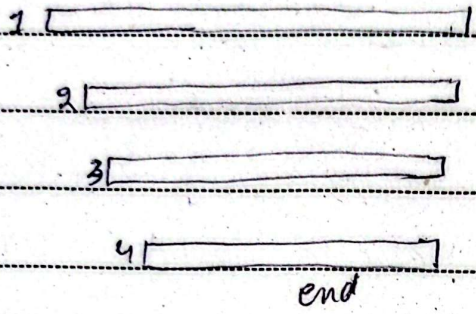
Time & Space Complexity

M1:- find duplicate :-

{1 2 4 3 5 4 6 7 9 8 10}

Algo:- • Take 1st number compare with rest
• Then second tell end.



formula = $\frac{n(n+1)}{2}$

$\frac{10(11)}{2}$

= 55

for 10 size array we do almost 55 op and go ahead if we have 1000 size array then?

then $\frac{n(n+1)}{2}$ ⇒

⇒ $\frac{\overset{500}{\cancel{1000}}(1001)}{\cancel{2}}$ ⇒ 500,500

Not more time consume

much time need

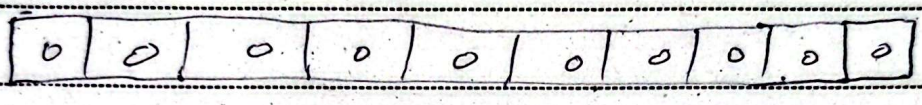
Duplicat find in array

Mth 2

A = {1, 2, 3, 4, 7, 6, 4, 5, 9, 8, 10}

algo :-

- Take tem array fill with 0
- check and match index with A.
- with unique num of A fill 1 in temp.
- If you find another num for 1 idx you find duplicat ok



- Now we check if {tem[A[i]] = 1} ⊕
- By ⊕ we check and fill each unique num
- Now also put condition if temp[] is already one(1) then you find duplica done

→ for 10 size array perform 10 operation
→ But space take whole another array

more Space Consume

Find duplicate array

Mth 3

arr = [1, 2, 10, 2, 3, 5, 4, 2, 6, 9, 8]

- Now we know: $\frac{n(n+1)}{2}$

algo:-

- add the number in array

Sum = 1 8 18 20 23 28 32 39 40 49 57

find sum of 1 to n

$$\frac{n(n+1)}{2} = \frac{10(10+1)}{2}$$

$$= \frac{5}{10}(11)$$

$$S = 55$$

Now Sum − S = 57 − 55

= 2 → duplicate

{ Not take space Nor time }

Rayhi

temp[A[i]] = 1

if store 1

temp[ ] = 1

A[i]

iterate over the whole array and put number 1 by 1

$\frac{n(n+1)}{2}$ sum of 1 → n how

1

start + end → n ⇒ (n+1)

n+1 =

$\frac{n}{2}$ = n → end and 2 → two two pair we add.