Sheet8
Transaction Processing & Concurrency Control

1) Which of the following schedules is (conflict) serializable? For each serializable schedule, determine the equivalent serial schedules.
   a) $r_1(X); r_3(X); w_3(X); w_1(X); r_2(X)$
   b) $r_3(X); r_2(X); w_3(X); r_1(X); w_1(X)$
2) How many serial schedules exist for the three transactions in the Figure below? What are they? What is the total number of possible schedules?

Transaction T_1
read_item(X);
write_item(X);
read_item(Y);
write_item(Y);

Transaction T_2
read_item(Z);
read_item(Y);
write_item(Y);
read_item(X);
write_item(X);

Transaction T_3
read_item(Y);
read_item(Z);
write_item(Y);
write_item(Z);

3) Determine which of the following schedules are recoverable, which are cascadeless, and which are strict.
   a) S_1: $r_1(X); w_1(X); r_1(Y); w_1(Y); C_1 ; r_2(X); w_2(X); C_2 ;$
   b) S_3: $r_1(X); w_1(X); r_1(Y); w_1(Y); r_2(X); w_2(X); C_1 ; C_2 ;$
   c) S_4: $r_1(X); w_1(X); r_1(Y); w_1(Y); r_2(X); w_2(X); C_2 ; C_1 ;$
   d) S_7: $r_1(X); w_1(X); r_1(Y); r_2(X); w_1(Y); w_2(X); C_2 ; C_1 ;$
   e) S_8: $r_1(X); w_1(X); r_1(Y); r_2(X); w_2(X); w_1(Y); C_1 ; C_2 ;$
   f) S_9: $r_1(X); w_1(X); r_1(Y); r_2(X); w_2(X); w_1(Y); C_2 ; C_1 ;$
   g) S_{21}: $r_1(X); r_2(X); w_1(X); r_1(Y); w_1(Y); C_1 ; w_2(X); C_2 ;$
   h) S_{26}: $r_1(X); r_2(X); w_1(X); r_1(Y); w_2(X); C_2 ; w_1(Y); C_1 ;$
   i) S_{27} : $r_1(X); r_2(X); w_1(X); w_2(X); r_1(Y); w_1(Y); C_1 ; C_2 ;$
   j) S_{36} : $r_2(X); r_1(X); w_1(X); r_1(Y); w_1(Y); C_1 ; w_2(X); C_2 ;$
4) Prove that strict two-phase locking guarantees strict schedules.
5) No more questions are provided for concurrency control. It means that most exam questions on this part are review questions (اكتب مذكرات جغرافية عن - علل).

How to submit the homework assignments?

- Solve the sheet individually without looking up the solution on the Internet. The sheet is to practice; it is a learning tool not an exam.
- Assignments are to be **handwritten**.
- Papers are to be scanned (I like camscanner app). Put all images in a pdf file (camscanner does that for you)