# GA Framework

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| **Representation** | **Selection** | **Perm Mutation** | **Perm Recombination** | **String Crossover** | **Fitness Scaling** | **Ranking** | **Survivor Selection** | **Combat Local Optima** |
| Strings | n/2  Truncation | DM | CX | Single point | Windowing | Linear | Elitism | Triggered hyper-mutation |
| Permutations | RWS | IM | OX | Two point | Exponential | Exponential | Delete Worst | niche penalty |
| Binary | SUS | SM | PMX | Uniform | Linear Trans |  | Aging | Random immigrants |
| Lists | Tournament | EM | ER |  | Linear Norm |  |  | Multi fitness |

**Representation** is problem dependent

**Selection** method is universal

**Perm mutation** is for permutation representation

**Perm recombination** is for permutation representation

**String crossover** is for strings or general vector representation

**Fitness scaling** is for proportional fitness

**Ranking** is for absolute fitness – parameters: k size, with/without replacement, probabilistic

**Survivor** selection is universal

Tournament (with/without replacement, deterministic / stochastic winners)