```
 1 from prettytable import PrettyTable
 2 import numpy as np
 3
 4
 5 def create_sequence_array(bound,n,num_sequences
   ):
 6     """
 7     Creates a 50x10000 array of sequences
 8     :param bound: int
 9     :return: array of 10000 sequences
10     """
11
12     sequence_array = []
13
14     for i in range(num_sequences):
15         sequence_array.append([np.random.
   randint(0, bound) for x in range(n)])
16
17     return sequence_array
18
19
20 def insertion_mod(sequence_array):
21     steps = 0
22     for sequence in sequence_array:
23         for i, num in enumerate(sequence):
24             j = i
25             while j != 0 and sequence[j] <
   sequence[j-1]:
26                 temp = sequence[j]
27                 sequence[j] = sequence[j-1]
28                 sequence[j-1] = temp
29                 steps += 1
30                 j -= 1
31
32     return steps/10
33
34
```

```
35 if __name__ == "__main__":
36     num_sequences = 10
37     bound = 10000
38     n_range = [100, 500, 1000, 2500, 3000, 3500
   ]
39     Table = PrettyTable(["Input Size", "
   Calculated Average", "Real Average"])
40     for n in n_range:
41         sequence_array = create_sequence_array(
   bound, n, num_sequences)
42         calculated_average = (n*n)/4 + (3*n)/4
43         real_average = round(insertion_mod(
   sequence_array), 2)
44         Table.add_row([n, calculated_average,
   real_average])
45
46     print(Table)
47
48
```