Normalisation

1. FLIGHT-TIMETABLE

FLIGHT#	DEPART	ORIGIN		DESTINATION		ARRIVAL	PLANE TYPE	MAX SEATS
		AIRPORT	COUNTRY	AIRPORT	COUNTRY			
BA687	07:30	Heathrow	UK	Arlanda	Sweden	09:20	TriPlus	275
AF471	08:20	Orly	France	JFK	USA	11:20	XBus	420
SA572	10:15	Heathrow	UK	Arlanda	Sweden	12:05	707S	185
BA242	11:20	Heathrow	UK	Orly	France	12:00	TriPlus	275
PA109	12:10	Gatwick	UK	O'Hare	USA	15:20	XBus	420

(**a**) In which Normal Form is the above relation? Why?
(**b**) Identify functional dependencies and decompose the above relation to BCNF. Are any tables redundant?
(**c**) Devise the EAR diagram that corresponds to the set of BCNF-relations.

2. PROJECT_ASSESSMENT

PROJECT TITLE	STUDENT ID	STUDENT NAME	STUDY FIELD	SUBMIT DATE	SUPERVISOR			ASSESSOR			FINAL MARK
					ID	NAME	MARK	ID	NAME	MARK	
Opera DB	S1234567	Drake	Co Sc	4-01-05	L23	Smith	87	L65	Jones	72	82

(**a**) Identify functional dependencies implied by the following data semantics:
- The values of PROJECT-TITLE are not necessarily unique
- Students may undertake more than one project and may re-submit the same project in case of a failure; all submissions are registered.
- project T (SUPERVISOR.ID) = project T (ASSESSOR.ID)

(**b**) Decompose the above relation to BCNF and devise the EAR diagram that corresponds to these relations.

3. RESIDENCE

ST#	STNAME	FIIELD	HOME	HALL	LOCATION	ROOM#	RMTYPE	RATE	MEAL	CHARGE
951	Smith	COIF	London	Morrell	Headington	101	Double	45	HB	20
948	Jones	IFSG	Bristol	Morrell	Headington	101	Double	45	HB	20
971	Green	INCY	Epsom	LSCC	Wheatley	245	Single	55	FB	35

(**a**) Identify functional dependencies implied by the following data semantics:
• ST# identify the students; ROOM# are unique within a hall.
• Students may live in single, double or triple rooms but no student occupies more than one room.
• Room rates in a hall are different for different rooms but all students sharing a room pay the same amount.
• Halls may provide different type of accommodation - Half-Board (HB), Full-Board (FB), Self-Catering
  (SC); charges for the meals vary accordingly but are set independently by each hall.
(**b**) Decompose the above relation to BCNF and devise the EAR diagram that corresponds to these relations.
(**c**) Suppose that the regulations with respect to both room rates and meal charges are made uniform, i.e.
independent of individual hall pricing policies. What effect would that change have for functional
dependencies held in the above relation? Repeat BCNF-decomposition accordingly.