Discrete Structures

Lecture 3

* String Sequence: " ", ' ', ''' '''

- Letters, numbers and Special letters.
- No Commas.
- If we remove Commas from a Sequence, it becomes string.

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* Regular Expression *

- example: email → abcd@Domain.Com

* 5 Rules of regular expression:

1) Λ «empty string» is R.E.
2) if α, β are R.E. → $\alpha\beta$ is R.E.
3) if $x \in A$ → x is R.E.
4) if α, β are R.E. → α or β is R.E.
5) if α is R.E. → α^* is R.E.

* Note: α^* means repition of the string any number of times.

- example: $A = \{0,1\}$, $00^*(0 \vee 1)^*1$
  → 01 or 001 or 00111011 01

- example 2: $A = \{a,b\}$, $a(ab \vee ba)^*bb$, find 10 different expressions
  → abb or aabbb or ababb or aababbb or abababb or aabbabb or aababbabb or abaabbabb or abaabbabb or aabbababab b

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* Prove that: $a(ab^{\vee}ba)^{*}bb$ is R.E

1) Since $a \in A \longrightarrow a$ is R.E.
2) Since $b \in A \longrightarrow b$ is R.E.
3) from rule 3 : Since b is R.E $\Rightarrow$ bb is R.E.
4) from rule 3 : Since a, b are R.E $\Rightarrow$ ab is R.E, ba is R.E.
5) from rule 4 : Since ab, ba are R.E $\Rightarrow$ $ab^{\vee}ba$ is R.E.
6) from rule 5 ; Since $ab^{\vee}ba$ are R.E $\Rightarrow$ $(ab^{\vee}ba)^{*}$ is R.E.