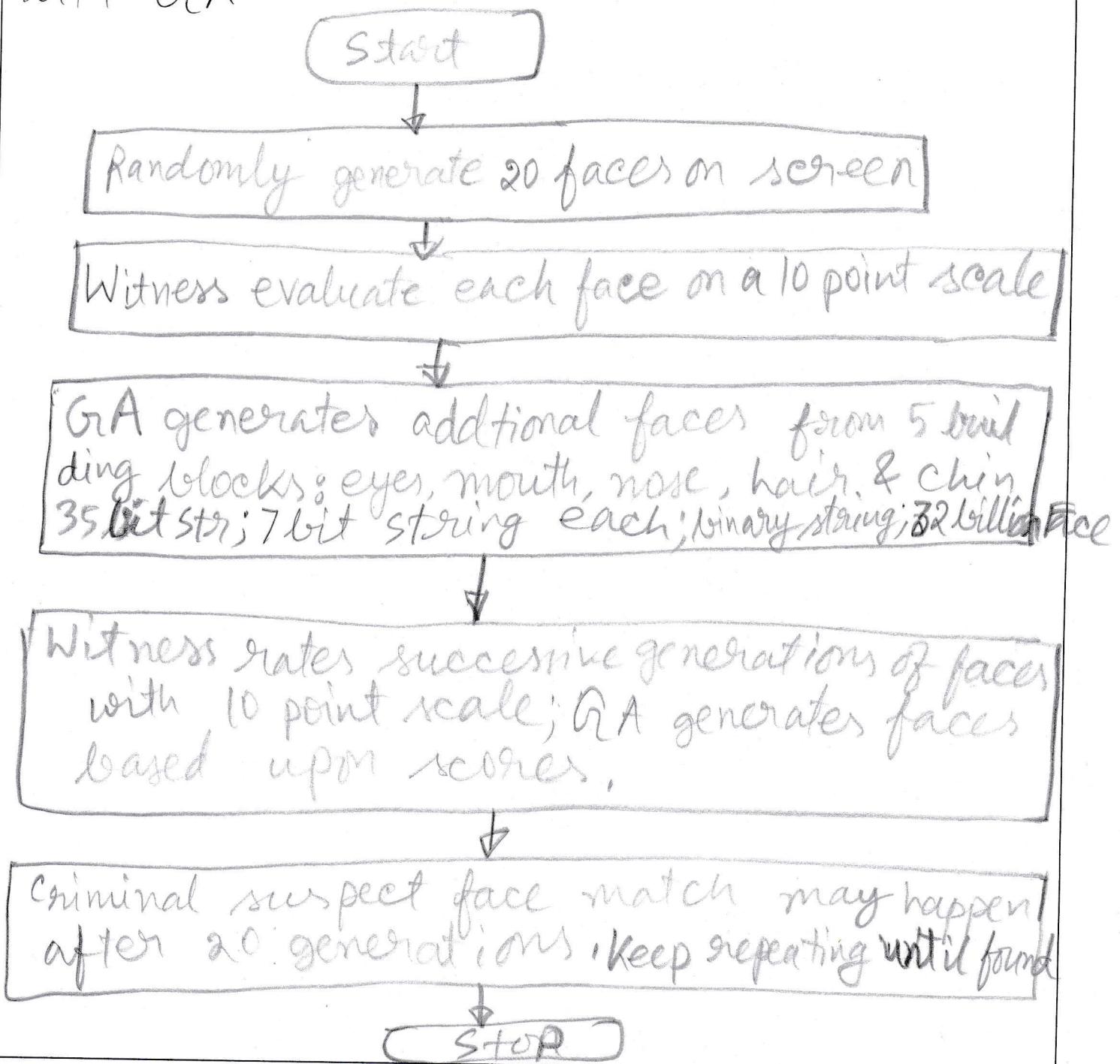


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Ans to the q. no-10

Flowchart for Criminal suspect recognition
with GrA



Ans to the QNO - 9

Parents are

(a) 1 2 4 5 3 6

(b) 1 5 4 2 6 3

Edge table

1	2	5			
2	1	-4	6		
3	5	-6			
4	-2	-5			
5	3	-4	1		
6	2	-3			

Enhanced Edge recombination operation:

1	2	5	
2	1	6	
3	5	-6	
4	-2	-5	
5	3	1	
6	2	-3	

1	5	2	
2	1	6	
3	5	-6	
4	-5	-2	
5	3	1	
6	-3	2	

↓
[4]

↓
[4] 2 | 6 | 1

STEP-1

STEP-2

Step - 3

1	5	
2	1	
3	-5	
4	3	
5	-3	
6		

Step - 4

1	5	
2	1	
3	-5	
4	-5	
5	1	
6	-3	

↓

4	2	6	1	1	
---	---	---	---	---	--

↓

4	2	6	3	
---	---	---	---	--

1	5	
2	1	
3	-5	
4	-5	
5	1	
6		

1	
2	
3	
4	
5	
6	

↓

4	2	6	3	5	
---	---	---	---	---	--

4	2	6	3	5	1	
---	---	---	---	---	---	--

Final offspring after one generation is
4 - 2 - 6 - 3 - 5 - 1 .

Ans. to the q.no-(8)

Fitness function: A fitness function is a particular type of objective function that is used to summarise ~~on~~ as a single figure of merit, how close a given design solution is to achieving the set aims. Fitness functions are also called cost functions - are used in genetic programming or GA to guide simulation to optimal design solution.

Fitness function is related to the problem not to algorithm. For example for solving TSP or vehicle routing method the cost function or distance between points does not change based on algorithm. Fitness or cost only change based on change of problem set.

Ans. to the q.no 7

"In operation of a population-based method, a few bad solutions are not harmful; however, good solutions need to retain"

For GA, while working to find optimal solution, we want to retain all the good qualities of all the good parents' chromosome to produce fit offsprings in next generations. If there is only few weak or bad offsprings those will be discarded / perish and strong ones will survive. Good solutions or strong of fittest offsprings in turn will result best solution possibilities only if they were able to retain good qualities and discard bad qualities (Elitism). Mostly we need good ge solution to retain to find fittest / least costly results; then the bad solutions will be negligible.

Ans to the q. no-5

Elitism operation in GAs In EA a method is - where the best solutions of each generation are copied to the next generation, without any change of mutation. This method is used to speed up ~~the~~ the convergence of the algorithm. This method that inserts the best chromosome to the new offspring population before crossover or mutation.

Importance of Elitism Elitism improves performance of solution finding.

Ans. to theq. no-4

Local Search: Local search is a heuristic method to solve hard optimization problems; local search can be used to move to solution to solution, maximizing a criterion among a number of candidate solutions, by applying local changes, until a solution deemed optimal is found or a time bound is elapsed.

Global Search: Global search optimization is a method of numerical analysis that attempts to find the global minima or global maxima of a function or a set of functions on a given set, is described as a maximization problem maximization of a real valued problem

$$f(x) := (-1) \cdot g(x)$$

Exploration: This consists probing a much larger portion of the search space with the hope of finding other promising solutions that are yet to be refined. This means diversifying the search in order to avoid getting trapped in a local maxima, doing a de facto global search.

Exploitation: Consists of searching in a limited (but promising) region of the search space with the hope of finding improved solutions. This refines & intensifies the search in the vicinity with de facto local search.

Ans to the question no-2

Basic properties of EAs:

- Initial population.
- ① Start by a set of initial population.
 - ② Calculate fitness / Evaluate costs.
 - ③ Selection.
 - ④ Crossover.
 - ⑤ Mutation.
 - ⑥ Termination Recombination
 - ⑦ Termination.

No, an EA method does not give guarantee of optimum outcome. EA can only give probable best solutions. EA method is preferred for engineering design tasks because this EA method can give optimal

design options, by simulating or computing, trial and error method; instead of actual test done, which would have cost much more in the lab setting or experiments.

Ans. to the q. no-3

Intelligence Characteristics:

① Adaptation ② Randomness ③ Communication
④ Feedback ⑤ Exploration & Exploitation.

Randomness for intelligence: Some degree of randomness is needed for intelligence but too much. So, randomness is a balance only within

Communication for Intelligence:

Communication is a feature for intelligent, a single person can not be intelligent. Communication is required for intelligence. Intelligence and communication form a positive feedback loop.

Ans. to the q.no-6

Ways to stop GA are -2

- ① Deemed best solution.
- ② Time bound.

~~Final~~ Pros: ① Deemed / probable best solution can only predict the probable best cost solution, not the actual best solution.

⑪ ~~Bross~~ Time bound method can limit the method within a time.

Cons: ① May not be the best solution, there may be other best solutions.

⑪ Time destruction may prevent us from going to the best solution.

Ans to the q.no-

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Ans. to the q.no-1

Optimization: Optimization refers to finding the best solution/alternative.

Unconstrained Optimization: Involves finding the maximum or minimum of a differentiable function of variables.

Constrained Optimization: Identifying

Feasible solutions out of a very large set of candidates where the problem can be modeled in terms of arbitrary constraints.

Multi Objective Optimization: This refers to finding the optimal solution values of more than one desired goal.

Multi Modal Optimization: Multiple optimal solutions, some local or some global.

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