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Assignment 2: PART 2

1.

a) The unit cost of each individual push operation (without factoring in resizing) is 50.
Since the capacity is 8, that means it will need to be resized at
index 9: which will add a unit cost of 8 as previous elements are copied over.
index 17: which will add a unit cost of 16 as previous elements are copied over.
index 25: which will add a unit cost of 24 as previous elements are copied over.
index 33: which will add a unit cost of 32 as previous elements are copied over.
index 41: which will add a unit cost of 40 as previous elements are copied over.
index 49: which will add a unit cost of 48 as previous elements are copied over.
That brings us to a total unit cost of:
50 (for each element itself being pushed) + 8 + 16 + 24 + 32 + 40 + 48 = 218
Now when we divide that number by the number of elements pushed (50), we get:

218/50 = **4.36** average cost.

b) The average big-oh complexity for push under this strategy for resizing is **O(1)+** .

2.

a)

Total cost of pushing each individual element is once again 50 units.
Since the array grows by 2 spaces once it has reached capacity than it will resize at indices:

9: adding 8 units when resized
11: adding 10 units when resized
13: adding 12 units when resized
15: adding 14 units when resized
17: adding 16 units when resized
19: adding 18 units when resized
21: adding 20 units when resized
23: adding 22 units when resized
25: adding 24 units when resized
27: adding 26 units when resized
29: adding 28 units when resized
31: adding 30 units when resized
33: adding 32 units when resized
35: adding 34 units when resized
37: adding 36 units when resized

39: adding 38 units when resized
41: adding 40 units when resized
43: adding 42 units when resized
45: adding 44 units when resized
47: adding 46 units when resized
49: adding 48 units when resized

The total cost of resizing throughout this exercise is then
8+10+12+14+16+18+20+22+24+26+28+30+32+34+36+38+40+42
+44+46+48 = 588.
The cost of pushing each element (50) + the total cost of resizing (588) = 638.
That leaves us with an average cost of 638 / 50 = **12.76** units.

b) The average big-oh complexity for push under this strategy for resizing is **O(n).**