Assignment 1 Stormckey

Problem 1

Part 1:

Property
$$p := \varepsilon$$

$$\mid np$$

$$\mid sp$$
Numerical Property $np := = n$

$$\mid > n$$

$$\mid < n$$

$$\mid np \land np$$

$$\mid np \lor np$$

$$\mid (np)$$
String Property $sp := = s$

$$\mid sp \lor sp$$
Schema $\tau := \text{number}\langle np \rangle$

$$\mid \text{number}\langle \varepsilon \rangle$$

$$\mid \text{string}\langle sp \rangle$$

$$\mid \text{string}\langle \varepsilon \rangle$$

$$\mid \text{bool}$$

$$\mid [\tau^*]$$

$$\mid \{(s : \tau)^*\}$$

Part 2:

Problem 2

Part 1:

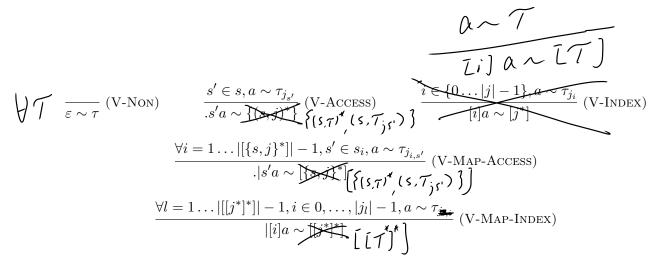
$$\frac{s' \in s}{(.s'a, \{(s, j)^*\}) \mapsto (a, j_{s'})} \text{ (E-ACCESS)} \qquad \frac{i \in \{0 \dots |j| - 1\}}{([i]a, [j^*]) \mapsto (a, j_i)} \text{ (E-INDEX)}$$

$$\frac{\forall i = 1 \dots |[\{s, j\}^*]| - 1, s' \in s_i}{(|.s'a, [\{s, j\}^*]) \mapsto [j_{i, s'}]} \text{ (E-MAP-ACCESS)}$$

$$\frac{\forall l = 1 \dots |[[j^*]^*]| - 1, i \in 0, \dots, |j_l| - 1}{(|[i]a, [[j^*]^*]) \mapsto [j_{l, i}^*]} \text{ (E-MAP-INDEX)}$$

$$\frac{\forall l = 1 \dots |[[j^*]^*]| - 1, i \in 0, \dots, |j_l| - 1}{(|[i]a, [[j^*]^*]) \mapsto [j_{l, i}^*]} \text{ (E-MAP-INDEX)}$$

Part 2:



Accessor safety: for all a, j, τ , if $a \sim \tau$ and $j \sim \tau$, then there exists a j' such that $(a, j) \stackrel{*}{\mapsto} \varepsilon, j'$.

Proof. Induction on the steps of derivation:

(1 step derivation)

trivial by case analysis of a.

(k step derivation, k > 1)

take 1 step like we did above then use the k-1 hypothesis.