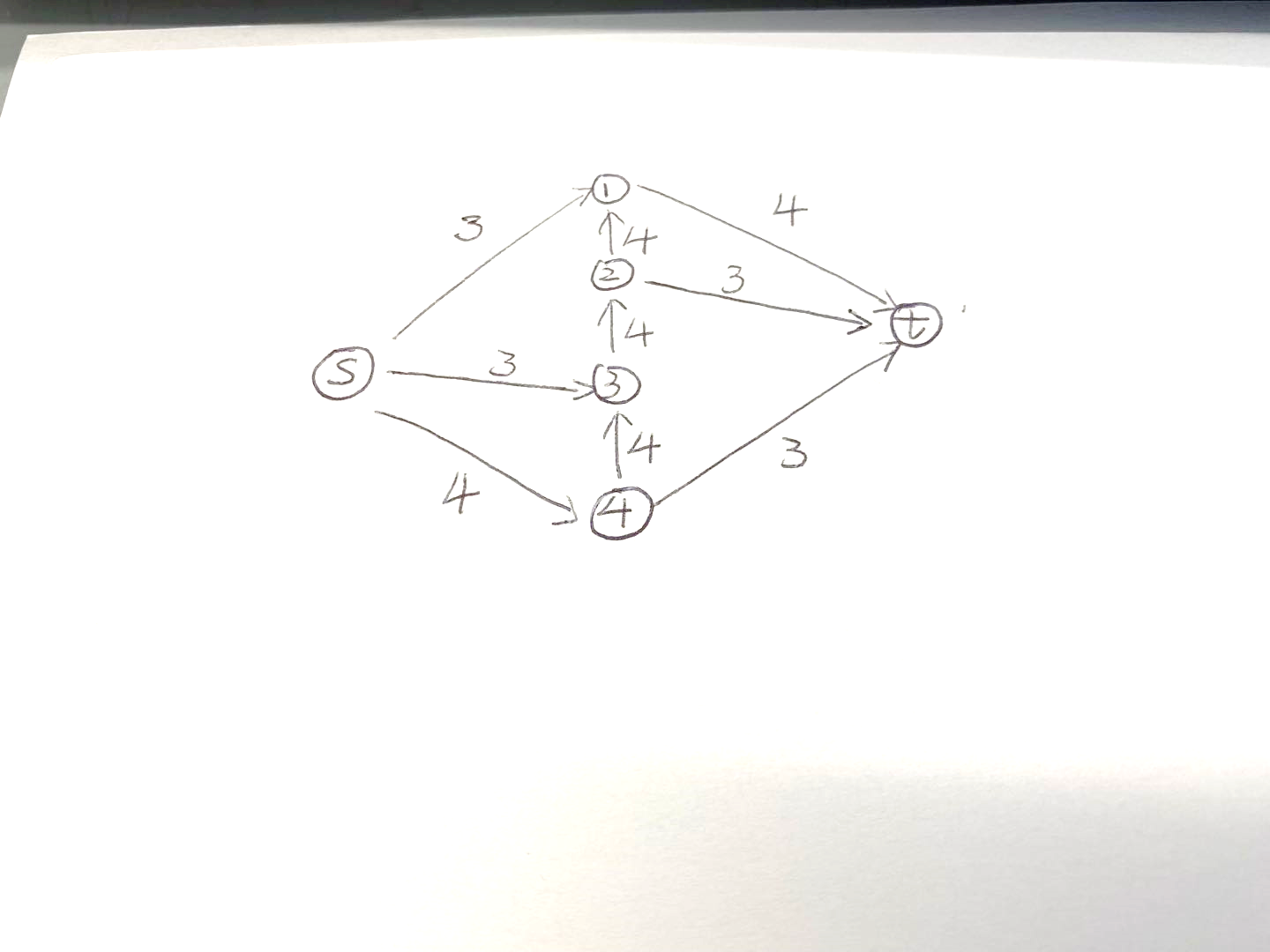
**CS5820 HW-6**

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1. Forward-Edge-Only Augmentations

The statement is false. Counter example is in below:



The maximum flow according to FF algorithm:

,

,

,

,

Total is 10

The forward-edge-only max-delta algorithm:

,

Total is

2. Finding minimum cut closest to t

(1) Algorithm

Build a residual graph based on the maximum value flow computing results.

Initialize set

While there exist an edge which and

Remove from

Add to

Endwhile

Return

(2) Running time

Build residual tree: the worst case contain 2m edges in residual graph, so it would take O(2m)

Initialize set , because totally n nodes

While loop: In each iteration, obviously Because there are at most 2m edges in residual graph, so iteration time is Hence while loop is totally

Totally, running time is , (because ).

(3) Correctness

Claim 1: If A,B is minimum cut, flow across A and B is equal to c(A, B)

Claim 2: In output B\*, remove any subset U from B\* will make B\* not a minimum cut anymore.