Run: main

```
Number of Student : 7
Enter percentage of student : 8
Enter percentage of student : 5
Enter percentage of student : 6
Enter percentage of student : 3
Enter percentage of student : 5
Enter percentage of student : 2
Enter percentage of student : 7
Array after  0 th pass is :  [5.0, 6.0, 3.0, 5.0, 2.0, 7.0, 8.0]
Array after  1 th pass is :  [5.0, 3.0, 5.0, 2.0, 6.0, 7.0, 8.0]
Array after  2 th pass is :  [3.0, 5.0, 2.0, 5.0, 6.0, 7.0, 8.0]
Array after  3 th pass is :  [3.0, 2.0, 5.0, 5.0, 6.0, 7.0, 8.0]
Array after  4 th pass is :  [2.0, 3.0, 5.0, 5.0, 6.0, 7.0, 8.0]
Array after  5 th pass is :  [2.0, 3.0, 5.0, 5.0, 6.0, 7.0, 8.0]
Array after  6 th pass is :  [2.0, 3.0, 5.0, 5.0, 6.0, 7.0, 8.0]
Array after sorting is :  [2.0, 3.0, 5.0, 5.0, 6.0, 7.0, 8.0]
13  number of swaps and 42  comparisons

Process finished with exit code 0
```

main.py

```
71
72  def optimised_bubble_sort(array):
73      swaps=0
74      comparison=0
75      isSwap=True
76      i=0
77      while(isSwap and i<len(array)):
78          isSwap=False
79          for j in range(1,len(array)):
80              if(array[j-1]>array[j]):
81                  swaps+=1
82                  isSwap=True
83                  temp=array[j]
84                  array[j]=array[j-1]
85                  array[j-1]=temp
86              comparison+=1
87          print("Array after ",i+1,"th pass is : ",array)
88          i+=1
89      print("Array after sorting is : ",array)
90      print(swaps," number of swaps and",comparison," comparisons")
91
92  if __name__ == '__main__':
93      no_of_student=int(input("Number of Student : "))
94      percentage=[]
95      for i in range(no_of_student):
96          percentage.append(float(input("Enter percentage of student : ")))
97      # shell_sort(percentage)
98      bubble_sort(percentage)
99      # optimised_bubble_sort(percentage)
100     # insertion_sort(percentage)
101     # selection_sort(percentage)
102
```

115

if __name__ == '__main__'

Run: main

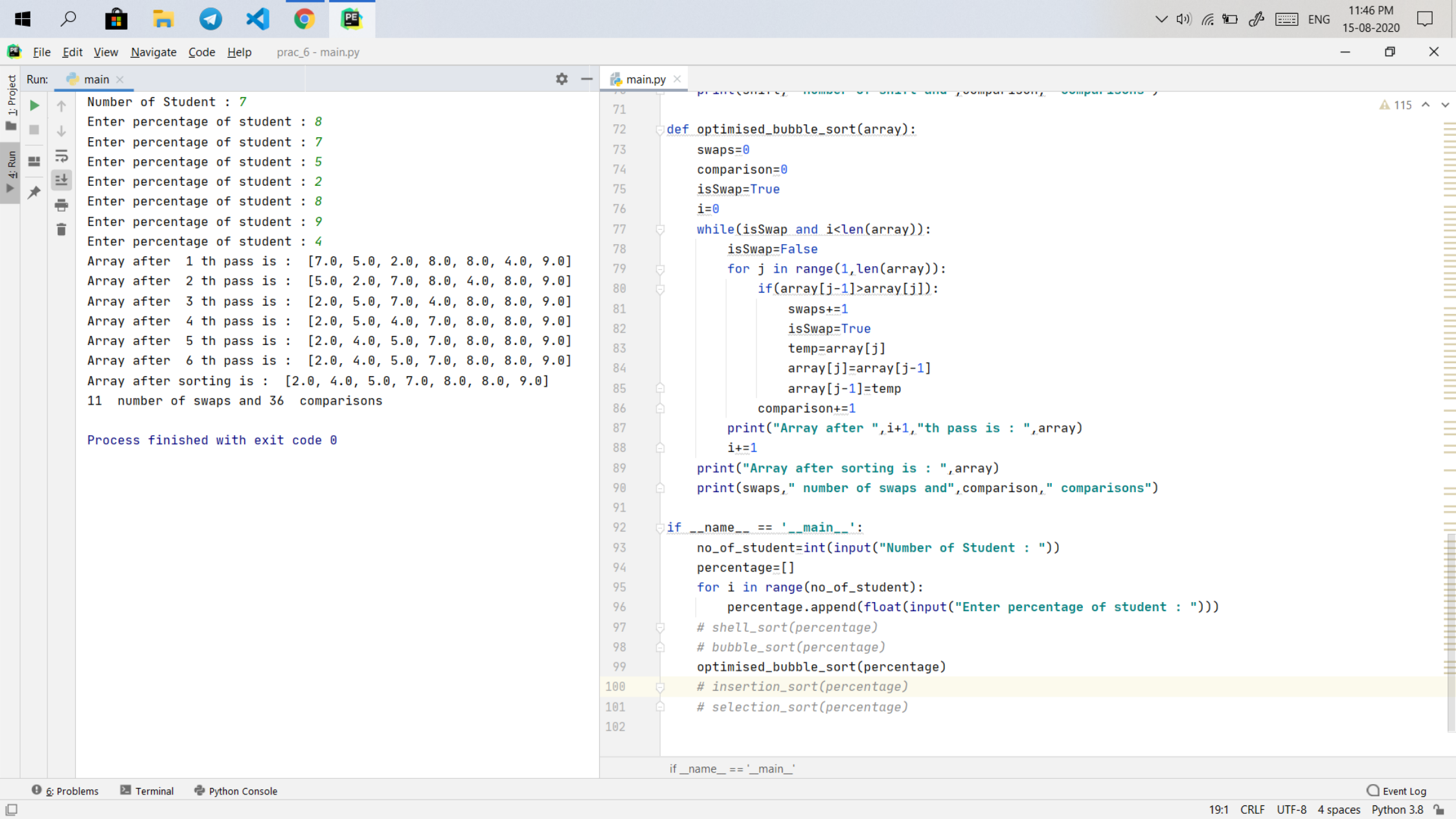
```
Number of Student : 8
Enter percentage of student : 9
Enter percentage of student : 5
Enter percentage of student : 2
Enter percentage of student : 5
Enter percentage of student : 6
Enter percentage of student : 7
Enter percentage of student : 8
Enter percentage of student : 9
Array after  2 th pass is :  [5.0, 9.0, 2.0, 5.0, 6.0, 7.0, 8.0, 9.0]
Array after  3 th pass is :  [2.0, 5.0, 9.0, 5.0, 6.0, 7.0, 8.0, 9.0]
Array after  4 th pass is :  [2.0, 5.0, 5.0, 9.0, 6.0, 7.0, 8.0, 9.0]
Array after  5 th pass is :  [2.0, 5.0, 5.0, 6.0, 9.0, 7.0, 8.0, 9.0]
Array after  6 th pass is :  [2.0, 5.0, 5.0, 6.0, 7.0, 9.0, 8.0, 9.0]
Array after  7 th pass is :  [2.0, 5.0, 5.0, 6.0, 7.0, 8.0, 9.0, 9.0]
Array after  8 th pass is :  [2.0, 5.0, 5.0, 6.0, 7.0, 8.0, 9.0, 9.0]
Array after sorting is :  [2.0, 5.0, 5.0, 6.0, 7.0, 8.0, 9.0, 9.0]
7  number of shift and 14  comparisons

Process finished with exit code 0
```

main.py

```
71
72  def optimised_bubble_sort(array):
73      swaps=0
74      comparison=0
75      isSwap=True
76      i=0
77      while(isSwap and i<len(array)):
78          isSwap=False
79          for j in range(1,len(array)):
80              if(array[j-1]>array[j]):
81                  swaps+=1
82                  isSwap=True
83                  temp=array[j]
84                  array[j]=array[j-1]
85                  array[j-1]=temp
86              comparison+=1
87          print("Array after ",i+1,"th pass is : ",array)
88          i+=1
89      print("Array after sorting is : ",array)
90      print(swaps," number of swaps and",comparison," comparisons")
91
92  if __name__ == '__main__':
93      no_of_student=int(input("Number of Student : "))
94      percentage=[]
95      for i in range(no_of_student):
96          percentage.append(float(input("Enter percentage of student : ")))
97      # shell_sort(percentage)
98      # bubble_sort(percentage)
99      # optimised_bubble_sort(percentage)
100     insertion_sort(percentage)
101     # selection_sort(percentage)
102
```

if __name__ == '__main__'


File Edit View Navigate Code Help prac_6 - main.py
Run: main
Number of Student : 7
Enter percentage of student : 8
Enter percentage of student : 7
Enter percentage of student : 5
Enter percentage of student : 2
Enter percentage of student : 8
Enter percentage of student : 9
Enter percentage of student : 4
Array after 1 th pass is : [7.0, 5.0, 2.0, 8.0, 8.0, 4.0, 9.0]
Array after 2 th pass is : [5.0, 2.0, 7.0, 8.0, 4.0, 8.0, 9.0]
Array after 3 th pass is : [2.0, 5.0, 7.0, 4.0, 8.0, 8.0, 9.0]
Array after 4 th pass is : [2.0, 5.0, 4.0, 7.0, 8.0, 8.0, 9.0]
Array after 5 th pass is : [2.0, 4.0, 5.0, 7.0, 8.0, 8.0, 9.0]
Array after 6 th pass is : [2.0, 4.0, 5.0, 7.0, 8.0, 8.0, 9.0]
Array after sorting is : [2.0, 4.0, 5.0, 7.0, 8.0, 8.0, 9.0]
11 number of swaps and 36 comparisons
Process finished with exit code 0
main.py
115
def optimised_bubble_sort(array):
swaps=0
comparison=0
isSwap=True
i=0
while(isSwap and i<len(array)):
isSwap=False
for j in range(1,len(array)):
if(array[j-1]>array[j]):
swaps+=1
isSwap=True
temp=array[j]
array[j]=array[j-1]
array[j-1]=temp
comparison+=1
print("Array after ",i+1,"th pass is : ",array)
i+=1
print("Array after sorting is : ",array)
print(swaps," number of swaps and",comparison," comparisons")
if __name__ == '__main__':
no_of_student=int(input("Number of Student : "))
percentage=[]
for i in range(no_of_student):
percentage.append(float(input("Enter percentage of student : ")))
# shell_sort(percentage)
# bubble_sort(percentage)
optimised_bubble_sort(percentage)
# insertion_sort(percentage)
# selection_sort(percentage)
if __name__ == '__main__'
6: Problems
Terminal
Python Console
Event Log
19:1 CRLF UTF-8 4 spaces Python 3.8
ENG
11:46 PM
15-08-2020

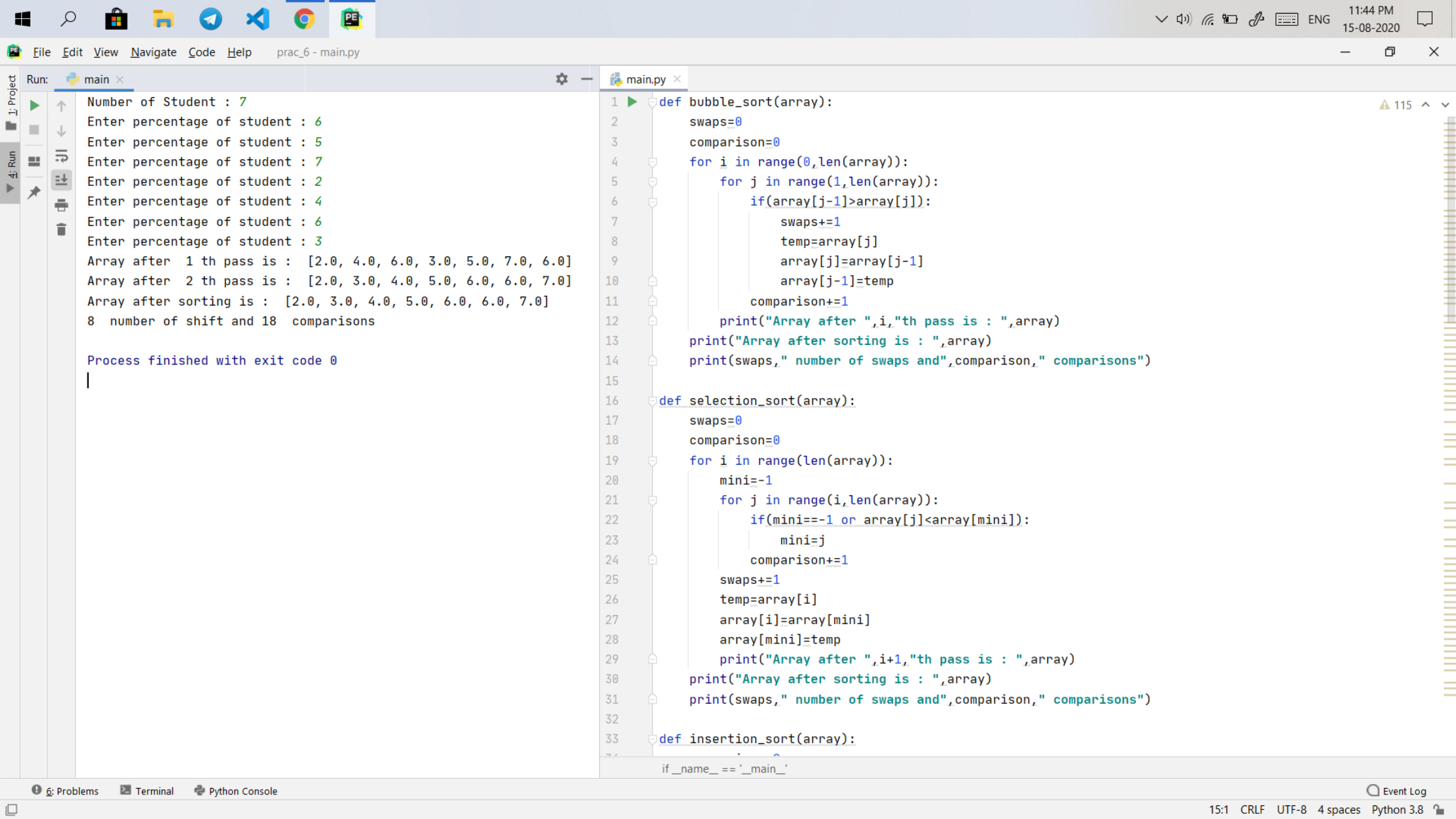
Run: main

```
Number of Student : 8
Enter percentage of student : 7
Enter percentage of student : 5
Enter percentage of student : 6
Enter percentage of student : 9
Enter percentage of student : 4
Enter percentage of student : 2
Enter percentage of student : 8
Enter percentage of student : 9
Array after  1 th pass is :  [2.0, 5.0, 6.0, 9.0, 4.0, 7.0, 8.0, 9.0]
Array after  2 th pass is :  [2.0, 4.0, 6.0, 9.0, 5.0, 7.0, 8.0, 9.0]
Array after  3 th pass is :  [2.0, 4.0, 5.0, 9.0, 6.0, 7.0, 8.0, 9.0]
Array after  4 th pass is :  [2.0, 4.0, 5.0, 6.0, 9.0, 7.0, 8.0, 9.0]
Array after  5 th pass is :  [2.0, 4.0, 5.0, 6.0, 7.0, 9.0, 8.0, 9.0]
Array after  6 th pass is :  [2.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 9.0]
Array after  7 th pass is :  [2.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 9.0]
Array after  8 th pass is :  [2.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 9.0]
Array after sorting is :  [2.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 9.0]
8  number of swaps and 36  comparisons

Process finished with exit code 0
```

main.py

```
71
72  def optimised_bubble_sort(array):
73      swaps=0
74      comparison=0
75      isSwap=True
76      i=0
77      while(isSwap and i<len(array)):
78          isSwap=False
79          for j in range(1,len(array)):
80              if(array[j-1]>array[j]):
81                  swaps+=1
82                  isSwap=True
83                  temp=array[j]
84                  array[j]=array[j-1]
85                  array[j-1]=temp
86              comparison+=1
87          print("Array after ",i+1,"th pass is : ",array)
88          i+=1
89      print("Array after sorting is : ",array)
90      print(swaps," number of swaps and",comparison," comparisons")
91
92  if __name__ == '__main__':
93      no_of_student=int(input("Number of Student : "))
94      percentage=[]
95      for i in range(no_of_student):
96          percentage.append(float(input("Enter percentage of student : ")))
97      # shell_sort(percentage)
98      # bubble_sort(percentage)
99      # optimised_bubble_sort(percentage)
100     # insertion_sort(percentage)
101     selection_sort(percentage)
102
```


File Edit View Navigate Code Help prac_6 - main.py
Run: main
Number of Student : 7
Enter percentage of student : 6
Enter percentage of student : 5
Enter percentage of student : 7
Enter percentage of student : 2
Enter percentage of student : 4
Enter percentage of student : 6
Enter percentage of student : 3
Array after 1 th pass is : [2.0, 4.0, 6.0, 3.0, 5.0, 7.0, 6.0]
Array after 2 th pass is : [2.0, 3.0, 4.0, 5.0, 6.0, 6.0, 7.0]
Array after sorting is : [2.0, 3.0, 4.0, 5.0, 6.0, 6.0, 7.0]
8 number of shift and 18 comparisons
Process finished with exit code 0
main.py
def bubble_sort(array):
swaps=0
comparison=0
for i in range(0,len(array)):
for j in range(1,len(array)):
if(array[j-1]>array[j]):
swaps+=1
temp=array[j]
array[j]=array[j-1]
array[j-1]=temp
comparison+=1
print("Array after ",i,"th pass is : ",array)
print("Array after sorting is : ",array)
print(swaps," number of swaps and",comparison," comparisons")
def selection_sort(array):
swaps=0
comparison=0
for i in range(len(array)):
mini=-1
for j in range(i,len(array)):
if(mini==-1 or array[j]<array[mini]):
mini=j
comparison+=1
swaps+=1
temp=array[i]
array[i]=array[mini]
array[mini]=temp
print("Array after ",i+1,"th pass is : ",array)
print("Array after sorting is : ",array)
print(swaps," number of swaps and",comparison," comparisons")
def insertion_sort(array):
if __name__ == '__main__'
6: Problems
Terminal
Python Console
Event Log
15:1 CRLF UTF-8 4 spaces Python 3.8