Possible Answers of Assignment One

Please turn in this homework with hardcopy (in class) at the end of the class in November 8th, 2017 (Wednesday)

1. Suppose a manufacturing company stores the employee details in a table named **employee** that has 5 attributes: **emp_id** for storing employee's id, **emp_name** for storing employee's name, **emp_dept_no** for storing the department number in which the employee works, and e**mp_dept_name** for storing the department name in which the employee works. At some point of time the table looks like this:

emp_id	emp_name	emp_dept_no	emp_dept_name
101	Rick	D001	Research
102	Smith	D001	Research
103	Maggie	D890	Payroll
104	Glenn	D890	Payroll
105	Rabbit	D004	HR

Question: Does the above relation exist **insert anomaly**, **delete anomaly**, or **update anomaly**? Why?

2. Suppose a school wants to store the data of teachers and the subjects they teach. They create a table that looks like this: Since a teacher can teach more than one subjects, the table can have multiple rows for a same teacher.

teacher_id	subject	subject_no
111	Maths	1
111	Physicals	1
222	Biology	1
333	Physics	2
333	Chemistry	2

Key: (teacher_id, subject)
Non-key attribute: subject_no

Question: Does the above relation be in 2NF? (hint: identify functional dependencies first)

3. Suppose a company wants to store the complete address of each employee, they create a table named employee_details that looks like this:

emp_id	emp_name	emp_zip	emp_state	emp_city	emp_district
1001	John	282005	UP	Agra	Dayal Bagh
1002	Ajeet	222008	TN	Chennai	M-City
1006	Lora	282007	TN	Chennai	Urrapakkam
1101	Lilly	292008	UK	Pauri	Bhagwan
1201	Steve	222999	MP	Gwalior	Ratan

Primary key: (emp_id)
Non-key attribute: the remaining attributes except for emp_id

Question: Does the above relation be in 2NF? (**hint1**: identify functional dependencies first; **hint2**: using the conclusion appearing in slides directly)

4. Consider a disk with the following characteristics (these are not parameters of any particular disk unit): block size B = 512 bytes; interblock gap size G = 128 bytes; number of blocks per track = 20; number of tracks per surface = 400. A disk pack consists of 15 double-sided disks.

   1) What are the total capacity and the useful capacity of a cylinder?
   2) Calculate the average time it would take to transfer 20 random blocks, and compare this with the time it would take to transfer 20 consecutive blocks using double buffering to save seek time and rotational delay.

5. A PARTS file with Part# as the key field includes records with the following Part# values: 23, 65, 37, 60, 46, 92, 48, 71, 56, 59, 18, 21, 10, 74, 78, 15, 16, 20, 24, 28, 39, 43, 47, 50, 69, 75, 8, 49, 33, 38. Suppose that the search field values are inserted in the given order in a B+-tree of order p = 4 and pleaf = 3; show how the tree will expand and what the final tree will look like.