PS03-03

January 19, 2018

a. $\alpha = 1^*(01^*0)1^*$

b. $\beta = 0^*10^*(10^*1)0^*$

c. $\gamma = \alpha \cup \beta$

d. This took several steps for me.

   I wanted to continue with the same idea: initialize with either an odd or even number(α was even, β odd) and then provide infinite permutations which consisted of an even number of both ones and zeroes.

   $\delta = (00)^*(1 \cup 010)\big((00 \cup 11 \cup 1010 \cup 0101)^* \cup 1(00 \cup 11 \cup 1010 \cup 0101)^*1 \cup 0(00 \cup 11 \cup 1010 \cup 0101)^*0\big)$

   The first section $(00)^*\{1 \cup 010 \cup 1\}$ makes sure that the string starts with as many even 0s and one 1.

   The next section loops over all possibilities of combinations of 1s and 0s. It's split into three to take into account one final 0 or 1.