Algorithm:

Algorithm for partition:

1. Start
2. Set pivot equal to element at the starting position of array
3. Set low equal to start plus 1
4. Set high equal to end
5. Repeat the following
   1. Repeat the following while low is less than equal to high and element at position high in array is greater than equal to pivot
      1. Decrement high by 1
   2. Repeat the following by low is less than equal to high and element at position low is less than equal to pivot
      1. Increment low by 1
   3. If low less than equal to high
      1. Swap elements at position low and high
   4. Else
      1. Exit from loop
6. Swap elements at position start and high
7. Return high
8. stop

Algorithm for quick:

1. Start
2. If low less than high
   1. Call partition and store the value in pi
   2. Increment count by 1
   3. Print the list L
   4. Call quick and set pi-1 as high
   5. Call quick and set pi+1 as low
3. Stop

Algorithm for main program:

1. Start
2. Declare a global variable count and initialize it to 0
3. Repeat the following
   1. Store the number of students in second year in variable a
   2. If a is greater than 5
      1. Exit from the loop
   3. Else
      1. Print(“There should atleast be more than 5 students in second year”)
4. Declare an empty list L
5. Repeat the following a times
   1. Repeat the following
      1. Store the percentage of each student in b
      2. If b lies within 0 and 100
         1. Append b to list L
         2. Exit from loop
      3. Else
         1. Print(“The percentage of a student must lie between 0 to 100”)
6. Print the list L to show all the entered percentages
7. Call quick sort
8. Print the list to show the sorted list
9. Reverse the list L and store in list L1
10. Run a loop and print first 5 elements from list L1
11. Stop

Pseudo Code:

Partition(array, start, end)

{

1. Pivot = array[start]
2. Low = start + 1
3. High = end
4. While True
   1. While low <= high and array[high] >= pivot
      1. High = high – 1
   2. While low <= high and array[low] <= pivot
      1. Low = low + 1
   3. If low <= high
      1. Array[low], array[high] = array[high], array[low]
   4. Else
      1. Break
5. Array[start], array[high] = array[high], array[start]
6. Return high

}

Quick(arr, low, high)

{

1. If low < high
   1. Pi = partition(arr, low, high)
   2. Count = count + 1
   3. Print(L)
   4. Quick(arr, low, pi-1)
   5. Quick(arr, pi+1, high)

}

Main program

{

1. Global count
2. Count = 0
3. While True
   1. a=int(input(“Enter the number of students in second year:”))
   2. if a > 5
      1. break
   3. else
      1. print(“There should atleast be more than 5 students in second year”)
4. L=[]
5. For i=0 to i=a-1
   1. While True
      1. b=float(input(“Enter the percentage of students”))
      2. If b >= 0 and b <= 100
         1. L.append(b)
         2. Break
      3. Else
         1. Print(“the percentage of a student must lie between 0 to 100”)
6. Print(“The entered percentages are:”, L)
7. Quick(L, 0, len(L)- 1)
8. Print(“The sorted list is”, L)
9. L1 = L[::-1]
10. Print(“The top 5 scores are:”)
11. For i =1 to i = 5
    1. Print(L1[i])

}