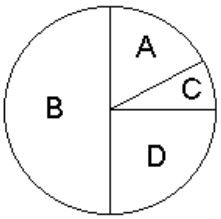
Example of a Simple Genetic Algorithm

8-bit chromosomes
Fitness function $f(x)$ = number of 1 bits in chromosome
Population size = 4
Crossover probability = 70%
Mutation probability per bit = 0.1%

Chromosome	Fitness
A: **00000110**	2
B: **11101110**	6
C: **00100000**	1
D: **00110100**	3

Average fitness of population = 12/4 = 3.0



Fitness-proportionate selection
("roulette-wheel sampling")

1. B and C selected, crossover not performed

2. B mutated

B: **11101110** → B': **01101110**

3. B and D selected, crossover performed

B: **11101110** → E: **10110100**

D: **00110100** → F: **01101110**

4. E mutated

E: **10110100** → E': **10110000**

New population:

Chromosome	Fitness
B': **01101110**	5
C: **00100000**	1
E': **10110000**	3
F: **01101110**	5

Best-fit string from previous population lost, but...Average fitness of population now 14/4 = 3.5