Problem of the Week

Problem E

Red Dog

We can take any word and rearrange all the letters to get another "word". These new "words" may be nonsensical. For example, you can rearrange the letters in $MATH$ to get $MTHA$.

Nalan wants to rearrange all the letters in $REDDOG$. However, she uses the following rules:

- the letters R, E, and D cannot be adjacent to each other and in that order, and
- the letters D, O, and G cannot be adjacent to each other and in that order.

For example, the "words" $DOGRED$, $DDOGRE$, $GDREDO$, and $DREDOG$ are examples of unacceptable words in this problem, but $DROEGD$ is acceptable.

How many different arrangements of the letters in $REDDOG$ can Nalan make if she follows these rules?