

Insertion Sort

$A = [64, 57, 13, 70, 85, 39, 22, 48]$

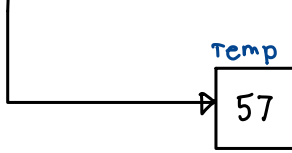
Iteration 1

0	1	2	3	4	5	6	7
64	57	13	70	85	39	22	48

Key

0	1	2	3	4	5	6	7
64		13	70	85	39	22	48

Temp



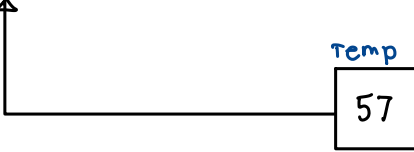
• is $A[0] > \text{Temp}$?

$64 > 57$? YES

Move $A[0]$ to the right

0	1	2	3	4	5	6	7
57	64	13	70	85	39	22	48

Temp



• Move temp to $A[0]$

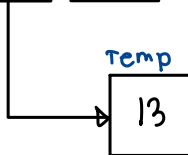
Iteration 2

0	1	2	3	4	5	6	7
57	64	13	70	85	39	22	48

Key

0	1	2	3	4	5	6	7
57	64		70	85	39	22	48

Temp



• is $A[1] > \text{Temp}$?

$64 > 13$? YES

Move $A[1]$ to the right

0	1	2	3	4	5	6	7
57		64	70	85	39	22	48

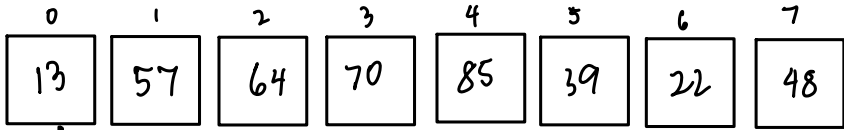
Temp

13

• is $A[0] > \text{Temp}$?

$57 > 13$? YES

Move $A[0]$ to the right

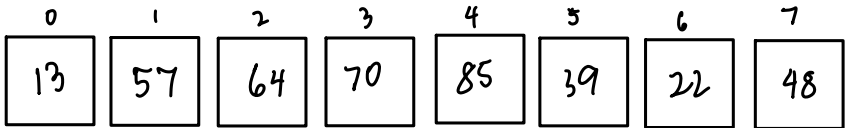


Temp

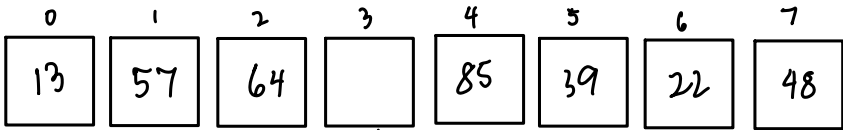
13

• Move temp to $A[0]$

Iteration 3



Key



Temp

70

• is $A[2] > \text{Temp}$?

$64 > 70$? No

Leave it as is

• is $A[1] > \text{Temp}$?

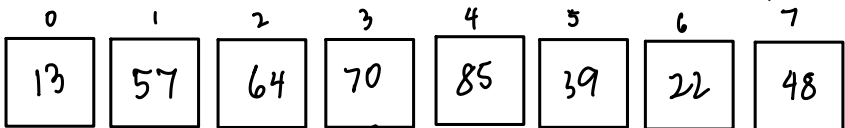
$57 > 70$? No

Leave it as is

• is $A[0] > \text{Temp}$?

$13 > 70$? No

Leave it as is



Temp

70

• Move Temp back to $A[3]$

Iteration 4

0	1	2	3	4	5	6	7
13	57	64	70	85	39	22	48

0	1	2	3	4	5	6	7
13	57	64	70		39	22	48

Key

Temp

85

• is $A[3] > \text{Temp}$?
 $70 > 85$? No

Leave as is

• is $A[2] > \text{Temp}$?
 $64 > 85$? No

Leave as is

• is $A[1] > \text{Temp}$?
 $57 > 85$? No

Leave as is

• is $A[0] > \text{Temp}$?
 $13 > 85$? No
Leave as is

0	1	2	3	4	5	6	7
13	57	64	70	85	39	22	48

Temp

85

• Move Temp back to $A[4]$

Iteration 5

0	1	2	3	4	5	6	7
13	57	64	70	85	39	22	48

Key

0	1	2	3	4	5	6	7
13	57	64	70	85		22	48

Temp

39

• is $A[4] > \text{Temp}$?

$85 > 39$? Yes

Move $A[4]$ to the right

0	1	2	3	4	5	6	7
13	57	64	70		85	22	48

Temp

39

• is $A[3] > \text{Temp}$?

$70 > 39$? Yes

Move $A[3]$ to the right

0	1	2	3	4	5	6	7
13	57	64		70	85	22	48

Temp

39

• is $A[2] > \text{Temp}$?

$64 > 39$? Yes

Move $A[2]$ to the right

0	1	2	3	4	5	6	7
13	57		64	70	85	22	48

Temp

39

• is $A[1] > \text{Temp}$?

$57 > 39$? Yes

Move $A[1]$ to the right

0	1	2	3	4	5	6	7
13		57	64	70	85	22	48

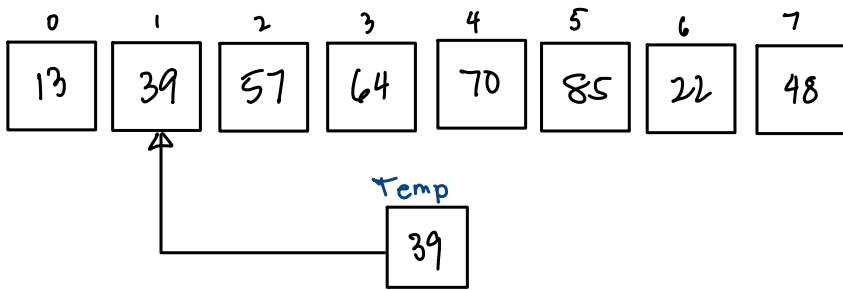
Temp

39

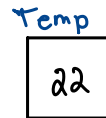
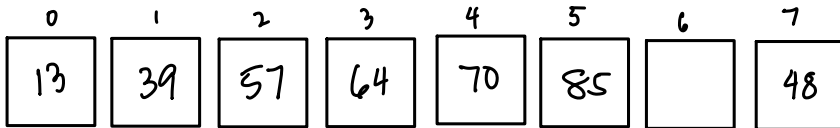
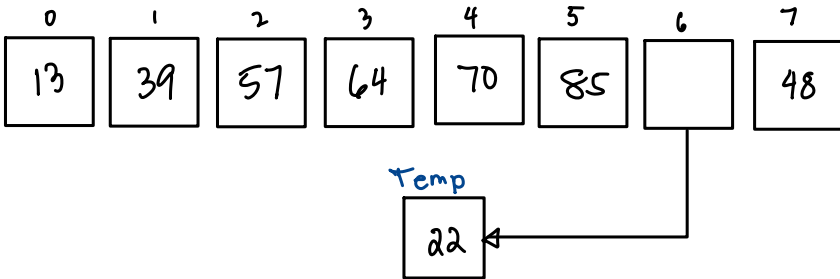
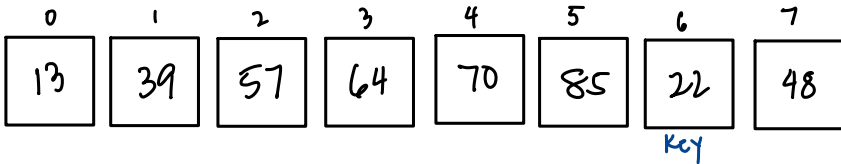
• is $A[0] > \text{Temp}$?

$13 > 39$? No

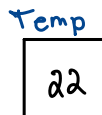
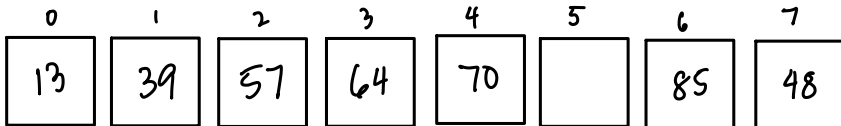
Move Temp to $A[1]$



Iteration 6



• is $A[5] > \text{Temp}$?
 $85 > 22$? Yes
 Move $A[5]$ to the right



• is $A[4] > \text{Temp}$?
 $70 > 22$? Yes
 Move $A[4]$ to the right

0	1	2	3	4	5	6	7
13	39	57	64		70	85	48

Temp

22

• is $A[3] > \text{Temp}$?

64 > 22? Yes

Move $A[3]$ to the right

0	1	2	3	4	5	6	7
13	39	57		64	70	85	48

Temp

22

• is $A[2] > \text{Temp}$?

57 > 22? Yes

Move $A[2]$ to the right

0	1	2	3	4	5	6	7
13		39	57	64	70	85	48

Temp

22

• is $A[1] > \text{Temp}$?

39 > 22? Yes

Move $A[1]$ to the right

0	1	2	3	4	5	6	7
13		39	57	64	70	85	48

Temp

22

• is $A[0] > \text{Temp}$?

13 > 22? No

Move Temp to $A[1]$

0	1	2	3	4	5	6	7
13	22	39	57	64	70	85	48

Temp

22

Iteration 7

0	1	2	3	4	5	6	7
13	22	39	57	64	70	85	48

Key

0	1	2	3	4	5	6	7
13	22	39	57	64	70	85	

• is $A[6] > \text{Temp}$?
 $85 > 48$? Yes

Move $A[6]$ to the right

Temp

48

0	1	2	3	4	5	6	7
13	22	39	57	64	70		85

Temp

48

• is $A[5] > \text{Temp}$?

$70 > 48$? Yes

Move $A[5]$ to the right

0	1	2	3	4	5	6	7
13	22	39	57	64		70	85

Temp

48

is $A[4] > \text{Temp}$?

$64 > 48$? Yes

Move $A[4]$ to the right

0	1	2	3	4	5	6	7
13	22	39	57		64	70	85

Temp

48

• is $A[3] > \text{Temp}$?

$57 > 48$? Yes

Move $A[3]$ to the right

0	1	2	3	4	5	6	7
13	22	39		57	64	70	85

Temp

48

• is $A[2] > \text{Temp}$?
 $39 > 48$? No

Leave as is

• is $A[1] > \text{Temp}$?
 $22 > 48$? No

Leave as is

• is $A[0] > \text{Temp}$?
 $13 > 48$? No

Leave as is

• Move Temp to $A[3]$

0	1	2	3	4	5	6	7
13	22	39	48	57	64	70	85



Temp

48