

SADS 2022 Problem Sheet #10

Problem 10.1: *guessing passwords (hydra)*

(1+1+1 = 3 points)

Download the VirtualBox image linked to the course web page and run it. To run the image, you need VirtualBox and the VirtualBox Extension Pack. Within VirtualBox, you need to have the HostNetwork vboxnet0 enabled (if missing, goto File -> Host Network Manager... and click Create). If all goes well, you should be able to start the virtual machine and reach it at the IPv4 address 192.168.56.2.

Install the tool `hydra` and answer the following questions. Send us a transcript of your shell commands. (Hint: The `script` command can be used to produce a typescript of shell commands.)

- a) Alice loves flowers. Find the password of Alice on 192.168.56.2.
- b) Bob is lazy and he never uses passwords longer than his name. Find Bob's password on 192.168.56.2.
- c) Find the password of the root user on 192.168.56.2.

Problem 10.2: *authorization*

(3+1+1+1+1 = 7 points)

Persistent storage systems often classify operations into create (*c*), read (*r*), update (*u*), and delete (*d*) operations. For example, SQL uses `insert` statements to create table rows (*c*), `select` statements to retrieve data (*r*), `update` statements to modify table rows (*u*), and `delete` statements to delete table rows (*d*). Access control policies for persistent storage systems are often expressed generically in terms of these *crud* operations.

Alice, Bob, and Marvin are studying at the Smallville Espresso University (SEU). Trent is working in the registrar's office of the SEU. Victor is one of Alice's instructors and Peggy is both Bob's and Alice's instructor. Alice's transcript (T_A), Bob's transcript (T_B), and Marvin's transcript (T_M) are electronic documents recording all study results.

- a) Define a suitable access control matrix describing the access of Alice, Bob, Marvin, Trent, Victor, and Peggy have to the transcripts.
- b) What are the access control lists of the transcripts?
- c) What are the capability lists of the different persons?
- d) The university is growing the number of students. How can the access control model be extended to keep the capability lists of reasonable sizes?
- e) Explain the difference between discretionary and mandatory access control.