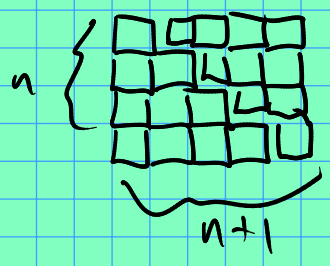
$$\sum_{i=1}^{n} i = 1+2+3+\dots+n = \frac{n(n+1)}{2}$$



Or, just make the computer do all the work!

Want to add $1+2+3+\dots+n$

$i \equiv$ current term

$$\sum_{i=1}^{n} i = \left(\sum_{i=1}^{n-1} i\right) + n$$

$$= \left[\left(\sum_{i=1}^{n-2} i\right) + (n-1)\right] + n$$

sum

$$(1+2)+3+4+\dots+n$$

↑ i

```
int n;
cin>>n;
int i; // next integer to add.
int sum; // LHS of our '+'.
         // ≡ sum of all values
         //   from 1,... i-1
i=1;
sum=0;
while(i<=n){
   sum = sum+i; // sum += i;
   i = i+1; // i++;
}
```

← Meaning of sum, i is consistent w/ values!

// at this point, i == n+1

// according the meaning we save (and

// faithfully preserved!) to our variables,

// $sum = \sum_{k=1}^{i-1} k = \sum_{k=1}^{n+1-1} k = \sum_{k=1}^{n} k$ ✓

$n = 9 = 3^2 < 3^2 \cdot 2^0$ ←

Example: "Brute force" GCD's.

gcd(10, 15) = 5.

```
int a,b; // say a,b > 0
cin >> a >> b;
int min;
if(a<b)
    min=a;
else
    min=b;
```

// possibilities for gcd: 1, 2, ..., min

// d is a common divisor if a%d == 0
& b%d == 0.

Exercise: finish this.