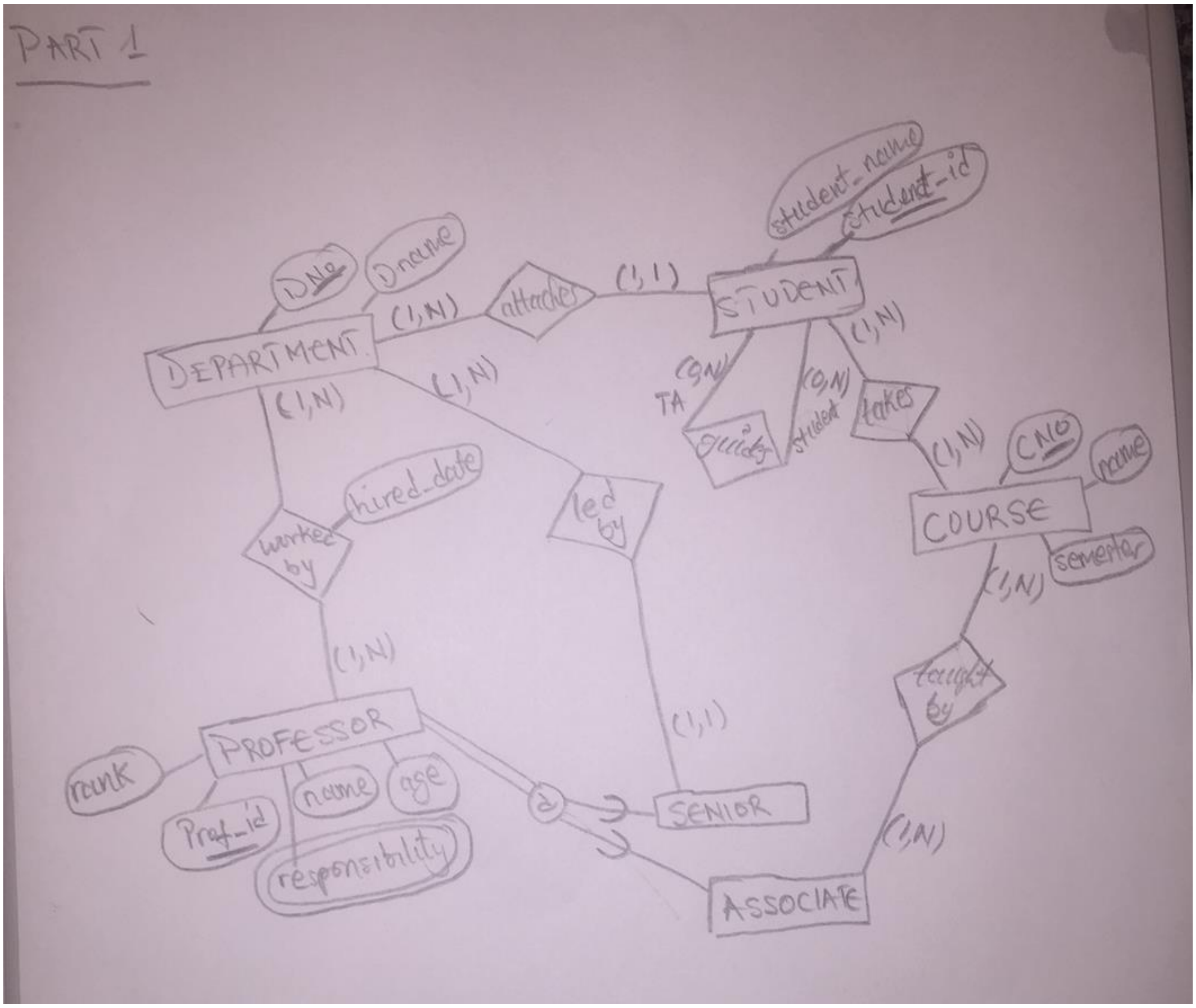
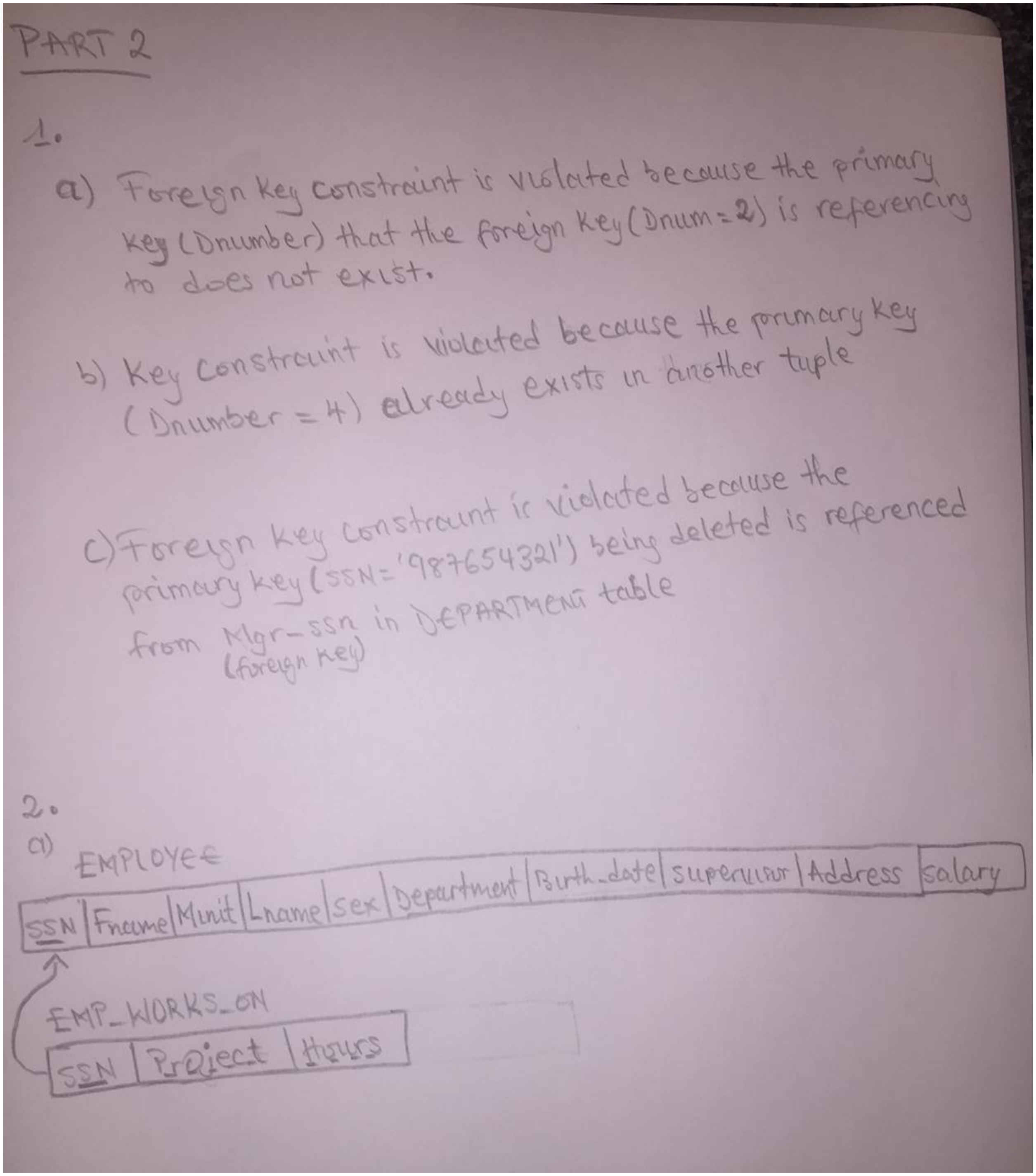
Rachid Bodson ID: 002211417

Part 1



Part 2



PART 2

1.

a) Foreign key constraint is violated because the primary key (Dnumber) that the foreign key (Dnum=2) is referencing to does not exist.

b) Key constraint is violated because the primary key (Dnumber = 4) already exists in another tuple

c) Foreign key constraint is violated because the primary key (SSN='987654321') being deleted is referenced from Mgr-ssn in DEPARTMENT table
(foreign key)

2.

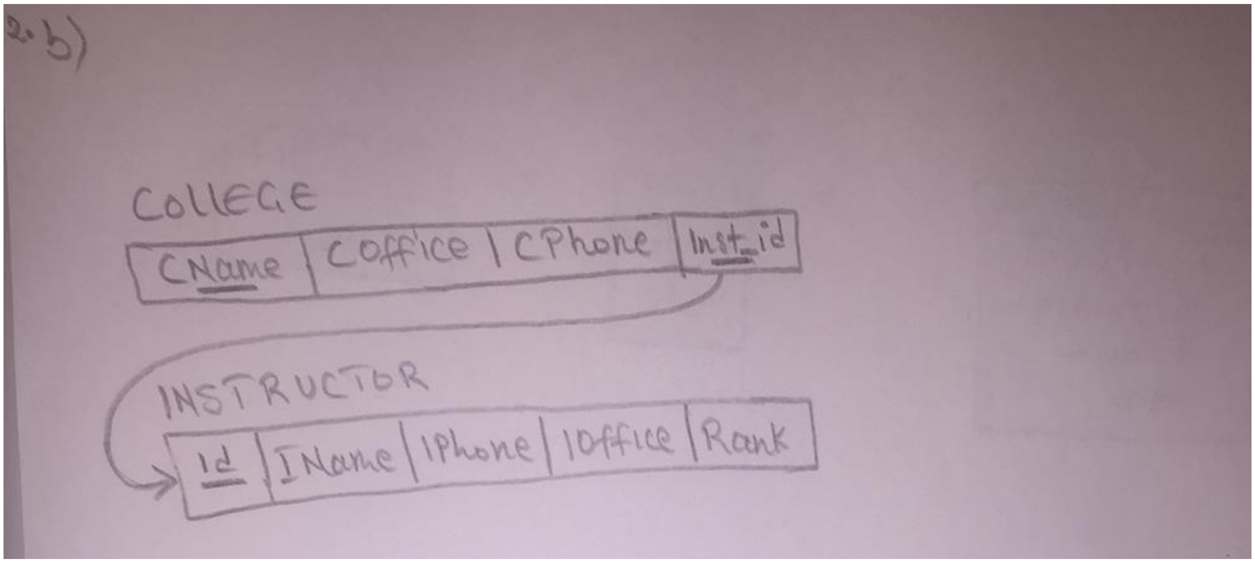
a)

EMPLOYEE

SSN	Fname	Minit	Lname	sex	Department	Birth_date	supervisor	Address	salary

EMP_WORKS_ON

SSN	Project	Hours



2. b)

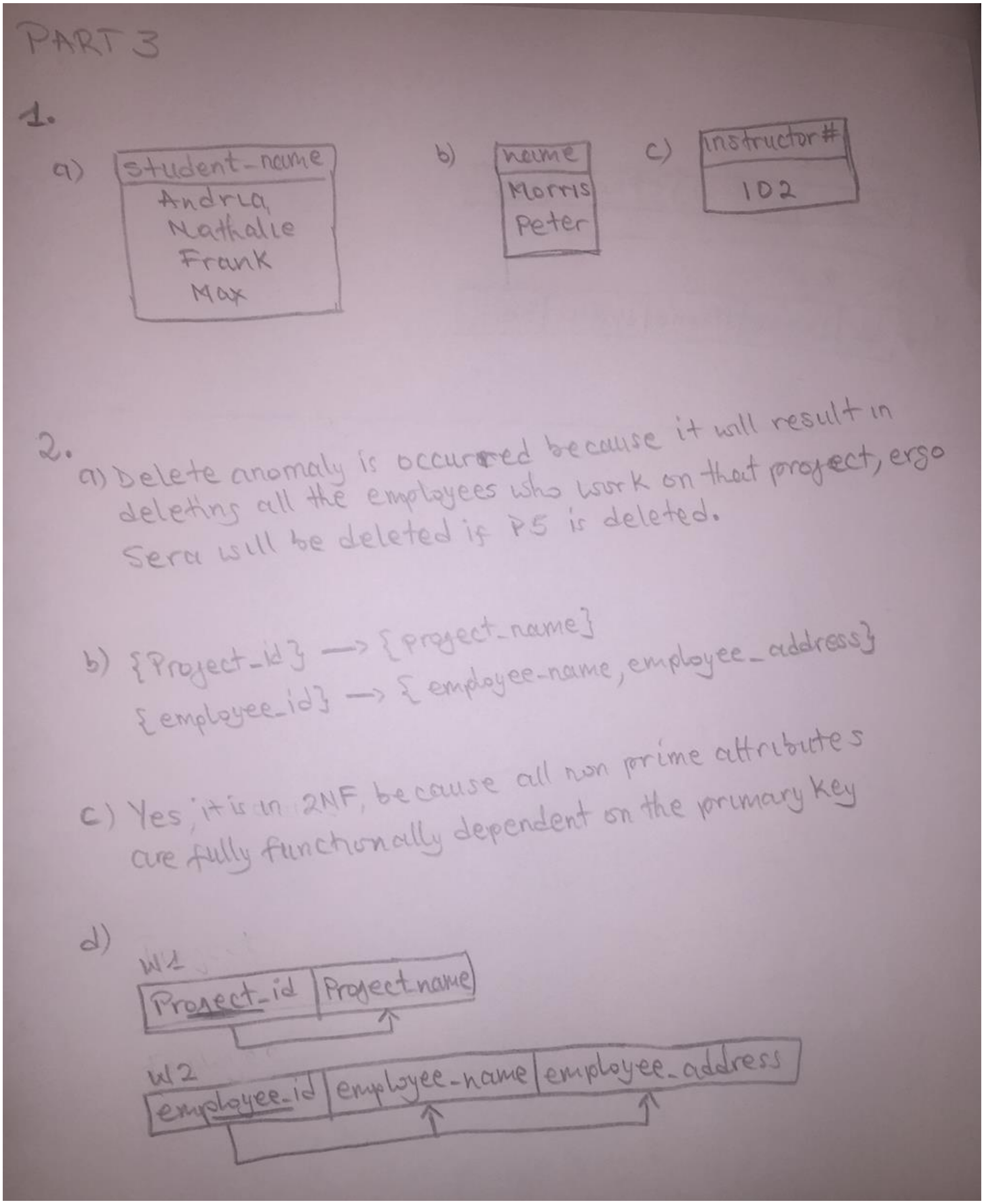
COLLEGE

CName	COffice	CPhone	Inst_id

INSTRUCTOR

Id	IName	IPhone	IOffice	Rank

Part 3



PART 3

1.

a)

student_name
Andria
Nathalie
Frank
Max

b)

name
Morris
Peter

c)

instructor#
102

2.

a) Delete anomaly is occurred because it will result in deleting all the employees who work on that project, ergo Sera will be deleted if P5 is deleted.

b) {Project_id} —> {project_name}
{employee_id} —> {employee-name, employee_address}

c) Yes, it is in 2NF, because all non prime attributes are fully functionally dependent on the primary key

d)

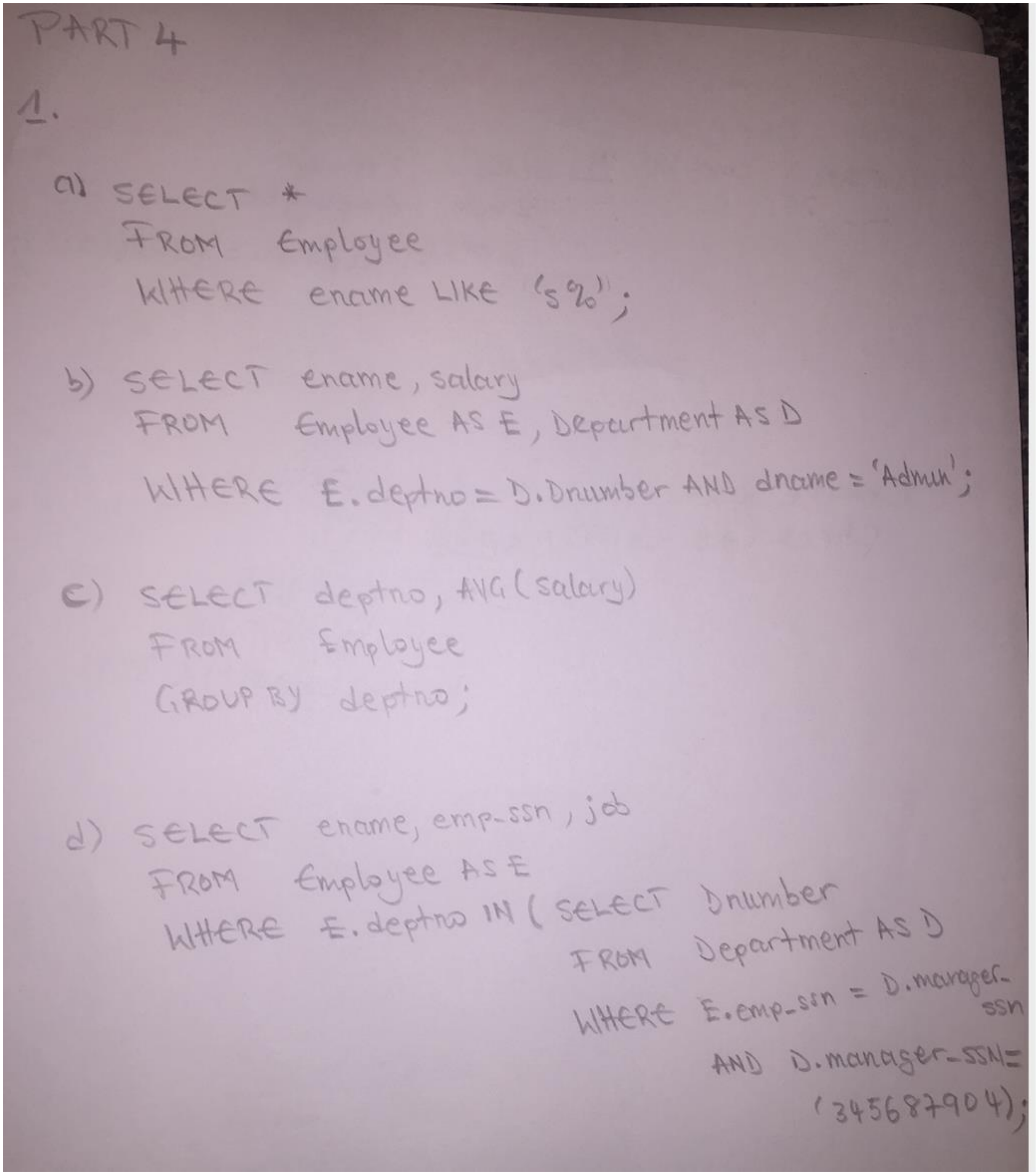
W1

Project_id	Project name

W2

employee_id	employee-name	employee_address

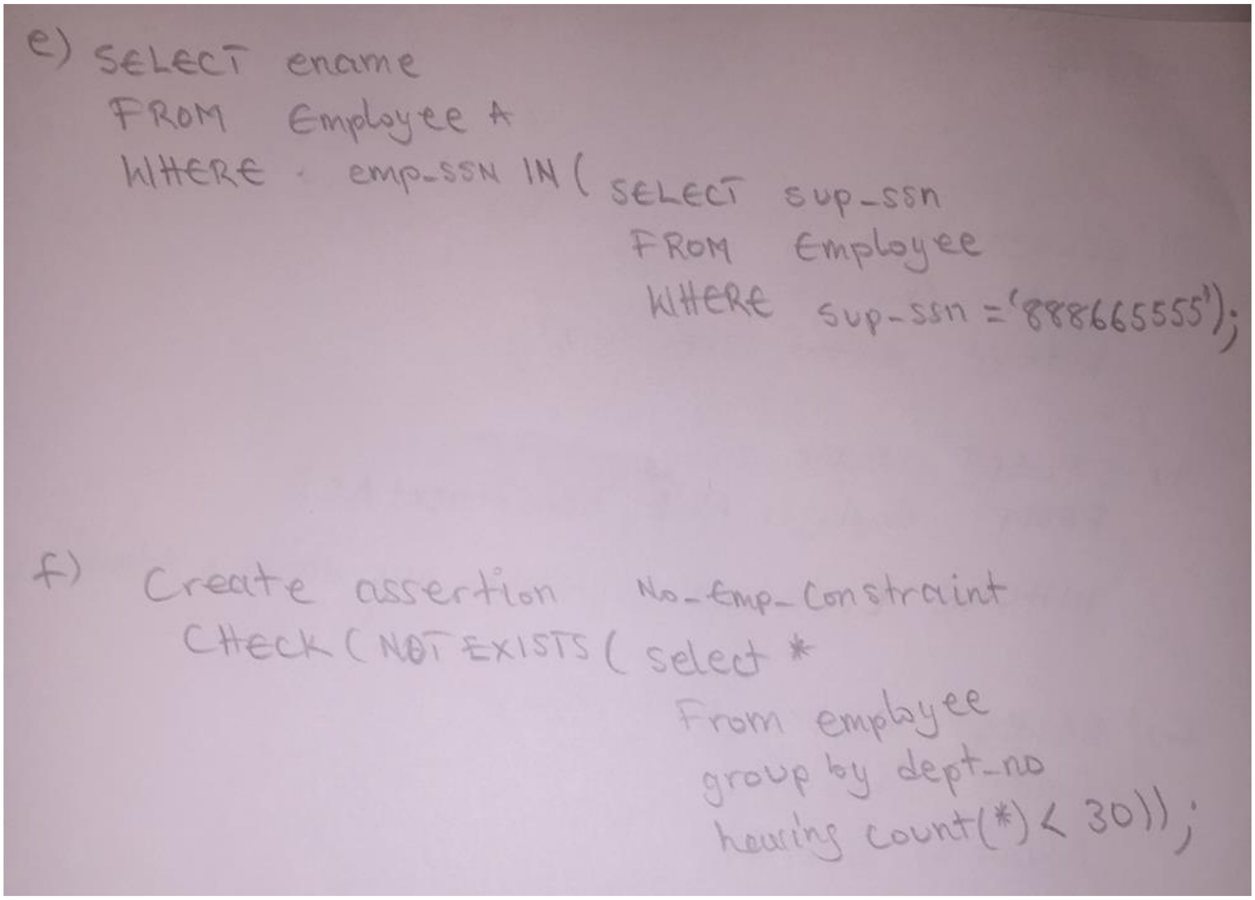
Part 4



PART 4

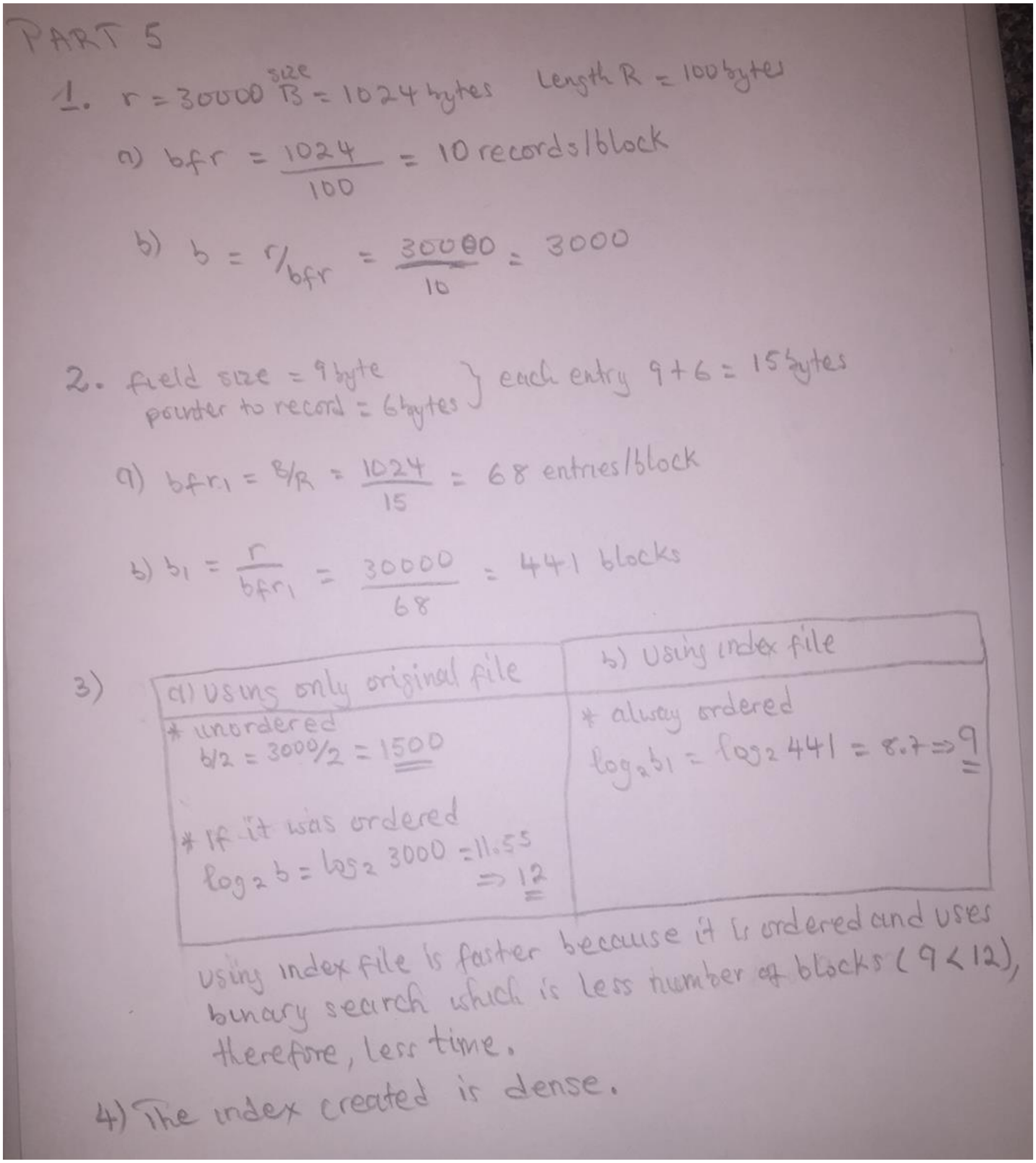
1.

```
a) SELECT *
   FROM   Employee
   WHERE  ename LIKE ('S%');

b) SELECT  ename, salary
   FROM    Employee AS E, Department AS D
   WHERE   E.deptno = D.Dnumber AND dname = 'Admin';

c) SELECT  deptno, AVG(salary)
   FROM    Employee
   GROUP BY deptno;

d) SELECT  ename, emp_ssn, job
   FROM    Employee AS E
   WHERE   E.deptno IN ( SELECT Dnumber
                         FROM   Department AS D
                         WHERE  E.emp_ssn = D.manager_
                                                  ssn
                               AND D.manager_SSN=
                                   ('345687904);
```



```
e) SELECT ename
   FROM Employee A
   WHERE  emp-SSN IN ( SELECT sup-ssn
                       FROM Employee
                       WHERE sup-ssn ='888665555');


f) Create assertion No_Emp_Constraint
   CHECK ( NOT EXISTS ( select *
                        From employee
                        group by dept_no
                        having count(*) < 30));
```

Part 5



PART 5

1. $r = 30000$ $\overset{size}{B} = 1024$ bytes   Length $R = 100$ bytes

a) $bfr = \frac{1024}{100} = 10$ records/block

b) $b = r/_{bfr} = \frac{30000}{10} = 3000$

2. field size = 9 byte
pointer to record = 6 bytes } each entry 9 + 6 = 15 bytes

a) $bfr_1 = B/R = \frac{1024}{15} = 68$ entries/block

b) $b_1 = \frac{r}{bfr_1} = \frac{30000}{68} = 441$ blocks

3)

a) using only original file	b) Using index file
* unordered $b/2 = 3000/2 = \underline{\underline{1500}}$ * If it was ordered $\log_2 b = \log_2 3000 = 11.55 \Rightarrow \underline{\underline{12}}$	* alway ordered $\log_2 b_1 = \log_2 441 = 8.7 \Rightarrow \underline{\underline{9}}$

Using index file is faster because it is ordered and uses binary search which is less number of blocks (9 < 12), therefore, less time.

4) The index created is dense.