

Genetic Algorithms

INITIALIZE POPULATION (random or biased?)

EVALUATE FITNESS (max or min)

Iterate (until stop condition)

APPLY SELECTION

(elitism? top $\frac{1}{2}$, tournament, Roulette, fitness 2 ?)

CROSSOVER (1-pt, 2-pt, n-point, none?)

MUTATION (bitstring vs real values vs lines of code)

EVALUATE FITNESS

STORE RESULTS (avg & best fitness, diversity...)

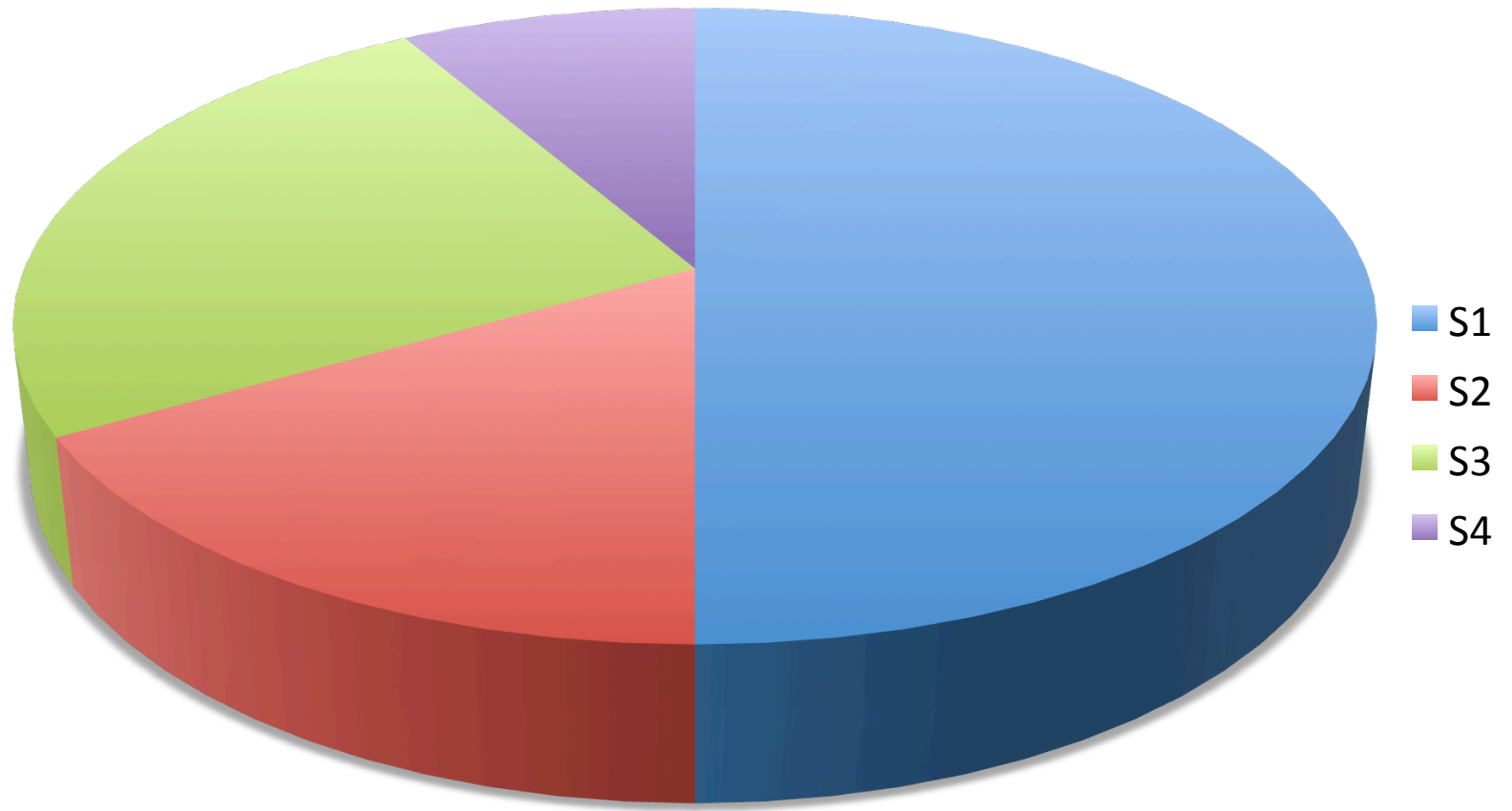
- S1= 3, 4, 7.2, 5 F= 86
- S2= 13, 12, 0.1, 63 F = 2
- S3 = 0.8, 17.6, 12.2, 20 F = 3
- S4 = 1, 2, 6.9, 24 F = 1

1 pt crossover: 3,4,.01, 63

2 pt crossover: 3, 12, 0.1, 63

Mutation ?

Roulette selection?



- **Convergence vs. Diversity**
 - Exploitation vs. Exploration
- **Elitism**
 - Almost always beneficial
 - Minimal sacrifice of exploration
- **Mutation**

gray codes: should all mutations be equally influential?
- **Crossover:**
 - combine schema vs destroy schema