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Discrete Structures Problem Set 3

For all these questions I’ve added the inputs into code and other programs like egrep that have given me these outputs, as well as the numerical way of computation.

1. 510 ./PatterSearcherWithRepeat | cut -c -4 | uniq | egrep "RR|BB|OO|YY|PP|WW" | egrep “RRBB|RROO|RRYY|RRPP|RRWW”

./PatterSearcherWithRepeat | cut -c -4 | uniq | egrep "RR|BB|OO|YY|PP|WW" | egrep -v "RRBB|RROO|RRYY|RRPP|RRWW|BBRR|BBOO|BBYY|BBPP|BBWW|OORR|OOBB|OOYY|OOPP|OOWW|YYRR|YYBB|YYOO|YYPP|YYWW|PPRR|PPBB|PPOO|PPYY|PPWW|WWRR|WWBB|WWOO|WWYY|WWPP|WWWW|PPPP|YYYY|OOOO|BBBB|RRRR" | wc -l

1. 575 ./PatterSearcherWithRepeat | cut -c -4 | sort | uniq | egrep -v "OOOO|OOO|OO" | egrep "O" | wc -l
2. 5040. ./PatternSearcher | sort | uniq | wc –l given by 8!/(2!\*2!\*2!) every 2 represents a letter that is repeated, A, E and T in ANTEATER’s case.
3. 1000
4. 13!\*39!

Problem 2:

Set of 10 cities: ABCDEFGHIJ

Number of possibilities: 3628800

1. 1088640 ./PatternSearcher | egrep "^A|^B|^C" | wc –l . Given by 10! \* .3 since 30% of the possibilities must start with those cities.
2. 725,760 ./PatternSearcher | egrep "AB|BA" | wc –l . Since AB are now one pattern we only have to look at 9! Possibilities, however the nature of BA being a valid answer as well means that 9! \* 2 gives us our answer.
3. 604,800 ./PatternSearcher | egrep "A.\*B.\*C|A.\*BC|AB.\*C|ABC " | wc -l