Homework: Normalization … SOLUTION

- Answer question (1) then convert the others into BCNF.
- Make sure that your decomposition is lossless.
- Make sure that you underline the key of every relation you produce.
- Answer ***all*** the questions although I may check only some of them for grading.

(1)

Determine the ***highest*** normal form (1NF, 2NF, 3NF, or BCNF) for each one of the following six relations. Notice that the primary key of each relation is underlined.)

	Relations	Answers
1	**Work (EmpNumber, ProjectNumber)**	**BCNF**
2	**Work (EmpNumber, ProjectNumber, ManagerSSN)** *Given that a project has one manager only.*	**2NF**
3	**Work (EmpNumber, ProjectNumber, HoursPerWeek)**	**BCNF**
4	**Work (EmpNumber, ProjectNumber, EmpName, Location)** *Given that a project is located in one location only.*	**2NF**
5	**Work (EmpNumber, ProjectNumber, Location)** *Given that a project is located in one location only.*	**1NF**
6	**Work (EmpNumber, ProjectNumber, Location)** *Given that a location has one project only.*	**3NF**

(2)

HouseSale (houseID, agentID, dateSold, commissionRate, interestRate)

Where:
dateSold → *interestRate*
agentID → *commissionRate*
houseID → *dateSold*

- What is the highest normal form that the above relation satisfies? ____**1NF**____
- Decomposition into BCNF:

Interest (dateSold, interestRate)
CommissionRates (agentID, commissionRate)
SaleDates (houseID, dateSold)
SoldBy (houseID, agentID)

(3)

Faculty (facultyNum, deptNum, officeNum, rank, dateHired, salary)

Where:
officeNum → *deptNum*
rank, dateHired → *salary*

- What is the highest normal form that the above relation satisfies? ____**2NF**____
- Decomposition into BCNF:

  Using Armstrong's pseudo-transitive axiom, rewrite as:

  Faculty (facultyNum, officeNum, deptNum, rank, dateHires, salary)

  Decomposition into BCNF:

  Offices (officeNum, deptNum)
  Faculty (facultyNum, officeNum, rank, dateHired)
  Hiring (rank, dateHired, salary)

(4)

Lots (propertyID, county, lotNum, area, price, taxRate)

Where:
county, lotNum → *propertyID, area, price, taxRate*
county → *taxRate*
area → *price*

- What is the highest normal form that the above relation satisfies? ____**INF**____

- Decomposition into BCNF:

  Taxes (county, taxRate)
  Prices (area, price)
  Lots (propertyID, county, lotNum, area)