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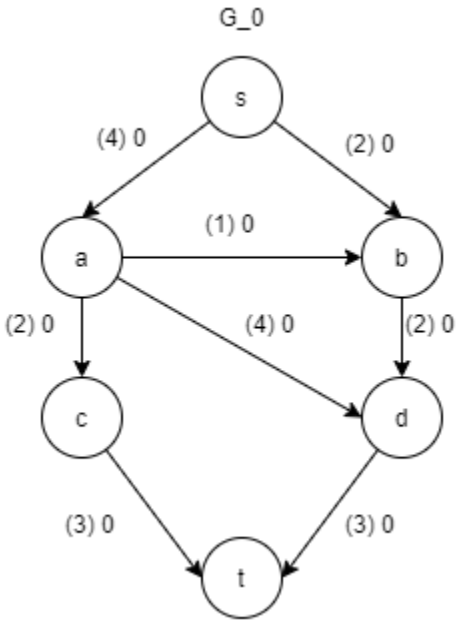
Prof. Haller

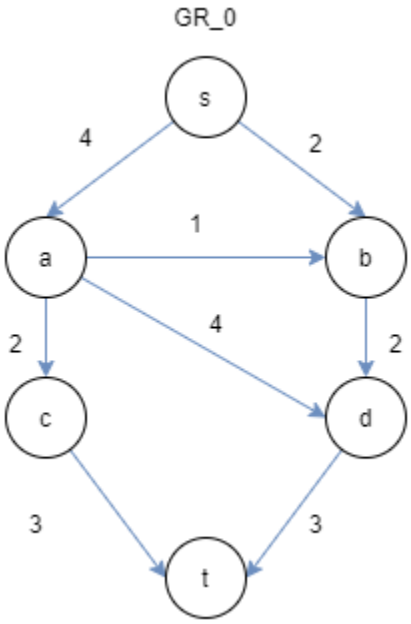
CSCI 261 Section 2

May 6, 2021

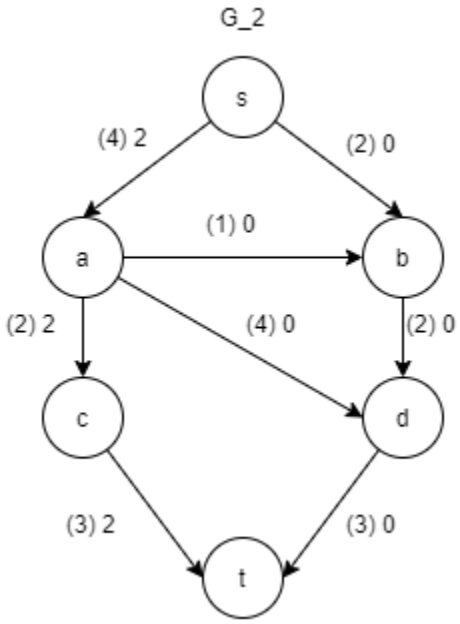
Homework #7

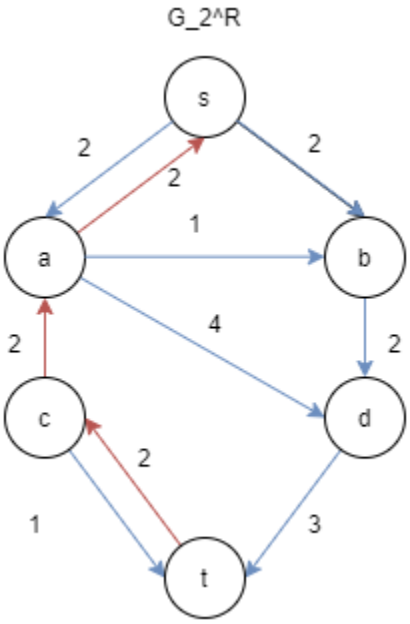
1)



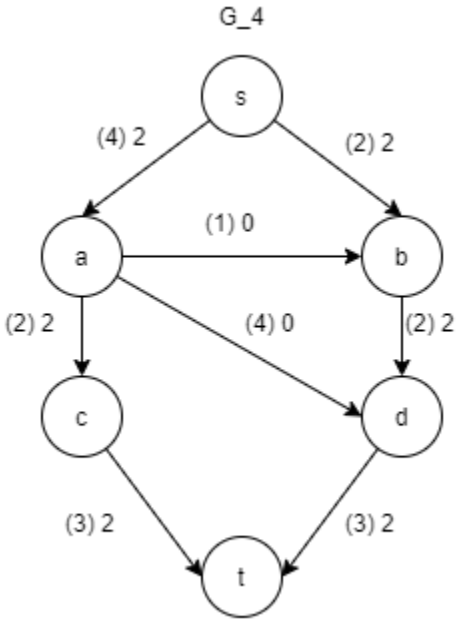


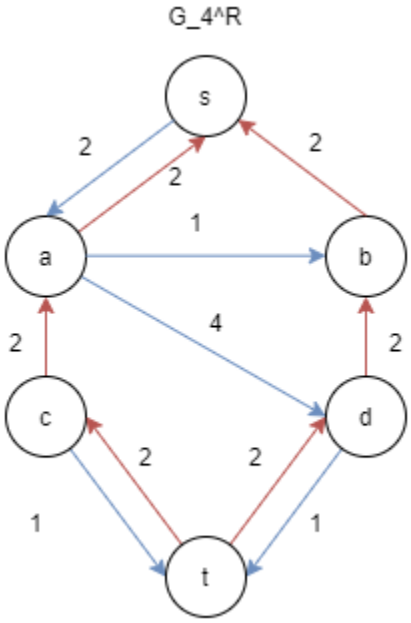
Path: s, a, c, t



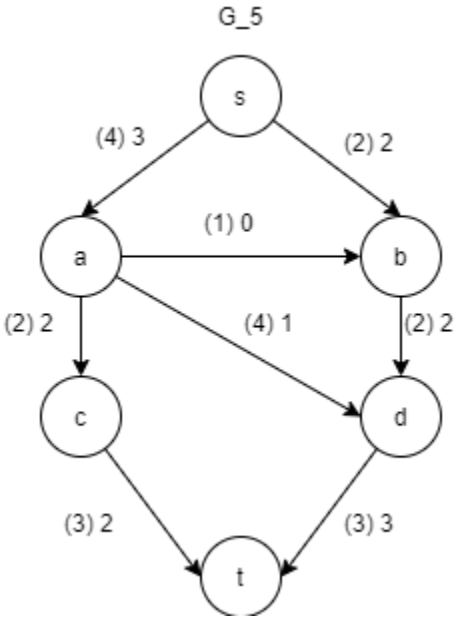


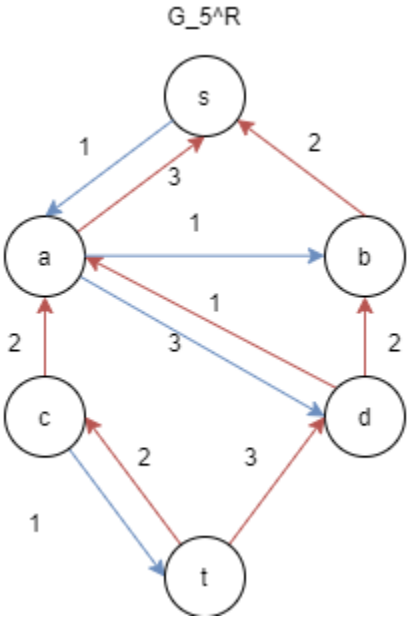
Path: s, b, d, t





Path: s, a d, t





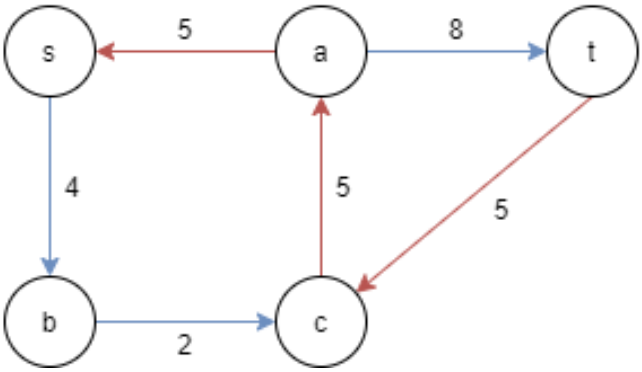
2) s-t cut (A*, B*): A* = {s, a, b, d}

B* = {c, t}

cap (A*, B*) = 5

3)

a)



b) The next path is s -> b -> c -> a -> t

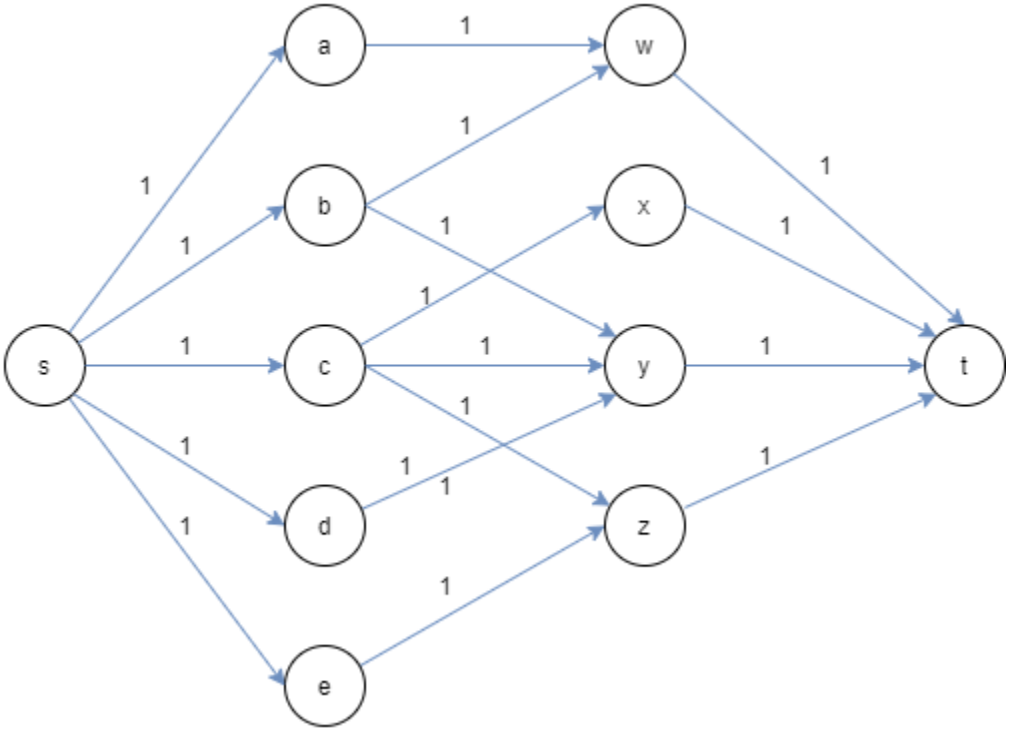
There is a bottleneck of 2 because of edge *bc*.

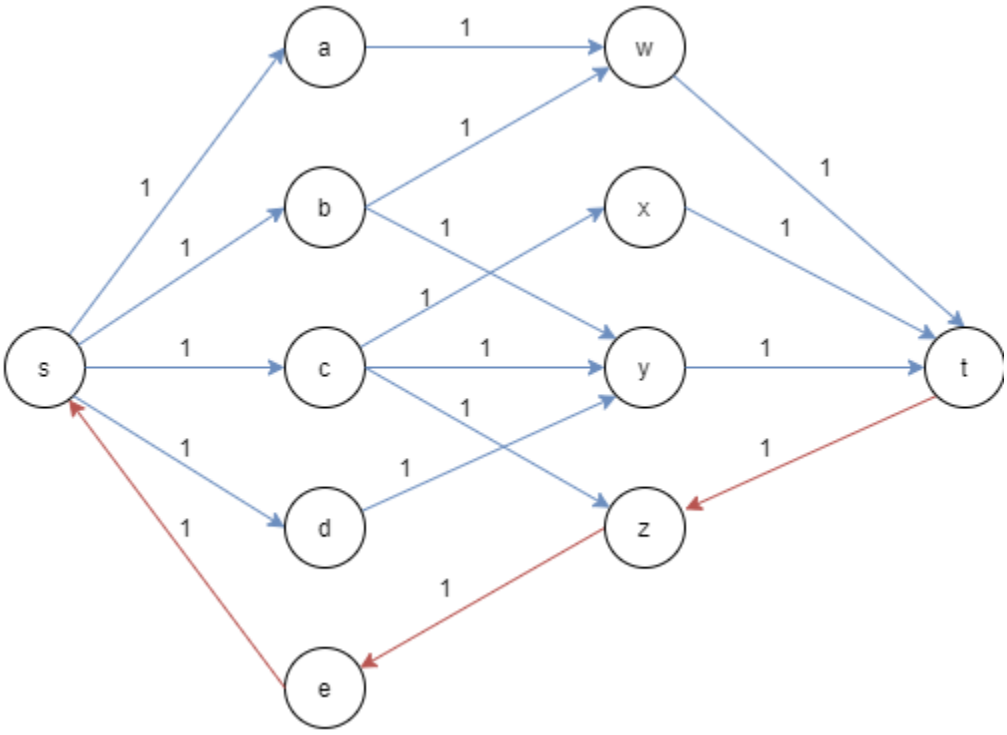
c) To start, we would add a flow of 2 onto the next path (s -> b -> c -> a -> t). This would create G_7^R. In this residual graph, a flow of 2 is added to the edges *sb*, *bc*, and *at*. However, since edge *ca* is already "full," adding more flow would mean a subtraction, making edge *ca* equal to 3.

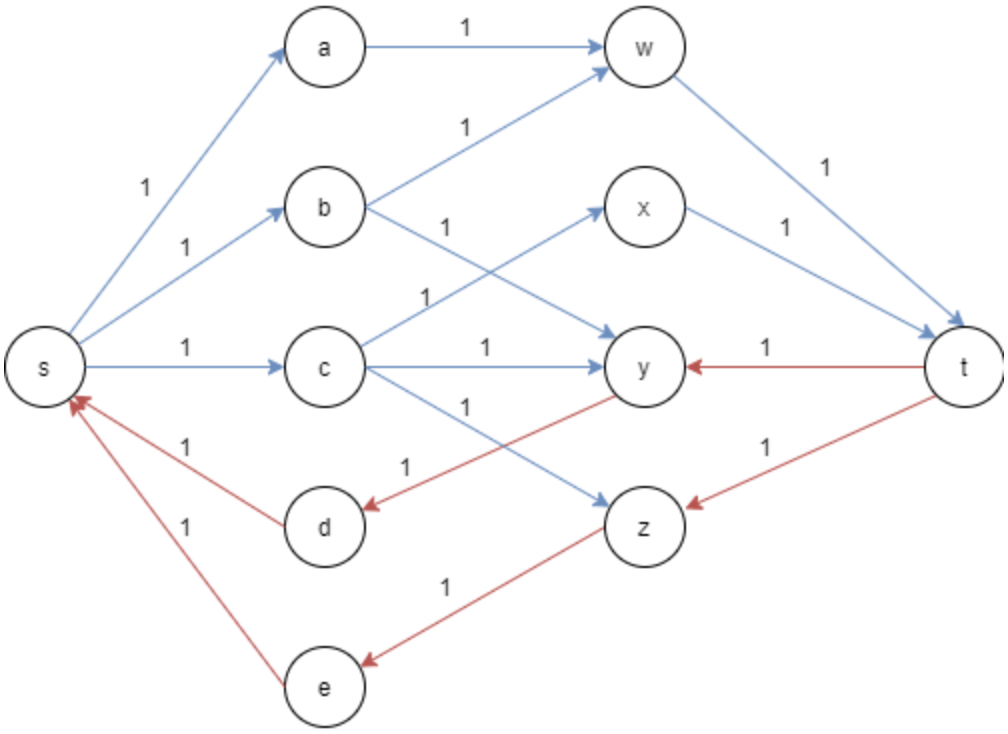
d) cut (A*, B*): A* = {s, b}

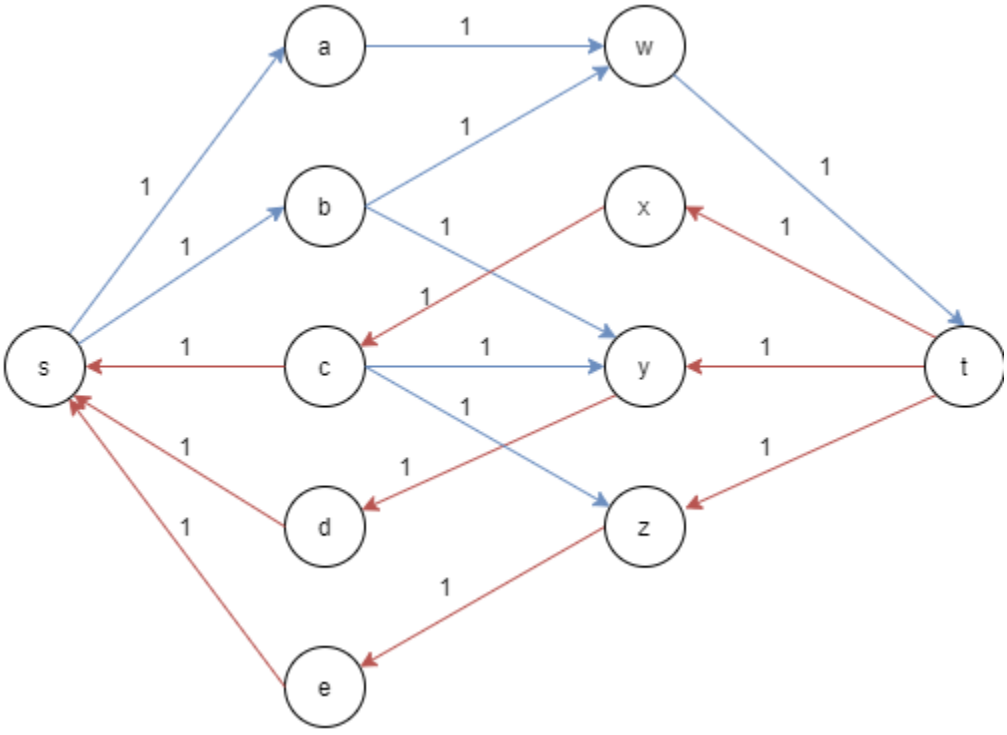
B* = {a, c, t}

4)

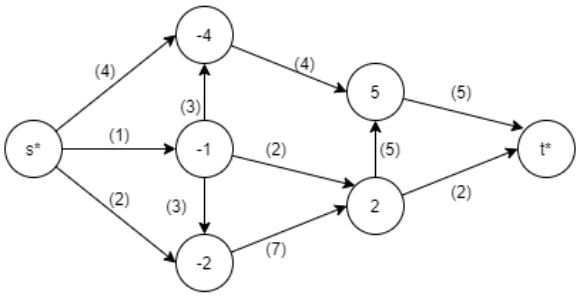


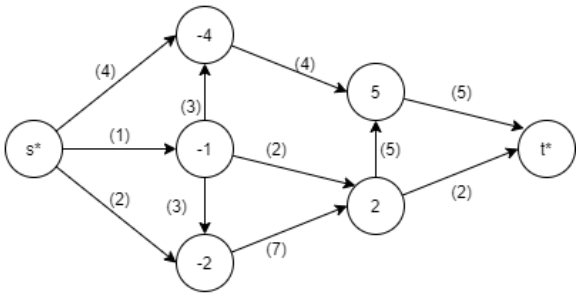



a
w
b
x
s
c
y
t
d
z
e
1

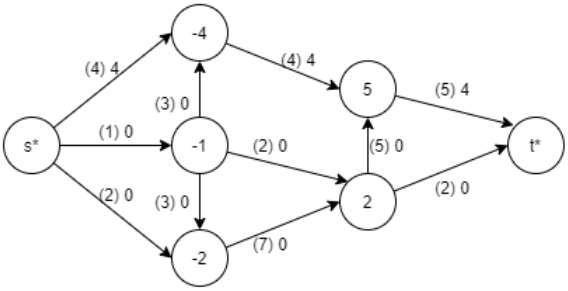

a
w
b
x
s
c
y
t
d
z
e
1

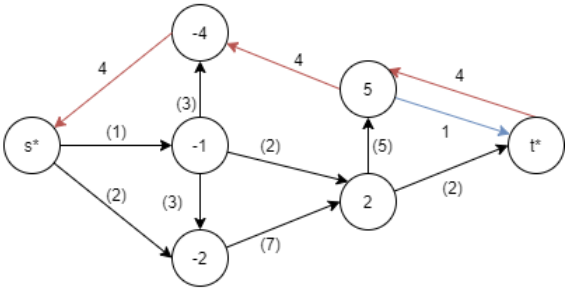
5) Residual graph is on the right.



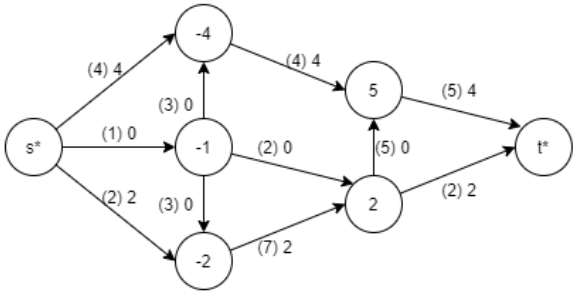


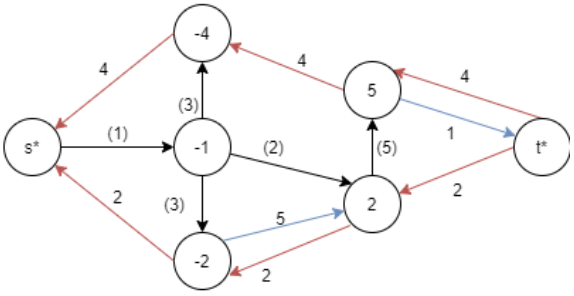
Path: s*, -4, 5, t*



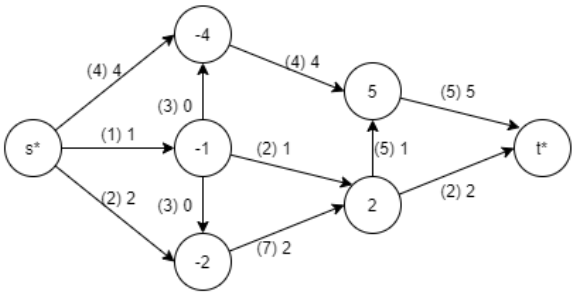


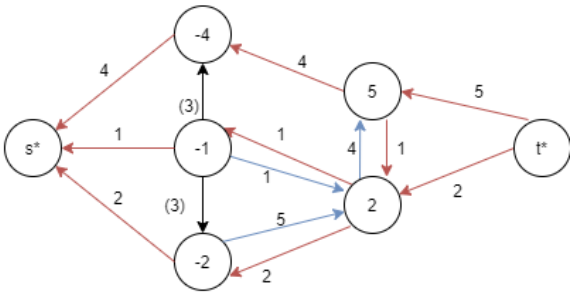
Path: s*, -2, 2, t*

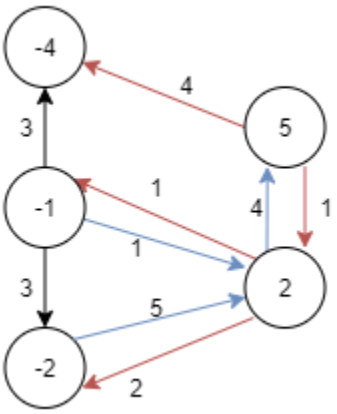


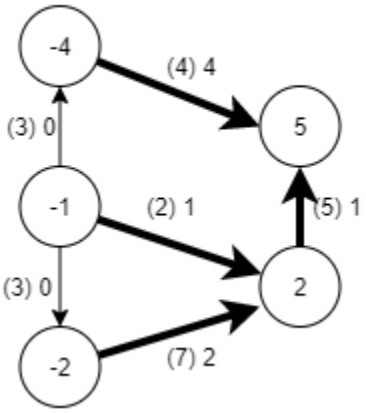


Path: s*, -1, 2, 5, t*


-4
(4) 4
(4) 4
5
(5) 5
(3) 0
s*
(1) 1
-1
(2) 1
(5) 1
t*
(2) 2
(3) 0
2
(2) 2
-2
(7) 2


-4
4
4
5
5
(3)
s*
1
-1
1
4
1
t*
1
2
2
(3)
5
-2
2


-4
4
5
3
1
-1
4
1
1
3
2
5
-2
2


-4
(4) 4
5
(3) 0
-1
(2) 1
(5) 1
(3) 0
2
-2
(7) 2