i	$|V_i|$	$|\tilde{V}_i|$
1	1000	10
2	250	2.5
3	100	1
4	500	5
5	300	3
6	400	4
7	150	1.5

Block connection prob. p_{ij}

0	0.05	0	0	0	0	0
0	0.1	0.3	0	0.25	0	0
0	0	0	0.1	0	0	0
0	0	0	0	0	0	0
0	0	0	0.5	0	0.2	0.4
0	0	0	0.15	0	0	0
0	0	0	0	0	0	0

Cost $\quad c_{ij} := \dfrac{1}{p_{ij}|\tilde{V}_i||\tilde{V}_j|}$

0	0.8	0	0	0	0	0
0	0	1.33	0	0.53	0	0
0	0	0	2	0	0	0
0	0	0	0	0	0	0
0	0	0	0.13	0	0.42	0.56
0	0	0	0.33	0	0	0
0	0	0	0	0	0	0

Path:
$$P = \{V_1, V_2, V_5, V_4\}$$

Path length:
$$\ell = c_{12} + c_{25} + c_{54}$$
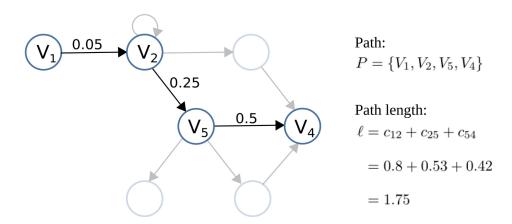$$= 0.8 + 0.53 + 0.42$$
$$= 1.75$$

Fig S1. An illustrative example for calculating the path length of a random walk on the circuit.