351. Android Unlock Patterns Premium

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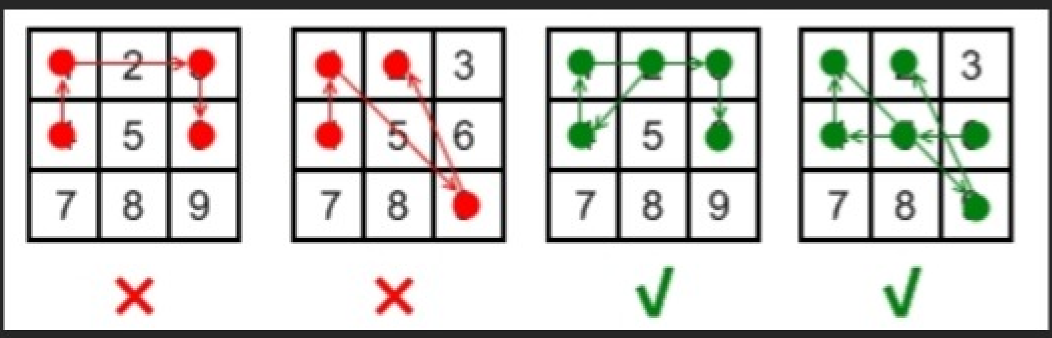
Android devices have a special lock screen with a `3 x 3` grid of dots. Users can set an "unlock pattern" by connecting the dots in a specific sequence, forming a series of joined line segments where each segment's endpoints are two consecutive dots in the sequence. A sequence of `k` dots is a **valid** unlock pattern if both of the following are true:

- All the dots in the sequence are **distinct**.
- If the line segment connecting two consecutive dots in the sequence passes through the **center** of any other dot, the other dot **must have previously appeared** in the sequence. No jumps through the center non-selected dots are allowed.
  - For example, connecting dots `2` and `9` without dots `5` or `6` appearing beforehand is valid because the line from dot `2` to dot `9` does not pass through the center of either dot `5` or `6`.
  - However, connecting dots `1` and `3` without dot `2` appearing beforehand is invalid because the line from dot `1` to dot `3` passes through the center of dot `2`.

Here are some example valid and invalid unlock patterns:



- The 1st pattern `[4,1,3,6]` is invalid because the line connecting dots `1` and `3` pass through dot `2`, but dot `2` did not previously appear in the sequence.
- The 2nd pattern `[4,1,9,2]` is invalid because the line connecting dots `1` and `9` pass through dot `5`, but dot `5` did not previously appear in the sequence.
- The 3rd pattern `[2,4,1,3,6]` is valid because it follows the conditions. The line connecting dots `1` and `3` meets the condition because dot `2` previously appeared in the sequence.
- The 4th pattern `[6,5,4,1,9,2]` is valid because it follows the conditions. The line connecting dots `1` and `9` meets the condition because dot `5` previously appeared in the sequence.

Given two integers `m` and `n`, return *the* ***number of unique and valid unlock patterns*** *of the Android grid lock screen that consist of* ***at least*** `m` *keys and* ***at most*** `n` *keys.*

Two unlock patterns are considered **unique** if there is a dot in one sequence that is not in the other, or the order of the dots is different.

Example 1:

```
Input: m = 1, n = 1
Output: 9
```

Example 2:

```
Input: m = 1, n = 2
Output: 65
```

Constraints:

- `1 <= m, n <= 9`

Seen this question in a real interview before? 1/5

Yes No

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Discussion (25)