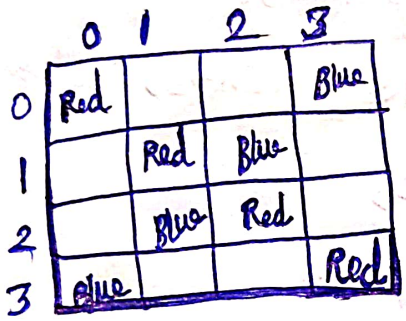
Doubt Session

1. Matrix (2D-arrays)



Given: Find |Red - blue|

Brute Force — $O(N^2)$

```
for (i=0; i<4; i++)
    Red += a[i][i]
for (i=0; i<4; i++)
    Blue += a[i][n-i+1]
```

→ O(n)

1) Find the primary diagonal sum - elements at pos^n (i, i)
2) Find the secondary " " - " " " (i, N-i-1)
3) Print the absolute difference b/w the two sums.

2. URL

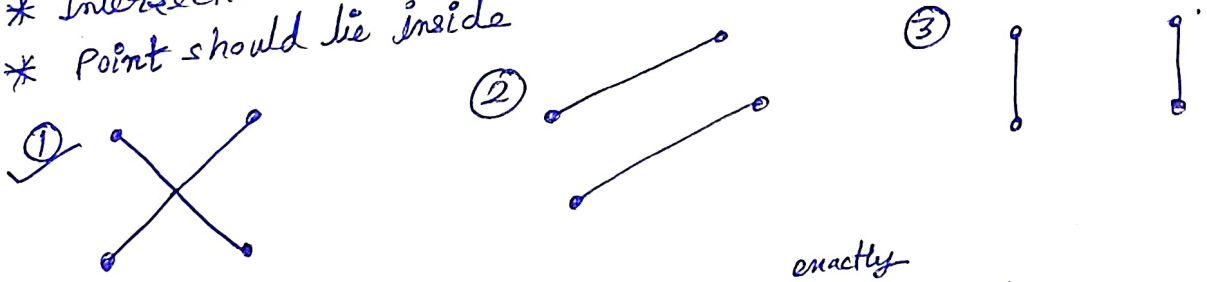
1. Start after ? → Use a flag to ignore characters after ?
2. Loop through each char in the string.
3. If '=' → print ':' to match the required output.
4. If '&' → print newline to separate each key-value pair.
5. else → print the character.

Code :-

```
void solve() {
    string s;
    cin >> s;
    int flag = 0;
    for (auto i : s) {
        if (i == '?') {
            flag = 1;
            continue;
        }
        if (flag == 1) {
            if (i == '&') cout << endl;
            else if (i == '=') cout << " : ";
            else cout << i;
        }
    }
}
```

3. No. of Intersecting Diagonals

* Intersection
* Point should lie inside



$^{n}C_4$ will ways to choose → they make exactly ^1 intersection

Diagonals intersect inside a polygon only when 4 vertices are choosen.

4. No. of parts in convex polygon

1. Draw all the diagonals of the polygon. You need to count how many regions are formed.
2. No. of regions $= {}^{N}C_4 + {}^{N-1}C_2$

$^{N}C_4$ → No. of intersections points of diagonals inside polygon

$^{N-1}C_2$ → No. of triangles formed from centre with polygon sides.

5. Kolya and Tanya

There are $3n$ gnomes each can get 1, 2 or 3 coins → 3 choices per gnome

Total ways to assign coins $= 3^{3n}$

Tanya is not satisfied if for any i, the triplet

$$a_i + a_{i+n} + a_{i+2n} \neq 6$$

There are 7 bad triplets that sum to 6

Valid ways $= 3^{3n} - 7^n$

6. No. of sum of digit

Count no. $\leq n$, whose sum of digits equal a given value.

Brute Force :-

```
for (int i=1; i<=n; i++) {
  if (sum of digits (i) == target) count++;
}
```