Homework 1

1-1

	1	2	3	4	5
1	×	1	2	3	2
2		×	1	2	1
3			×	1	1
4				×	1
5					×

① $l = \dfrac{\sum d_{ij}}{\frac{1}{2}N(N-1)} = \dfrac{1+2+3+2+1+2+1+1+1+1}{\frac{1}{2}\times 5\times 4}$

$= 1.5$

② $D = \max\{d_{ij}\} = d_{14} = 3.$

③ $C = \dfrac{\sum C(i)}{N} = \dfrac{1}{N}\sum \dfrac{E(i)}{\frac{1}{2}k(i)[k(i)-1]}$

$E(1) = 0,\ C(1) = 0$

$E(2) = 1,\ C(2) = \frac{1}{3}$

$E(3) = 2,\ C(3) = \frac{2}{3}$

$E(4) = 1,\ C(4) = 1$

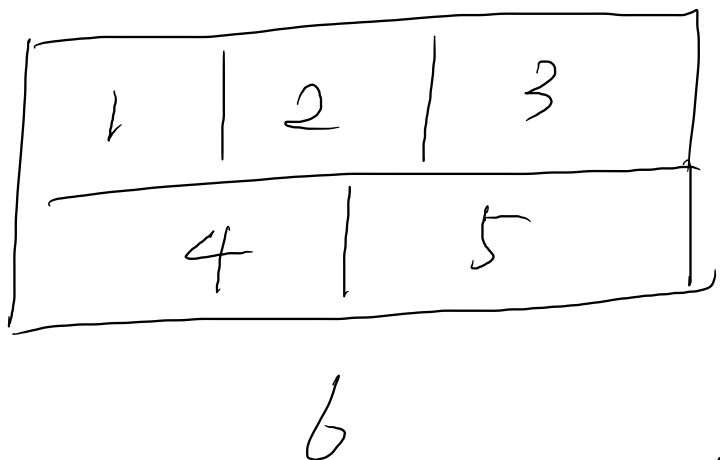
$E(5) = 2,\ C(5) = \frac{2}{3}$

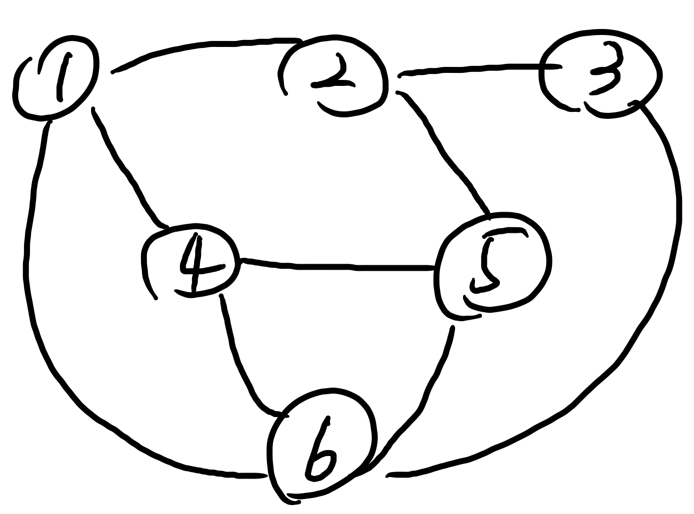
$\therefore C = \frac{1}{5}\times\frac{8}{3} = \frac{8}{15}$

④ degree $\langle 1,2,3,4,5\rangle = \langle 1,3,3,2,3\rangle$

$\langle k\rangle = \frac{1}{5}(1+3+3+2+3) = \frac{12}{5}$

1-2





Node	degree	
1	4	
2	3	✓
3	2	
4	4	
5	4	
6	7	✓

We can find that the degree of Node 2, 6. is odd, which means that G is not an Euler Graph.

So we can't walk through every door once and once only and return to the starting point.