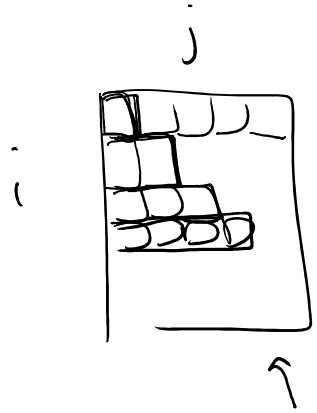
S. KIMMEL

Input: Adjacency Matrix A for $G=(V,E)$, G unweighted, undirected

Output: ??

```
1. S = 0
2. for i = 1 to |V|:
3.     for j = 1 to i:
4.         S = S + A[i,j]
5. return S
```



Returns $|E|$

How many operations?

- Use Σ for loops
- Use 1 for O(1) operations

$$\#\text{operations} = \underbrace{D}_{\text{some constant}} + \sum_{i=1}^{|V|} [\text{work done inside } i^{\text{th}} \text{ loop iteration}]$$

D: line 1 & 5; $\sum_{i=1}^{|V|}$: line 2

$$= D + \sum_{i=1}^{|V|} \left[\sum_{j=1}^{i} K \right]$$

K: some constant; $\sum_{j=1}^{i}$: line 3; K: line 4

Write your expression from outer loops to inner loop