

**CS 6393/CS 4483 SPRING 2021 ASSIGNMENT 2 ON LECTURE UNIT 3  
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POSTED ON 3/22/21**

**RECOMMENDED SUBMISSION: BY 4/09/21 MIDNIGHT CENTRAL  
LAST DATE FOR SUBMISSION: BY 5/14/21 MIDNIGHT CENTRAL**

**DO NOT WAIT TILL LAST MINUTE TO PREPARE YOUR RESPONSE  
I WILL GRADE AND RETURN INDIVIDUAL SUBMISSIONS AS THEY COME IN**

**ASSIGNMENT 2 GUIDELINES**

- Your response must be formulated and written individually without discussion with anyone else.
- You can refer to any material but are not allowed to discuss with anyone, including but not limited to your classmates.
- Searching for relevant material on the internet is not recommended for this assignment, but is allowed.
- Please cite any external sources used in your response and identify any parts directly taken from such a source as a quotation.
  
- Discussion and mention of irrelevant issues will be penalized.
- Use of incorrect and sloppy English will be penalized.
- Poor presentation will be penalized.
- Response must be typed. Hand drawn figures are acceptable if appropriate but must be incorporated in pdf.
  
- Your response is due by the final date of May 14, 2021
- It is strongly recommended that you submit by the suggested date of April 9, 2021
- However, there is no penalty or extra credit as long as you submit by May 14, 2021
  
- Submit your response for Assignment 2 as a pdf file named <your last name>2.pdf
- Submit your response in an email according to the following template.
  - **To:** ravi.sandhu@utsa.edu
  - **Subject:** 6393 assignment 1 OR **Subject:** 4483 assignment 1
  - **Email body:** *Please include the following honor code statement*  
As per the UTSA honor code I attest that I have not taken any help from anyone, including but not limited to my classmates, in formulating and writing this response. Also, I have not given any help to anyone else in writing their response to this assignment. Finally, I attest I have cited all sources used in my response and identified as quotations any material taken directly from such sources.
  - **Email attachment:** *Include a pdf file named <your last name>1.pdf*
  
- For questions 1 and 2 there is a “correct” answer. References are not relevant.
- For question 3 there is no “correct” answer. I am looking for demonstration that you can think through the question and answer it coherently. I do not expect or encourage references for this response. I do not encourage searching on the internet to formulate your response.
- Guidance for length of your response is provided along with each question.
- The 3 questions have equal weightage.

### ASSIGNMENT 2 ON LECTURE UNIT 3

1. Represent the following Access Matrix by means of: (a) Access Control Lists, (b) Capability Lists, and (c) Relation of triples.  
*Guidance: No explanation is required. Take whatever space is required to show the solutions.*

	J	K	L
U	r w	w	r
V		r w	r
W		r	r w

2. Suppose there are 2 subjects (note: subjects, not users) A and B and 2 files F and G. There are 2 security labels TS and S, with information flow allowed from S to TS but not vice versa, that is,  $TS > S$ . The Bell-LaPadula rules, as discussed in Unit 3, are as follows:

Subject X can read File Y if and only if  $label(X) \geq label(Y)$

Subject X can write File Y if and only if  $label(X) \leq label(Y)$

For each Access Matrix given below determine if the TS and S security labels can be assigned to A, B, F and G so these rules give the identical result as in the respective Access Matrix. If it is possible give an assignment of security labels to A, B, F and G. If it is not possible explain why not.

*Guidance: If assignment is possible show the solution, no explanation is required. If assignment is not possible, explain why in a couple of sentences.*

	F	G
A	r w	r w
B	r w	r w

2(a)

	F	G
A	r w	r
B	w	r w

2(b)

	F	G
A	r w	
B		r w

2(c)

3. Consider the following system that uses Access Control Lists (ACLs) to represent the Access Matrix.

- i. There is a single operational right a (a for access)
- ii. There is a single administrative right own (own for owner).
- iii. If  $X:own \in ACL(Y)$  then subject X can enter or delete  $Z:a$  from  $ACL(Y)$  for any subject Z

As the security architect you are asked to discuss the advantages and disadvantages of the following 2 proposals for specifying the administration of the own right:

- I. If  $X:own \in ACL(Y)$  then subject X can **transfer ownership** of Y to any subject Z by entering  $Z:own$  in  $ACL(Y)$  but **with** deletion of  $X:own$  from  $ACL(Y)$ .
- II. If  $X:own \in ACL(Y)$  then subject X can **grant co-ownership** of Y to any subject Z by entering  $Z:own$  in  $ACL(Y)$  but **without** deletion of  $X:own$  from  $ACL(Y)$ .

*Guidance: Identify at least one advantage and one disadvantage of each proposal. I encourage you to formulate the answer on your own without consulting the literature. If you do base your answer on published sources, please cite the source and reference it in your answer. Suggested length is half a page in 11pt or 12pt font.*