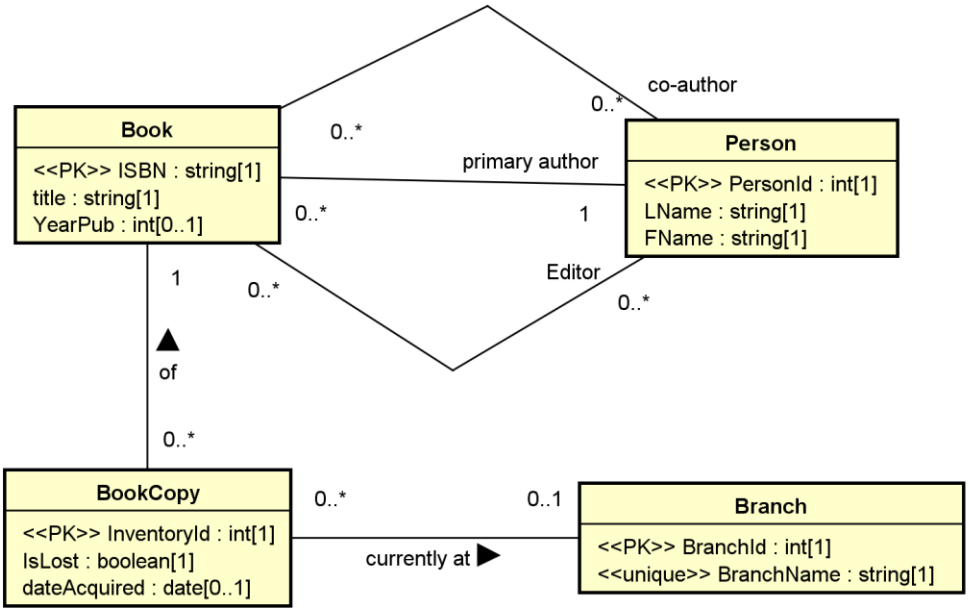
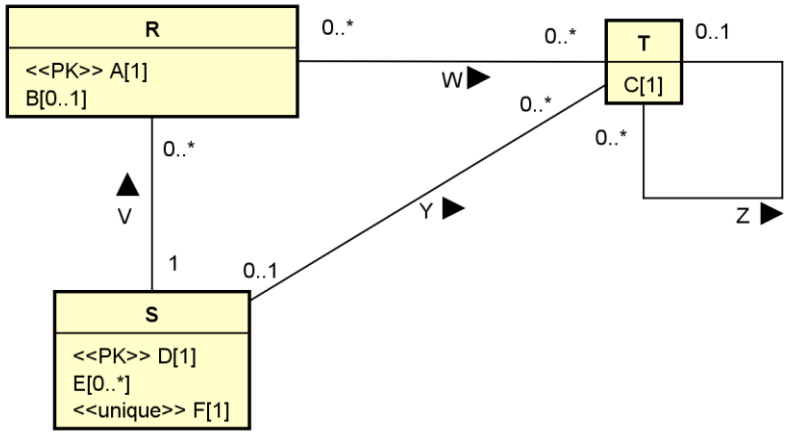
CSCI 4333 Design of Database Systems
Spring 2025
Suggested Solution to Section 1 Mid-Term Examination

(1) For example (types not needed):



(2) For:



Relation	R(A, B, D)	**Relation**	S(D, F)
[CK] (1) A [FK] (1) D references S(D) [Nullable] B [Non-nullable] A, D		[CK] (1) D, (2) F [FK] [Nullable] [Non-nullable] D, F [Note]	

[Note]			
Relation	T(T_Id, C, D, Z_T_Id)	**Relation**	W(W_Id, A, T_Id)
[CK] (1) T_Id [FK] (1) D references S(D), (2) Z_T_Id references T(T_Id) [Nullable] D, Z_T_Id [Non-nullable] T_Id, C [Note] (1) T_Id is created as the surrogate primary key.		[CK] (1) W_Id, (2) A, T_Id [FK] (1) A references R(A), (2) T_Id references T(T_Id) [Nullable] [Non-nullable] W_Id, A, T_Id [Note] (1) W_Id is created as the surrogate primary key.	
Relation	SE(SE_Id, D, E)	**Relation**	
[CK] (1) SE_Id, (2) D, E [FK] (1) D references S(D) [Nullable] [Non-nullable] SE_Id, D, E [Note] (1) SE_Id is created as the surrogate primary key.		[CK] [FK] [Nullable] [Non-nullable] [Note]	

(3)

(a)	F	(b)	T	(c)	T	(d)	T	(e)	T
(f)	F	(g)	T	(h)	T	(i)	T	(j)	F
(k)	T	(l)	F	(m)	F				

(4)

(a)

```
SELECT DISTINCT CONCAT(s.fname, ' ', s.lname) AS student,
   e.classId, e.grade
FROM student AS s INNER JOIN enroll AS e ON (s.stuId = e.stuId)
WHERE s.major = 'CSCI';
```

(b)

```
SELECT DISTINCT s.stuId, CONCAT(s.fname, ' ', s.lname) AS student
FROM student AS s INNER JOIN enroll AS e1 ON (s.stuId = e1.stuId)
        INNER JOIN enroll AS e2 ON (s.stuId = e2.stuId)
WHERE e1.grade = 'A'
AND e2.grade = 'B+';
```

(c)

```
SELECT DISTINCT s.stuId, CONCAT(s.fname, ' ', s.lname) AS `student enrolled in classes by Mary Tran`
FROM student AS s INNER JOIN enroll AS e ON (s.stuId = e.stuId)
```

```
        INNER JOIN class AS c ON (e.classId = c.classId)
        INNER JOIN faculty AS f ON (c.facId = f.facId)
WHERE f.fName = 'Mary' AND f.LName = 'Tran';
```