

Before Starting Homework

- Do not upload to generative AI.
- Complete the Programming Assignment before beginning the written portion of the homework.
- Answer all questions below.
- **Type** answers and upload to Canvas in PDF format.

1 Question 1 : Journaling

Answer the following questions about journaling.

1. In your implementation of `write_to_journal`, the ordering of your writes is important (i.e. `txb`, `i`, `b`, `Db`, `txe`). Why is this ordering important and what could happen if this order was violated?
2. Why is the `txe` written last? What is the importance of the `txe` during future checkpointing steps?

2 Question 2: Checkpointing

Answer the following questions about checkpointing.

1. Explain how you verify that the journal is complete before copying the content to `data.txt`.
2. Assume your system crashes between writing `Db` and `txe`. What should happen on recovery, and why?