VINOD KUMAR VERMA, PGT(CS), KV OEF KANPUR & SACHIN BHARDWAJ,
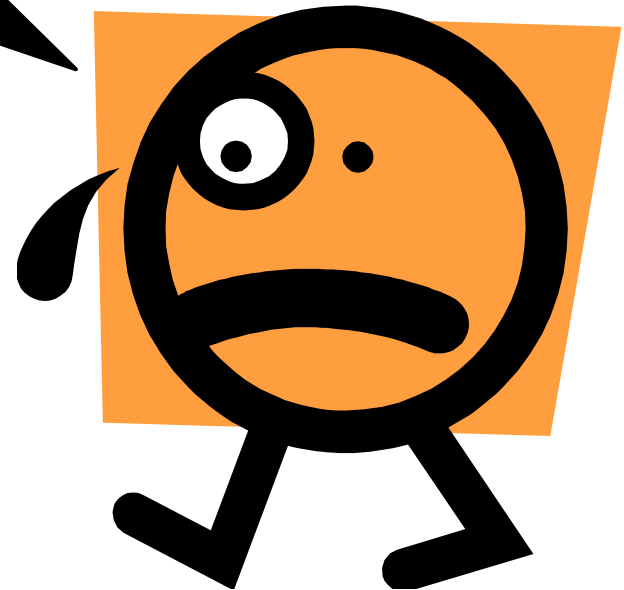PGT(CS), KV NO.1 TEZPUR

INSERTION SORTING

SHIFTING AND INSERTING

What is Insertion Sorting

- In this, process starts from second element, we take it as KEY and compare with previous elements till the number is greater than KEY.

- If previous number is greater than KEY we shift that element one place to its right.

- After all shifting we insert KEY to next position of last element scanned.

- NO SWAPPING, ONLY SHIFTING AND INSERTING

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SACHIN BHARDWAJ, PGT(CS), KV NO.1 TEZPUR

LETS UNDERSTAND WITH EXAMPLE

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SACHIN BHARDWAJ, PGT(CS), KV NO.1 TEZPUR

Algorithm

```
for i = 1 to n
  key = A[i]
  j = i - 1
  while j>=0 and A[j]>key
    A[j+1]=A[j]
    j=j-1
  A[j+1]=key
```

Python Code – Insertion Sorting

```
aList = [10,7,5,1,4,9]
print("Original list is ", aList)
n = len(aList)
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
print("Sorted List is ",aList)
```

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INDEX	0	1	2	3	4	5
VALUE	10	7	5	1	4	9

THESE ARE THE ELEMENTS WHICH WE HAVE TO SORT USING INSERTION

INDEX	0	1	2	3	4	5
VALUE	10	7	5	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=1

INDEX	0	1	2	3	4	5
VALUE	10	7	5	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

1 < 6, Yes

INDEX	0	1	2	3	4	5
VALUE	10	7	5	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

KEY = 7
i = 1

VINOD KUMAR VERMA, PGT(CS), KV OEF KANPUR &
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INDEX	0	1	2	3	4	5
VALUE	10	7	5	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

KEY = 7
i = 1
J=0

INDEX	0	1	2	3	4	5
VALUE	10	7	5	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

KEY = 7
i = 1
J=0
0>=0 && 10>7 true

INDEX	0	1	2	3	4	5
VALUE	10	10	5	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

KEY = 7
i = 1
J=0
0>=0 && 10>7 true

INDEX	0	1	2	3	4	5
VALUE	10	10	5	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

KEY = 7
i = 1
J=-1

VINOD KUMAR VERMA, PGT(CS), KV OEF KANPUR &
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INDEX	0	1	2	3	4	5
VALUE	10	10	5	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

KEY = 7
i = 1
J=-1
-1>=0 false, loop ends

INDEX	0	1	2	3	4	5
VALUE	10	10	5	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

KEY = 7
i = 1
J=-1
A[-1 + 1] = KEY

INDEX	0	1	2	3	4	5
VALUE	7	10	5	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

KEY = 7
i = 1
J=-1
A[0] = 7

INDEX	0	1	2	3	4	5
VALUE	7	10	5	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i = 2

INDEX	0	1	2	3	4	5
VALUE	7	10	5	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

2 < 6? true

INDEX	0	1	2	3	4	5
VALUE	7	10	5	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i = 2
KEY = 5

VINOD KUMAR VERMA, PGT(CS), KV OEF KANPUR &
SACHIN BHARDWAJ, PGT(CS), KV NO.1 TEZPUR

INDEX	0	1	2	3	4	5
VALUE	7	10	5	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i = 2
KEY = 5
j=1

VINOD KUMAR VERMA, PGT(CS), KV OEF KANPUR &
SACHIN BHARDWAJ, PGT(CS), KV NO.1 TEZPUR

INDEX	0	1	2	3	4	5
VALUE	7	10	5	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i = 2
KEY = 5
j=1
1>=0 && 10>5? true

INDEX	0	1	2	3	4	5
VALUE	7	10	5	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i = 2
KEY = 5
j=1
A[2] = A[1]

INDEX	0	1	2	3	4	5
VALUE	7	10	10	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i = 2
KEY = 5
j=1
A[2] = A[1]

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VALUE	7	10	10	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i = 2
KEY = 5
j=0

INDEX	0	1	2	3	4	5
VALUE	7	10	10	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i = 2
KEY = 5
j=0
0>=0 && 7>KEY? true

INDEX	0	1	2	3	4	5
VALUE	7	10	10	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i = 2
KEY = 5
j=0
A[1] = A[0]

INDEX	0	1	2	3	4	5
VALUE	7	7	10	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i = 2
KEY = 5
j=0
A[1] = A[0]

INDEX	0	1	2	3	4	5
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```
for i in range(1,n):
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        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i = 2
KEY = 5
j=-1

INDEX	0	1	2	3	4	5
VALUE	7	7	10	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i = 2
KEY = 5
j=-1
-1>=0&&A[-1]>KEY? false

INDEX	0	1	2	3	4	5
VALUE	7	7	10	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

Loop ends

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INDEX	0	1	2	3	4	5
VALUE	7	7	10	1	4	9

i=2
KEY = 5
j=-1
A[-1+1]=KEY

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

INDEX	0	1	2	3	4	5
VALUE	5	7	10	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=2
KEY = 5
j=-1
A[0]=5

VINOD KUMAR VERMA, PGT(CS), KV OEF KANPUR &
SACHIN BHARDWAJ, PGT(CS), KV NO.1 TEZPUR

INDEX	0	1	2	3	4	5
VALUE	5	7	10	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=3

INDEX	0	1	2	3	4	5
VALUE	5	7	10	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=3
3<6? true

INDEX	0	1	2	3	4	5
VALUE	5	7	10	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=3
KEY=1

INDEX	0	1	2	3	4	5
VALUE	5	7	10	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=3
KEY=1
j=2

INDEX	0	1	2	3	4	5
VALUE	5	7	10	1	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=3
KEY=1
j=2
2>=0&&A[2]>KEY? true

INDEX	0	1	2	3	4	5
VALUE	5	7	10	10	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=3
KEY=1
j=2
A[3] = A[2]

INDEX	0	1	2	3	4	5
VALUE	5	7	10	10	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=3
KEY=1
j=1

INDEX	0	1	2	3	4	5
VALUE	5	7	10	10	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=3
KEY=1
j=1
1>=0&&A[1]>KEY? true

INDEX	0	1	2	3	4	5
VALUE	5	7	7	10	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=3
KEY=1
j=1
A[2]=A[1]

INDEX	0	1	2	3	4	5
VALUE	5	7	7	10	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=3
KEY=1
j=0

INDEX	0	1	2	3	4	5
VALUE	5	7	7	10	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=3
KEY=1
j=0
0>=0&&A[0]>KEY? true

INDEX	0	1	2	3	4	5
VALUE	5	5	7	10	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=3
KEY=1
j=0
A[1] =A[0]

INDEX	0	1	2	3	4	5
VALUE	5	5	7	10	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=3
KEY=1
j=-1

INDEX	0	1	2	3	4	5
VALUE	5	5	7	10	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=3
KEY=1
j=-1
-1>=0&&A[-1]>KEY? false

INDEX	0	1	2	3	4	5
VALUE	5	5	7	10	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

Loop ends

INDEX	0	1	2	3	4	5
VALUE	5	5	7	10	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=3
KEY=1
j=-1
A[-1+1]=KEY

INDEX	0	1	2	3	4	5
VALUE	1	5	7	10	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=3
KEY=1
j=-1
A[0]=1

INDEX	0	1	2	3	4	5
VALUE	1	5	7	10	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=4

INDEX	0	1	2	3	4	5
VALUE	1	5	7	10	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=4
4<6? true

INDEX	0	1	2	3	4	5
VALUE	1	5	7	10	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=4
KEY=4

INDEX	0	1	2	3	4	5
VALUE	1	5	7	10	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=4
KEY=4
j=3

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INDEX	0	1	2	3	4	5
VALUE	1	5	7	10	4	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=4
KEY=4
j=3
3>=0&&A[3]>KEY? true

INDEX	0	1	2	3	4	5
VALUE	1	5	7	10	10	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=4
KEY=4
j=3
A[4]=A[3]

INDEX	0	1	2	3	4	5
VALUE	1	5	7	10	10	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=4
KEY=4
j=2

INDEX	0	1	2	3	4	5
VALUE	1	5	7	10	10	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=4
KEY=4
j=2
2>=0&&A[2]>KEY? true

INDEX	0	1	2	3	4	5
VALUE	1	5	7	7	10	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=4
KEY=4
j=2
A[3] = A[2]

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INDEX	0	1	2	3	4	5
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```
for i in range(1,n):
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        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=4
KEY=4
i=1

INDEX	0	1	2	3	4	5
VALUE	1	5	7	7	10	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=4
KEY=4
j=1
1>=0&&A[1]>KEY? true

INDEX	0	1	2	3	4	5
VALUE	1	5	5	7	10	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=4
KEY=4
j=1
A[2] = A[1]

INDEX	0	1	2	3	4	5
VALUE	1	5	5	7	10	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=4
KEY=4
j=0

VINOD KUMAR VERMA, PGT(CS), KV OEF KANPUR &
SACHIN BHARDWAJ, PGT(CS), KV NO.1 TEZPUR

INDEX	0	1	2	3	4	5
VALUE	1	5	5	7	10	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=4
KEY=4
j=0
0>=0&&A[0]>KEY?false

INDEX	0	1	2	3	4	5
VALUE	1	5	5	7	10	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=4
KEY=4
j=0
Loop ends

INDEX	0	1	2	3	4	5
VALUE	1	5	5	7	10	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=4
KEY=4
j=0
A[0+1]=KEY

INDEX	0	1	2	3	4	5
VALUE	1	4	5	7	10	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=4
KEY=4
j=0
A[1]=4

INDEX	0	1	2	3	4	5
VALUE	1	4	5	7	10	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=5

INDEX	0	1	2	3	4	5
VALUE	1	4	5	7	10	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=5
5<6? true

INDEX	0	1	2	3	4	5
VALUE	1	4	5	7	10	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=5
KEY=9

INDEX	0	1	2	3	4	5
VALUE	1	4	5	7	10	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=5
KEY=9
J=4

INDEX	0	1	2	3	4	5
VALUE	1	4	5	7	10	9

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=5
KEY=9
J=4
4>=0&&A[4]>KEY? true

INDEX	0	1	2	3	4	5
VALUE	1	4	5	7	10	10

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=5
KEY=9
J=4
A[5] = A[4]

INDEX	0	1	2	3	4	5
VALUE	1	4	5	7	10	10

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=5
KEY=9
J=3

INDEX	0	1	2	3	4	5
VALUE	1	4	5	7	10	10

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=5
KEY=9
J=3
3>=0&&A[3]>KEY? false

INDEX	0	1	2	3	4	5
VALUE	1	4	5	7	10	10

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=5
KEY=9
J=3
Loop ends

INDEX	0	1	2	3	4	5
VALUE	1	4	5	7	10	10

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=5
KEY=9
J=3
A[3+1]=KEY

INDEX	0	1	2	3	4	5
VALUE	1	4	5	7	9	10

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=5
KEY=9
J=3
A[4]=9

INDEX	0	1	2	3	4	5
VALUE	1	4	5	7	9	10

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=6

INDEX	0	1	2	3	4	5
VALUE	1	4	5	7	9	10

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

i=6
6<6? false

INDEX	0	1	2	3	4	5
VALUE	1	4	5	7	9	10

```
for i in range(1,n):
        key = aList[i]
        j=i-1
        while j>=0 and aList[j]>key:
                aList[j+1]=aList[j]
                j=j-1
        aList[j+1]=key
```

Sorting is Over!

FEEL FREE TO CONTACT

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