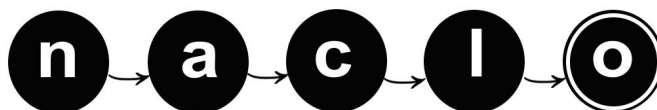# (E) Use the Force (1/2)

E1.
   a. you must go
   b. I think this one is strong with the force
   c. please don't forget to pick up milk before coming home tonight

E2.
   a. [Use < [force Luke] the >]
   b. < Luke < [the force] Use > >   MORE POSSIBLE
   c. < Luke < force < the Use > > >   MORE POSSIBLE
   d. NOT POSSIBLE
   e. < [the < Luke force >] Use >

E3. 24 (4!)

E4. 22
This can be done by enumeration or by noting that all permutations of 3 items are Yoda-isms and that placing two adjacent sequential items (i.e. the permutation contains e.g. 23 or 32) yields a sequence of 3 items after the first rule application; there are only 2 permutations of 4 items that don't place two adjacent sequential items (2413 and 3142).

E5.
   a. Permutations: 12   Yoda-isms: 12
Since 4! = 24 (from above) and each sequence has a twin (where the first "do" can stand in for the second) we can divide by 2. Any sequence is identical to the one where 1 and 3 are swapped; it can be seen that the two non-Yoda-ism cases are equivalent to Yoda-ism cases so all are Yoda-isms.

   b. Permutations: 120   Yoda-isms: 90
5! = 120 Note that any sequence of 4 items in either of the 2 bad-4 patterns (call them a and b) will result in a fail, regardless of where the 5th item is placed. So 52413, 25413....24135. But let the sequence "1235" map to "1234" and then its permutation, "2513" is non-Yoda-ism no matter where the 4 is placed. 5 sets of 4 items x 5 configurations of those 4 (i.e. where to place the 5th) x 2 patterns = 50. But some of those 50 are duplicates. Note:
2413 3142
2513 3152
2514 4152
3514 4153
3524 4253
(the sequence of 4 items in configurations a and b). Each vertical pair contains 2 duplicates. E.g. 2413 and 2513 both yield 25413 and 24513. That's 4 pairs x 2 duplicates x 2 configurations = 16 duplicates. And there are 4 "twins" between configurations a and b; each yields a single duplicate:
2413 - 4153 (24153)
2513 - 4253 (42513)
3524 - 3152 (31524)
3514 - 3142 (35142)
Note 2514 and 4152 are not twins, so 50 - 16 - 4 = 30, which are the non-Yoda-ism permutations.
120 - 30 = 90

c.   Permutations: 60   Yoda-isms: 52

5!/2 = 60 per above. From the above table note that any sequence of 4 containing both 3 and 4 will have identical patterns that are Yoda-isms (e.g. 2413 = 2314, which is a Yoda-ism, no matter where the 5 is placed). That leaves 2513 and 3152 (2514/4152 are redundant to them). That's 5x2 = 10 cases, but of those 10 the placement of the 4 on either side of the 3 are identical, so eliminate 2. 60 - 10 - 2 = 52.