

Assignment 3.1

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Shell Sort

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1 Shell sort selects two elements of the array that are a particular
   "gap" length away from each other. Depending on the value of
   the elements, the function swaps those elements to make the
   array closer to the ascending order we want to achieve. The
   function traverses the array, swapping elements the same gap
   length away to achieve closer to a sorted array. Once the array
   has been traversed with one particular gap length, the gap
   length becomes half of what it was and this process continues
   again logn times.
2
3 Test case: [4,3,6,1,5]
4
5 gap = 2
6 i=2
7 j=0 —> the inner most for loop is not ran because v[0] is not
   greater than v[2]
8
9 i=3
10 j=1
11 A swap occurs: [4,1,6,2,5]
12 j=-1 —> inner most loop terminates because j is not >=0
13
14 i = 4 —> the second loop will terminate in the next iteration
15 j= 2
16 A swap occurs: [4,1,5,2,6]
17
18 gap = 1
19 i = 1
20 j = 0
21 A swap occurs : [1,4,5,2,6]
22
23 i=2
24 j=1 —> the inner most for loop is not ran because v[0] is not
   greater than v[2]
25
26 i=3
27 j=2
28 A swap occurs: [1,4,2,5,6]
29
30 j=1
31 A swap occurs: [1,2,4,5,6]
32
```

```
33 i=4 —> the second loop is terminated in the next iteration
34 j=3 —> the inner most for loop is not ran because v[0] is not
    greater than v[2]
35 the outer most loop terminates
36
37 result: [1,2,4,5,6]
```