Crossover in Genetic Algorithm

Optimization

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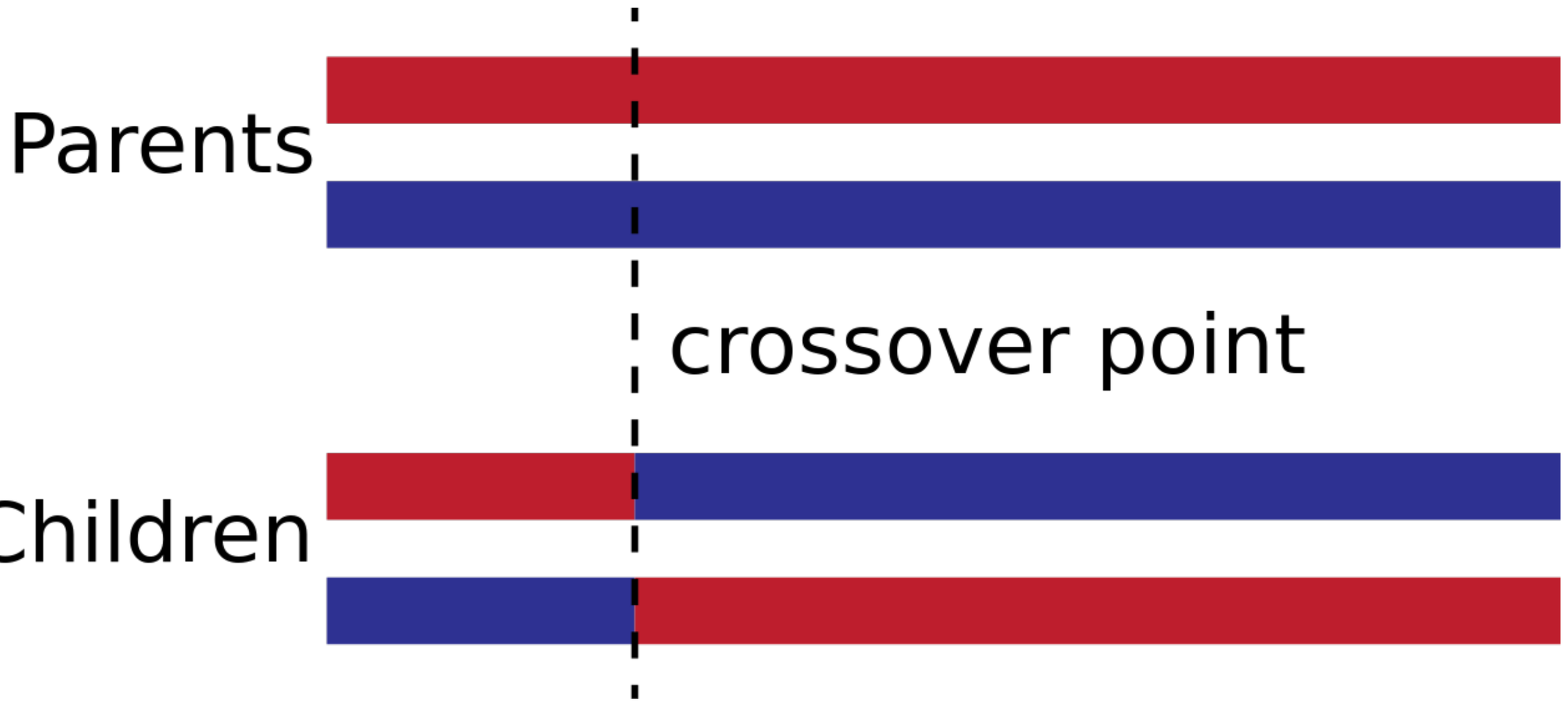
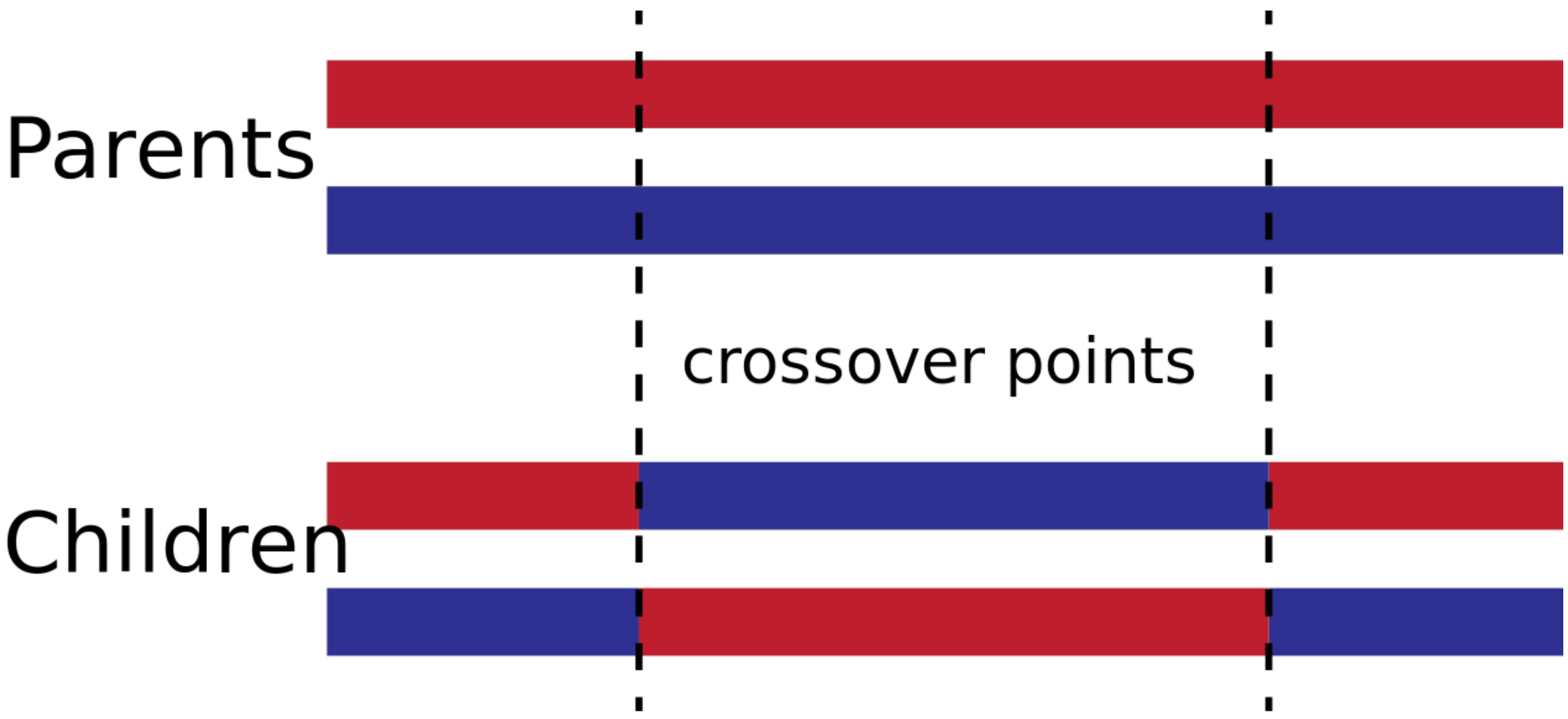
One-point Crossover



Two-point Crossover



Optimization of 3 Variables

Use GA to solve the following optimization

$$\max f(x_1, x_2, x_3) = 4x_1 - x_1^2 + 3x_2 - x_2^2 + 5x_3 - 3x_3^2$$

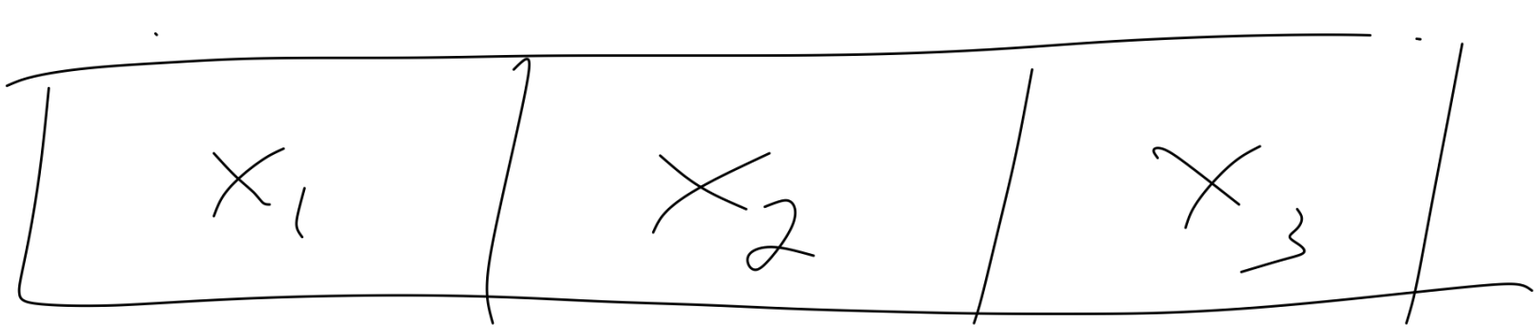
$$3x_1 + 2x_2 + 3x_3 \leq 10$$

$$x_1 + 4x_2 + x_3 \leq 20$$

$$x_1 \geq 0, x_2 \geq 0, x_3 \geq 0$$

Encoding the problem into GA

each candidate of solution is represented by a chromosom like this one:

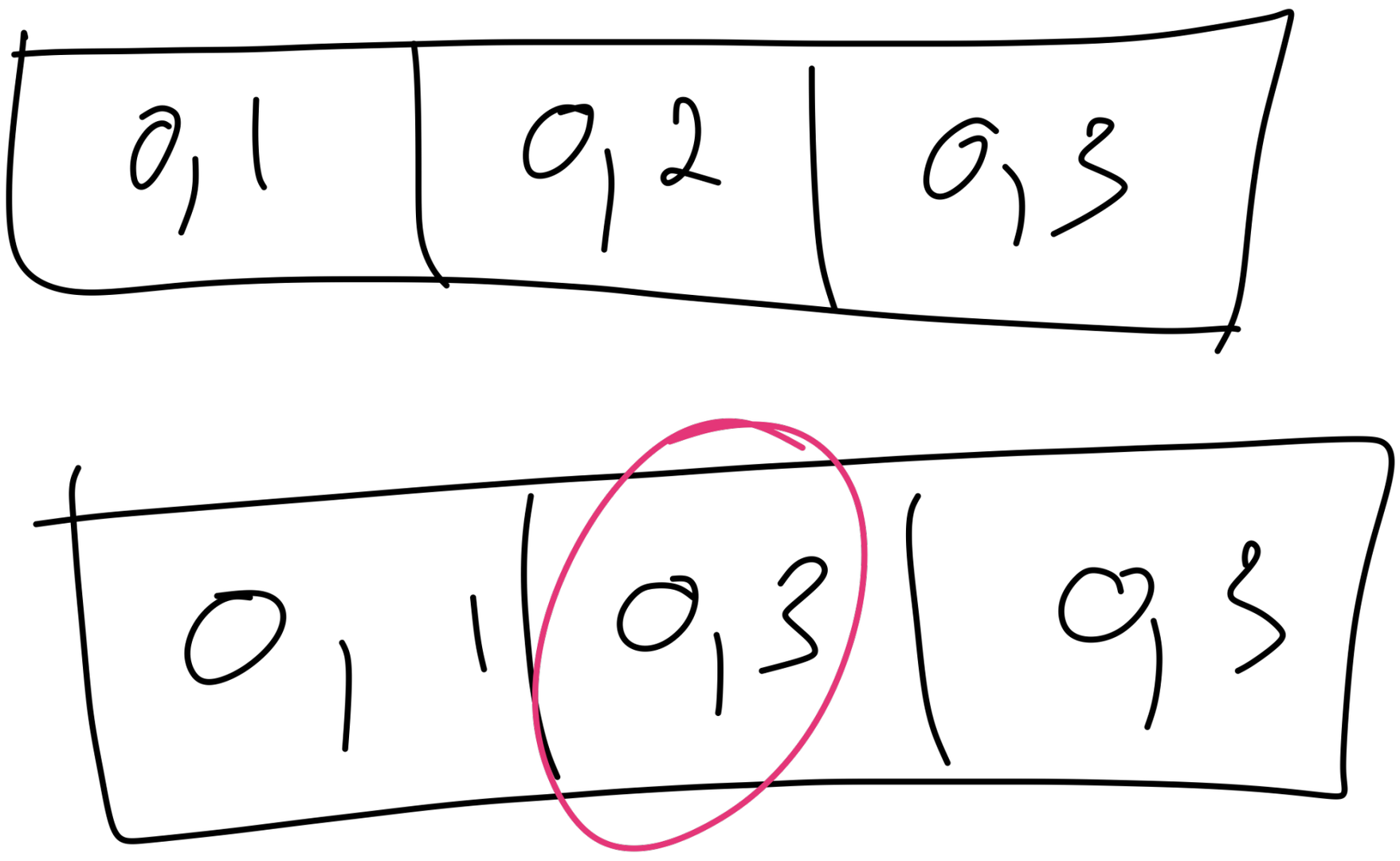


where $x_i \in R \quad i \in \{1,2,3\}$

this is "real encoding"

Mutation

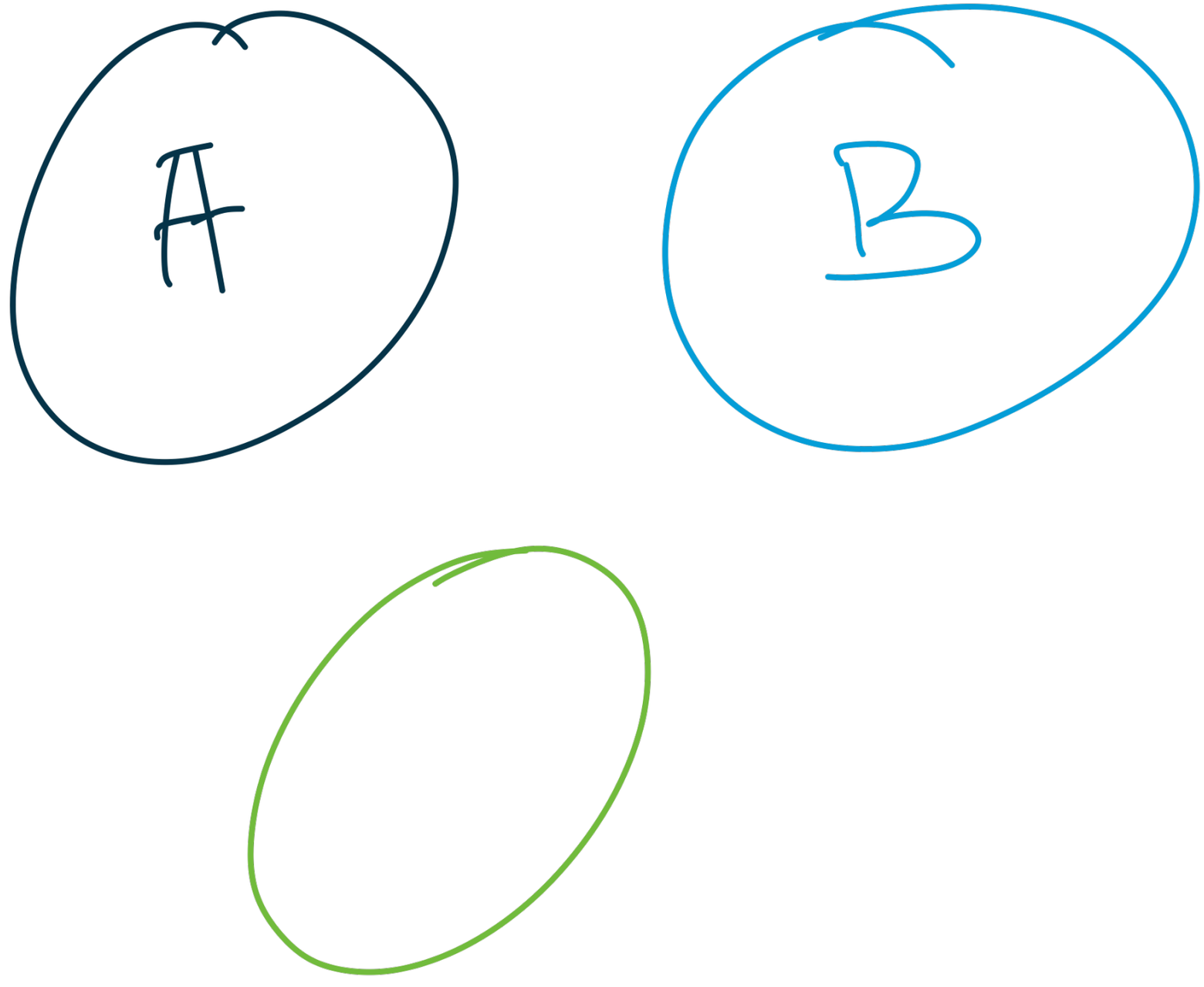
- Mutation changes one or more genes.



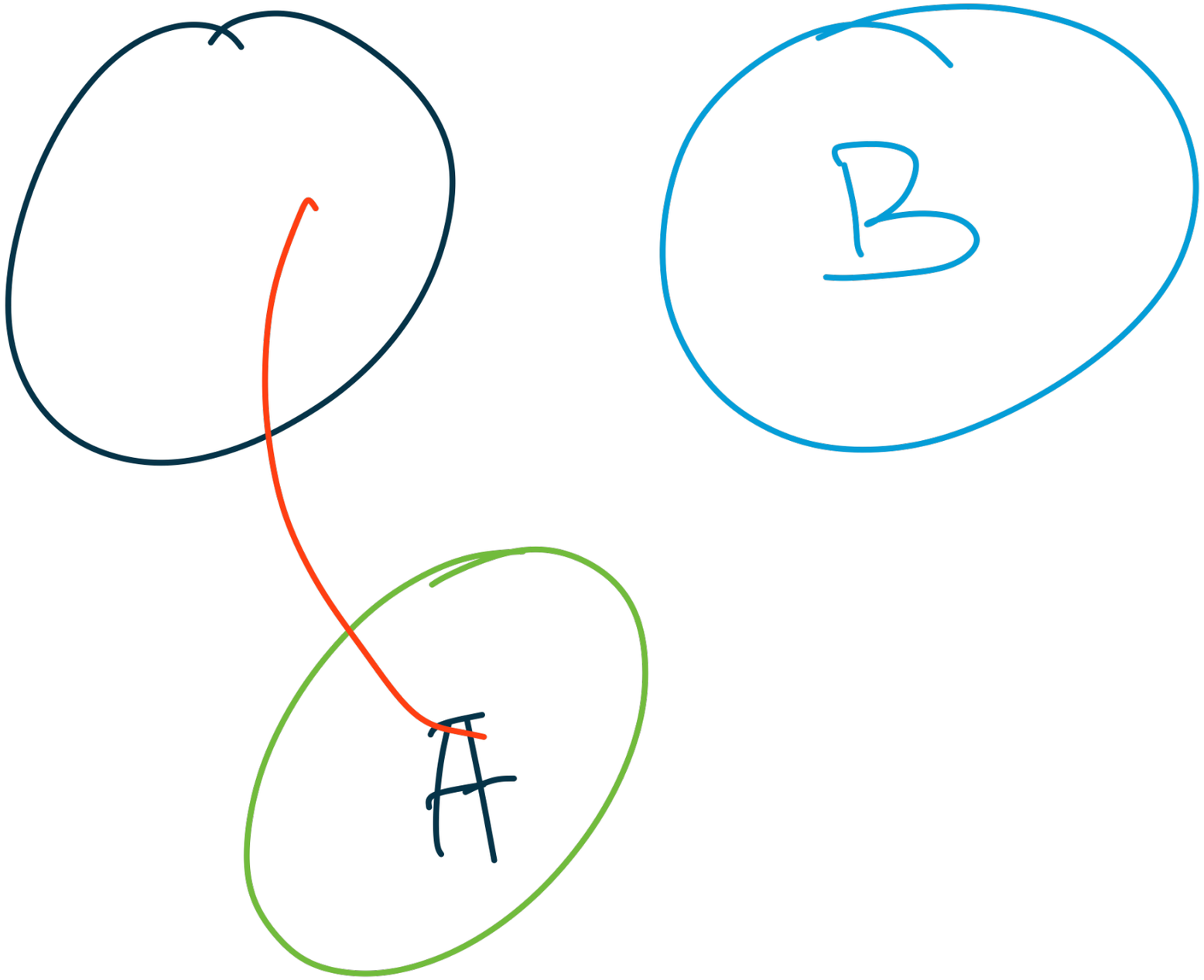
Crossover at point 1

Father	x_1	x_2	x_3
Mother	y_1	y_2	y_3
Child 1	x_1	y_2	y_3
Child 2	y_1	x_2	x_3

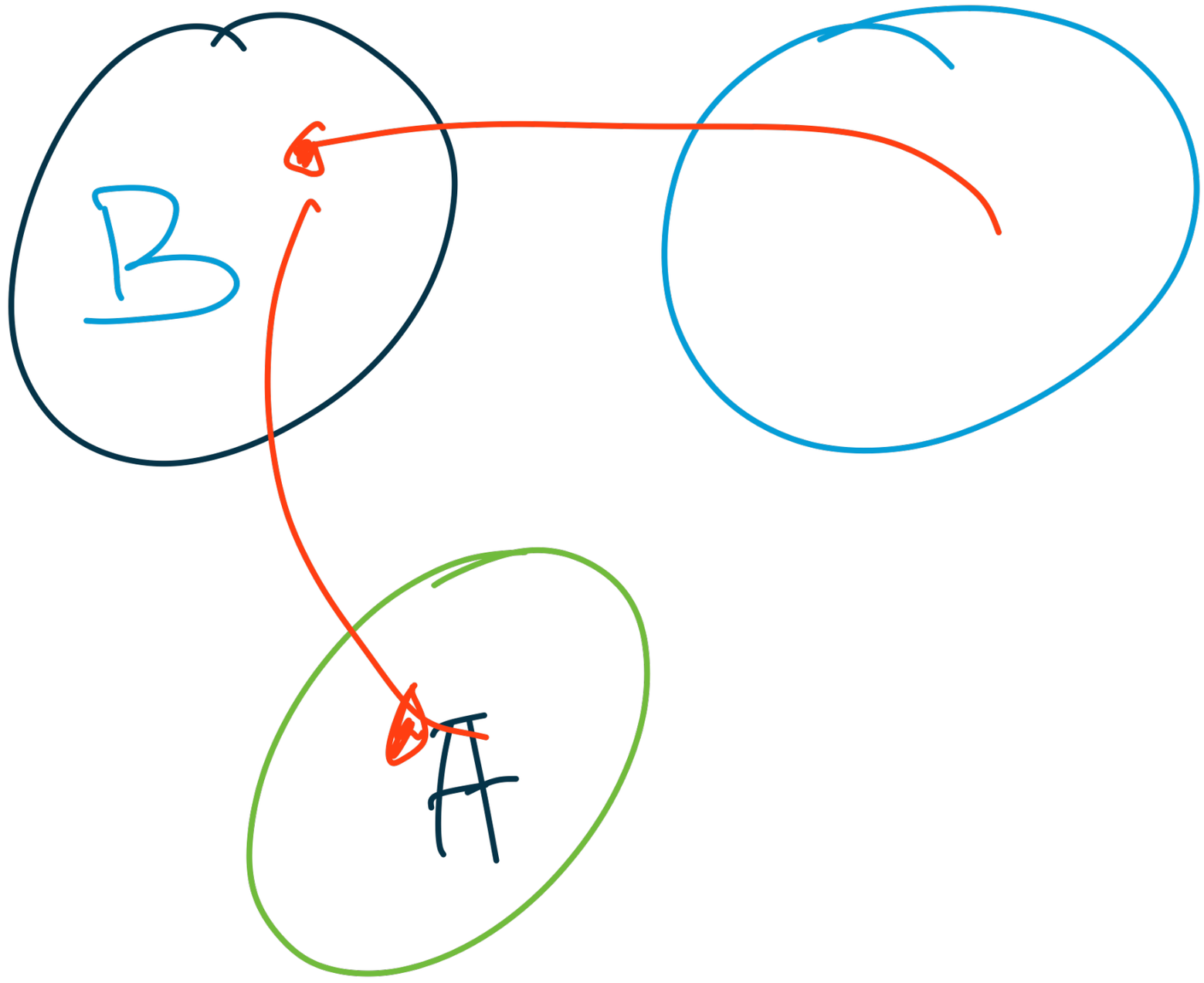
How to switch values



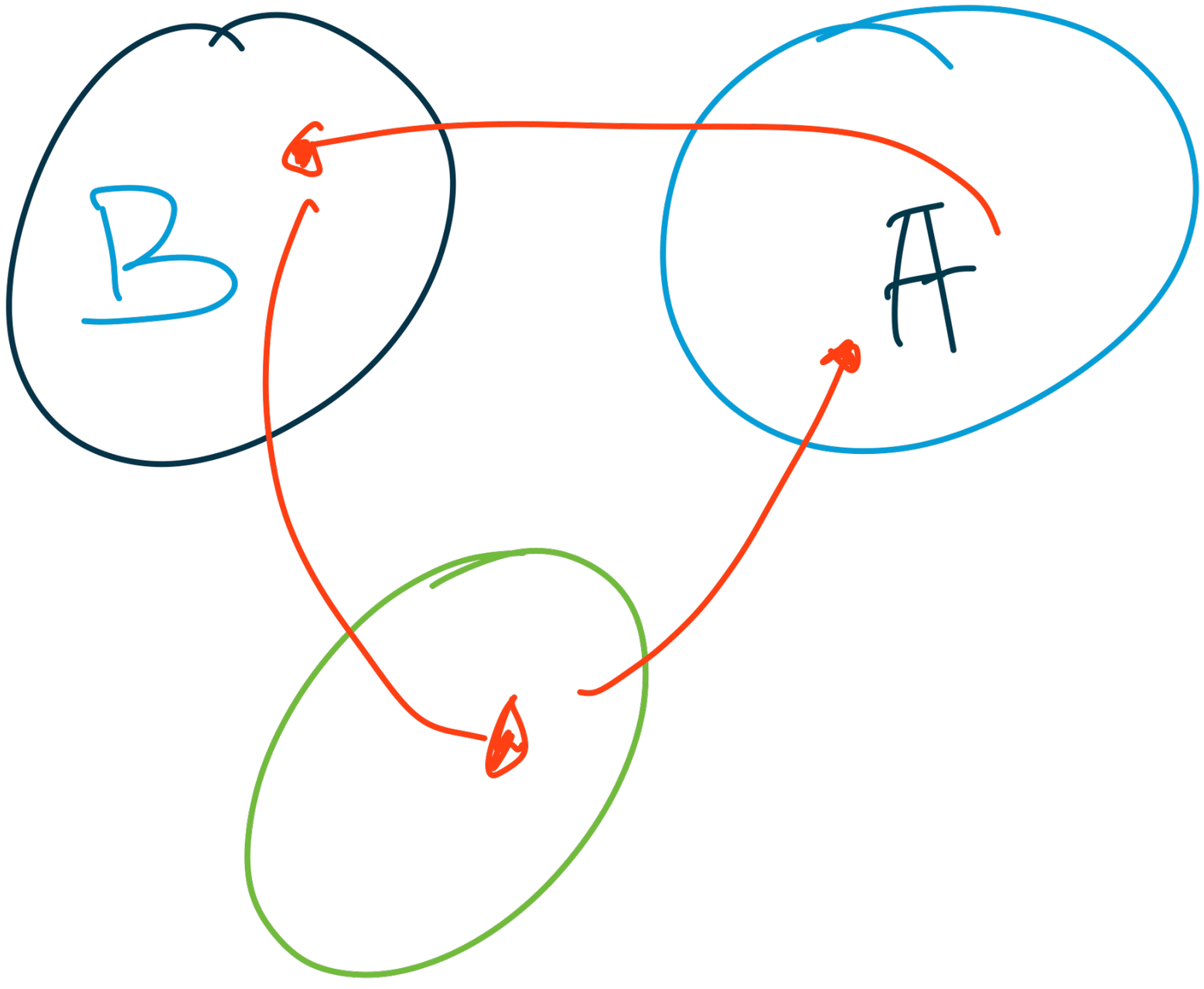
How to switch values

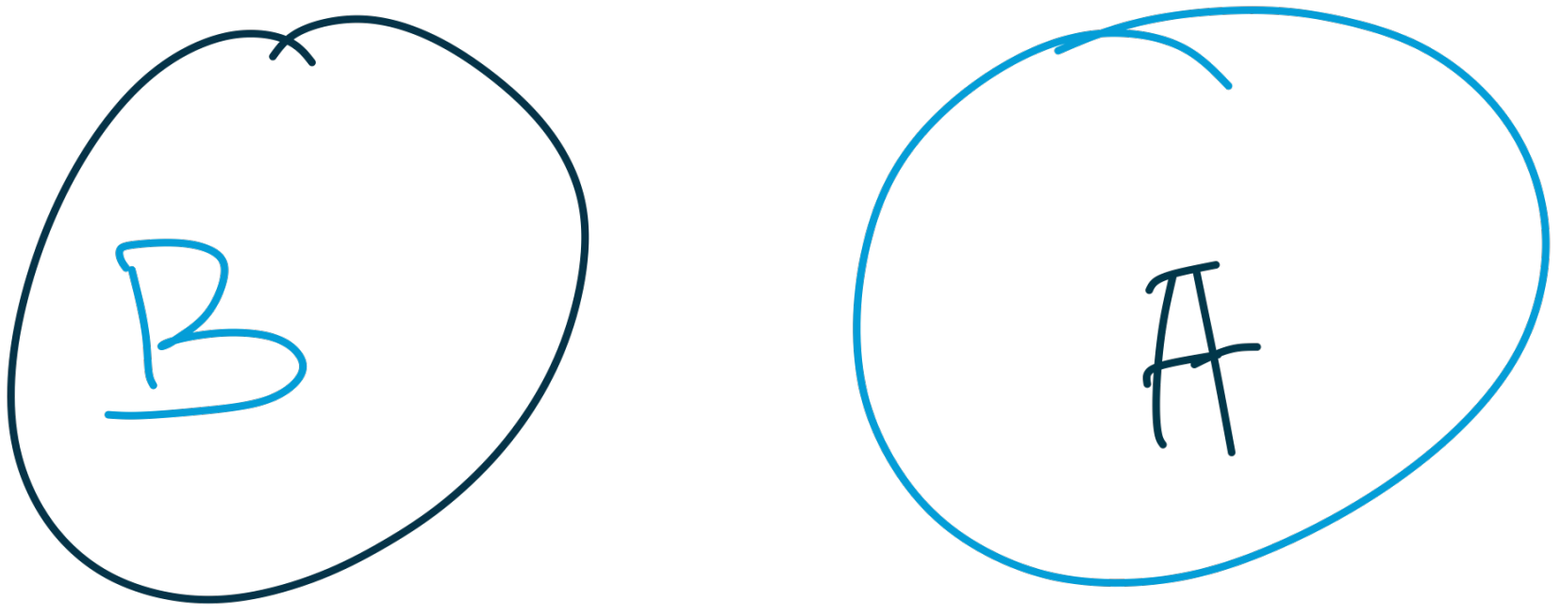


How to switch values



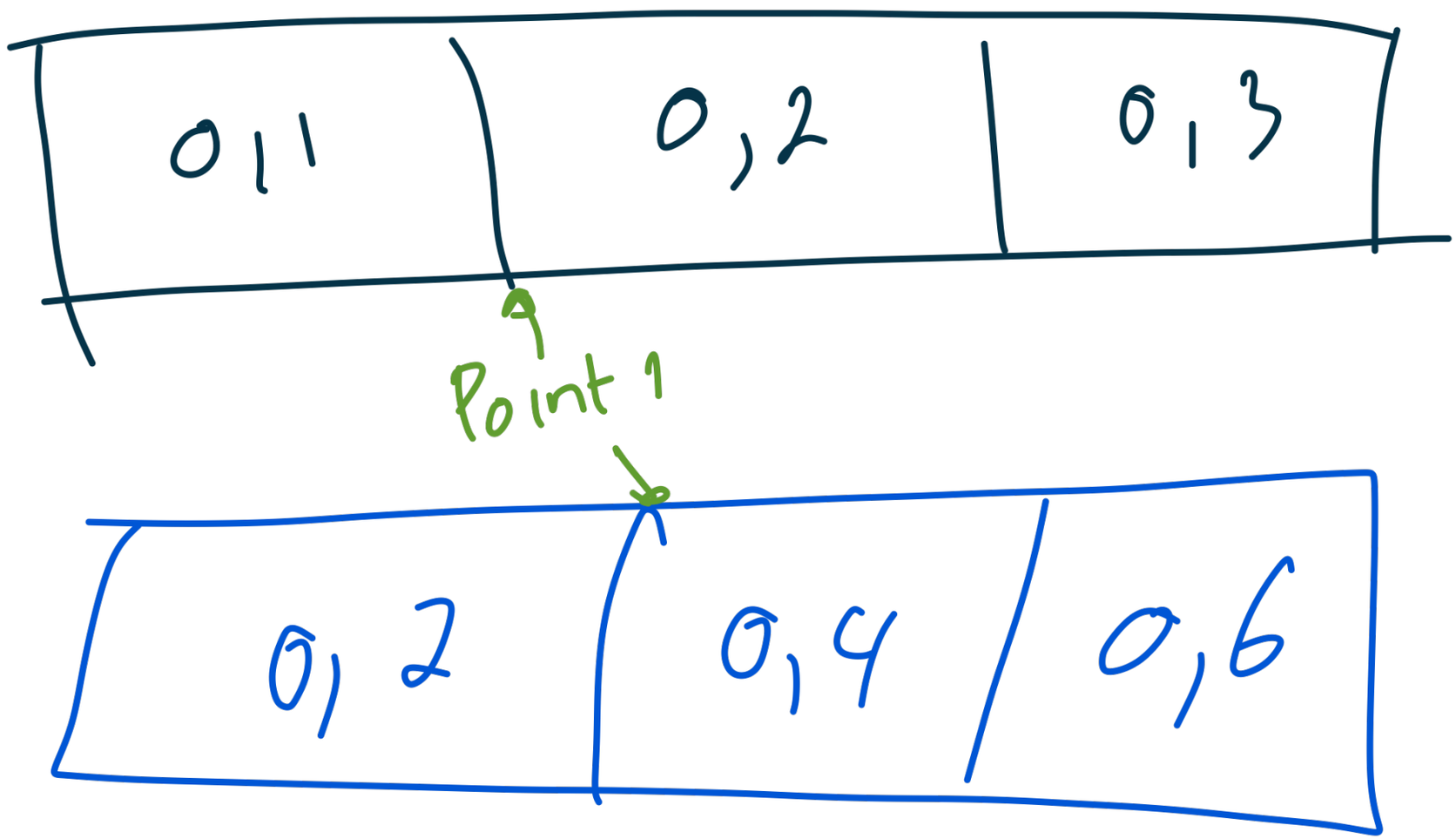
How to switch values




B
A

Quiz

- Write a Julia code implementing a crossover between the folllowing at point 1



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