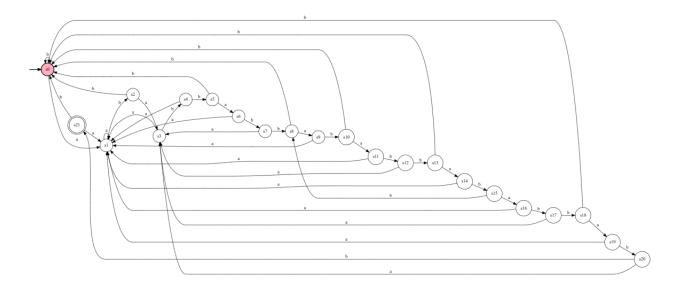
Assignment 9

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- 1. (a) Research one path in the residual network and update the max flow. The time complexity is O(V+E).
 - (b) Find the path containing the decreased edge, and check whether it is the minimum edge in that path. If it is true, then reduce the f in that path and update the max flow. The time complexity is O(V+E).



- 2. The picture is a little obscure.
- 3. (a) If P matches the position i in S, then there is a equation like below:

$$\sum_{j=0}^{k-1} (S[i+j] - P[j])^2 = 0$$

We reverse the P, and we will get another equation:

$$\sum_{j=0}^{m-1} (S[i+j] - P[m-j-1])^2 = 0$$

$$i+j+m-j-1 = i+m-1$$

In the above equation, every character minus * equals to 0.

So the problem turns into how to calculate the convolution of S and P, and the result F[i + m - 1] reflects the matching information of the position i between S and P.

We can use FFT to calculate it.

(b) The second problem is the same.