**9 Squares Problem -**

It was given that the side lengths of the 8 squares are the following

1, 4, 7, 8, 9, 10, 14, 15, 18

As all the inner shapes were square, I squared the side lengths of the squares, to find the area, and added them together in order to obtain the area of the complete rectangular quilt after the squares are placed correctly.

$1^2 + 4^2 + 7^2 + 8^2 + 9^2 + 10^2 + 14^2 + 15^2 + 18^2$

1 + 16 + 49 + 64 + 81 + 100 + 196 + 225 + 324

= 1056

Thus through this I got to know that the area of the quilt was 1056 units squared. Next, to find the dimensions of this quilt with known area, *I found out two numbers which were divisible by 1056* –

For this I used the method of L.C.M.

| | 1056 |
|---|---|
| 2 | 528 |
| 2 | 264 |
| 2 | 132 |
| 2 | 66 |
| 2 | 33 |
| 3 | 11 |
| 11 | 1 |

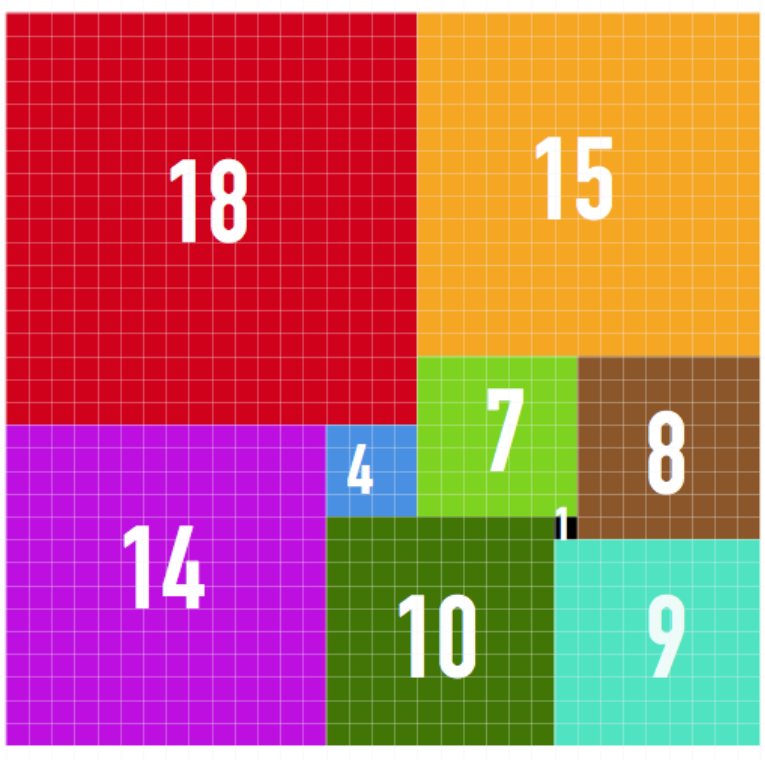
I broke down 1056 into its smallest factors. Later, I grouped the factors to find two numbers whose product is 1056.

When I took, 11, 3 and on the other side, 2 five times, I learnt that if I multiply 11 and 3, I get 33, and if I multiply 2 to itself 5 times, I get 32. So now I am left out with two numbers, 33, and 32. If I multiply 33 and 32 together, I get 1056. Therefore 33 and 32 could be the possible dimensions of the rectangular quilt, in which all the squares would fit.

One thing which I had to keep in mind was that the dimensions should not be smaller than 18, as 18 is the biggest side length of the inner square. And it shouldn't be bigger than 77, as it was the total of all the dimensions of the inner squares.

I was a bit curious to know how the quilt will look, so I made small squares with respective dimensions and tried to create the rectangular quilt. As I knew the dimensions, I made a border as per the dimensions, and tried fixing the rest of the squares in the gaps.

I used a couple of strategies, such as, placing all the big squares in one corner, and all the rest of them on the other. And this actually worked. Another thing which I did was, I tried all the possible combinations on the sides to make the dimension, which I found. Even this was helpful. And eventually I found the placements and created the following rectangular quilt.




**10 Squares Problem -**

To solve this problem, I followed the same steps as I did for previous one. First, I found out the total area of the rectangular quilt. Next, through LCM of the area found out the two side dimensions of the quilt and at last used paper cuttings to place the squares into a perfect rectangular quilt.

Process is shown below

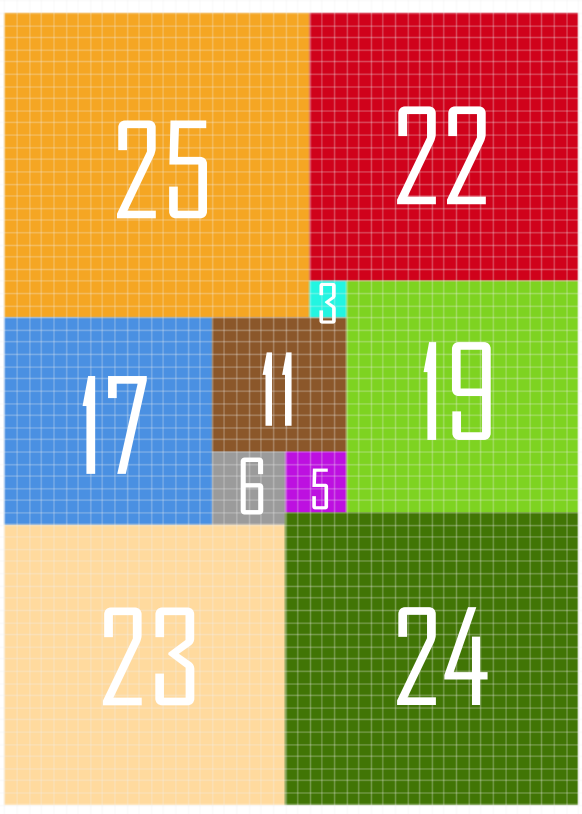
$3^2 + 5^2 + 6^2 + 11^2 + 17^2 + 19^2 + 22^2 + 23^2 + 24^2 + 25^2$

9 + 25 + 36 + 121 + 289 + 361 + 484 + 529 + 576 + 625

= 3055

| | 3055 |
|---|---|
| 5 | 611 |
| 13 | 47 |
| 47 | 1 |

Therefore, dimensions were 65 x 47 units


25
22
3
17
11
19
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23
24