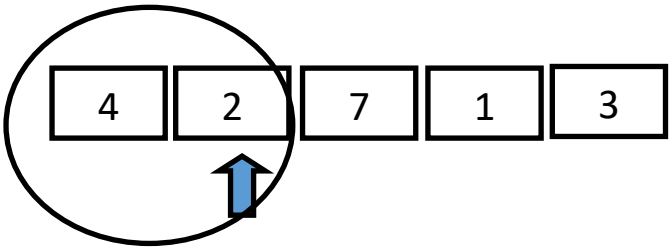
Insertion Sort

Let us apply the Insertion Sort to the array [4,2,7,1,3]

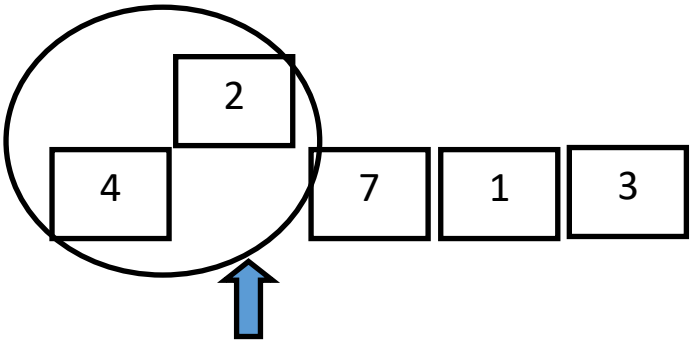
(**1) We will begin the 1st passthrough** by looking at the value in index 1.

This contains the value 2.



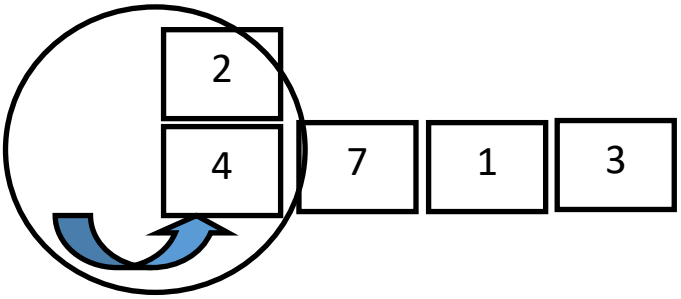
(2) (i) We move the 2, temporarily and keep it inside a variable called temp_value.

(ii) So temp_value = 2.



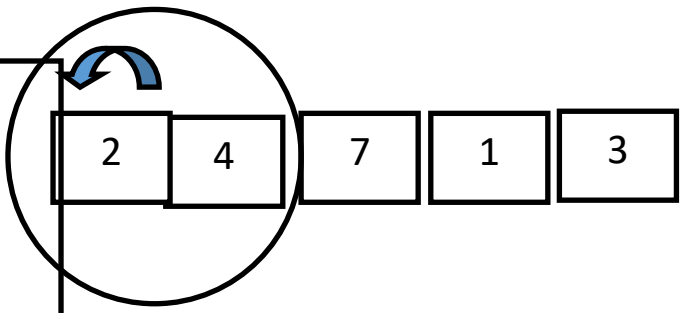
(3) (i) Then we ask if 4 is greater than 2?

(ii) Yes. So we shift 4 to the right.



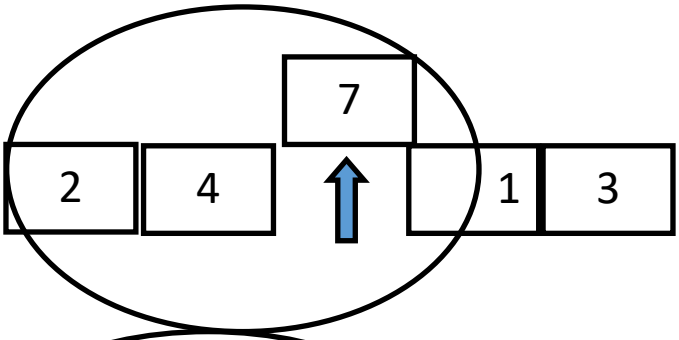
(4) (i) There is nothing left to shift, as the Gap is now at the left end of the array.

(ii) So, we insert the temp_value back into the array, **completing the 1st passthrough.**



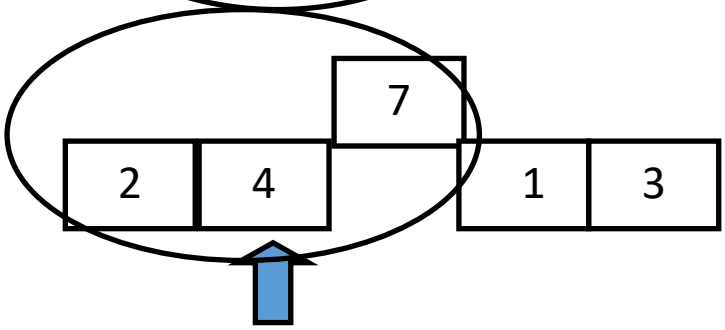
(4) (i) **We will begin the 2nd Passthrough.**

(ii) We will look at the value stored in index 2.



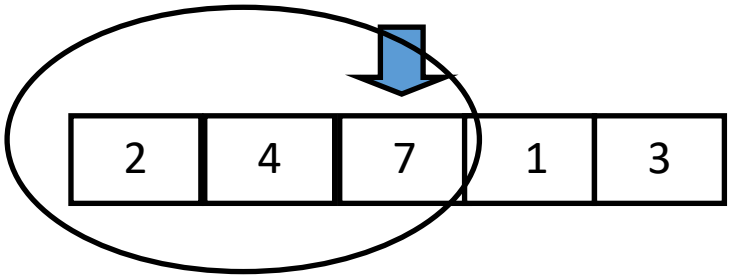
(5) (I) Is 4 greater than 7?

(ii) No. So the Shifting phase is over



(6) (I) As the Shifting Phase is over we insert the temp_value which is 7 back into the gap.

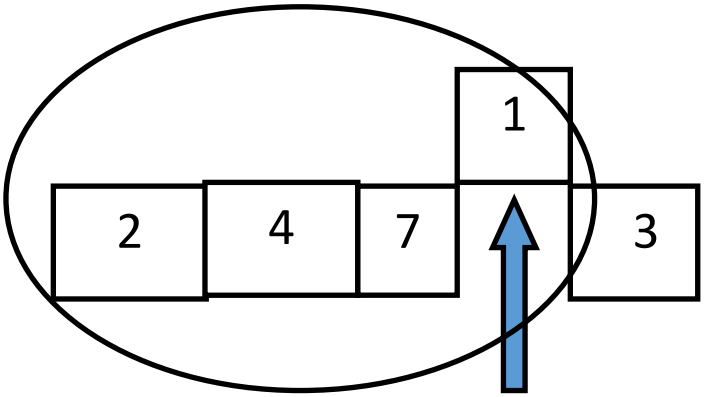
(ii) **The 2nd Passthrough is over.**



(7) (i) ***We will the 3rd Passthrough***

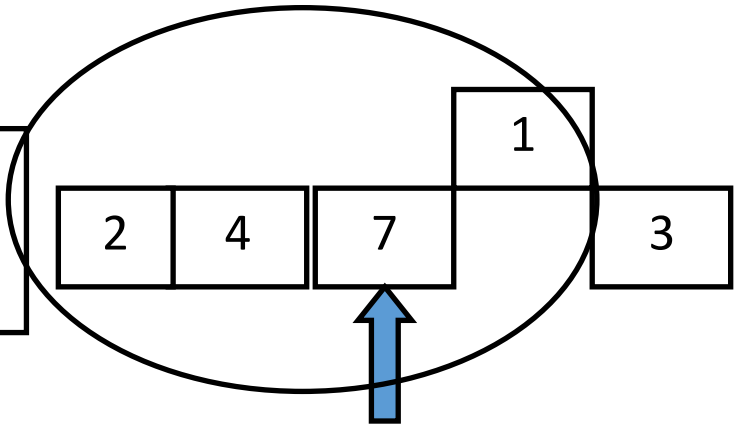
(ii) We will look at index 3 and its value 1

(iii) We will set temp_value = 1



(8) (i) Is 7 greater than 1?

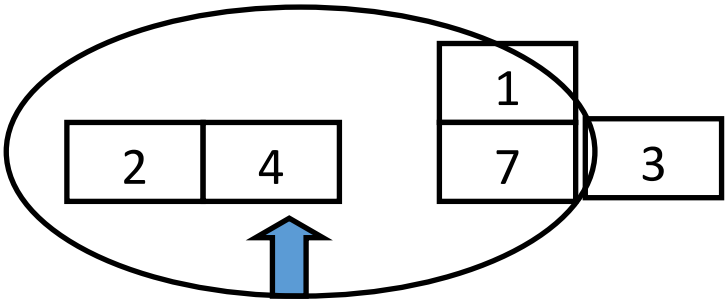
(ii) Yes. So we Shift 7 to the Right, and see the Next diagram for this.



(9) (I) Here we see the 7 shifted to the right

(ii) And we ask is 4 greater than 1?

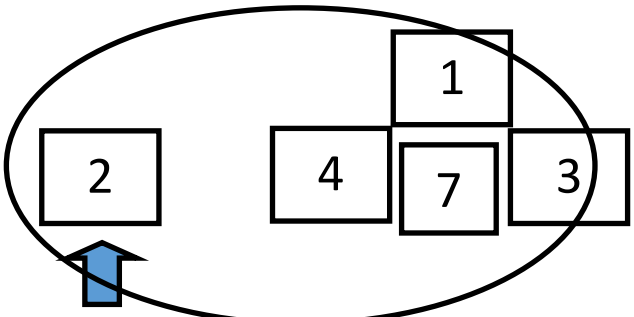
(iii) Yes. So we shift 4 to the right and we see that in the next diagram.



(10) (i) So here we see the 4 shifted to the right

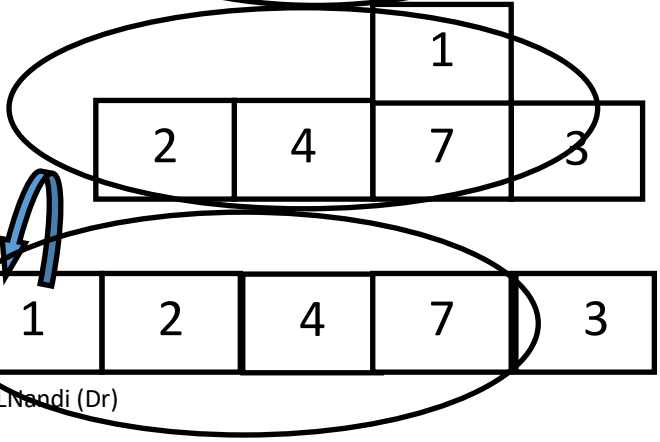
(ii) We ask is 2 greater than 1?

(iii) Yes. So we shift 2 to the right and we see that in the next diagram.



(11) (i) We see the 2 shifted to the right

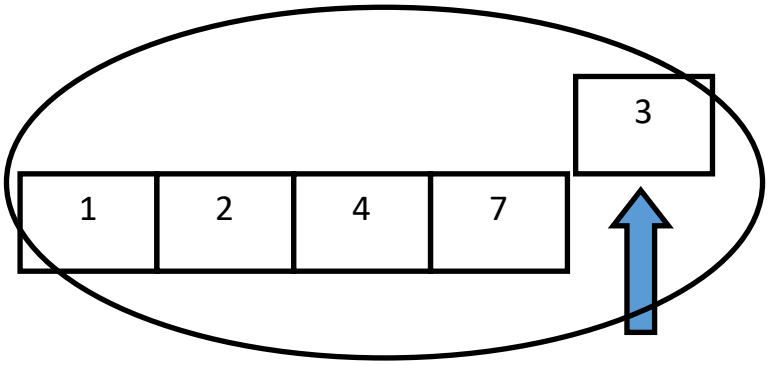
(ii) And now the gap has reached the left end of the array so we insert the 1 there and we will see that in the next diagram.



(12) (i) We see the inserted 1. **3rd Passthrough is over.**

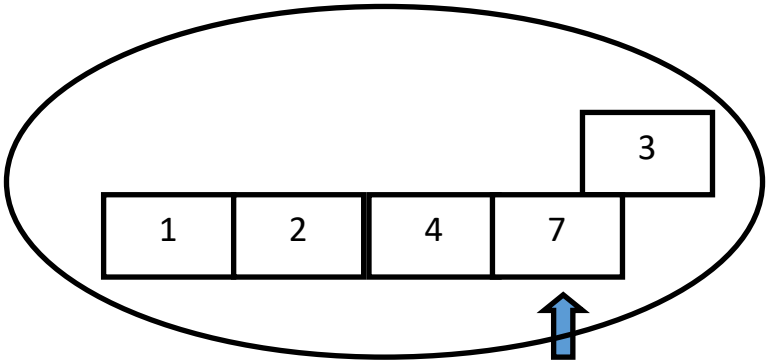
(13) (i)We will now start with the **4th Passthrough.**

(ii) **We will look at the value in Index 4 which is 3.**



(14) (i) We ask is 7 greater than 3?

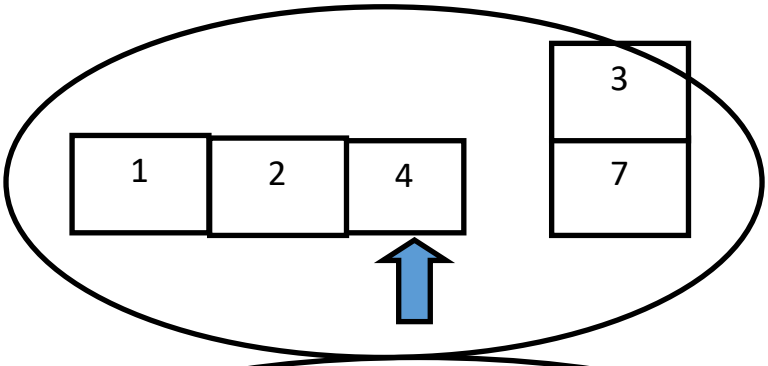
(ii) Yes. So we will shift 7 to the right. And we will see that in the next diagram.



(15) (i) Here we see 7 shifted to the right

(ii) We ask is 4 greater than 3?

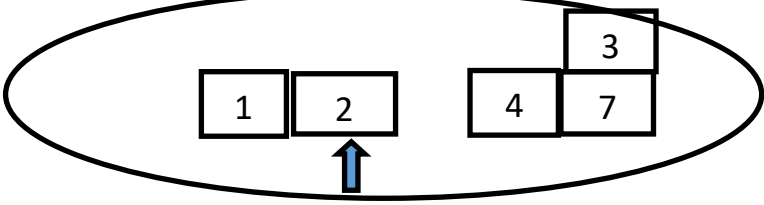
(iii) Yes. So we shift 4 to the right and that will be seen in the next diagram.



(16) (i) Here we see the 4 shifted to the right.

(ii) We ask is 2 greater than 3?

(iii) No. So we stop shifting. And then as this shifting is complete. We insert 3 in the gap as shown in the next diagram.



(17) Here we see the 3 inserted in the gap and the array is fully sorted. **The 4th Passthrough is complete.** (Remember we have looked at the last index).