

Class work: Some-Sort-3

As usual, we denote the size of A by n .

```
SOME-SORT-3( $A$ )
1  for  $k = 1$  to  $n - 1$ 
2       $key = A[k]$ 
3       $i = k - 1$ 
4      while  $i \geq 0$  and  $A[i] > key$ 
5           $A[i + 1] = A[i]$ 
6           $i = i - 1$ 
7       $A[i + 1] = key$ 
```

1. What can you say about A after one execution of the outer loop?
2. What is the case after two executions of the outer loop?
3. For a given value of k , describe what the code in the for loop does. Be as concise as you can.
4. Now argue that that algorithm is correct by arguing that after the outer loop finishes executing, the input is always sorted.
5. Show how this works on $A = (3, 1, 5, 7, 4, 6, 2)$ by showing A after each execution of the outer loop.
6. For a given value of k , how many times does the while loop execute?
7. Can you think of any ways to improve this code? If so, are they worth it?