Due: In class **Wednesday March 31st**.   NO LATE ASSIGNMENTS ACCEPTED

Answer each of the following questions completely.   Make sure that your answers are neatly written and very readable.   Points will be deducted if your assignment is not presented in a neat format.   For example, don't turn it in on notebook paper torn out of a spiral notebook.

Problem #1 (10 points each)
   (a) Find a non-redundant cover for the set of functional dependencies F shown below.
   (b) If G = {A → BC, A → D, CD → E} is G equivalent to F?

   Let F = { A → BC, A → E, A → AB, A → D, CD → E}

Problem #2 (10 points)
   Given the relational scheme R = (A, D, E, M, T, X, Z) and the set of functional dependencies F, shown below, find $(XD)^+$. Is (XD) a key for R?

   Let F = {X → E, AT → Z, ME → T, AT → D, MT → A, XA → D, D → M}

Problem #3 (10 points)
   Given the set of functional dependencies F shown below, does (a) F logically imply AD → C, and (b) F logically imply AB → CE?

   Let F = { A → B, BD→ C, D → E, B → CA, C → E}

Problem #4 (60 points total - 5 points each)

   Given the relation instance r(R) shown below, determine which of the functional dependencies listed hold on r(R).

relation r(R)				
A	**B**	**C**	**D**	**E**
a	a	x	r	d
m	e	x	m	a
r	e	x	m	t
b	f	a	b	a
z	a	c	a	b
b	r	a	c	a
a	c	y	m	s
b	r	r	c	e

C → B
B → C
DE → A
CD→ B
B → CD
A → CE
CE → A
AB → D
DB→ A
DB→ AE
E → CA
ECA → B

Problem #5 (15 points)

Given the relational scheme R = (A,B,C,D,E,F,G,H), the set of functional dependencies X = {B → E, C → E, EF → G, G → ABH}, and the decomposition scheme Y = {(ABFG), (BC), (CDFH), (AEH)}, determine if Y has the lossless join property and preserves the dependencies.

Problem #6 (10 points)

Given the relation scheme R = (D, S, M, Q) and the set of functional dependencies F = {D → M, DS → Q}, determine if R is in 2NF? If so, simply state yes, if not, explain why it isn't.