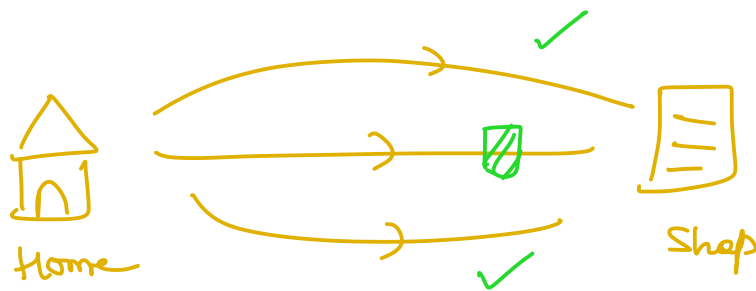it takes lesser time.

↓
Collection



Home          Shop
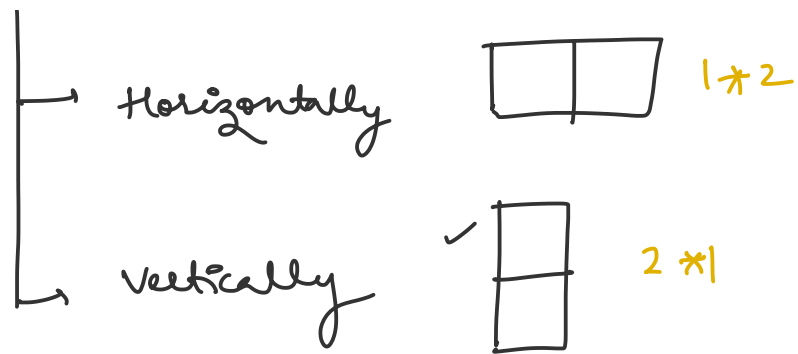
Here we are targetting to find all the feasible sol$^n$s.

Q Tiling problem — Amazon

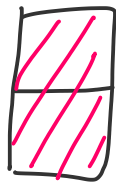Given a board of size "$2*n$" and tile of size "$2*1$", count the number of ways to tile the given board.

som For placing a tile, we have 2 placements

Horizontally ⊓⊓ 1*2

Vertically ✓ ⊟ 2*1

n = 1

size of board = 2 * n
= 2 * 1

Placed the tile vertically

Total no of ways = 1

n = 2
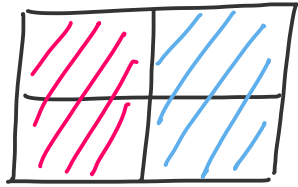
Board size = 2 * n
= 2 * 2
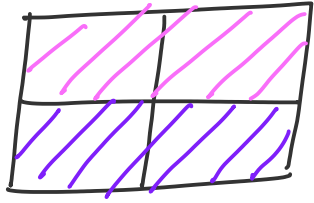
Both vertically



Both horizontally

Total no of ways = 2

## n = 3

Board size = 2 * n

= 2 * 3
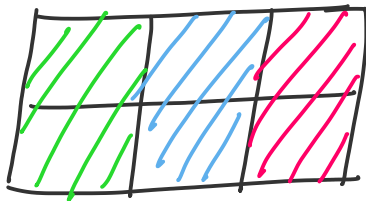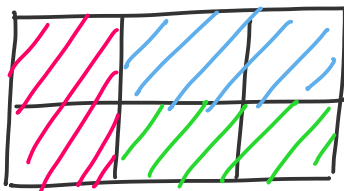
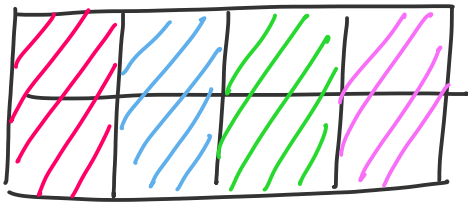

All vertically



one vertically,

two horizontally
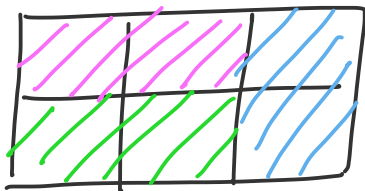


Two horizontally,

one vertically

Total no of ways = 3

n = 4

Board size = 2 * 4


All vertically
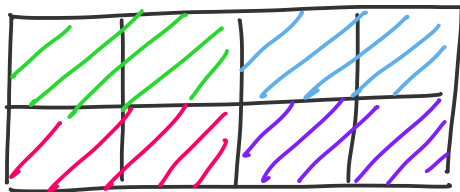

All horizontally
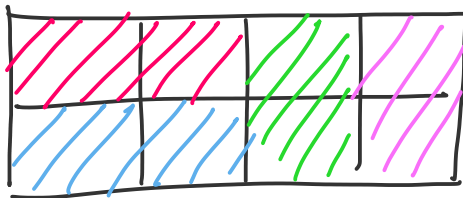

2H + 2V
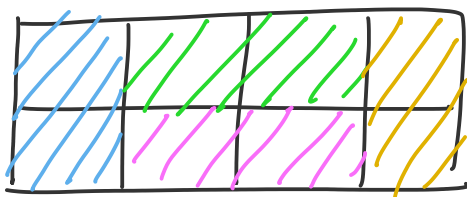

1V + 2H + 1V
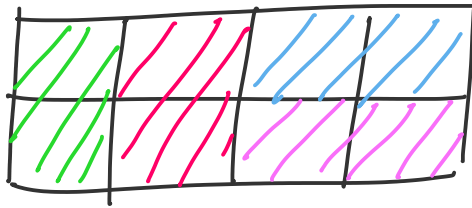
$$2V + 2H$$

Total no of ways = 5

| $n$ | | Total no of ways | |
|-----|---|------------------|---|
| 1 | $\longleftrightarrow$ | 1 | Base case |
| 2 | $\longleftrightarrow$ | 2 | |
| 3 | $\longleftrightarrow$ | 3 | |
| 4 | | 5 | Recursive call |
| 5 | | 8 | |
| | | ⋮ | |

Getways ( n )
{

     Base Case

     Recursive call

}

## Base case

```
if (n == 1)
    ↳ return 1


if (n == 2)
    ↳ return 2


if (n == 3)
    ↳ return 3
```

combine them

```
if (n == 1 || n == 2 || n == 3)
{
    return n;

}
```

OR

```
if ( n ≤ 3)
```

```
{
    return n;
}
```

$2 * n$

$1 \vee$

$n-1$

If we place one tile vertically then the problem reduces to $n-1$, so for this we will use Getways $(n-1)$.
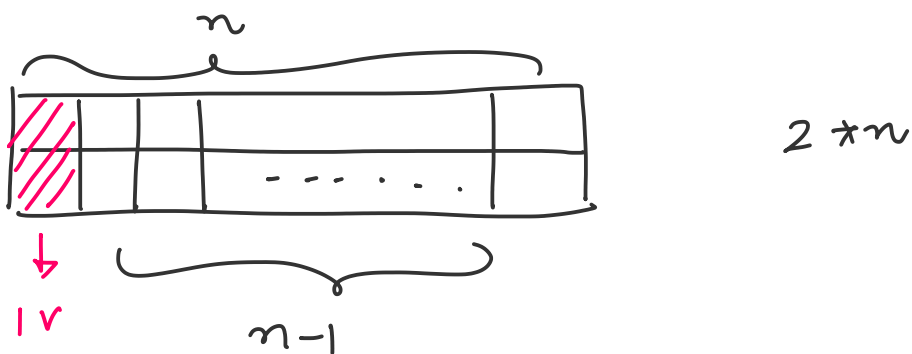


$2 * n$

$2 H$

$n-2$
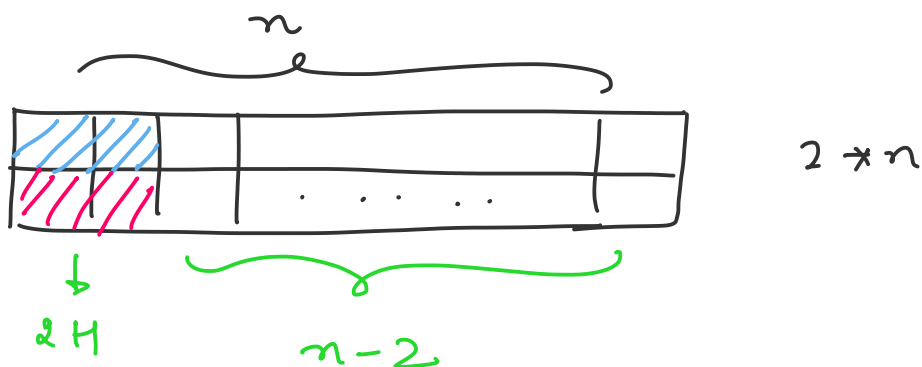
If we are placing one tile horizontally then we will have to place second

tile also horizentally, so the problem
reduces to n-2, so for this
we can call Getways (n-2)

```
Getways (n)
{
    if (n ≤ 3)
    {
        return n;
    }

    return    Getways (n-1) +
                    Getways (n-2) ;
}
```

Dry Run

n = 4

Getways (4)
↓

$n = 4$

$n \leq 3$

$4 \leq 3$

$\downarrow$

no

return   Getways (3) $\checkmark$ + Getways (2)

Getways (3)

$\downarrow$

$n = 3$

$n \leq 3$

$3 \leq 3$

$\downarrow$

yes

$\quad\longrightarrow$ return  $n = 3$

Getways (2)

$\downarrow$

$n = 2$

$$n \leq 3$$

$$2 \leq 3$$

$$\downarrow$$

yes

$\longrightarrow$ return $n = 2$

$$\text{Getways}(4) = \text{Getways}(3) + \text{Getways}(2)$$

$$= 3 + 2$$

$$= 5$$

Q Print all the sequences of a string using recursion.

Eg- $\{1, 2\}$

$$\downarrow$$

$\{1\}, \{2\}, \{1,2\}$

Eg- $\{1, 2, 3\}$

$$\downarrow$$

$\{1\}, \{2\}, \{3\}, \{1,2\},$

$\{1,3\}, \{2,3\}, \{1, 2, 3\}$