

Assignment 2

Due :April 28, 2022, 11:59:59PM PST on Canvas

Remember, assignments should be done in groups of size 3

Question 1.

Consider the following five schedules marked 1 to 5. For each schedule, indicate whether it is final-state serializable and/or view serializable and/or conflict serializable. Give a brief explanation for each.

Schedule 1: $w_1(y)w_2(x)r_1(x)w_1(x)r_2(y)$

Schedule 2: $w_1(y)r_2(y)w_2(x)r_1(x)w_1(x)$

Schedule 3: $w_1(y)r_3(y)w_2(y)w_2(x)r_1(x)w_1(x)w_3(y)$

Schedule 4: $w_1(y)w_2(y)w_2(x)r_1(x)w_1(x)w_3(y)$

Schedule 5: $w_1(x)r_2(x)r_2(y)r_3(z)w_1(z)$

Question 2:

Consider the following five schedules marked 1 to 5. For each schedule S_i , indicate whether it is recoverable, ACA, and/or strict. Give a brief explanation for each.

Schedule 1: $r_1(x)w_2(x)r_2(y)w_1(y)c_1c_2$

Schedule 2: $w_1(x)r_2(x)w_2(y)r_1(y)c_1c_2$

Schedule 3: $w_1(x)r_2(x)r_2(y)a_1c_2$

Schedule 4: $r_1(x)w_2(x)w_2(y)w_1(y)c_2a_1$

Schedule 5: $w_1(x)w_2(x)r_3(x)c_2c_3a_1$

Question 3:

Which of the schedules below are 1-copy serializable. Explain why.

Schedule 1: $r_1(x_a)w_2(x_b)r_2(y_a)w_1(y_b)$

Schedule 2: $w_1(y_a)w_2(x_a)r_1(x_b)w_1(x_b)r_2(y_b)$

Schedule 3: $w_1(y_a)r_2(y_a)w_2(x_a)r_1(x_a)w_1(x_a)w_1(x_b)$

Question 4:

(reading assignment) Read the following 2 papers by Peter Bailis et. Al.,

1. [Quantifying Eventual Consistency with PBS](#)
2. [Coordination Avoidance in Database systems.](#)

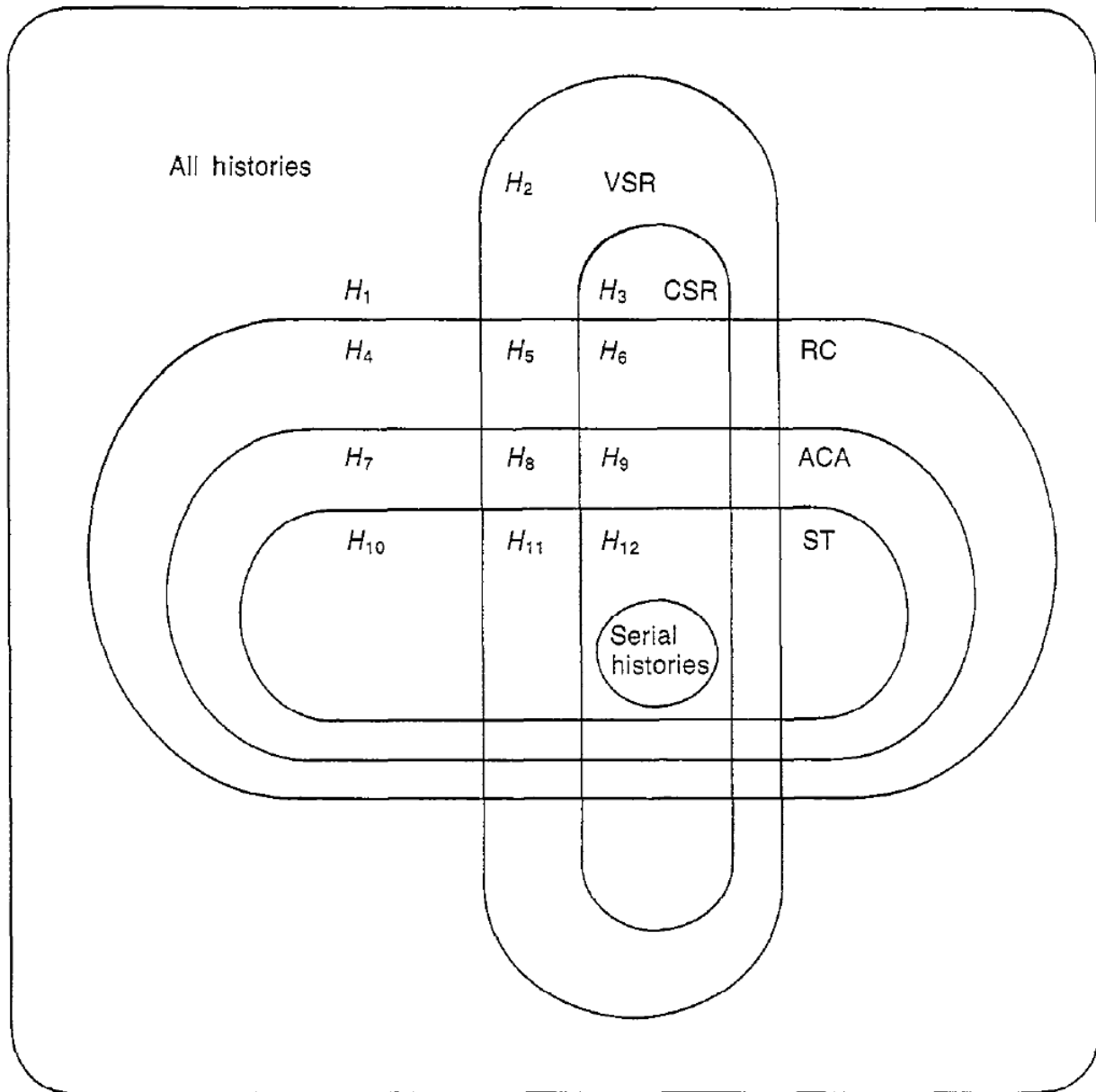
The first is a CACM article on eventual consistency, and the second is part of his dissertation on coordination avoidance.

Describe the main ideas of these papers using concrete examples to illustrate the main idea of the paper. For instance, for the coordination avoidance, explain the authors intuition in defining correctness beyond serializability. How do they define I-confluence and use it to overcome some of the challenges faced in supporting serializability. Please make your response short. The key is to demonstrate in a paragraph or so that you have read and understood the main idea of the paper.

Question 5:

Create and explain an example schedule that satisfies snapshot isolation, but does not satisfy CSR.

Question 6:



Prove that all regions in the diagram above represent non-empty sets by providing example histories H_1 - H_{12} .

ST - Strict

ACA - Avoids cascading abort

RC - Recoverable