Sequential GA =●In sequential genetic algorithms, we proceed in an iterative manner, where, in each iteration, we generate a new population of from the old ones.●Every string is the encoded version of a tentative solution. Every string's suitability to the problem is evaluated based on its fitness measure.-In order to compute a whole generation of new strings, the algorithm applies stochastic operators such as selection, crossover and mutation on an initial random population.●In sequential GA there are again two variants: steady state GA and generational GA.1]The steady state GA is a simpler version of the generational GA.2]In steady state GA, the entire current population is not replaced, rather, two best parents are selected from population and crossed obtaining two offspring that are then mutated and inserted in the current population.3]On the other hand, in generational version, a large portion of the population is selecte & crossed the resulting offspring is mutated and inserted into the population, thus replacing the old individuals.

Parallel GA=●Parallel GAS (PGAs) are parallel versions of sequential GAS.●The basic idea behind most parallel programs is to divide a task into chunks and to solve the chunks simultaneously using multiple processors. This divide-and-conquer approach can be applied to GAS.●The members of the population can be partitioned into subpopulations that are distributed among different processors.●There are two classes of Parallel GAs: Centralised GA and distributed GA: ●Centralised GAs are also called Global GA. There is a single population (just as in simple GA), but the evaluation of fitness is distributed among several processors.●Since, in this type of GA selection and crossover consider the entire population, it is also called global parallel GA.●The algorithm can be executed on a shared memory multiprocessor, where the chromosomes are stored in the shared memory and each procesor only develop certain chromosome●With distributed GA, each parallel component has its own copy of the reproduction. Distributed GAs can be further classified as: 1]Single-population Fine-grained.2]Multiple-population Coarse-grained.●In order to enable a good genetic material transfer from one sub-population into another and consequently a faster improvement of the entire population, we occasionally allow an individual chromosome migration between sub-populations

Advantages of using PGA=●Works on a coding of the problem (least restrictive). ●Basically independent of the problem (robustness)●Can yield alternative solution to the problem. ●Parallel search from multiple points in the space.●Easy parallelization as islands or neighbourhoods.●Better search, even if no parallel hardware is used. ●Higher efficiency and efficacy than sequential GAS. Easy cooperation with other search procedures.

Messy Genetic Algorithms=●In simple GA, genes are encoded as a fixed length strings. The meaning of a single gene is determined by its position inside the string.●Messy GA uses variable length, position-independent coding. Each gene has associated index with it that allows to identify its position. Thus a gene in Messy GA is no more represents the single allele value and a fixed position. It represents the pair of index and an allele .fig shows working of messy GA

| 1 | 0 | 0 | 1 | 0 | 1 |
|(1,1)|(2,0)|(3,0)|(4,1)|(5,0)|6,1)|
Messy cooling

|(2,0)|(1,1)|(6,0)|(1,1)|(4,1)|6,1)|

●Since it is possible to identify the genes uniquely with the help of the index, genes may be swapped randomly without changing the meaning of the string.●The free arrangements of genes and the variable length encoding may pose some of the challenges in Messy GA.●It can happen that there are two entries in a string, which corresponds to the same index, but have conflicting alleles. This situation is called 'over-specification".●The solution to this problem is to use positional preferences- The first entry, which refer to a gene, is taken.●There could be a problem of 'under specification' meaning some of the genes may not occur in the encoded string at all. ●One possible solution to this problem is to check all possible combinations and to take the best one.

Adaptive Genetic Algorithms=●In adaptive GA, the parameters such as population size, cross over probability, mutation probability etc. are varied at run time. One such example is, one can change the mutation rate according to the changes in the population. Longer the population does not improve, the higher the mutation rate is chosen.

Hybrid genetic algorithm=●Hybrid genetic algorithm combines the GA and conventional methods for optimization task. ●Here, the optimization task is divided into two parts.●The GA does the course, global optimization and local refinement is done by the conventional methods (such as gradient descent, hill climbing, simulate annealing etc.).●A number of variants are possible:1. GA performs coarse search first. After the GA completes, local refinement is done using conventional methods.2.The local method is integrated in GA itself.3. Both methods run in parallel. ●The algorithm switch repeatedly between global search (stage 1) and the local search (stage 2) during execution.●In stage 1, the global search is initialized and monitored.●In stage 2, the local search is executed when the threshold levels are expected. Then this solution is passed back to the global search.●The algorithm is stopped when convergence is achieved for the global optimization algorithm.