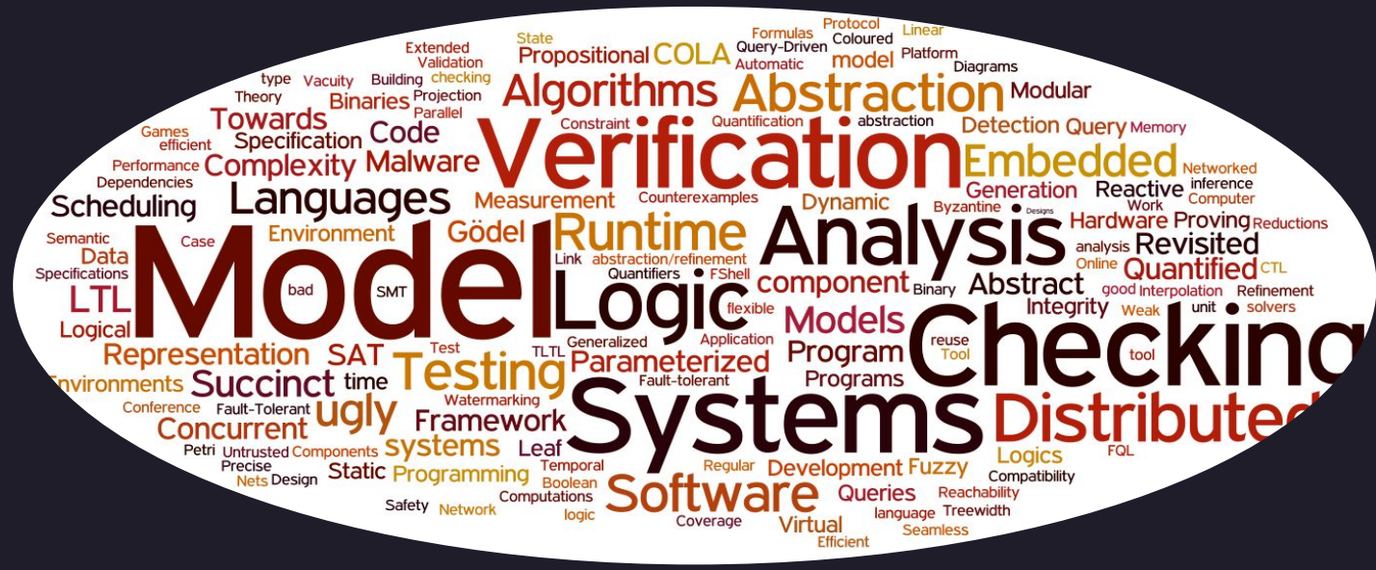
Tutorial 3 : ω-Regular Languages & NBA

CS60030 Formal Systems

PALLAB DASGUPTA,
FNAE, FASc,
A K Singh Distinguished Professor in AI,
Dept of Computer Science & Engineering
Indian Institute of Technology Kharagpur
Email: pallab@cse.iitkgp.ac.in
Web: http://cse.iitkgp.ac.in/~pallab



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FORMAL METHODS FOR SAFETY CRITICAL SYSTEMS

Equivalence of ω-Regular Languages

For each of the following pairs, determine if they are equivalent. If the two are found to be not equivalent provide a string to distinguish between the two languages:

1. $(E_1 + E_2).F^{\omega} \equiv E_1.F^{\omega} + E_2.F^{\omega}$

2. $E.(F_1 + F_2)^{\omega} \equiv E.F_1^{\omega} + E.F_2^{\omega}$

3. $E.(F.F^*)^{\omega} \equiv E.F^{\omega}$

4. $(E^*.F)^{\omega} \equiv E^*.F^{\omega}$

NBA

Construct NBA for the following properties/expressions

1. Between two neighboring A's there are odd no. of B's
2. Between two neighboring A's there are odd no. of B's and odd no. of C's
3. If A occurs, it occurs consecutively in multiples of three
4. $(A^*CA + BB)^*(A + CC)^{\omega}$

LTL to GNBA

Consider the LTL formulas over the set of atomic propositions AP = { p }. Construct an equivalent GNBA G (that is, $L_\omega(G) = Words(\phi)$) according to the algorithm discussed in the class.

- $\phi_1 = p\ U\ (Xp)$
- $\phi_1 = p\ U\ (Gp)$