System Security
Constructor University
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Module: MCSSE-CYB-02
Date: 2026-03-13
Due: 2026-03-20

Problem Sheet #4

Problem 4.1: *Linux capabilities* (3+3+2+2 = 10 points)

a) Create a copy of the `/bin/sleep` program and make the copy setuid root. Set `CAP_SYS_NICE` capability as an effective and permitted capability on the copied executable. Show that the resulting file has the proper permissions and capabilities set. Provide a transcript of your shell commands.

b) What happens if the copy of `/bin/sleep` is executed? Which permissions does the process have? Provide a transcript explaining how you determined the answer.

c) Explore the file `security/commoncap.c` of the Linux kernel. In which structure does the kernel store the capabilities of tasks? What is the data type used to store a capability set?

d) What is the invariant of the ambient capability set?