Formleg mál og reiknanleiki

Pétur

October 1, 2018

1.

a)

$A = \{0^{n+m}1^m | n \geq 0, m \geq 0\}$

- Assume A is regular only if pumping lemma holds for some p.
- Let $s = 0^p1^p$, so that $|s| = 2p > p$. According to pumping lemma, s can be split into 3 pieces, $s = xyz$, such that $xy^iz \epsilon A$ for all $i \geq 0$
- 3 cases
  1. y consist only of zeros: xy^2z has more zeros than ones and that is not in the language A.
  2. y consist solely on ones: xy^2z has more ones than zeros and that is not in the language A.
  3. y consist of "10": xy^2z has then "1010" witch is not in the language A.
- as all three cases lead to contradiction, the initial assumption, A being regular must be false.

b)

$B = \{0^n1^m0^n | n \geq 0, m \geq 0\}$

- Assume B is regular only if pumping lemma holds for some p.
- Let $s = 0^p10^p$, so that $|s| = 2p > p$. According to pumping lemma, s can be split into 3 pieces, $s = xyz$, such that $xy^iz \epsilon A$ for all $i \geq 0$
- 3 cases
  1. y consist only of zeros left hand side of the one: xy^iz has more zeros left hand side than right, witch is not in the language A.
  2. y consist only of zeros right hand side of the one: xy^iz has more zeros right hand side than left, witch is not in the language A.
  3.

c)

$C = \{www | w \epsilon \{0, 1\}*$