

## Homework 5

1. Access control is about deciding whether a principal that issues a request should be trusted on this request. Explain how such decision problems can be solved by using logic.
2. The informal meaning of the formula  $P \text{ controls } F$  is ‘ $P$  is entitled to do  $F$ ’. Give a definition for this formula in terms of *says*.
3. Explain what is meant by a *derived* inference rule.
4. Give a justification for the derived rule

$$\frac{\Gamma \vdash P \text{ controls } F \quad \Gamma \vdash P \text{ says } F}{\Gamma \vdash F}$$

5. Give a justification for the derived rule

$$\frac{\Gamma \vdash P \mapsto Q \quad \Gamma \vdash P \text{ says } F}{\Gamma \vdash Q \text{ says } F}$$

6. Model formally the situation that a customer has bought a ticket and requests to see a movie. For this suppose three principals, *Ticket*, *Customer* and *Cinema*, and suppose an authorization

$$\text{Permitted}(\text{Customer}, \text{sees\_movie}).$$

Using access-control logic, give formulas for a *Customer*’s access request, an access-control policy of the *Cinema*, a trust assumption and a ticket rule.

7. Assume  $\Gamma$  is a set consisting of the three formulas:

$$\begin{aligned} &(\text{Admin says del\_file}) \Rightarrow \text{del\_file} \\ &\text{Admin says } ((\text{Alice says del\_file}) \Rightarrow \text{del\_file}) \\ &\text{Alice says del\_file} \end{aligned}$$

Give a proof of the judgement

$$\Gamma \vdash \text{del\_file}$$