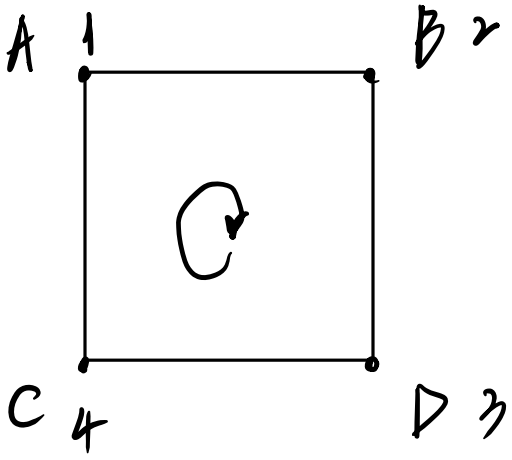


DNA1 = 2 3 4

DNA2 = 4 3 2

DNA3 = ?

TSP !

$$\left\{\begin{array}{lll} 2 & 3 & 4 \\ 2 & 4 & 3 \\ 3 & 2 & 4 \\ 3 & 4 & 2 \\ 4 & 2 & 3 \\ 4 & 3 & 2 \end{array}\right\}$$

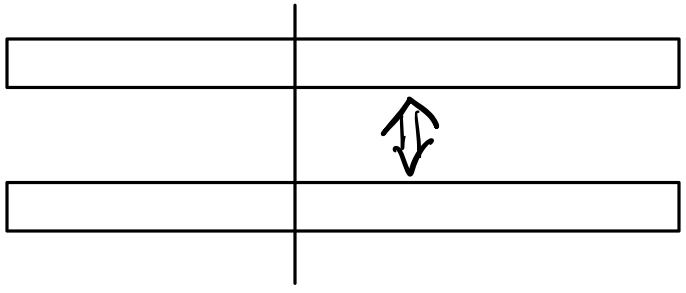
Ex.

		A	B	C	D
1	A	0	1	2	3
2	B	2	0	4	2
3	C	3	4	0	1
4	D	∞	2	3	0

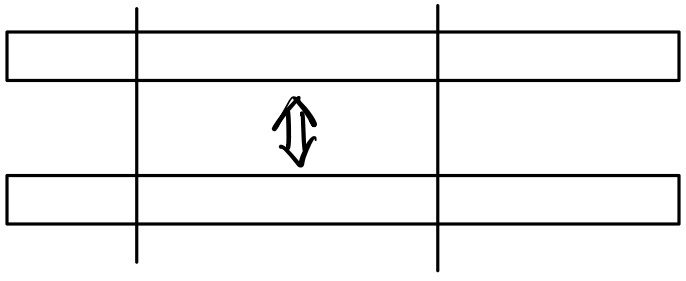
$F(\underset{2\,4\,3}{BDC}) = 1+2+3+3 = 9$

Existing methods :

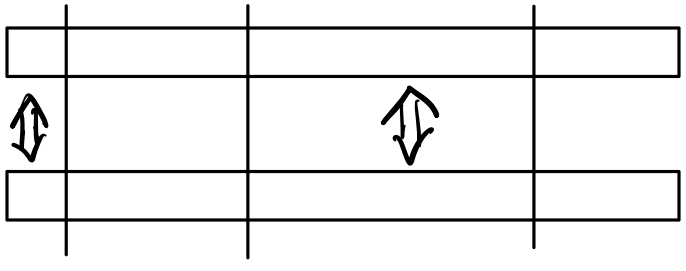
1. Single-point crossover



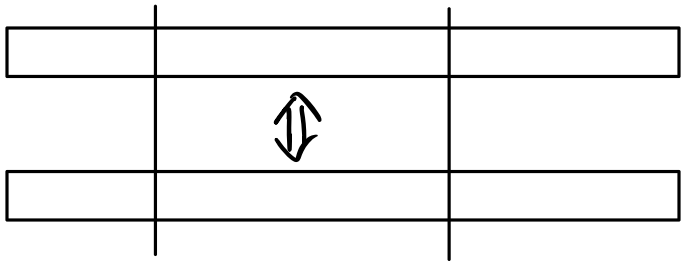
2. Two-points crossover

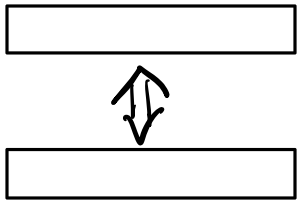


3. Multi-point crossover



4. Partially-mapped crossover





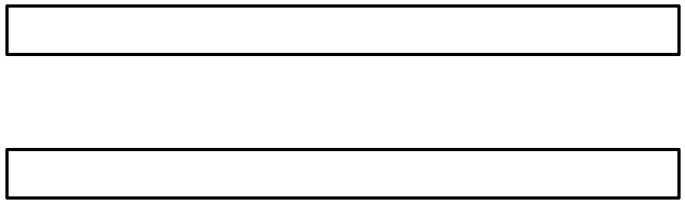
Conflict detection

New mapping

5. Uniform crossover

$a \leq P \leq b$

$\Rightarrow$

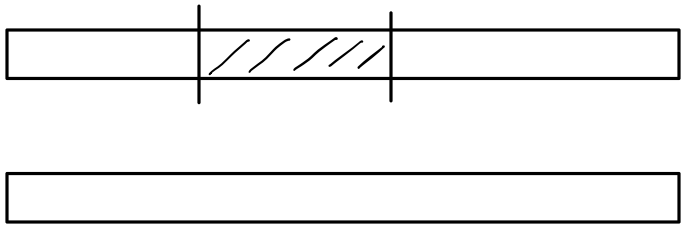


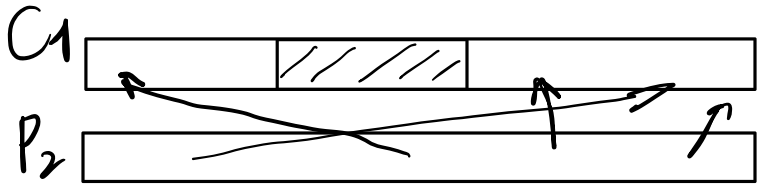
Scan one by one, swap with probability P

6. Order crossover

P_1

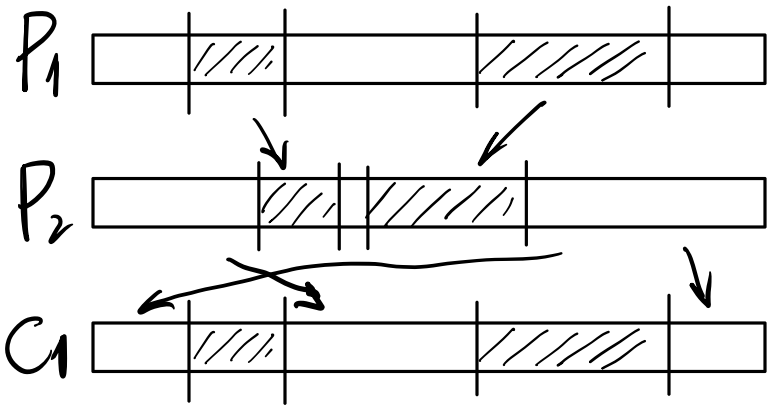
P_2





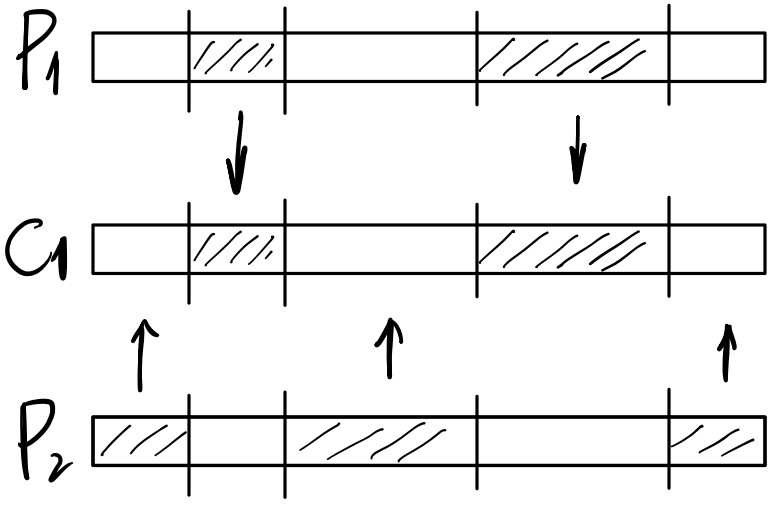
Fill missing ones of Child 1 from Parent 2

7. Position-based crossover

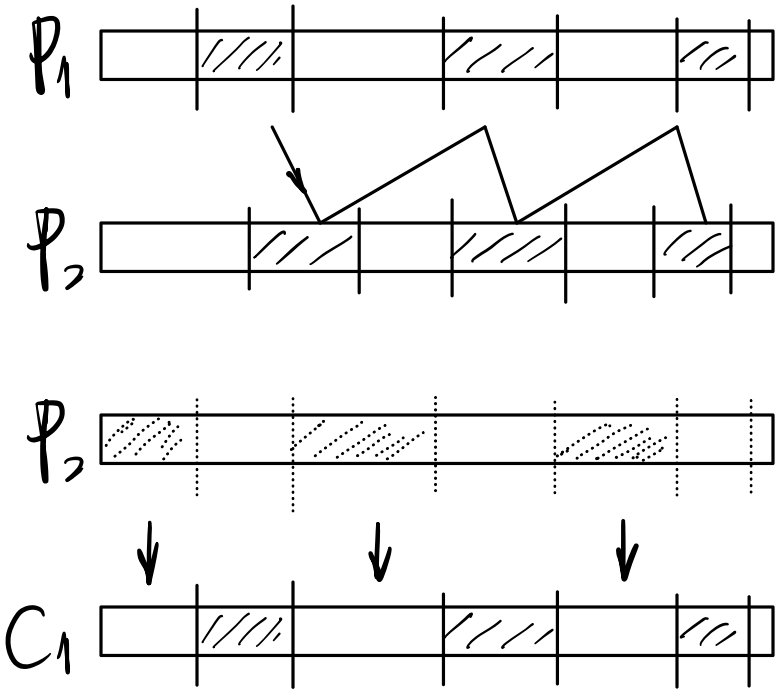


Chose from parent 1, Find corresponding ones in P2. Use the rest of P2 and Chosen ones from P1 to get Child 1

8. Order-based crossover



9. Cycle crossover



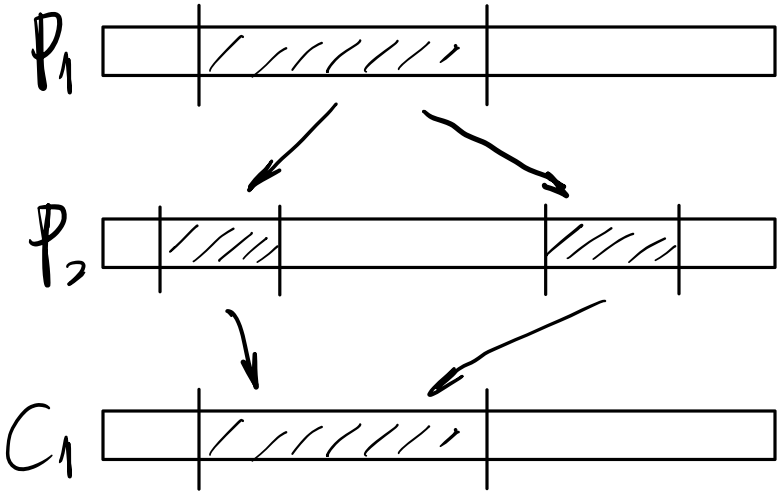
Chose random position from parent 1

Find corresponding value on parent 2

Then find value position on parent 1 and

so on.

10. Sub tour exchange crossover



Find a group of positions from parent 1

Then find corresponding value on parent 2

Disregard the orders, use values from parent 2 and rest part of parent 1 to get child 1

Proposed method :

① Use more than 2 parents

② Hybrid methods :

Ex. Combine PMX and OX

Chose one with probability P