

Homework #1

Due: January 24, 2023

Points: 100

Questions

1. (24 points) Suppose Alice has r and w rights over the file *book*. Alice wants to copy r rights to *book* to Bob.
 - (a) Assuming there is a copy right c , write a command to do this.
 - (b) Now assume the system supports a copy flag; for example, the right r with the copy flag would be written as rc . In this case, write a command to do the copy.
 - (c) In the previous part, what happens if the copy flag is *not* copied?
2. (16 points) Prove Lemma 3.1.
3. (15 points) Someone asks, “Since the Harrison-Ruzzo-Ullman result says that the security question is undecidable, why do we waste our time trying to figure out how secure the Linux operating system is?” Please give an answer justifying the analysis of the security of the Linux system (or any system, for that matter) in light of the HRU result.
4. (30 points) Lemma 3.1, used in the proof of Theorem 3.1, states: “Suppose two subjects s_1 and s_2 are created and the rights in $A[s_1, o_1]$ and $A[s_2, o_2]$ are tested. The same test for $A[s_1, o_1]$ and $A[s_1, o_2] = A[s_1, o_2] \cup A[s_2, o_2]$ will produce the same result.” Justify this statement. Would it be true if one could test for the absence of rights as well as for the presence of rights?
5. (15 points) In the SPM model, acyclic creates impose constraints on the types of created subjects but not on the types of created objects. Why not?