*Problems with preexisting editorials are excluded.

Problem B:
Let **B** = the number of black squares.
Then the number of white squares, **W = N-B**.
Let w_i, be the number of white blocks between block i and (i+1). Let w_0 be the no of white squares to the left of the first black square and w_{k+1} be the no of white square to the right of the last black square.

Then $\mathbf{w_0 + w_1 + w_2 + \ldots + w_{k-1} + w_k = W}$
where, $\mathbf{w_0, w_k >= 0}$ and $\mathbf{w_{1,\ldots} w_{k-1} >= 1.}$

We want to count the number of solutions to the above equation. That can be done with stars and bars.

Problem D:
Straightforward Game Theory. Let dp[i] = 1 if first player wins, 0 otherwise.
Then dp[i] = 0 if and only if for all j, dp[i-fibo[j]] is 1.

Problem E:
Let us call a person special if he has one of the four special roles. Let's fix the number of special persons, **x**. Then **x** can be between 1 and 4. The Special persons can be chosen C(n, x) ways and their roles of the special persons can be chosen S(4, x)*x! Ways where S(n, x) is the Sterling no of the second kind. Finally for each of the resk n-x people we have 2 choices for each of them, include or exclude.

So, the answer is $\sum_{i=1}^{4} C(n,\ i) * S(4,\ i) * i! * 2^{n-i}$

Instead of using stirling numbers we can also count the number of ways to assign roles manually.

Problem F:

The answer is the catalan numbers. The proof is somewhat hard. But this can also be solved with dp.

Problem H:

Easy inclusion exclusion. For each subset of {n, n+d, n+2*d, n+3*d, n+4*d}. Calculate how many numbers are divisible by all of the elements. Then add or subtract depending on the parity.

Problem I:

Let's fix the number of fixed points, **x**. Then the first m positions will have **k** fixed points, the other n-m positions will have **x-k** fixed points. We want a derangement of the remaining **n-x** elements. So, the number of valid permutations with exactly **x** fixed points is C(m, k)*(n-m, x-k)*D[n-x]. Where D[i] is the number of derangements. Sum over all possible values of x.

Problem J:

This was discussed in class. C(n, r) is odd if and only if r is a submask of n.

Problem L:

Let the no of unique positions be **k.** So, we have to divide n horses into k groups with no empty groups. This can be done in S(n, k)*k! Ways.

So, the answer is $\sum_{i=1}^{k} S(n,\ k) * k!$. This is known as Ordered Bell Number.

Problem M:

Sort the numbers. The **i**th smallest one can be the largest number of a subset in C(i-1, k-1) ways. So, the answer is $\sum_{i=1}^{k} a[i]\ C(i-1,\ k-1)$.

Problem P:

https://toph.co/p/pleasant-permutations/editorial