Northeastern University
CS5200 – DBMS
Spring 2025, Derbinsky

Homework 7

This assignment has two (2) problems (equally weighted). Notes:

- Submit to Canvas a **a single PDF** document, containing your responses to all the problems.
- You must typeset all responses – hand-drawn/written work will receive 0% credit.

Problem 1. Consider the following constraint: $X < Y$

For each of the following transactions, state whether or not they preserve the consistency of the database. If not, supply an example of initial values (that adhere to the constraint) and what they result in after the transaction completes (that violates the constraint).

a. $X = 5X; Y = 5Y$
b. $X = X - 10; Y = Y + X$

Problem 2. At the time of a system failure, let the following reflect the UNDO/REDO log on disk...

```
<T1, START>
<T1, X, 110, 8>
<T1, COMMIT>
<T2, START>
<T2, X, 8, 2>
<START CKPT(T2)>
<T2, Z, 120, 9>
<T3, START>
<T2, COMMIT>
<T3, X, 2, 6>
<END CKPT>
<T3, Z, 9, 30>
<T4, START>
<START CKPT(T3, T4)>
<T3, COMMIT>
<T4, Z, 30, 7>
```

What are the values of X and Z in the database at the end of recovery?