



ΕΡΓΑΣΤΗΡΙΟ #8

ΜΕΡΟΣ Α': Recoverability and Serializability

1. Specify the type for each of the possible schedules of transactions T_1 and T_2 (*conflict-serializable, recoverable, avoids-cascading-aborts, strict*).

$T_1 : r_1(X); w_1(X); r_1(Y); w_1(Y); C_1 ;$

$T_2 : r_2(X); w_2(X); C_2 ;$

Answer:

Generally, with m given transactions with n_1, n_2, \dots, n_m , the number of possible schedules is: $(n_1 + n_2 + \dots + n_m)! / (n_1! * n_2! * \dots * n_m!)$, where $!$ is the factorial function. In our case, the $m = 2$ and $n_1 = 5$ and $n_2 = 3$, so the number of possible schedules is: $(5 + 3)! / (5! * 3!) = 8 * 7 * 6 * 5 * 4 * 3 * 2 * 1 / 5 * 4 * 3 * 2 * 1 * 3 * 2 * 1 = 56$

1.	$r_1(X)$	$w_1(X)$	$r_1(Y)$	$w_1(Y)$	C_1	$r_2(X)$	$w_2(X)$	C_2	strict	serializable
2.	$r_1(X)$	$w_1(X)$	$r_1(Y)$	$w_1(Y)$	$r_2(X)$	C_1	$w_2(X)$	C_2	recoverable	serializable
3.	$r_1(X)$	$w_1(X)$	$r_1(Y)$	$w_1(Y)$	$r_2(X)$	$w_2(X)$	C_1	C_2	recoverable	serializable
4.	$r_1(X)$	$w_1(X)$	$r_1(Y)$	$w_1(Y)$	$r_2(X)$	$w_2(X)$	C_2	C_1	non-recoverable	serializable
5.	$r_1(X)$	$w_1(X)$	$r_1(Y)$	$r_2(X)$	$w_1(Y)$	C_1	$w_2(X)$	C_2	recoverable-(ser)	serializable
6.	$r_1(X)$	$w_1(X)$	$r_1(Y)$	$r_2(X)$	$w_1(Y)$	$w_2(X)$	C_1	C_2	recoverable	serializable
7.	$r_1(X)$	$w_1(X)$	$r_1(Y)$	$r_2(X)$	$w_1(Y)$	$w_2(X)$	C_2	C_1	non-recoverable	serializable
8.	$r_1(X)$	$w_1(X)$	$r_1(Y)$	$r_2(X)$	$w_2(X)$	$w_1(Y)$	C_1	C_2	recoverable	serializable
9.	$r_1(X)$	$w_1(X)$	$r_1(Y)$	$r_2(X)$	$w_2(X)$	$w_1(Y)$	C_2	C_1	non-recoverable	serializable
10.	$r_1(X)$	$w_1(X)$	$r_1(Y)$	$r_2(X)$	$w_2(X)$	C_2	$w_1(Y)$	C_1	non-recoverable	serializable
11.	$r_1(X)$	$w_1(X)$	$r_2(X)$	$r_1(Y)$	$w_1(Y)$	C_1	$w_2(X)$	C_2	recoverable	serializable
12.	$r_1(X)$	$w_1(X)$	$r_2(X)$	$r_1(Y)$	$w_1(Y)$	$w_2(X)$	C_1	C_2	recoverable	serializable
13.	$r_1(X)$	$w_1(X)$	$r_2(X)$	$r_1(Y)$	$w_1(Y)$	$w_2(X)$	C_2	C_1	non-recoverable	serializable
14.	$r_1(X)$	$w_1(X)$	$r_2(X)$	$r_1(Y)$	$w_2(X)$	$w_1(Y)$	C_1	C_2	recoverable	serializable
15.	$r_1(X)$	$w_1(X)$	$r_2(X)$	$r_1(Y)$	$w_2(X)$	$w_1(Y)$	C_2	C_1	non-recoverable	serializable
16.	$r_1(X)$	$w_1(X)$	$r_2(X)$	$r_1(Y)$	$w_2(X)$	C_2	$w_1(Y)$	C_1	non-recoverable	serializable
17.	$r_1(X)$	$w_1(X)$	$r_2(X)$	$w_2(X)$	$r_1(Y)$	$w_1(Y)$	C_1	C_2	recoverable	serializable
18.	$r_1(X)$	$w_1(X)$	$r_2(X)$	$w_2(X)$	$r_1(Y)$	$w_1(Y)$	C_2	C_1	non-recoverable	serializable
19.	$r_1(X)$	$w_1(X)$	$r_2(X)$	$w_2(X)$	$r_1(Y)$	C_2	$w_1(Y)$	C_1	non-recoverable	serializable
20.	$r_1(X)$	$w_1(X)$	$r_2(X)$	$w_2(X)$	C_2	$r_1(Y)$	$w_1(Y)$	C_1	non-recoverable	serializable
21.	$r_1(X)$	$r_2(X)$	$w_1(X)$	$r_1(Y)$	$w_1(Y)$	C_1	$w_2(X)$	C_2	strict	not serializable
22.	$r_1(X)$	$r_2(X)$	$w_1(X)$	$r_1(Y)$	$w_1(Y)$	$w_2(X)$	C_1	C_2	cascadeless	not serializable
23.	$r_1(X)$	$r_2(X)$	$w_1(X)$	$r_1(Y)$	$w_1(Y)$	$w_2(X)$	C_2	C_1	cascadeless	not serializable
24.	$r_1(X)$	$r_2(X)$	$w_1(X)$	$r_1(Y)$	$w_2(X)$	$w_1(Y)$	C_1	C_2	cascadeless	not serializable

25.	r ₁ (X)	r ₂ (X)	w ₁ (X)	r ₁ (Y)	w ₂ (X)	w ₁ (Y)	C ₂	C ₁	cascadeless	not serializable
26.	r ₁ (X)	r ₂ (X)	w ₁ (X)	r ₁ (Y)	w ₂ (X)	C ₂	w ₁ (Y)	C ₁	cascadeless	not serializable
27.	r ₁ (X)	r ₂ (X)	w ₁ (X)	w ₂ (X)	r ₁ (Y)	w ₁ (Y)	C ₁	C ₂	cascadeless	not serializable
28.	r ₁ (X)	r ₂ (X)	w ₁ (X)	w ₂ (X)	r ₁ (Y)	w ₁ (Y)	C ₂	C ₁	cascadeless	not serializable
29.	r ₁ (X)	r ₂ (X)	w ₁ (X)	w ₂ (X)	r ₁ (Y)	C ₂	w ₁ (Y)	C ₁	cascadeless	not serializable
30.	r ₁ (X)	r ₂ (X)	w ₁ (X)	w ₂ (X)	C ₂	r ₁ (Y)	w ₁ (Y)	C ₁	cascadeless	not serializable
31.	r ₁ (X)	r ₂ (X)	w ₂ (X)	w ₁ (X)	r ₁ (Y)	w ₁ (Y)	C ₁	C ₂	cascadeless	not serializable
32.	r ₁ (X)	r ₂ (X)	w ₂ (X)	w ₁ (X)	r ₁ (Y)	w ₁ (Y)	C ₂	C ₁	cascadeless	not serializable
33.	r ₁ (X)	r ₂ (X)	w ₂ (X)	w ₁ (X)	r ₁ (Y)	C ₂	w ₁ (Y)	C ₁	cascadeless	not serializable
34.	r ₁ (X)	r ₂ (X)	w ₂ (X)	w ₁ (X)	C ₂	r ₁ (Y)	w ₁ (Y)	C ₁	cascadeless	not serializable
35.	r ₁ (X)	r ₂ (X)	w ₂ (X)	C ₂	w ₁ (X)	r ₁ (Y)	w ₁ (Y)	C ₁	strict	not serializable
36.	r ₂ (X)	r ₁ (X)	w ₁ (X)	r ₁ (Y)	w ₁ (Y)	C ₁	w ₂ (X)	C ₂	strict	not serializable
37.	r ₂ (X)	r ₁ (X)	w ₁ (X)	r ₁ (Y)	w ₁ (Y)	w ₂ (X)	C ₁	C ₂	cascadeless	not serializable
38.	r ₂ (X)	r ₁ (X)	w ₁ (X)	r ₁ (Y)	w ₁ (Y)	w ₂ (X)	C ₂	C ₁	cascadeless	not serializable
39.	r ₂ (X)	r ₁ (X)	w ₁ (X)	r ₁ (Y)	w ₂ (X)	w ₁ (Y)	C ₁	C ₂	cascadeless	not serializable
40.	r ₂ (X)	r ₁ (X)	w ₁ (X)	r ₁ (Y)	w ₂ (X)	w ₁ (Y)	C ₂	C ₁	cascadeless	not serializable
41.	r ₂ (X)	r ₁ (X)	w ₁ (X)	r ₁ (Y)	w ₂ (X)	C ₂	w ₁ (Y)	C ₁	cascadeless	not serializable
42.	r ₂ (X)	r ₁ (X)	w ₁ (X)	w ₂ (X)	r ₁ (Y)	w ₁ (Y)	C ₁	C ₂	cascadeless	not serializable
43.	r ₂ (X)	r ₁ (X)	w ₁ (X)	w ₂ (X)	r ₁ (Y)	w ₁ (Y)	C ₂	C ₁	cascadeless	not serializable
44.	r ₂ (X)	r ₁ (X)	w ₁ (X)	w ₂ (X)	r ₁ (Y)	C ₂	w ₁ (Y)	C ₁	cascadeless	not serializable
45.	r ₂ (X)	r ₁ (X)	w ₁ (X)	w ₂ (X)	C ₂	r ₁ (Y)	w ₁ (Y)	C ₁	cascadeless	not serializable
46.	r ₂ (X)	r ₁ (X)	w ₂ (X)	w ₁ (X)	r ₁ (Y)	w ₁ (Y)	C ₁	C ₂	cascadeless	not serializable
47.	r ₂ (X)	r ₁ (X)	w ₂ (X)	w ₁ (X)	r ₁ (Y)	w ₁ (Y)	C ₂	C ₁	cascadeless	not serializable
48.	r ₂ (X)	r ₁ (X)	w ₂ (X)	w ₁ (X)	r ₁ (Y)	C ₂	w ₁ (Y)	C ₁	cascadeless	not serializable
49.	r ₂ (X)	r ₁ (X)	w ₂ (X)	w ₁ (X)	C ₂	r ₁ (Y)	w ₁ (Y)	C ₁	cascadeless	not serializable
50.	r ₂ (X)	r ₁ (X)	w ₂ (X)	C ₂	w ₁ (X)	r ₁ (Y)	w ₁ (Y)	C ₁	strict	not serializable
51.	r ₂ (X)	w ₂ (X)	r ₁ (X)	w ₁ (X)	r ₁ (Y)	w ₁ (Y)	C ₁	C ₂	non-recoverable	serializable
52.	r ₂ (X)	w ₂ (X)	r ₁ (X)	w ₁ (X)	r ₁ (Y)	w ₁ (Y)	C ₂	C ₁	recoverable	serializable
53.	r ₂ (X)	w ₂ (X)	r ₁ (X)	w ₁ (X)	r ₁ (Y)	C ₂	w ₁ (Y)	C ₁	recoverable	serializable
54.	r ₂ (X)	w ₂ (X)	r ₁ (X)	w ₁ (X)	C ₂	r ₁ (Y)	w ₁ (Y)	C ₁	recoverable	serializable
55.	r ₂ (X)	w ₂ (X)	r ₁ (X)	C ₂	w ₁ (X)	r ₁ (Y)	w ₁ (Y)	C ₁	recoverable	serializable
56.	r ₂ (X)	w ₂ (X)	C ₂	r ₁ (X)	w ₁ (X)	r ₁ (Y)	w ₁ (Y)	C ₁	strict	serializable