Write a **python**program to store first year percentage of students in array. Write function for sorting array of floating point numbers in ascending order using
a) Selection Sort
b) Bubble sort and display top five scores.

Bubble Sort is the simplest sorting algorithm that works by repeatedly swapping the adjacent elements if they are in wrong order.

Python

```
# Python program for implementation of Bubble Sort

def bubbleSort(arr):
    n = len(arr)

    # Traverse through all array elements
    for i in range(n-1):
    # range(n) also work but outer loop will repeat one time more than needed.

        # Last i elements are already in place
        for j in range(0, n-i-1):

            # traverse the array from 0 to n-i-1
            # Swap if the element found is greater
            # than the next element
            if arr[j] > arr[j+1] :
                arr[j], arr[j+1] = arr[j+1], arr[j]
  # Driver code to test above
arr = [64, 34, 25, 12, 22, 11, 90]

bubbleSort(arr)

print ("Sorted array is:")
for i in range(len(arr)):
    print ("%d" %arr[i]),
```

Example:

First Pass:
(**5 1** 4 2 8) –> (**1 5** 4 2 8), Here, algorithm compares the first two elements, and swaps since 5 > 1.
(1 **5 4** 2 8) –> (1 **4 5** 2 8), Swap since 5 > 4
(1 4 **5 2** 8) –> (1 4 **2 5** 8), Swap since 5 > 2
(1 4 2 **5 8**) –> (1 4 2 **5 8**), Now, since these elements are already in order (8 > 5), algorithm does not swap them.
Second Pass:
(**1 4** 2 5 8) –> (**1 4** 2 5 8)
(1 **4 2** 5 8) –> (1 **2 4** 5 8), Swap since 4 > 2
(1 2 **4 5** 8) –> (1 2 **4 5** 8)
(1 2 4 **5 8**) –> (1 2 4 **5 8**)
Now, the array is already sorted, but our algorithm does not know if it is completed. The algorithm needs one **whole** pass without **any** swap to know it is sorted.
Third Pass:
(**1 2** 4 5 8) –> (**1 2** 4 5 8)
(1 **2 4** 5 8) –> (1 **2 4** 5 8)
(1 2 **4 5** 8) –> (1 2 **4 5** 8)
(1 2 4 **5 8**) –> (1 2 4 **5 8**)

i = 0	j	0	1	2	3	4	5	6	7
	0	5	3	1	9	8	2	4	7
	1	3	5	1	9	8	2	4	7
	2	3	1	5	9	8	2	4	7
	3	3	1	5	9	8	2	4	7
	4	3	1	5	8	9	2	4	7
	5	3	1	5	8	2	9	4	7
	6	3	1	5	8	2	4	9	7
i = 1	0	3	1	5	8	2	4	7	9
	1	1	3	5	8	2	4	7	
	2	1	3	5	8	2	4	7	
	3	1	3	5	8	2	4	7	
	4	1	3	5	2	8	4	7	
	5	1	3	5	2	4	8	7	
i = 2	0	1	3	5	2	4	7	8	
	1	1	3	5	2	4	7		
	2	1	3	5	2	4	7		
	3	1	3	2	5	4	7		
	4	1	3	2	4	5	7		
i = 3	0	1	3	2	4	5	7		
	1	1	3	2	4	5			
	2	1	2	3	4	5			
	3	1	2	3	4	5			
i = 4	0	1	2	3	4	5			
	1	1	2	3	4				
	2	1	2	3	4				
i = 5	0	1	2	3	4				
	1	1	2	3					
i = 6	0	1	2	3					
		1	2						

SELECTION SORT

The selection sort algorithm sorts an array by repeatedly finding the minimum element (considering ascending order) from unsorted part and putting it at the beginning. The algorithm maintains two subarrays in a given array.

1) The subarray which is already sorted.
2) Remaining subarray which is unsorted.

In every iteration of selection sort, the minimum element (considering ascending order) from the unsorted subarray is picked and moved to the sorted subarray.

```
# Python program for implementation of Selection

# Sort

import sys

A = [64, 25, 12, 22, 11]

# Traverse through all array elements

for i in range(len(A)):

 # Find the minimum element in remaining

  # unsorted array

  min_idx = i

  for j in range(i+1, len(A)):

    if A[min_idx] > A[j]:

      min_idx = j


  # Swap the found minimum element with

  # the first element

  A[i], A[min_idx] = A[min_idx], A[i]
```

```
# Driver code to test above

print ("Sorted array")

for i in range(len(A)):

    print("%d" %A[i]),
```

Let's see how it works in action with a list that contains the following elements: `[3, 5, 1, 2, 4]`.

We begin with the unsorted list:

- 3 5 1 2 4

The unsorted section has all the elements. We look through each item and determine that `1` is the smallest element. So, we swap `1` with `3`:

- **1** 5 3 2 4

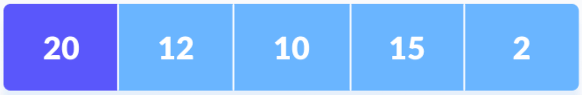
Of the remaining unsorted elements, `[5, 3, 2, 4]`, `2` is the lowest number. We now swap `2` with `5`:

- **1 2** 3 5 4

This process continues until the list is sorted:

How Selection Sort Works?

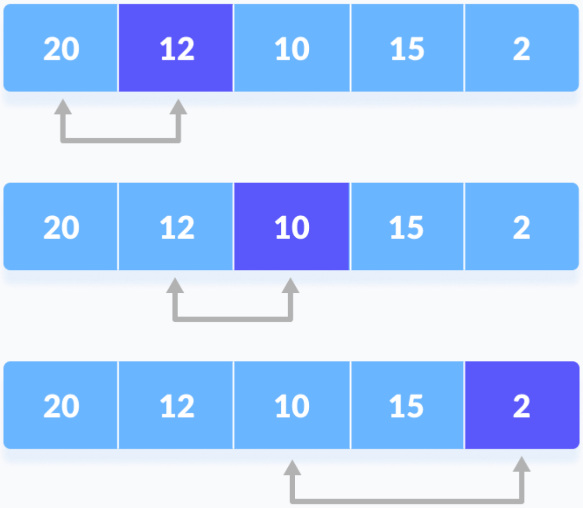
1. Set the first element as `minimum`.



   Select first element as minimum

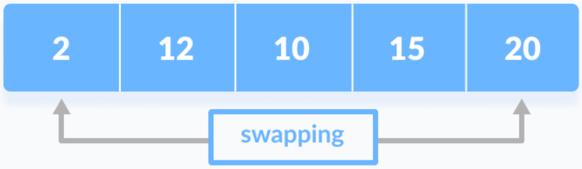
2. Compare `minimum` with the second element. If the second element is smaller than `minimum`, assign the second element as `minimum`.

   Compare `minimum` with the third element. Again, if the third element is smaller, then assign `minimum` to the third element otherwise do nothing. The process goes on until the last element.



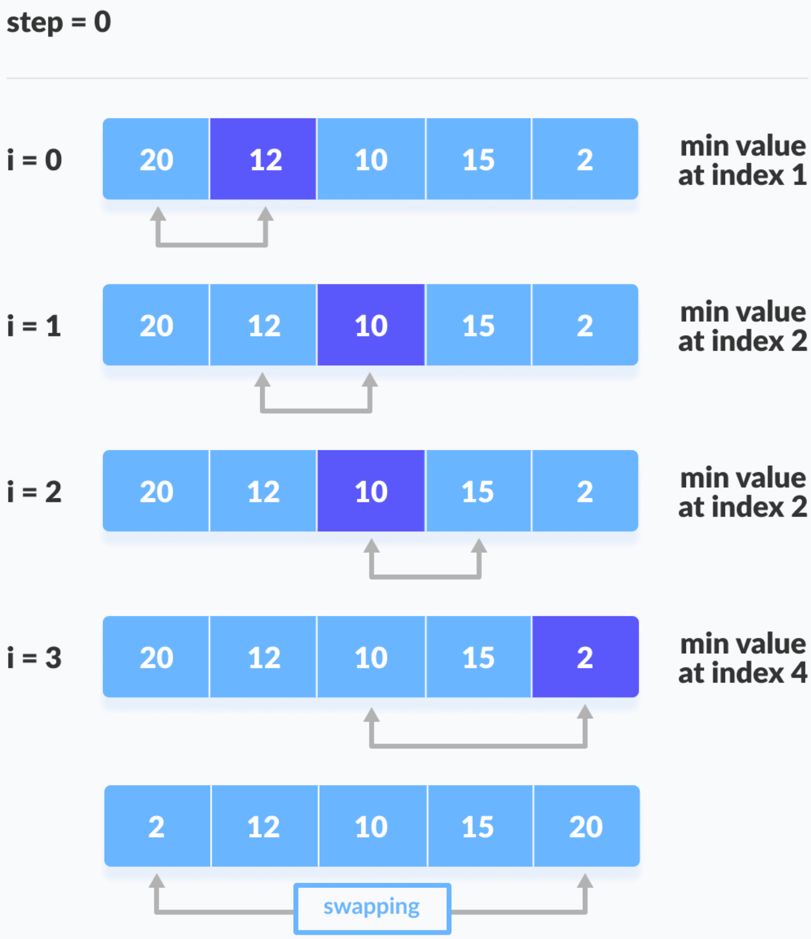
   Compare minimum with the remaining elements

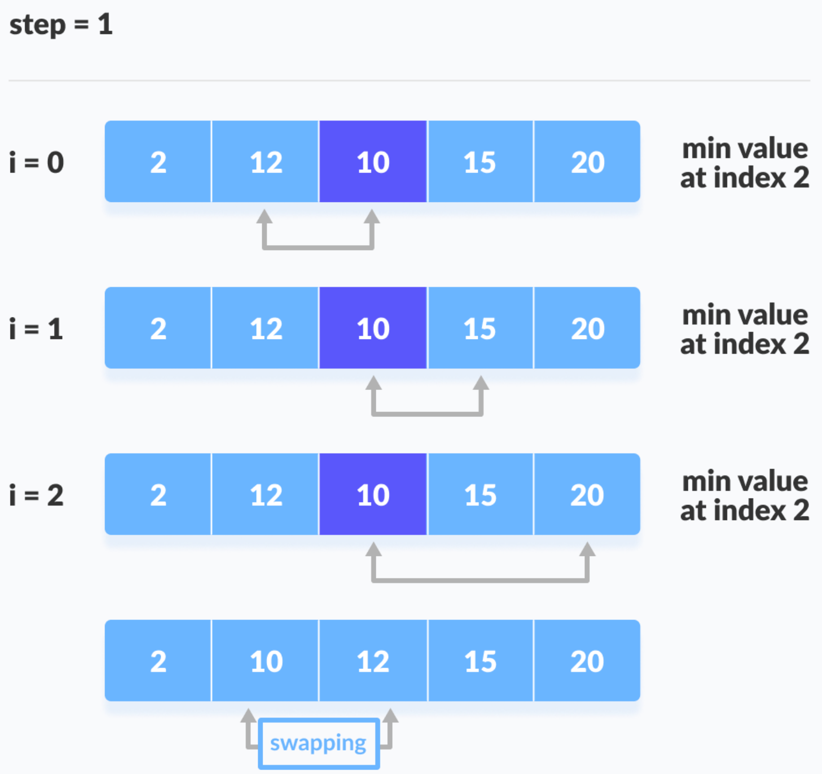
3. After each iteration, `minimum` is placed in the front of the unsorted list.



Swap the first with minimum

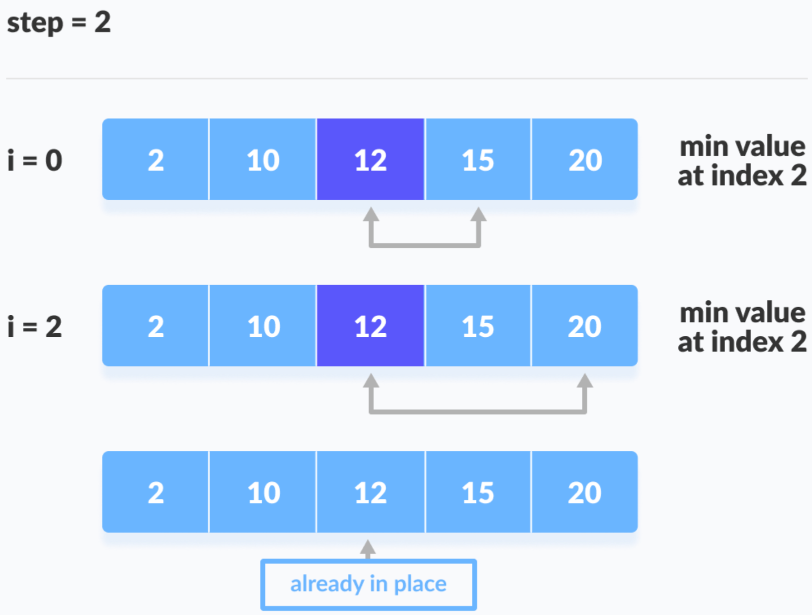
4. For each iteration, indexing starts from the first unsorted element. Step 1 to 3 are repeated until all the elements are placed at their correct positions.



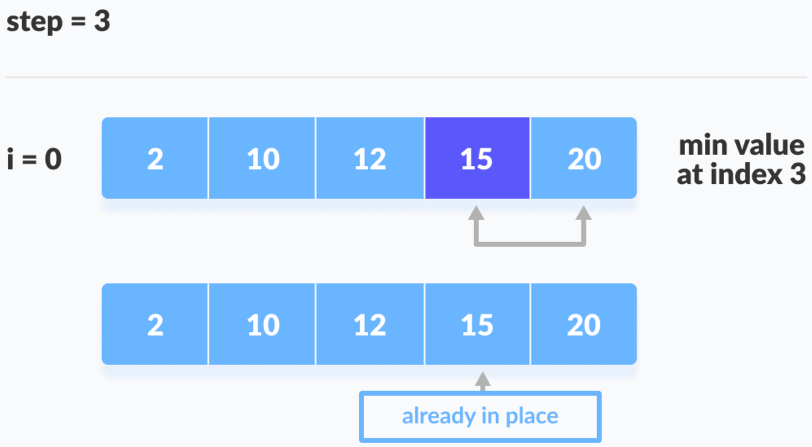


The first iteration

The second



n The third



fourth iteration

Sort using bubble sort 5 3 8 6 7 2