Coursework 3: Graph Algorithms and Complexity Theory

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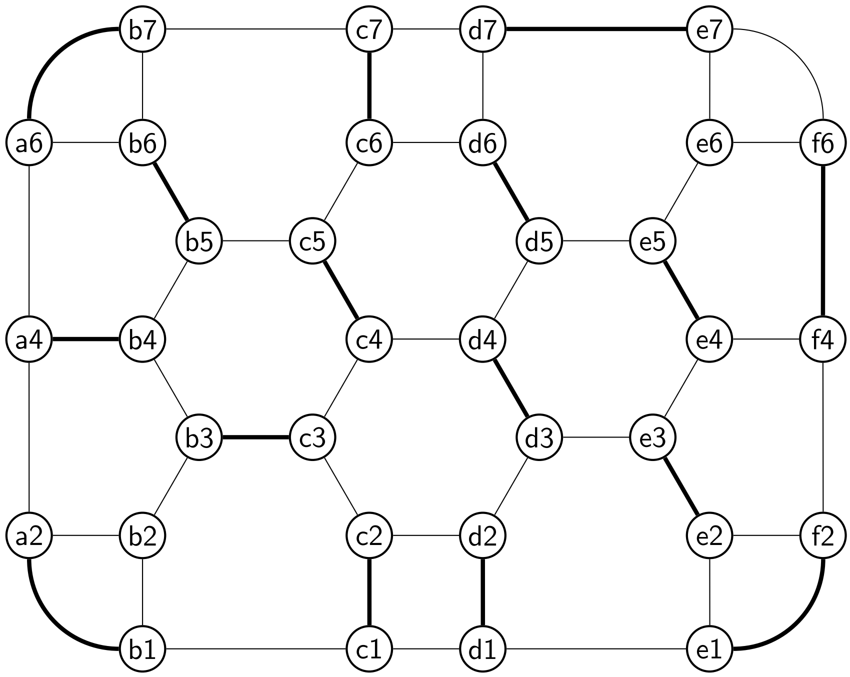
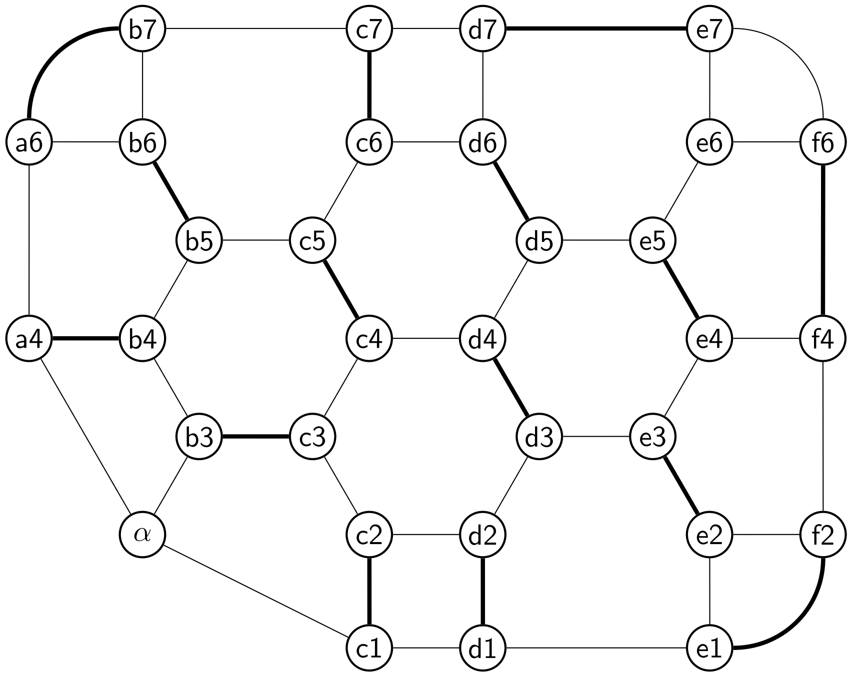
Tutorial Session: Thursday 1pm

In the graph below a matching is indicated by bold lines. The trees created will also have a bold line indicating a matching.

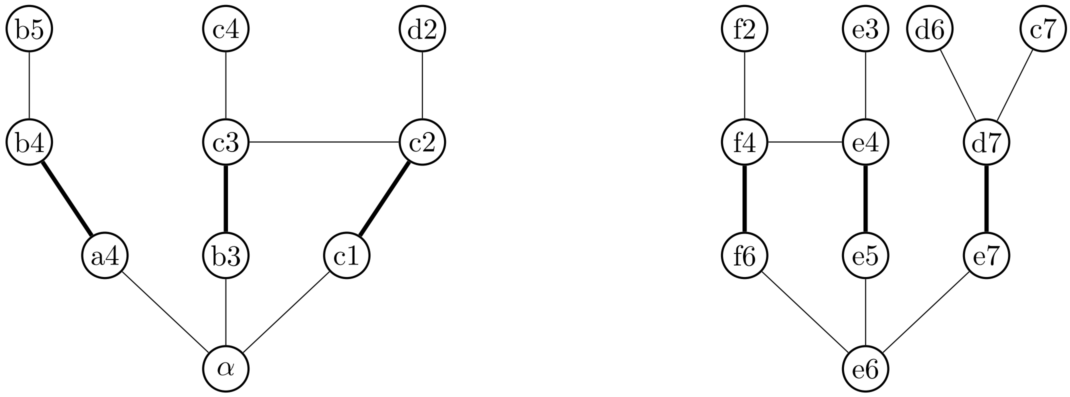


There are two M-unsatured vertices, namely b2 and e6. Therefore, we initiate Edmond's algorithm starting by growing two alternative trres starting at these two vertices.

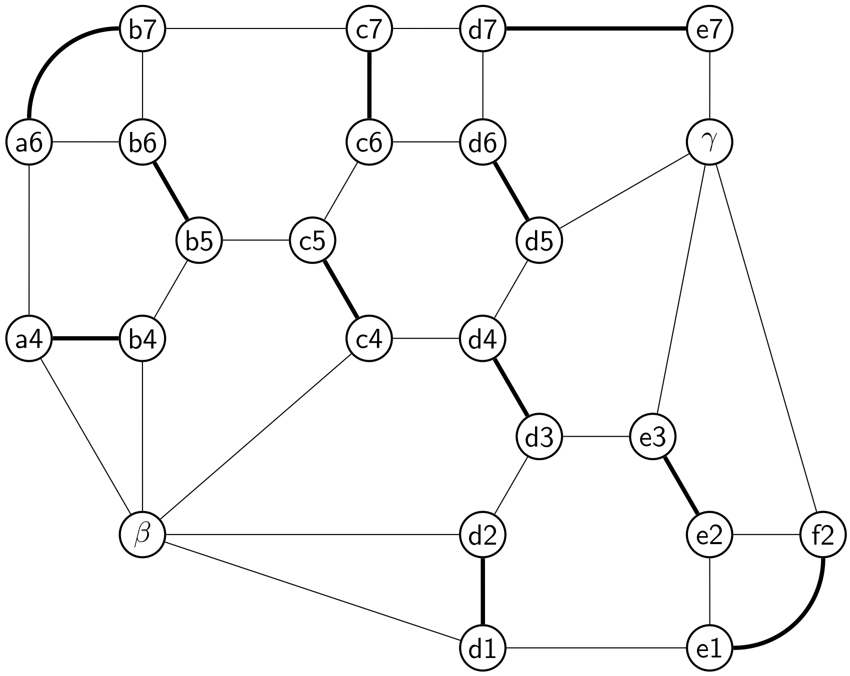
A blossom has been found. The blossom consists of vertices b2, b1, a2 and I shrink it to vertex α. This way, we obtain the following graph:



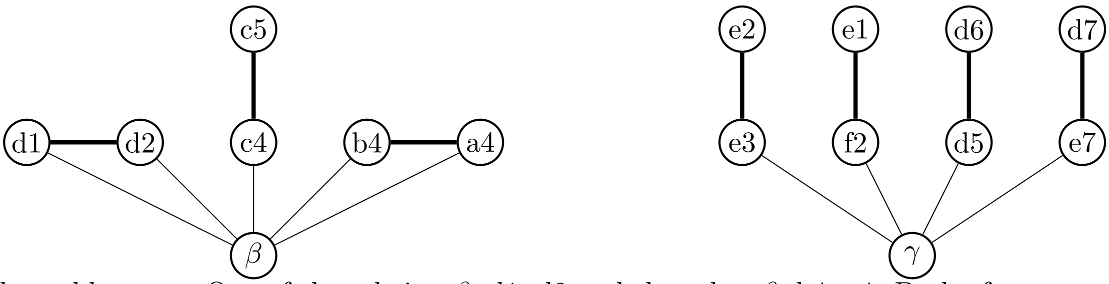
α and e6 are M-unsatured, so I start growing the two alternative trees again.



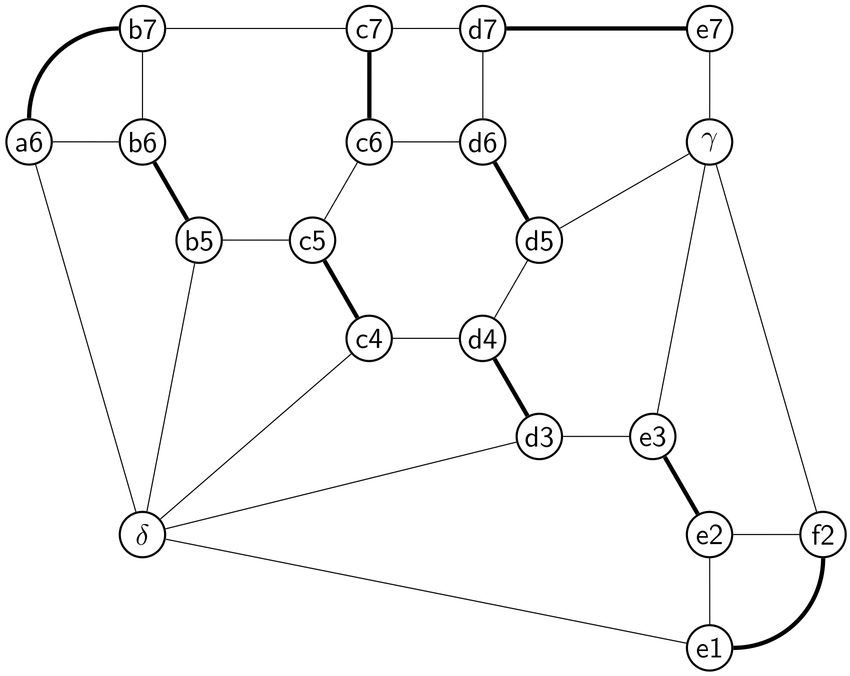
Another two blossoms have been found. One of them being containing α, b3, c3, c2, c1 I will shrink this to vertex β. The other blossom consists of e6, e5, e4, f6, f4 I will shrink this to vertex γ. The following graph is obtained:



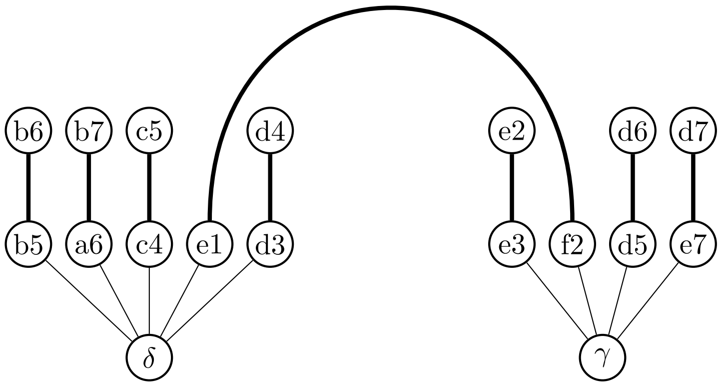
The two M-unsaturated vertices left are β and γ. Therefore, the following alternative trees are grown:



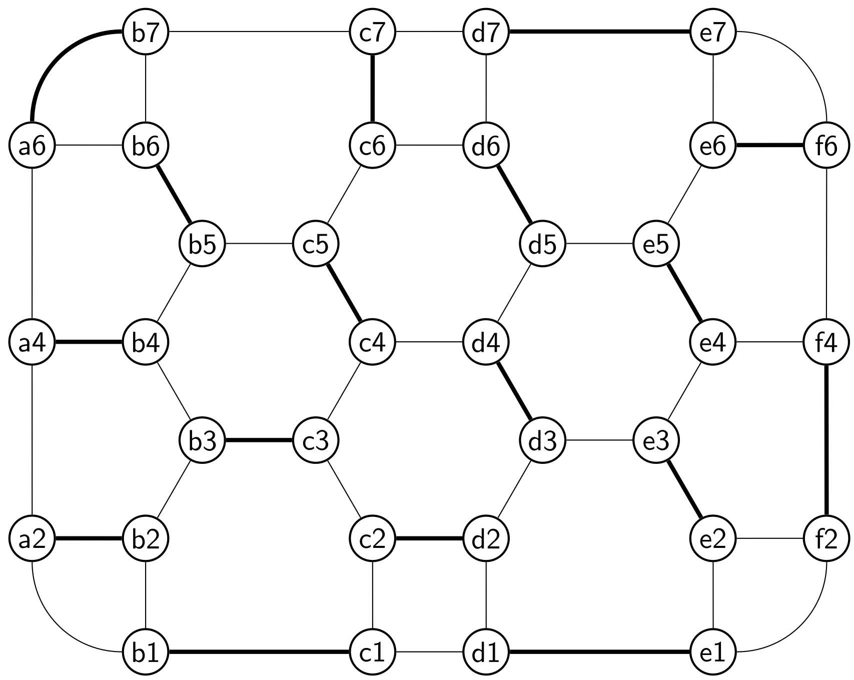
I have found two blossoms. One of them being β, d1, d2 and the other β, b4, a4. Both of these can be shrunk to a single vertex δ. The following graph is then produced:



The two M-unsaturated vertices are δ and γ so the two alternative trees are created:



An augmenting path has been found. The path being (δ, e1, f2, γ). This can be further simplified, by first going around the first blossom {β, d2, d1} and the second blossom {f4, f6, e6}, making the augmenting path (β, d2, d1, e1, f2, f4, f6, e6). There is another blossom to traverse, for which I have chosen the path {α, c1, c2} as it is the only alternative path do d2. This makes the path now (α, c1, c2, d2, d1, e1, f2, f4, f6, e6). Finally, traversing the last blossom {b2, a2, b1} as it is the only alternative path to c1. Making the final path (b2, a2, b1, c1, c2, d2, d1, e1, f2, f4, f6, e6).


b7
c7
d7
e7
a6
b6
c6
d6
e6
f6
b5
c5
d5
e5
a4
b4
c4
d4
e4
f4
b3
c3
d3
e3
a2
b2
c2
d2
e2
f2
b1
c1
d1
e1