CSCE 5370 Assignment#3 Answers – Spring 2024

1. (12)
   1) ASG → site 3
   2) EMP → site 3
   3) Site 3 computes EMP *join* ASG *join* PROJ

2. (30)
   First, we reduce EMP by semijoin as follows
   1) Π_{ENO}(ASG) → site 1
   2) Site 1 computes EMP' = EMP *semi join with* ENO ASG

   Second, we reduce PROJ by semijoin :

   1) Π_{PNO} (ASG) → site 3

   2) Site 3 computes PROJ' = PROJ *semi join with* PNO ASG

   Third, we reduce ASG by semijoin

   1) Π_{ENO} (EMP) → site 2
   2) Π_{PNO} (PROJ) → site 2
   3) Site 2 computes ASG' = (ASG *semi join with* ENO EMP) *semi join with* PNO PROJ

   Finally, we send semijoined relations EMP' and PROJ' to site 2 which joins all semijoined relations.

   1) EMP' → site 2
   2) PROJ' → site 2
   3) Site 2 computes EMP' *join with* ENO ASG' *join with* PNO PROJ'

3. (15+1)
   1) ASG' = ASG *join* PROJ (q1) since it is smaller.
   2) site 2 is chosen as processing site and PROJ is sent to site 2 which computes q1.
   3) site 2 is chosen as processing site and each fragment of EMP (at sites 1 and 3) is sent to site 2 which then computes q2 (EMP join ASG')

4. (18+4=22)
   1)

W2(x);W1(x)	or	W1(x);W2(x)
W2(x);R3(x)	or	R3(x);W2(x)
W2(x);R1(x)	or	R1(x);W2(x);
W1(x);R3(x)	or	R3(x);W1(x)
W2(y);R3(y)	or	R3(y);W2(y)
R2(x);W1(x)	or	W1(x); R2(x)

   2) none of these histories are conflict-equivalent.

5. (20)
H1 is not serializable. H2 is not serializable. H3 is serializable. H4 is serializable.