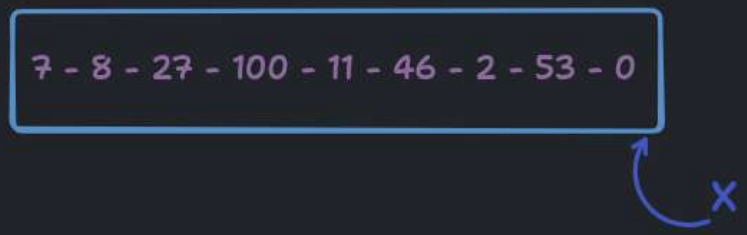
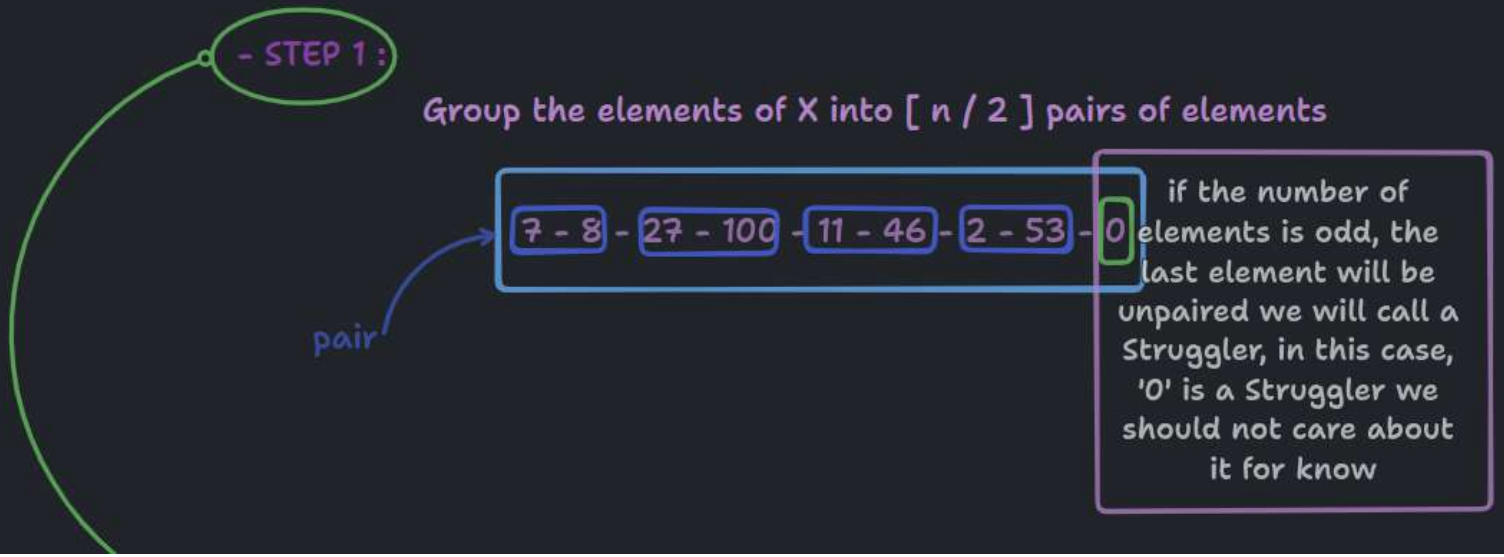
merge-insertion sort or the Ford–Johnson algorithm

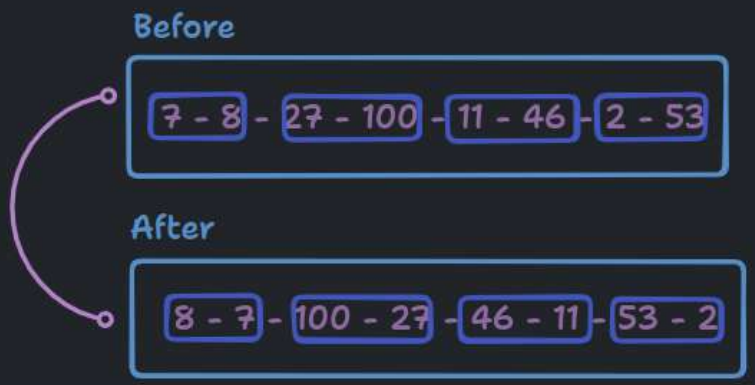
Integer sequence X, of n elements, in this case n = 9




- STEP 1 :
Group the elements of X into [n / 2] pairs of elements
7 - 8 - 27 - 100 - 11 - 46 - 2 - 53 - 0
pair
if the number of elements is odd, the last element will be unpaired we will call a Struggler, in this case, '0' is a Struggler we should not care about it for know

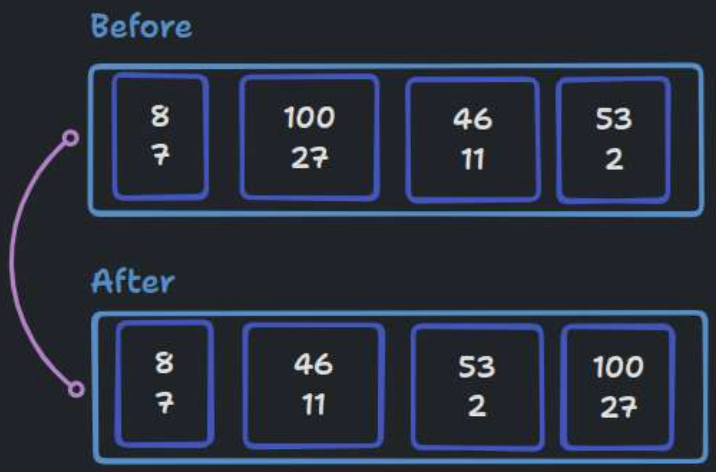
- STEP 2:

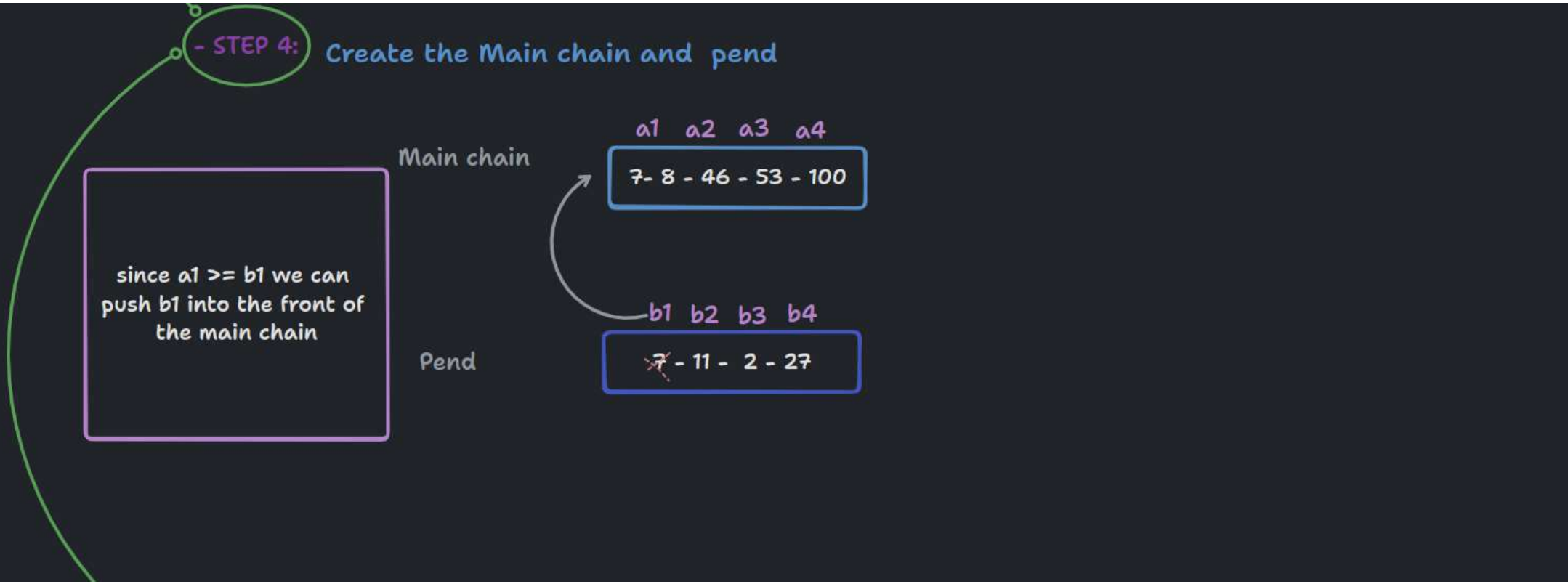
Determine the larger of the two elements in each pair

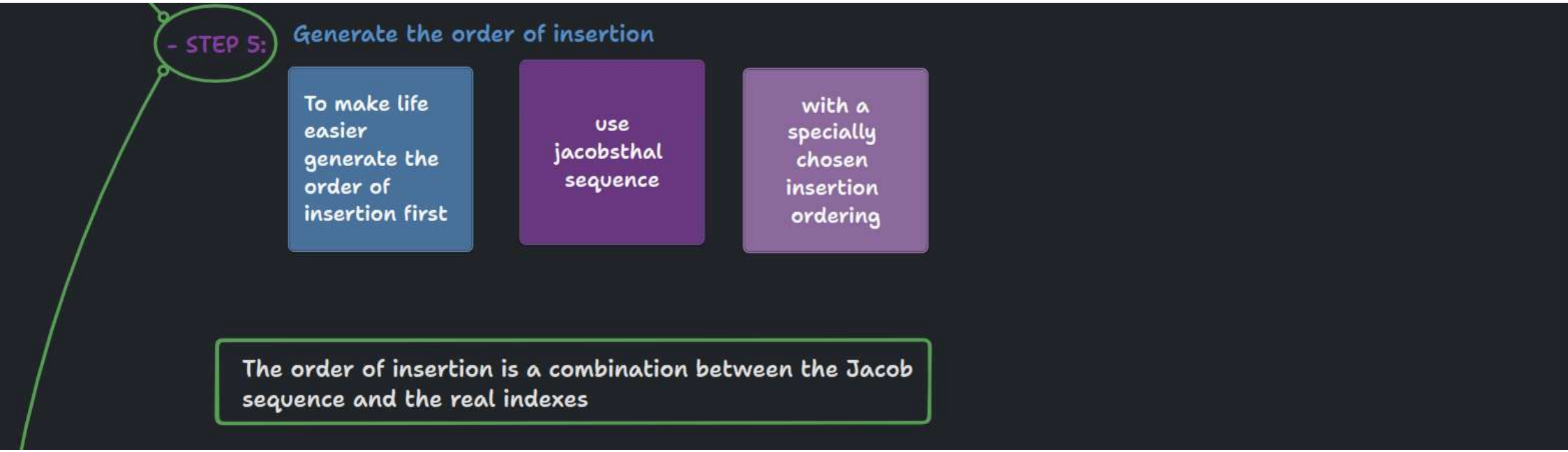


- STEP 3:

Recursively sort the [n / 2] larger elements from each pair




- STEP 4:
Create the Main chain and pend
Main chain
a1 a2 a3 a4
7- 8 - 46 - 53 - 100
since a1 >= b1 we can push b1 into the front of the main chain
b1 b2 b3 b4
7 - 11 - 2 - 27
Pend


- STEP 5:
Generate the order of insertion
To make life easier generate the order of insertion first
use jacobsthal sequence
with a specially chosen insertion ordering
The order of insertion is a combination between the Jacob sequence and the real indexes

Jacobsthal numbers

0, 1, 1, 3, 5, 11, 21, 43, 85, 171, 341 ...

genereate the jacob number based on the size of your pend

Real indexes

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 ...

The combination

3, 2, 5, 4, 11, 10, 9, 8, 7, 6, 21, 20 ...

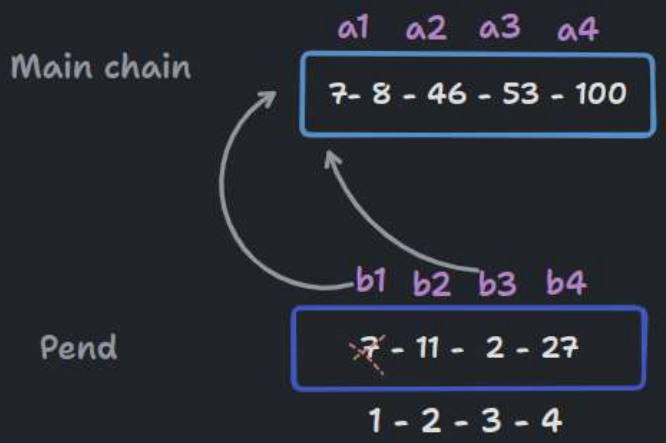
To apply specially chosen insertion ordering we will start from the element 3 since we alredy pushed the element num 1

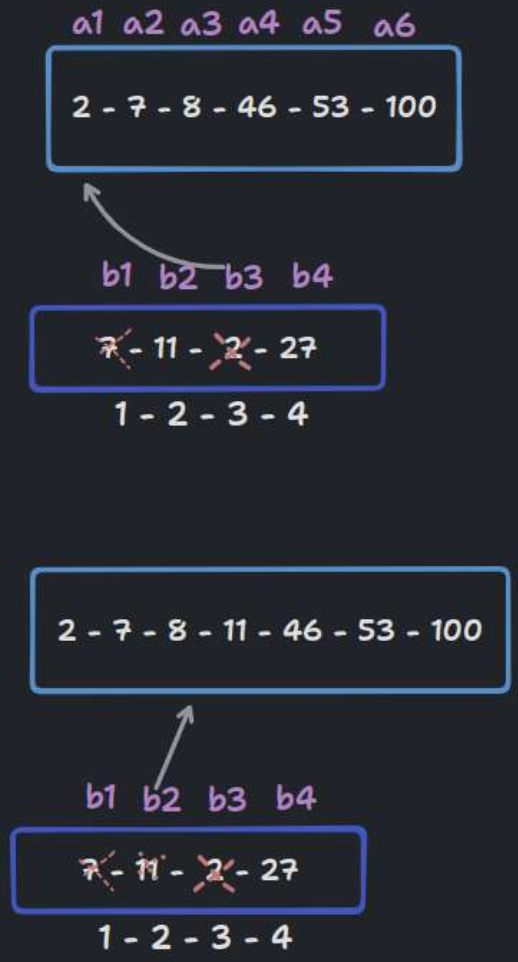
The trick here is to insert Jacob number first then the indexes befor it

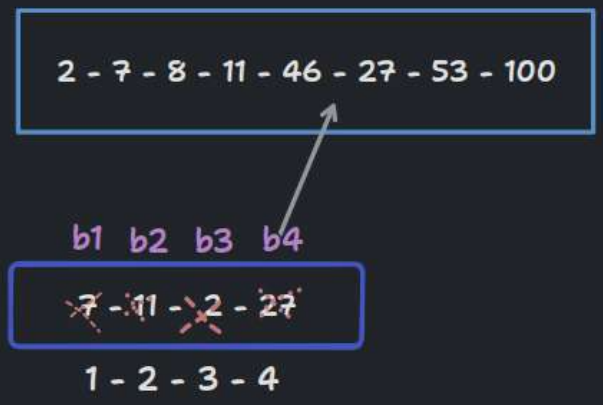
- STEP 6:

Insert the elements of the pend into the main chain

Use binary search in the pend to determine the position at which each element should be inserted




a1 a2 a3 a4 a5 a6
2 - 7 - 8 - 46 - 53 - 100
b1 b2 b3 b4
7 - 11 - 2 - 27
1 - 2 - 3 - 4
2 - 7 - 8 - 11 - 46 - 53 - 100
b1 b2 b3 b4
7 - 11 - 2 - 27
1 - 2 - 3 - 4


2 - 7 - 8 - 11 - 46 - 27 - 53 - 100
b1 b2 b3 b4
7 - 11 - 2 - 27
1 - 2 - 3 - 4

- STEP 7: Do you remember the struggler ?

now you can push it

0 - 2 - 7 - 8 - 11 - 46 - 27 - 53 - 100