UVa - 10245

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The Closest Pair Problem

Given a set of points in a two dimensional space, you will have to find the distance between the closest two points.

Input
The input file contains several sets of input. Each set of input starts with an integer **N (0<=N<=10000)**, which denotes the number of points in this set. The next **N** line contains the coordinates of **N** two-dimensional points. The first of the two numbers denotes the **X-coordinate** and the latter denotes the **Y-coordinate**. The input is terminated by a set whose **N=0**. This set should not be processed. The value of the coordinates will be less than **40000** and non-negative.

Output
For each set of input produce a single line of output containing a floating point number (with four digits after the decimal point) which denotes the distance between the closest two points. If there is no such two points in the input whose distance is less than **10000**, print the line **INFINITY**.

link

Sample I/O

sample input	sample output
3 0 0 10000 10000 20000 20000 5 0 2 6 67 43 71 39 107 189 140 0	INFINITY 36.2215

How to Solve

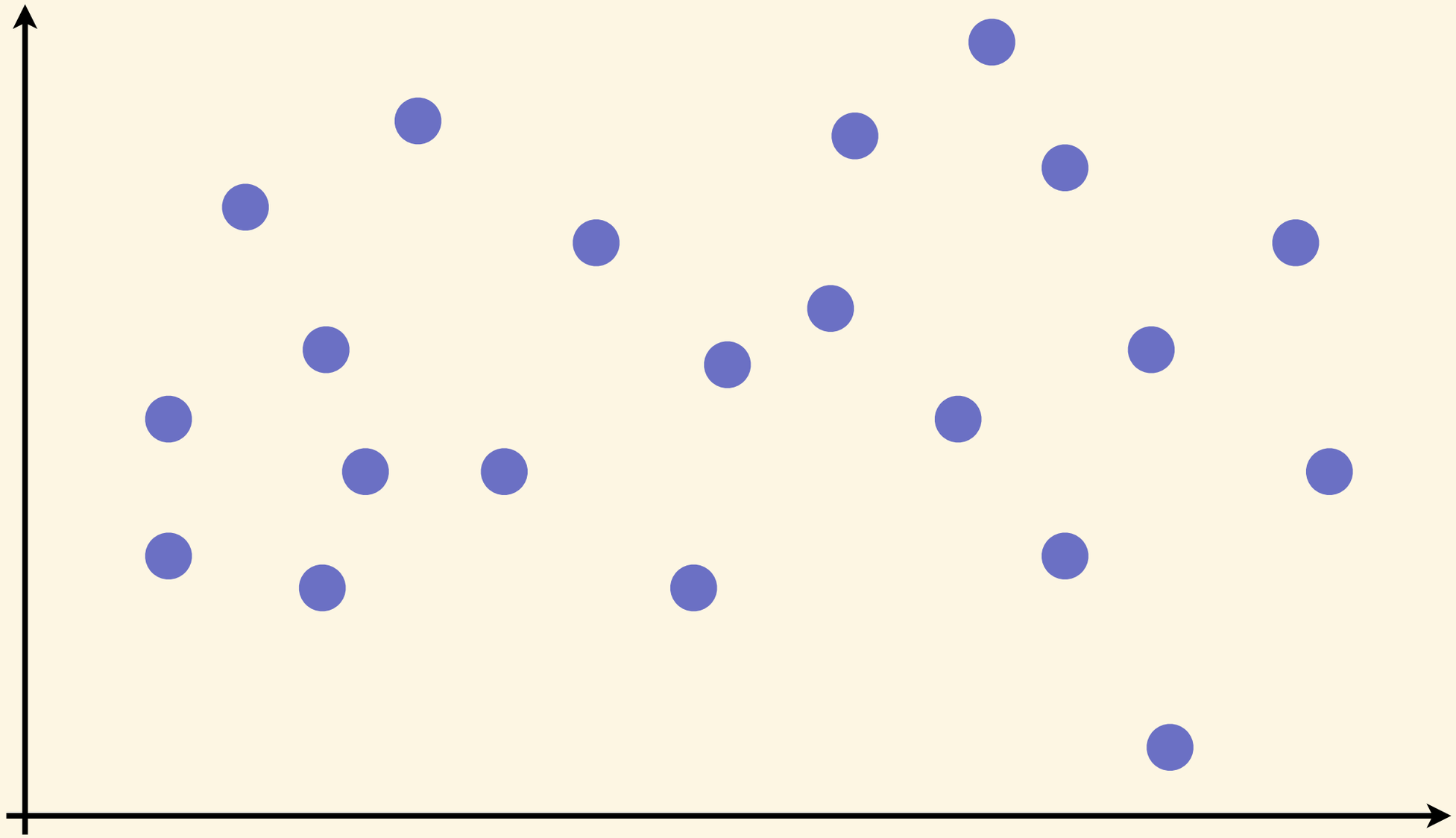
1. 對所有點**依據 x 座標**進行排序
2. 每次點群**對半分為兩堆**
3. 剩下小於等於三個點時，枚舉點對求最短距離
4. 利用子問題求出的**最短距離 d**，從切割點向兩邊尋找所有 x 座標與切割點 x 座標**相差小於等於 d 的點**
5. 枚舉該範圍內的點對求最短距離，並與從子問題求出的解做比較

Sort by x-coordinate

index	0	1	2	3	4	5	6	7	8	9
x	7	6	2	9	10	6	1	8	13	11
y	7	8	5	9	5	1	2	8	11	13

index	0	1	2	3	4	5	6	7	8	9
x	1	2	6	6	7	8	9	10	11	13
y	2	5	8	1	7	8	9	5	13	11

Divide



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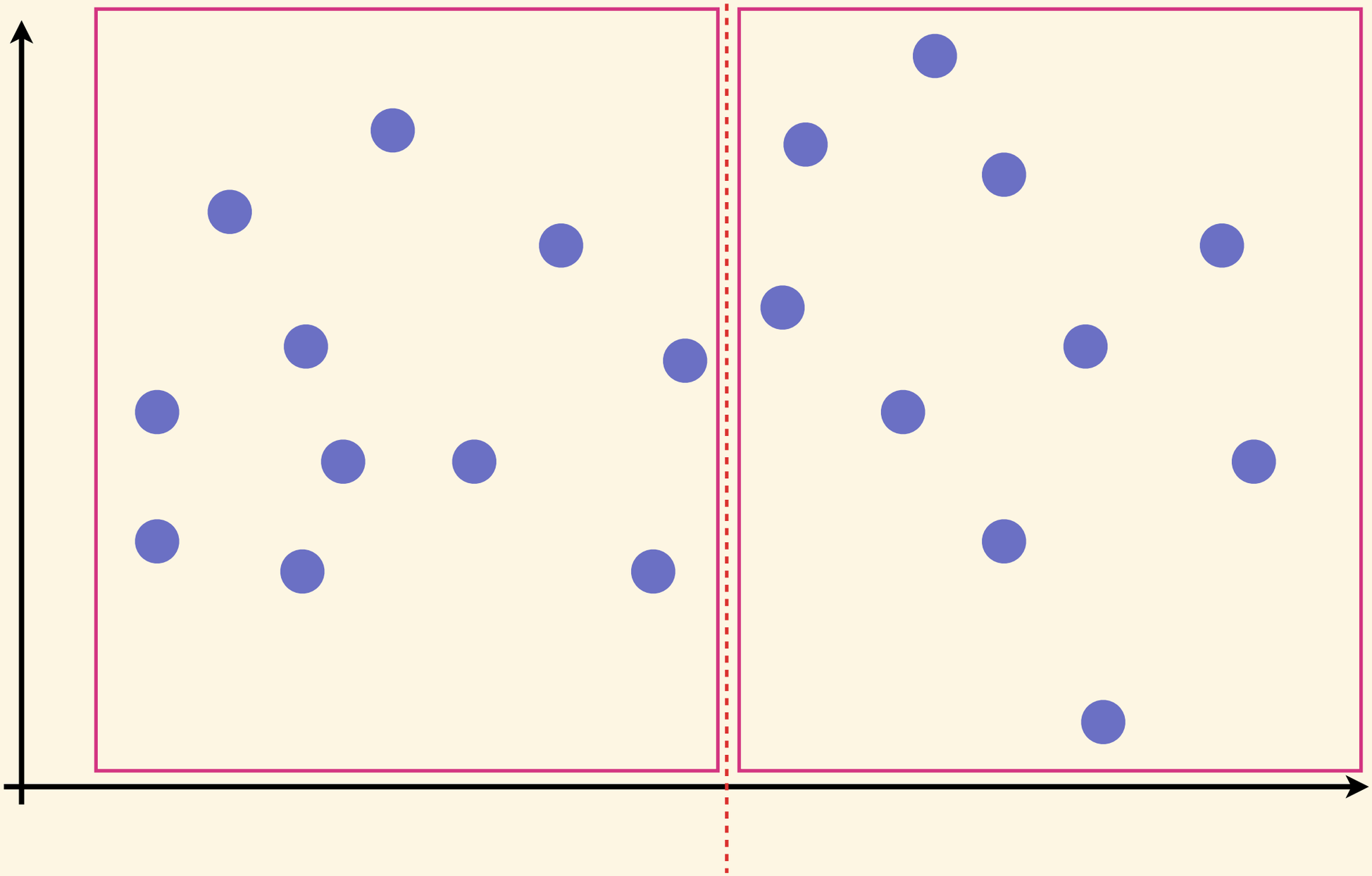

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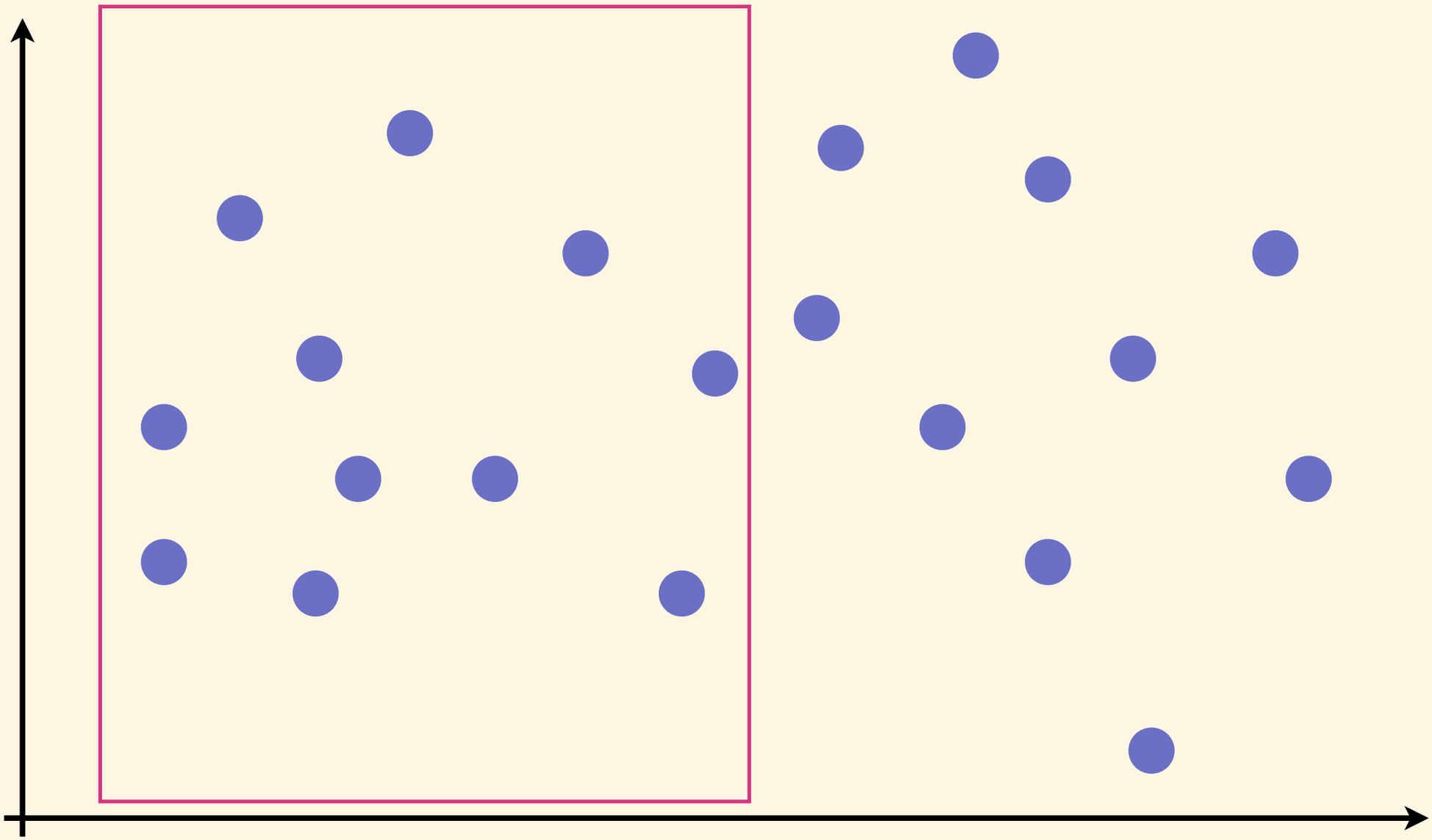

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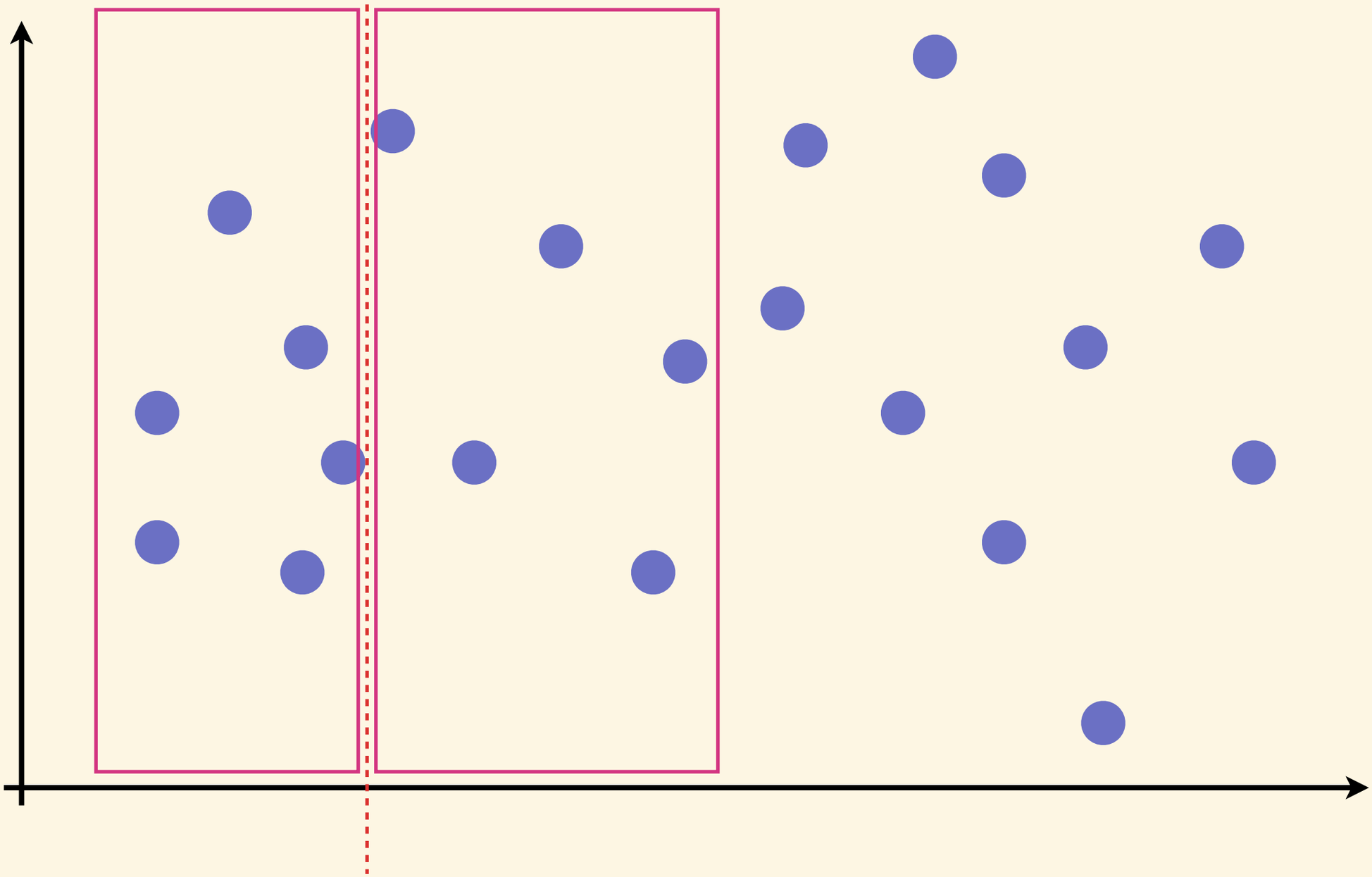

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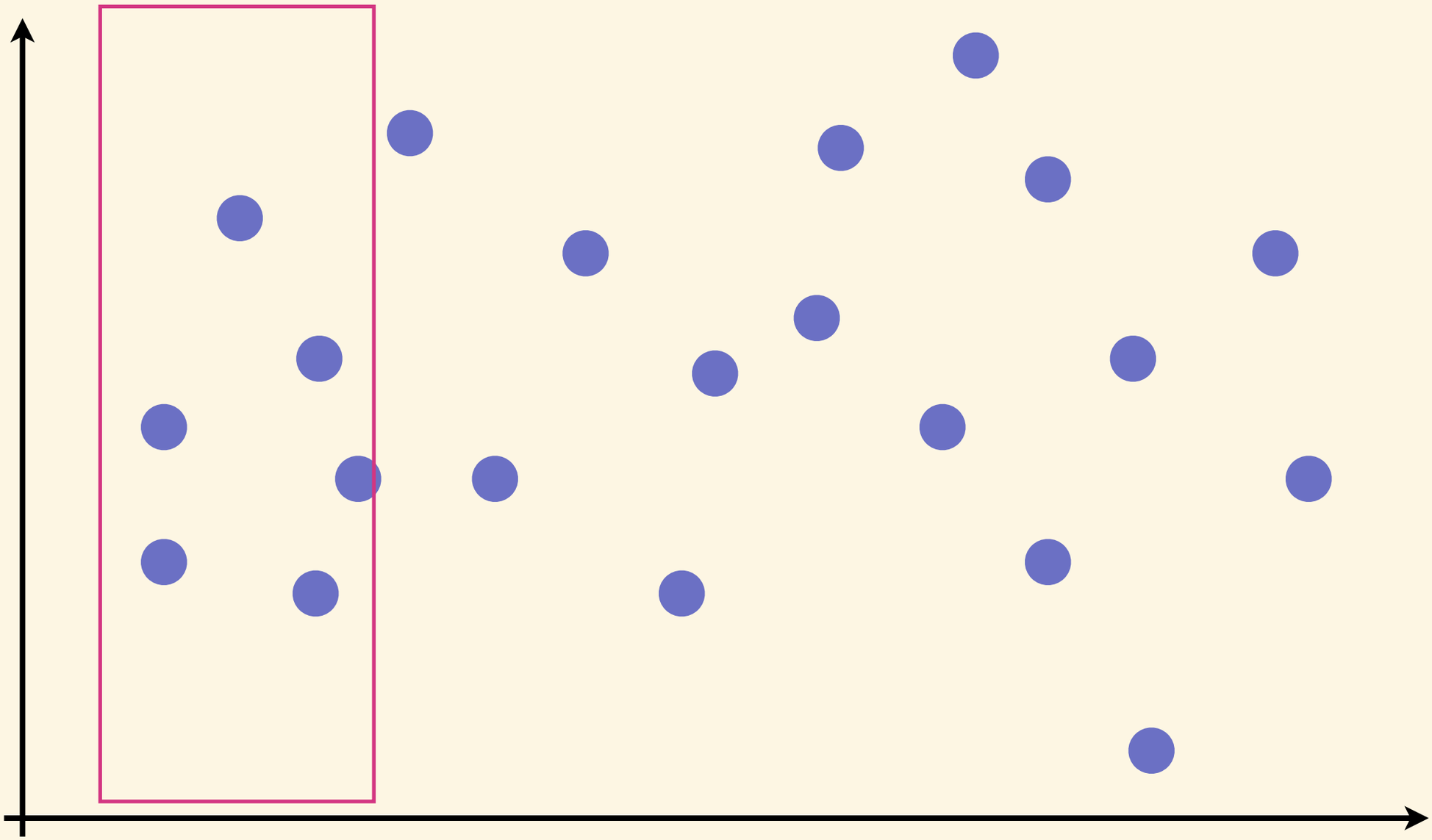

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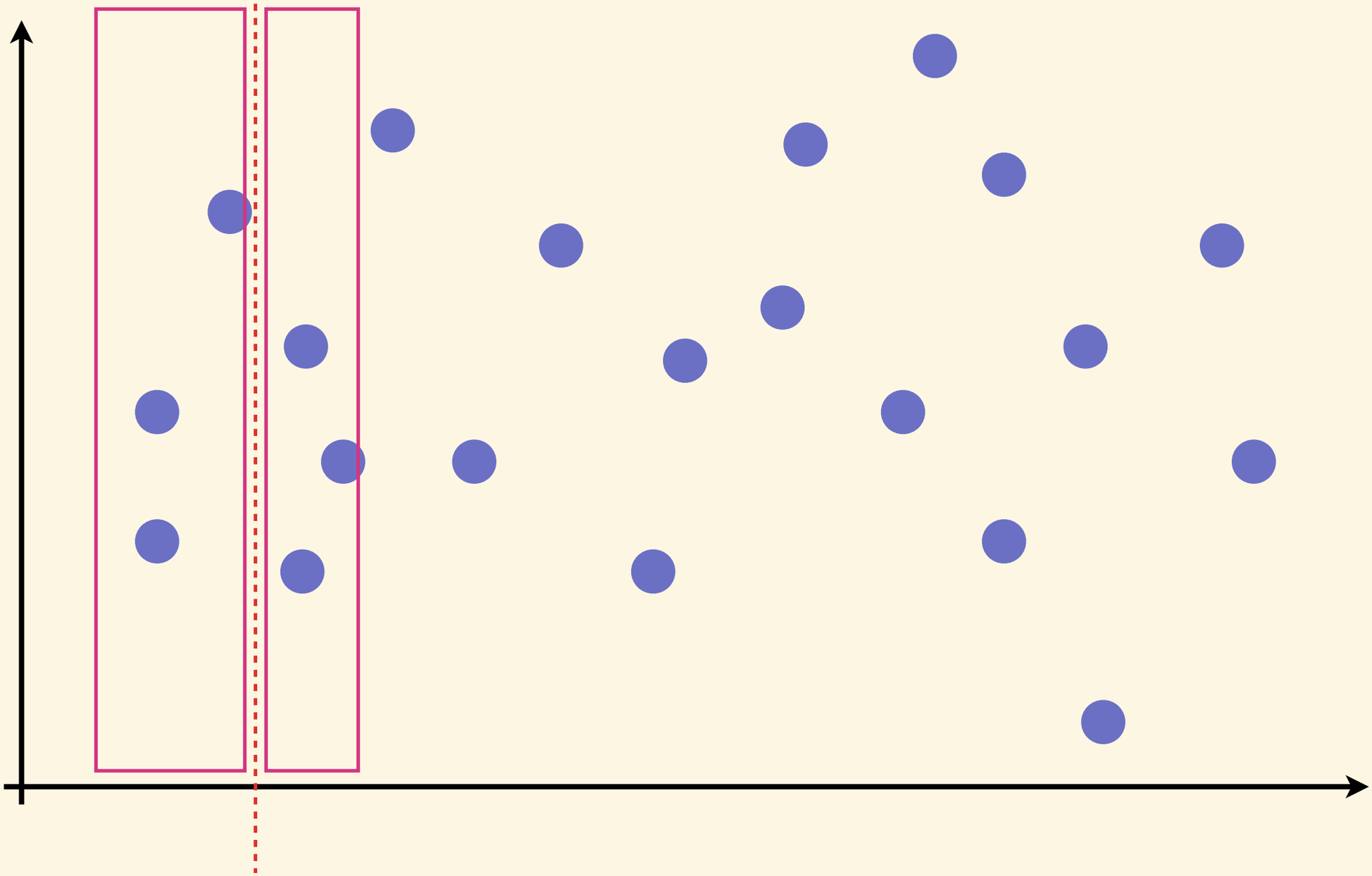

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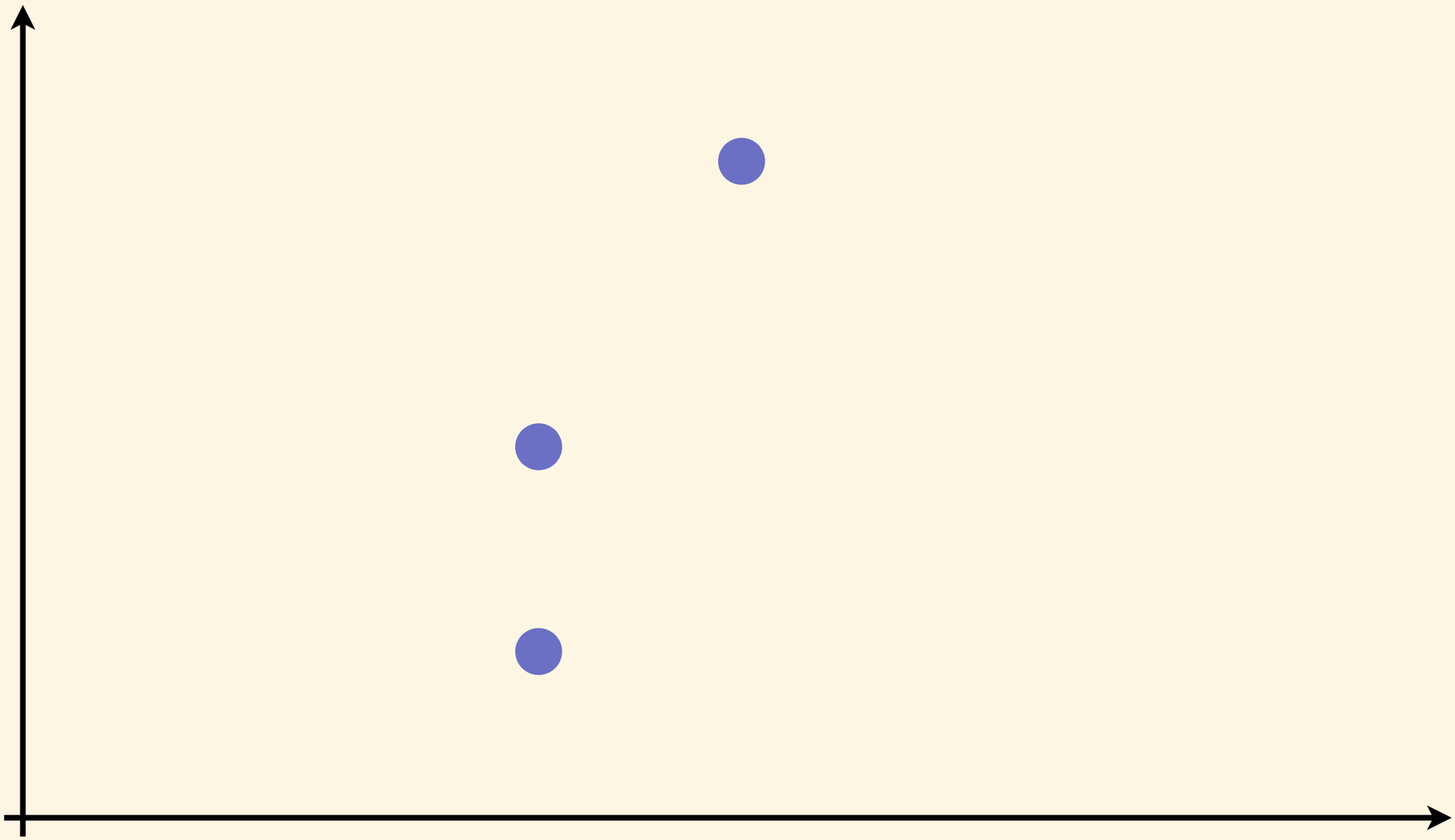
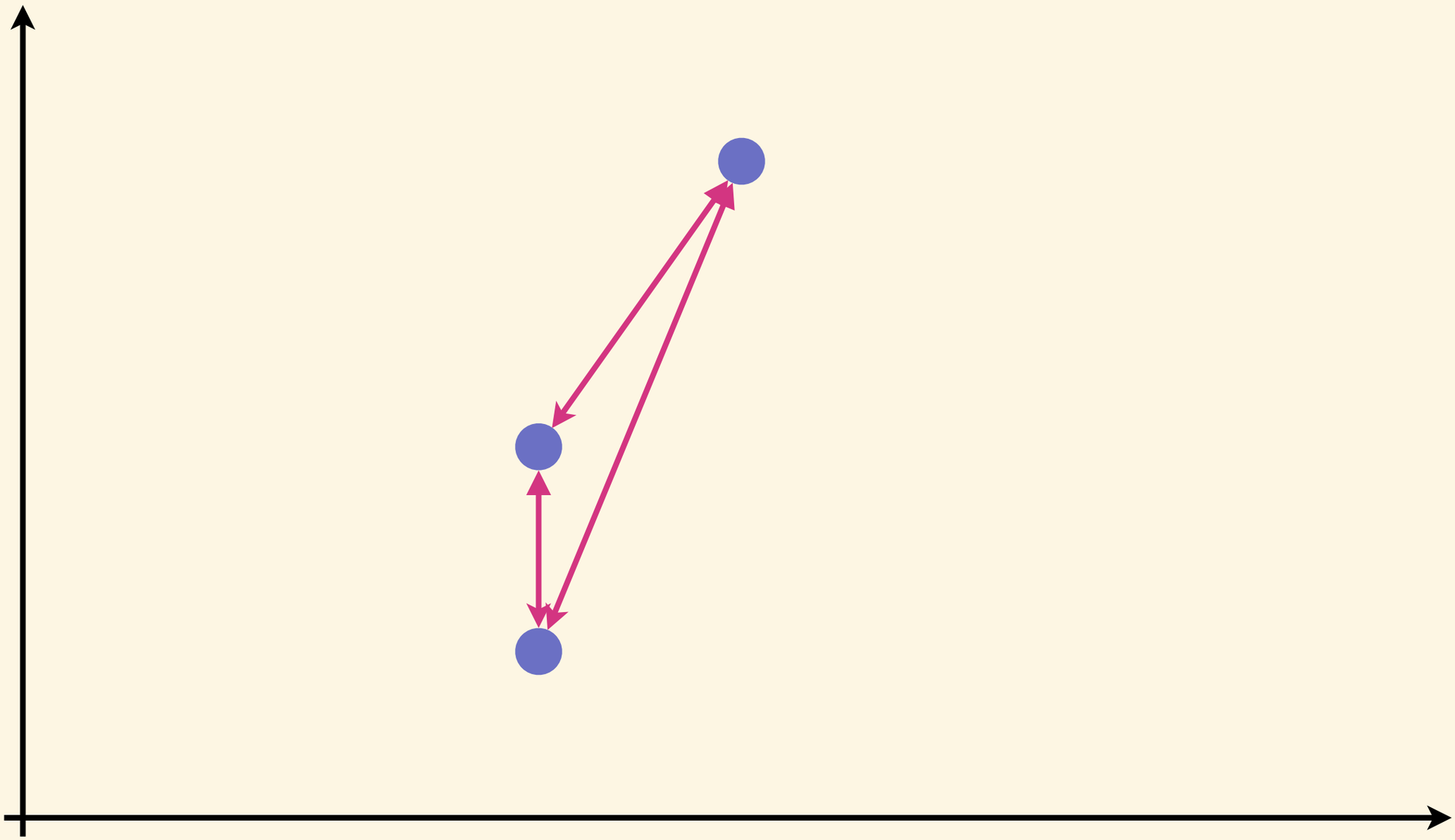


Solve



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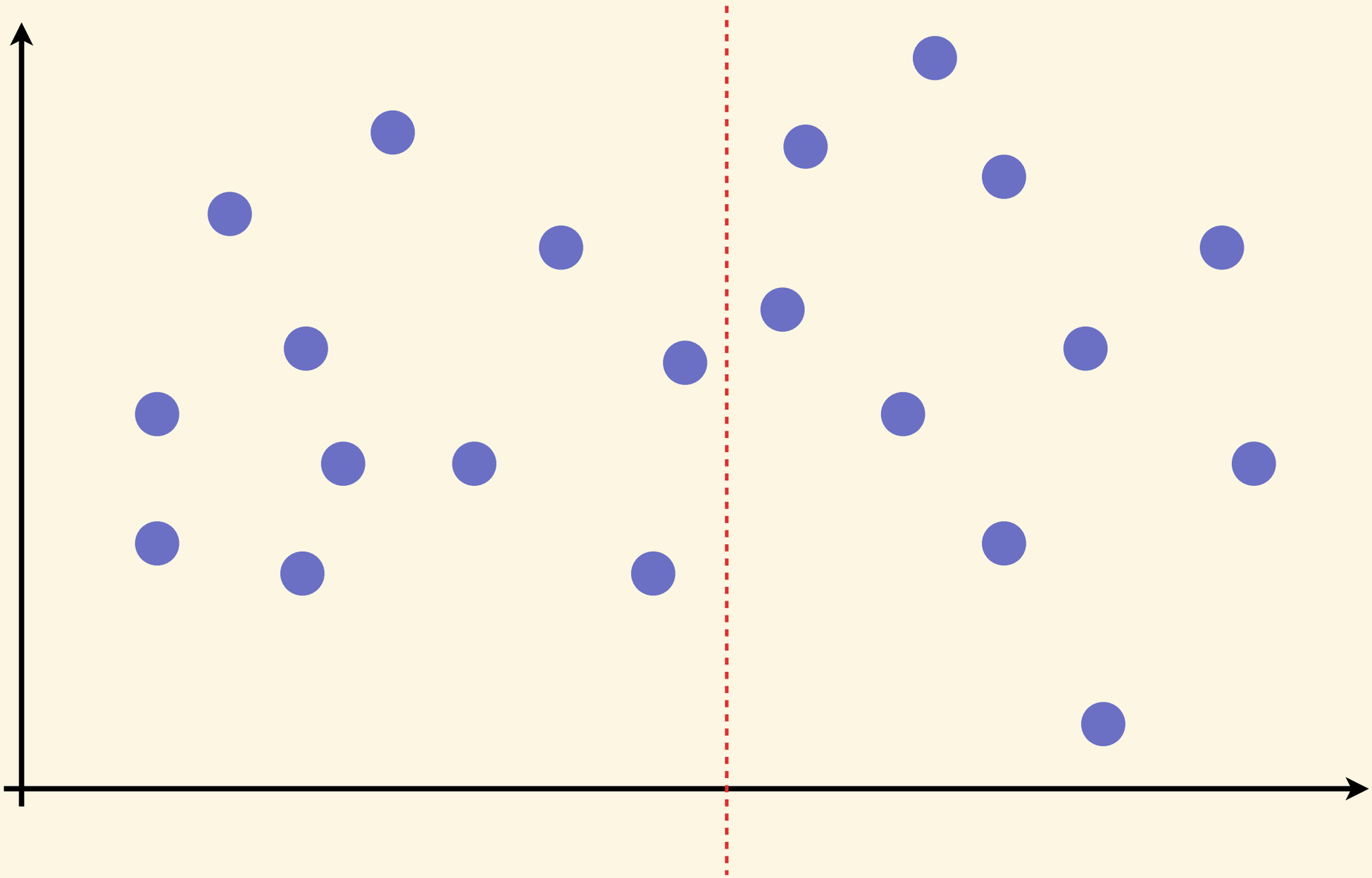

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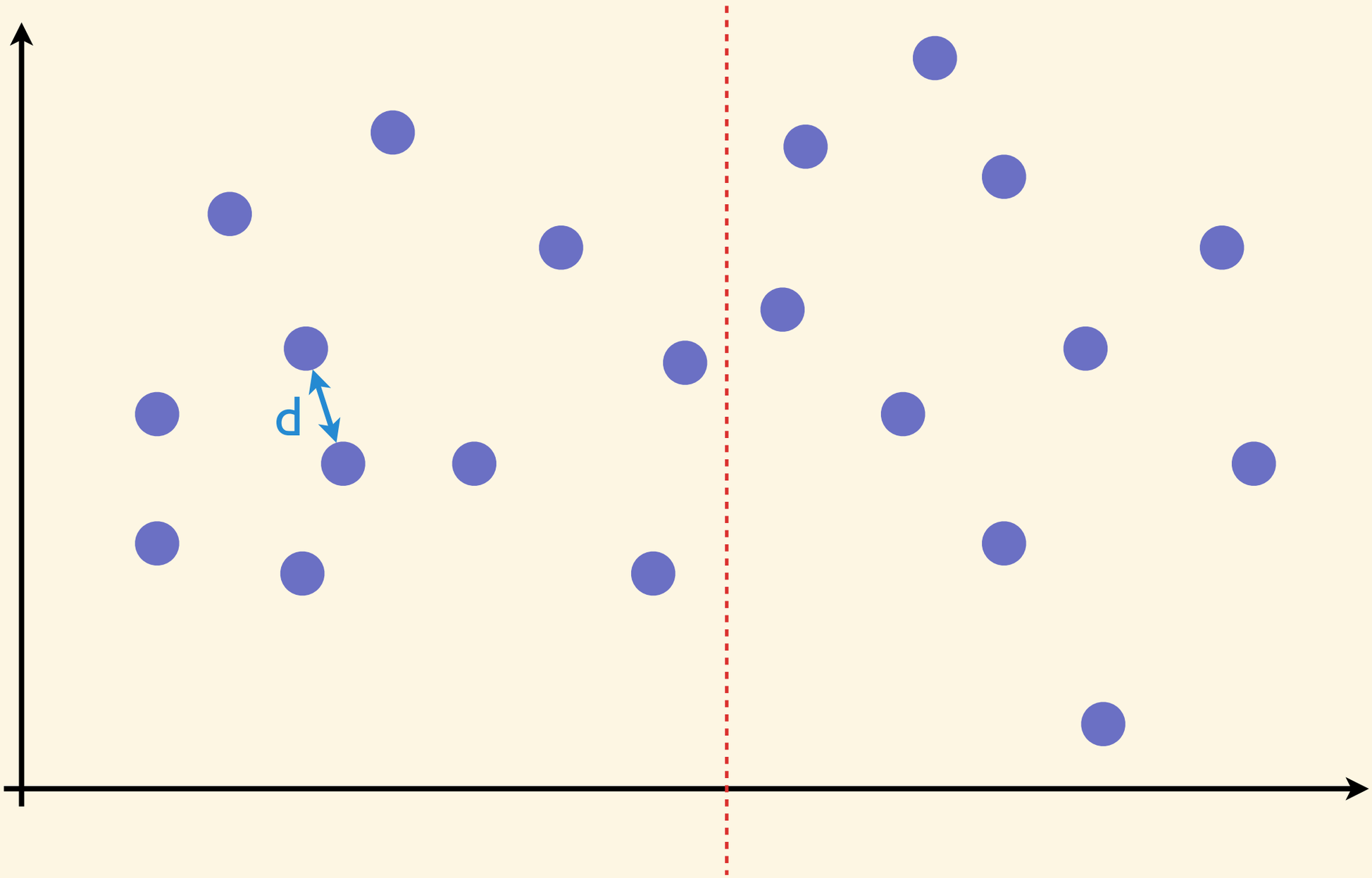

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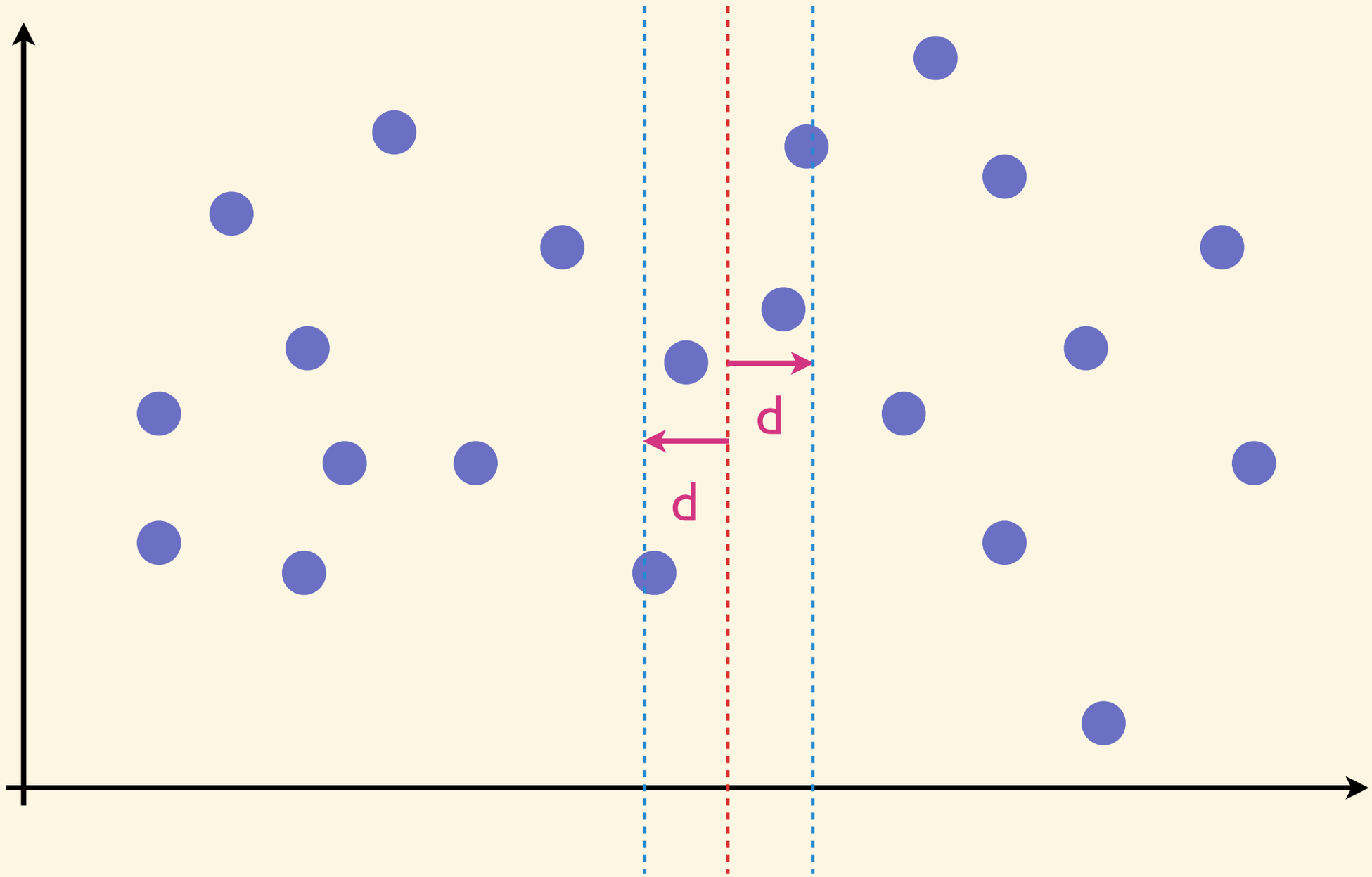

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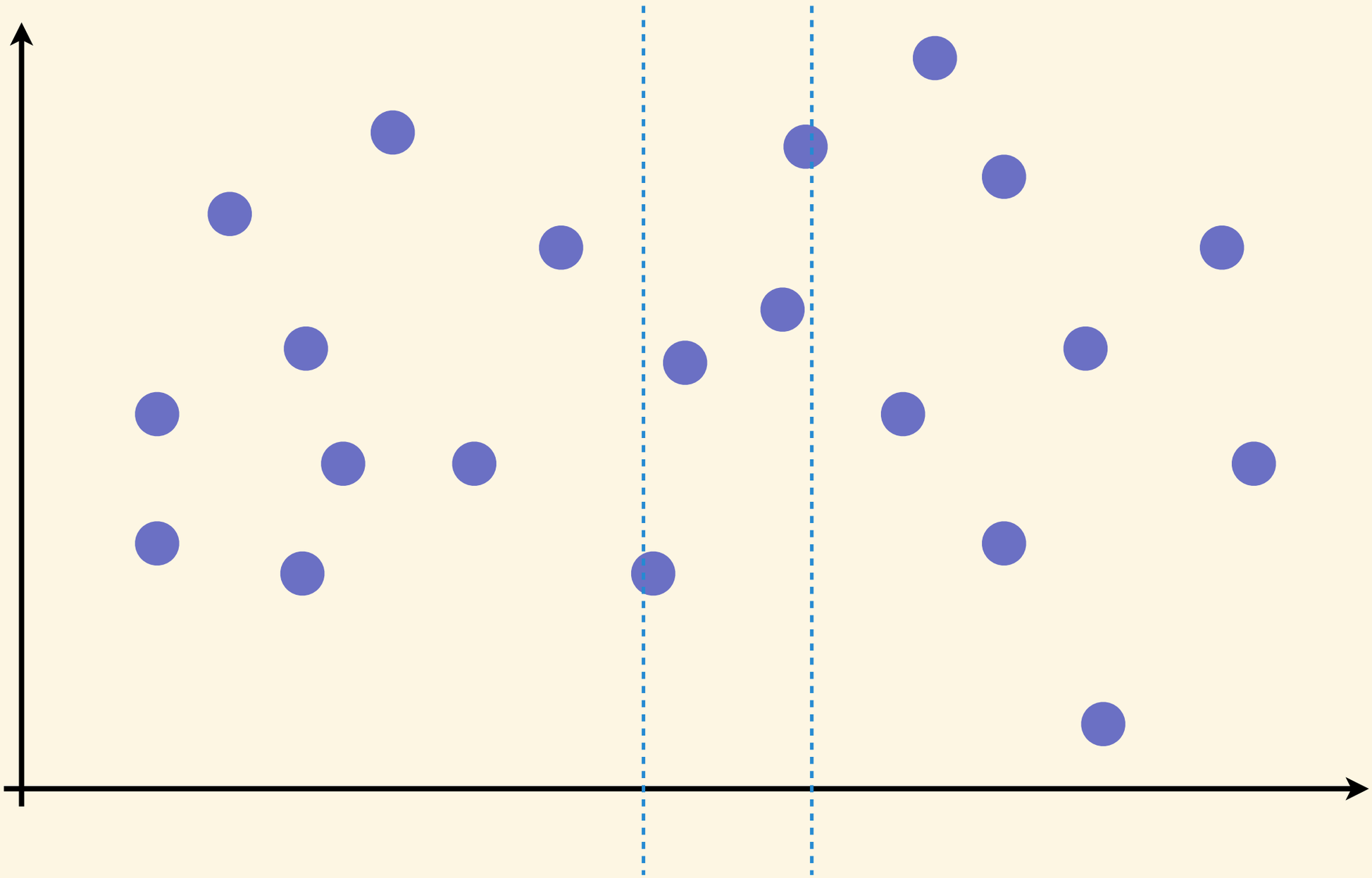

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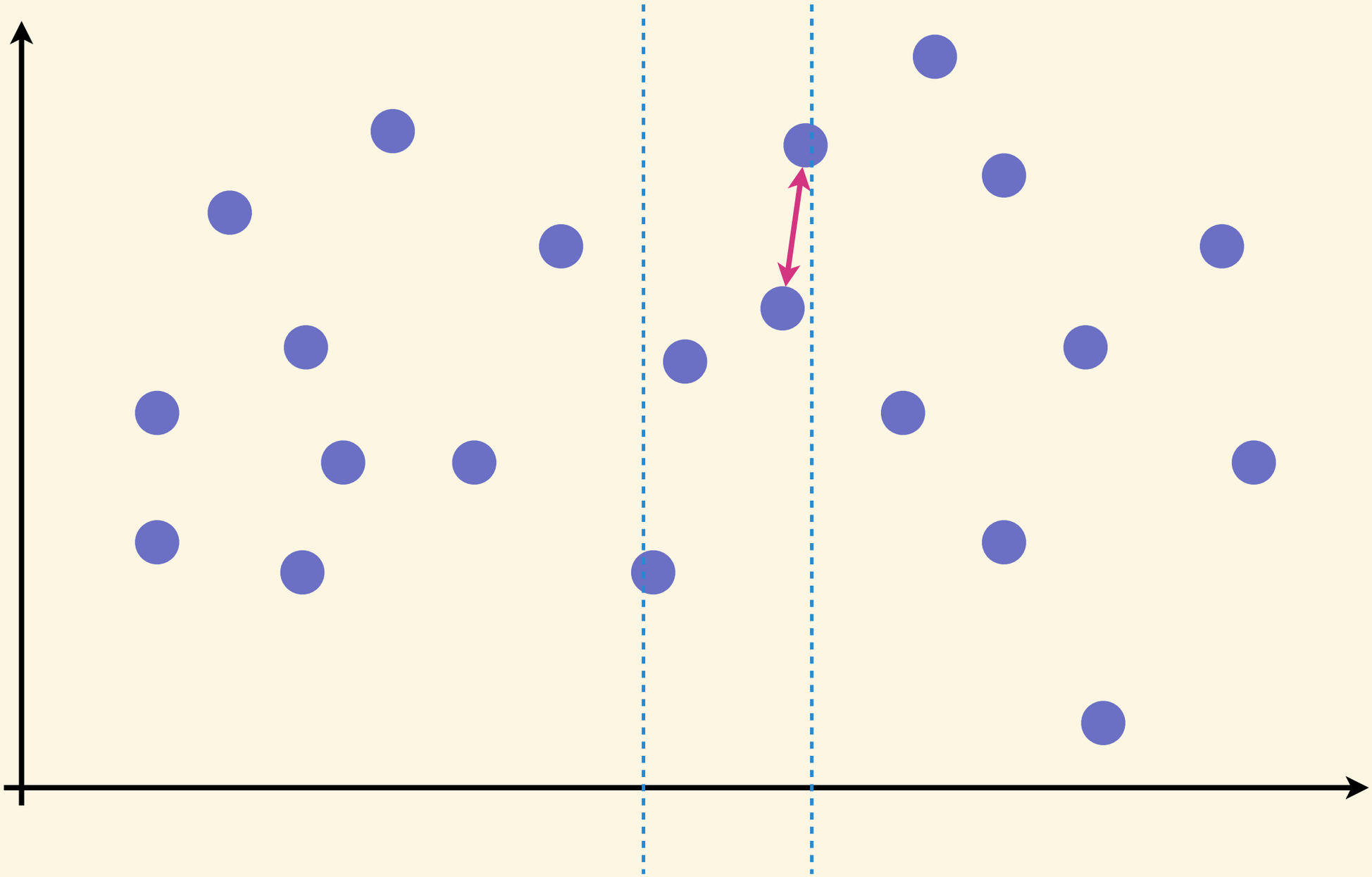

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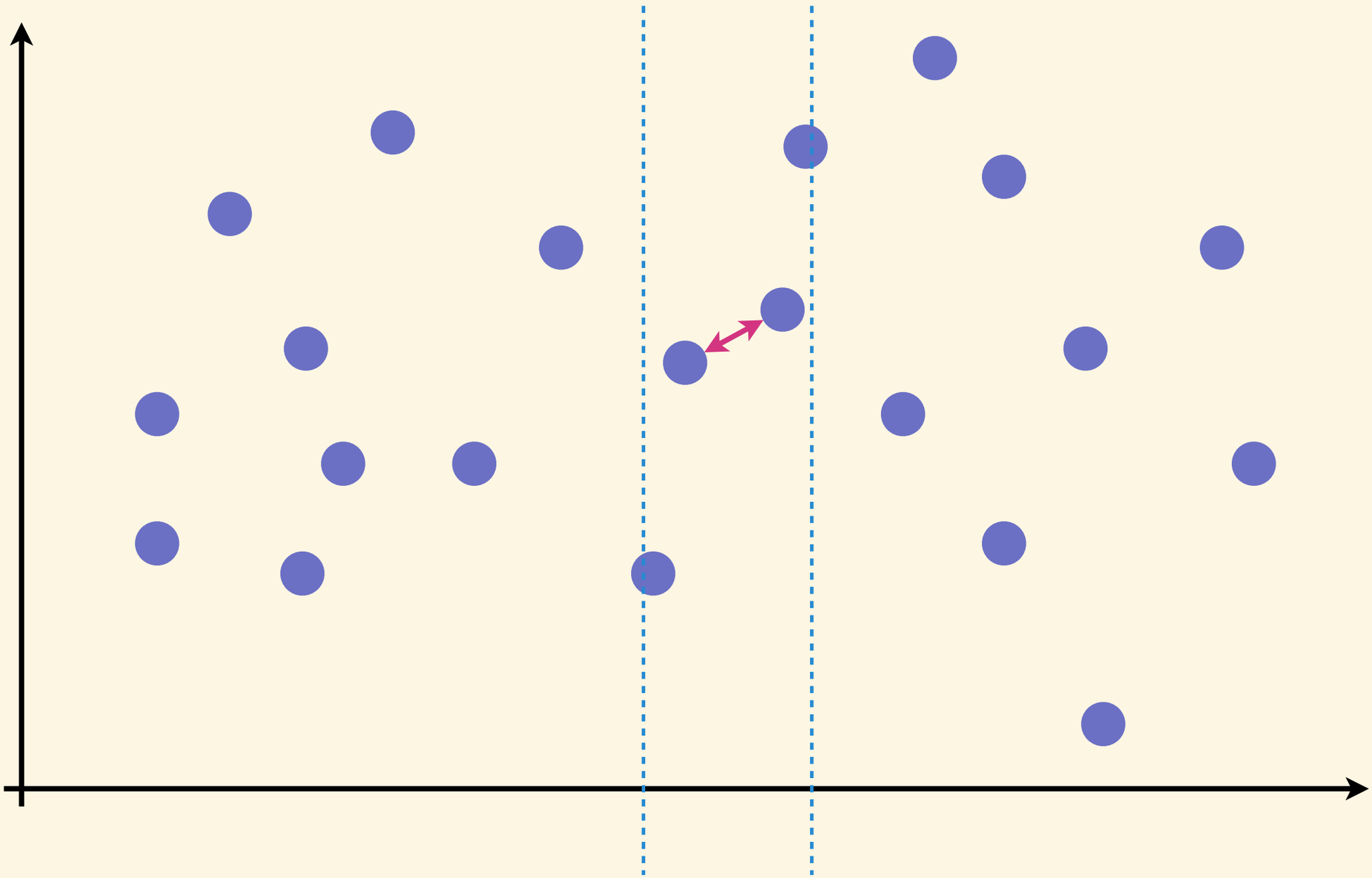

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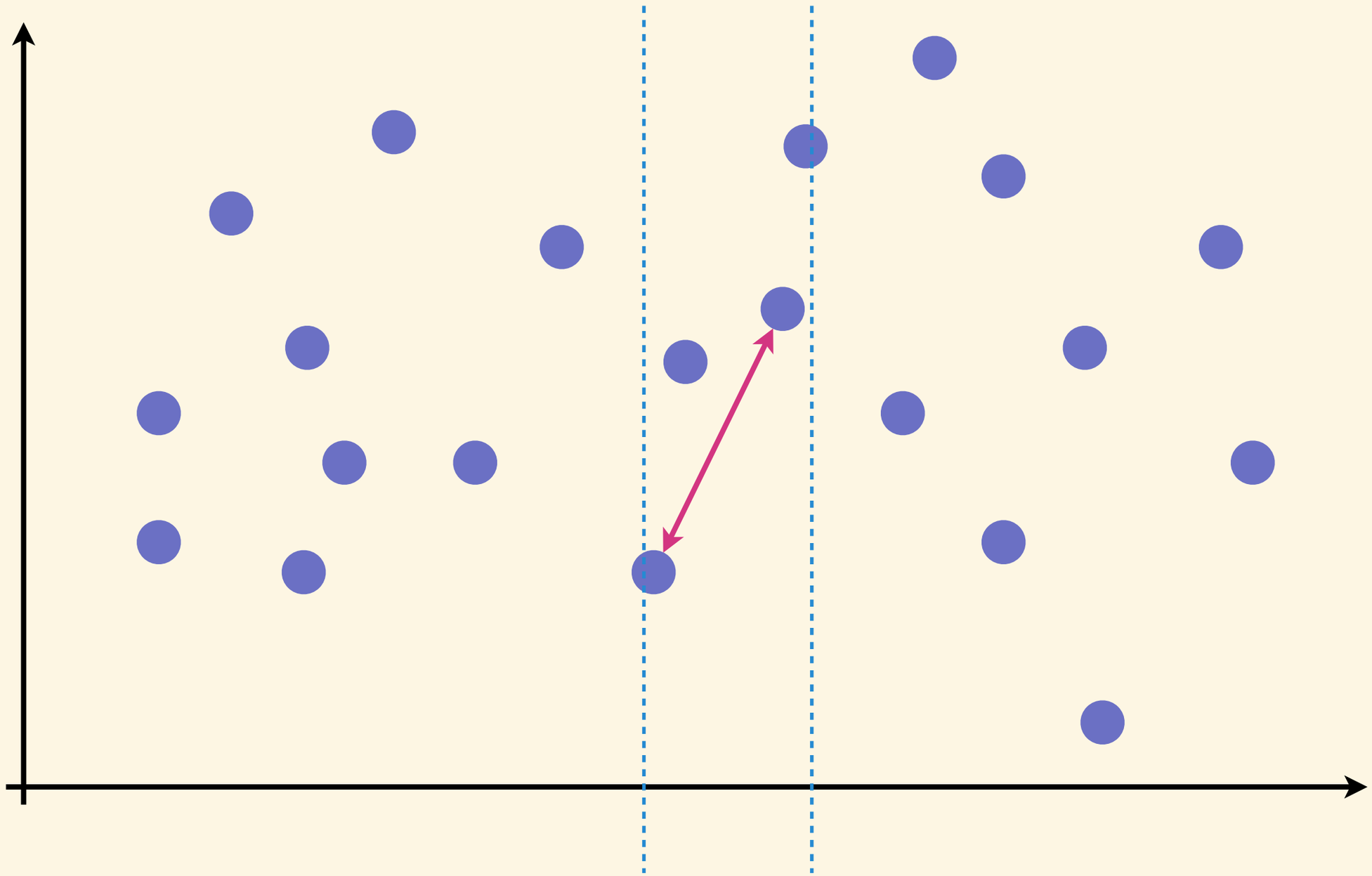

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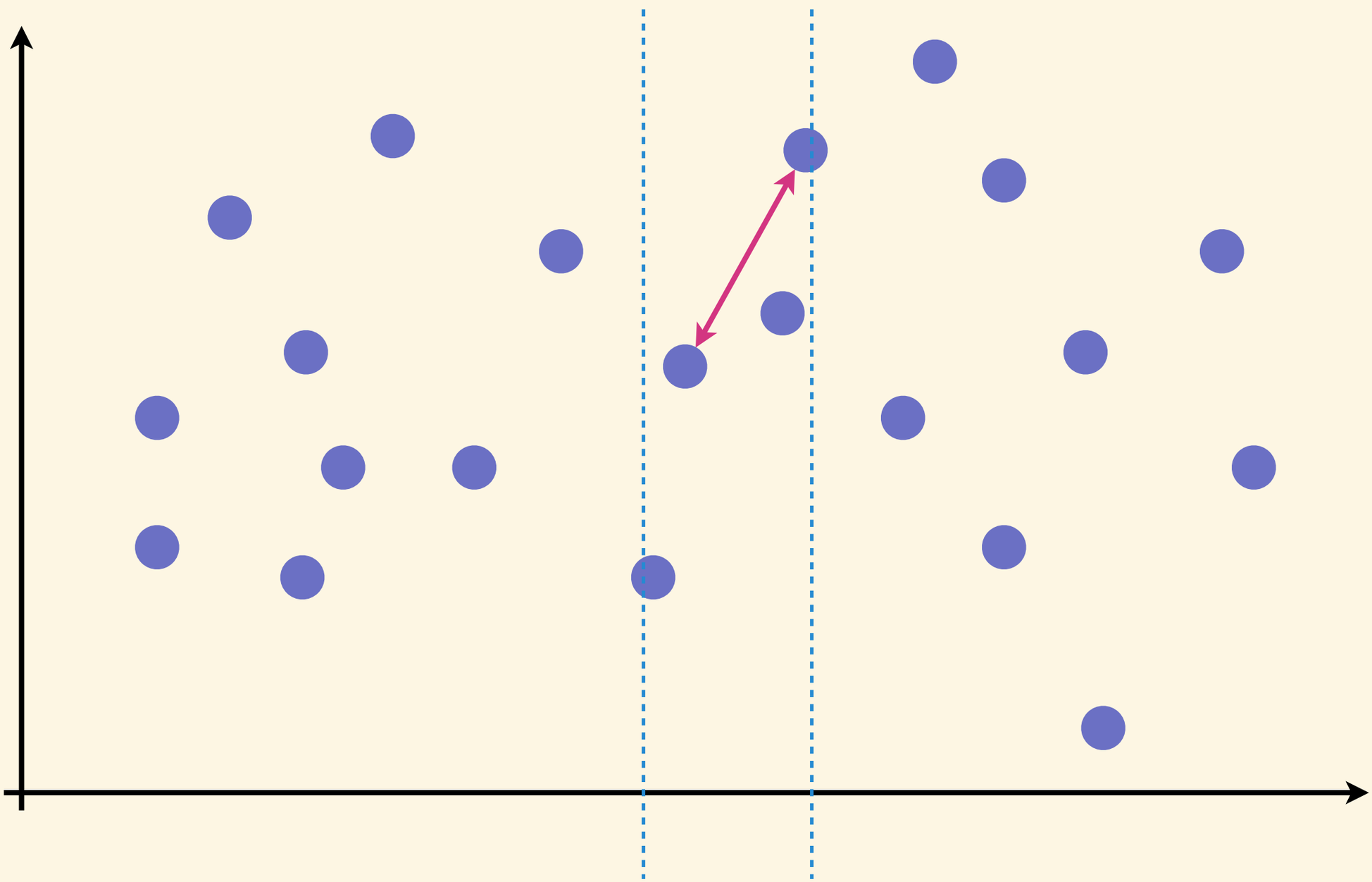

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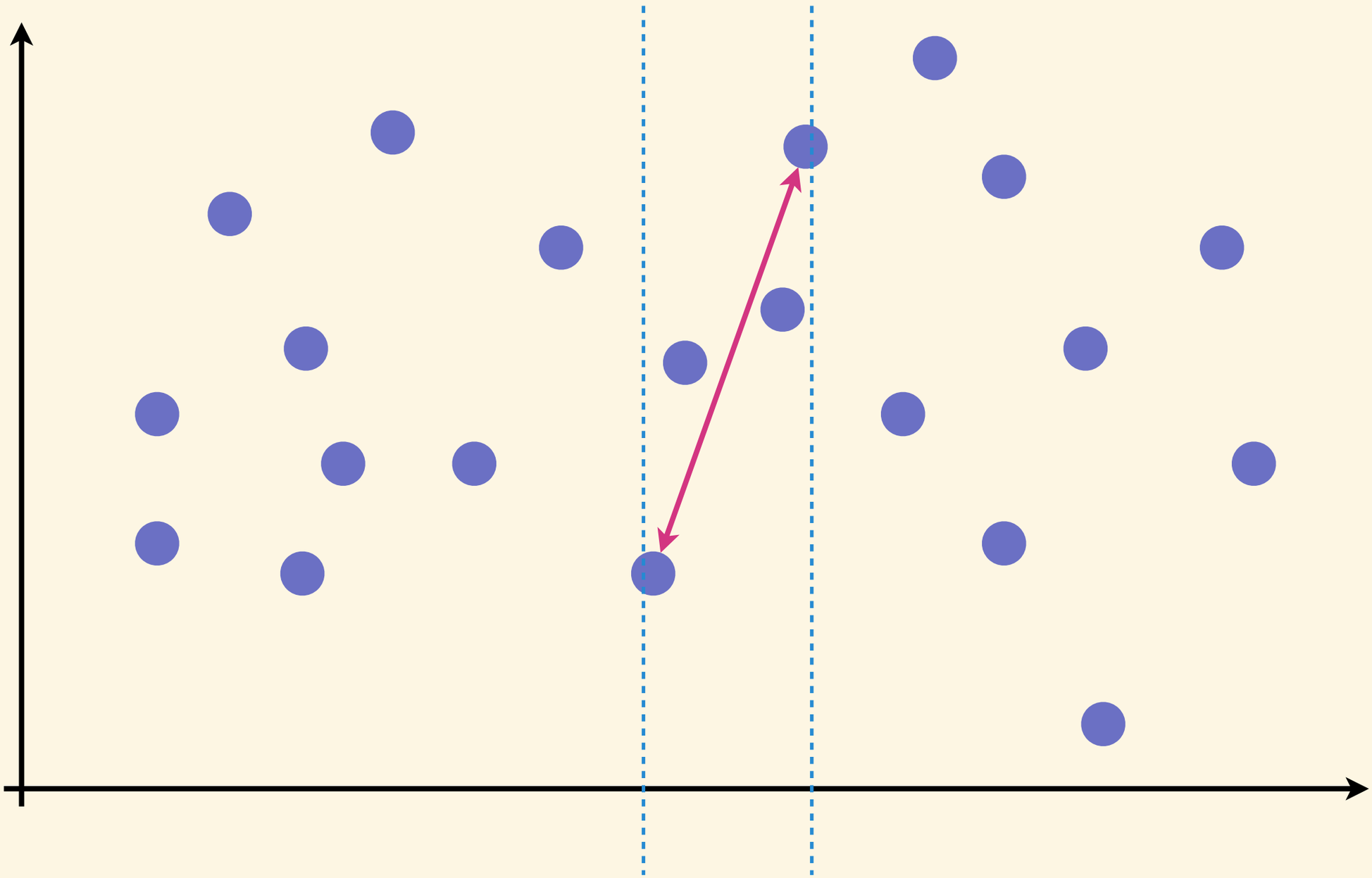

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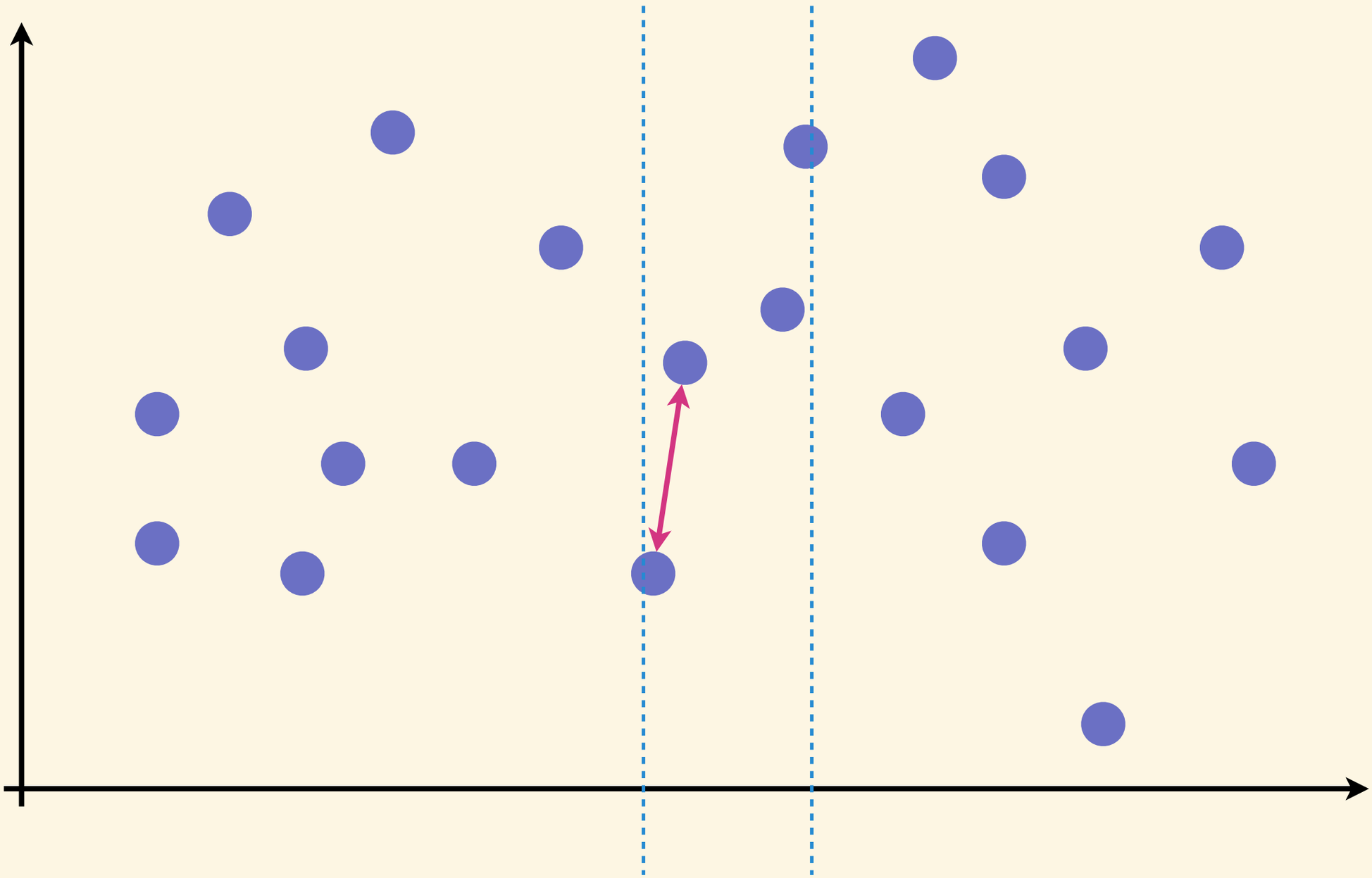

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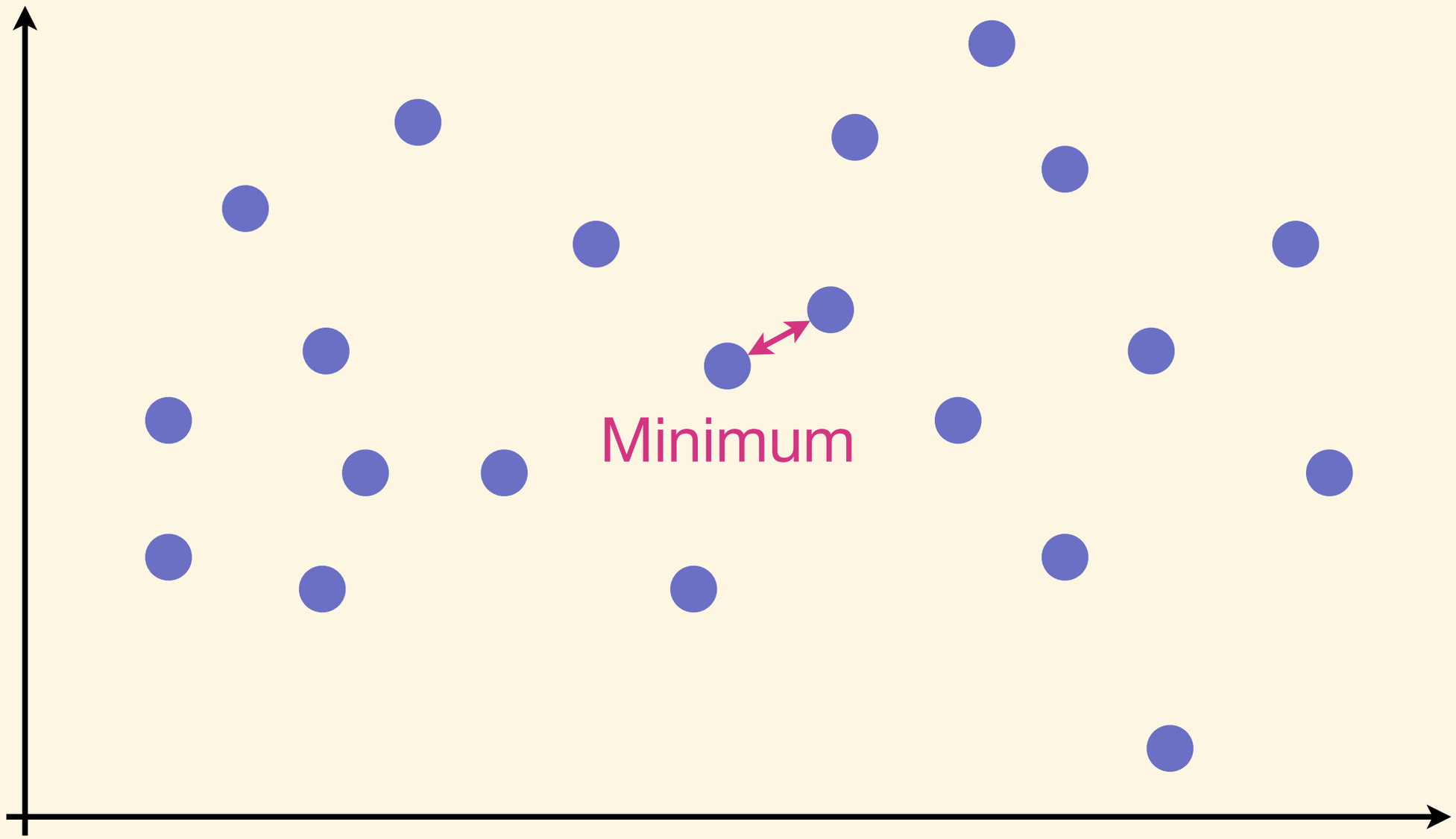

Cheer up!