CSE596 Q&A and Prelim II Review, Tue. 11/26, 2019

First, problem 5 on HW5:

HW 5.5: Given $G=(V,E)$ directed! and $s, t \in V$. $\xrightarrow{g}$ 2CNF ϕ s.t.

$\langle x, N \rangle \in A_{NFA} \Leftrightarrow$ N has a path from s to a final state t that processes x.

ϕ is satisfiable iff then is no path from s to t

$\phi_{s,t} = (s) \wedge (\bar{t}) \wedge \bigwedge_{(u,v) \in G} (\bar{u} \vee v)$

$\phi_G = \bigvee_{s,t \in V} \phi_{s,t}$

$u \xrightarrow{} v$

): $\bar{C}$ is an acc comp of M on input x

$\star I_1 \# I_2$ $\# I_t$

3SAT

(3b) $\phi = C_1 \wedge C_2 \wedge \cdots \wedge C_m$

$C_j = (\bar{x_i} \vee \bar{x_k} \vee x_\ell)$

Problems (1) and (3A) of the exam:

$A_{NFA} = \{ \langle x, N \rangle : N$ is an NFA and N accepts x $\}$

$\boxed{}$ Current state.

$\boxed{30}$ Current index of x — next bit to read

$\boxed{3}$ Scratch tape to help keep i up to date.

$s, t \in V$.

$\langle x, N \rangle \in A_{NFA} \Leftrightarrow$ N has a path from s to a final state t that processes x.

$\phi_{s,t} = (s) \wedge (\bar{t}) \wedge$

$\phi_G = \bigvee_{s,t \in V} \phi_{s,t}$

$M \xrightarrow{t}$ Verifier of computation by M

map is effective, so it reduces V_{ETM} to B.

V_m

V_m B-a DLBA

can k n ahead w

2-tape DFA

Runs in linear time ch.

fixed ↓

$L(V_m) = \langle M, x, \bar{C} \rangle : \bar{C}$ is an acc comp of M on input x

$\star I_0(x) \star I_1 \# I_2$ $\# I_t$

$B = \{ \langle v \rangle : V$ is a DLBA and $L(v) \neq \emptyset \}$

Problem (3B) of the exam:

④ ABET req'd

3SAT

(3b) $\Phi = C_1 \wedge C_2 \wedge -- \wedge C_m$

$C_j = (\bar{x}_i \vee \bar{x}_k \vee x_\ell)$

order so $i < k < \ell$

$B = \{\langle r_1 -- r_m \rangle : \exists a \in \{0,1\}^n : a \text{ violates each } r_j\}$

$\xrightarrow{f} f(\Phi) = R \qquad R = \langle r_1 -- r_m \rangle$

st there is an a that violates each r_j

$\Rightarrow$ the same a satisfies each C_j $\therefore \Phi$.

$r_j = \underbrace{(0 \pm 1) --- (0 \pm 1)}_{j-1 \text{ don't cares}} | (0 \pm 1) \cdot \sim (0 \pm 1) | (0 \pm 1) -- (0 \pm 1) 0$

$\underset{pos \; k-1}{} \qquad \underset{pos \; \ell-1}{} \qquad (0 \pm 1) \sim (0 \pm 1)$

pos n.

BENE since we can guess a