USA  Tutor

No More Odd Photos

Analysis by David Yang

Statement Summary

You are given N<=1000 cows

Each cow has a breed id

You want to place cows in groups where the group parity (even/odd) follows this rule

E O E O E…

Observations

2 Odds make an even

Any amount of evens can become 1 even, or 2evens=even

E O E O E…

-> Given this structure and an arbitrary amount of evens

-> How can you find the valid numbers of odds?

Structure of the Alternating Sequence

E O E = One more even than an odd

E O E O = Same amount of evens and odds

E = O+1 or E = O

Math Equations

2O = E

XE = E

O = E+1 or O= E

How can we simplify our equations?

Sample

We’re given 7 odd numbers

2O = E

O = E+1 or O=E

-> Same as E = O-1 or E=O

We must smush the 7 odds until one of the following E=O equations are satisfied

Sample

Evens: 0, Odds: 7

Evens: 1, Odds: 5

Evens: 2, Odds: 3

Evens: 3, Odds 1

We see we must keep smushing until E>O

Sample

Evens: 3, Odds 1

We still must satisfy either E=O or E= O+1

We must smush Evens to become 2

Our answer is Evens 2, Odds 1

1+2 =3

Key Idea

For the variable that we must smush

We want to smush as less as possible

And we also must smush in the order of O->E, then 2E-> E

Read in Input

```
Scanner sc= new Scanner(System.in);
int N= sc.nextInt();
int evens=0;
int odds=0;
for(int i=0; i<N; i++){
   int num=sc.nextInt();
   // if number is divisible by 2
   if(num%2==0){
      evens++;
   }
   else{
      odds++;
   }
}
```

Smush Odds -> Evens

```
while(odds>evens){
    odds-=2;
    evens++;
}
```

Smush 2Evens -> Evens

```
while(evens>odds+1){
    evens--;
}
```

Print Answer

System.*out*.println(evens+odds);