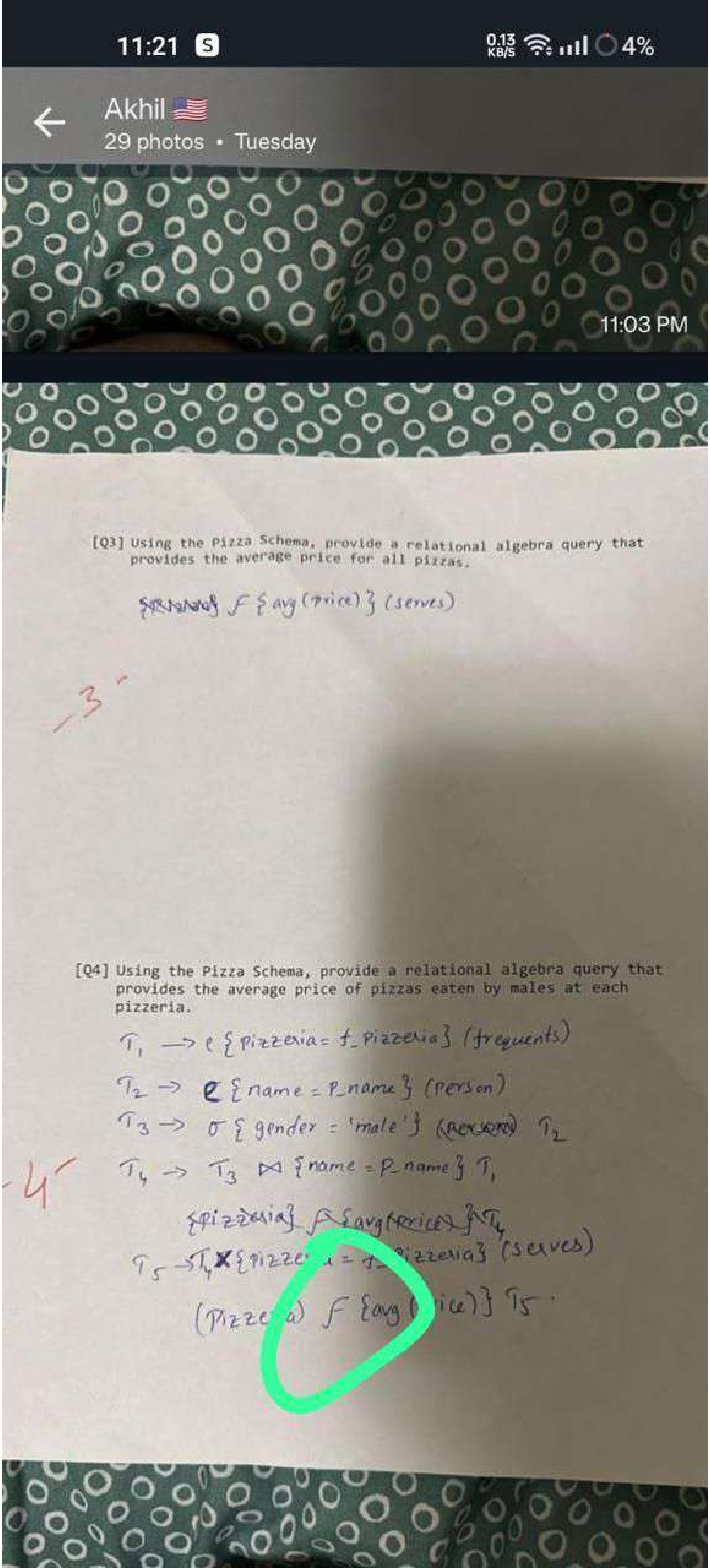


[Q3] Using the Pizza Schema, provide a relational algebra query that provides the average price for all pizzas.

$\mathcal{F}\{avg(price)\}$ (serves)

-3

[Q4] Using the Pizza Schema, provide a relational algebra query that provides the average price of pizzas eaten by males at each pizzeria.

$T_1 \rightarrow \rho\{pizzeria = f\_pizzeria\}$ (frequents)

$T_2 \rightarrow \rho\{name = p\_name\}$ (person)

$T_3 \rightarrow \sigma\{gender = 'male'\}$ T_2

-4 $T_4 \rightarrow T_3 \bowtie \{name = p\_name\}$ T_1

$\{pizzeria\}$ $\mathcal{F}\{avg($~~price~~$)\}$ T_4

$T_5 \rightarrow T_4 \times \{pizzeria = f\_pizzeria\}$ (serves)

$(pizzeria)$ $\mathcal{F}\{avg(price)\}$ T_5.

[Q3] Using the Pizza Schema, provide a relational algebra query that provides the average price for all pizzas.

$\mathcal{F}\{avg(price)\}(serves)$

-3

[Q4] Using the Pizza Schema, provide a relational algebra query that provides the average price of pizzas eaten by males at each pizzeria.

$T_1 \rightarrow \rho\{pizzeria = f\_pizzeria\}(frequents)$

$T_2 \rightarrow \rho\{name = p\_name\}(person)$

$T_3 \rightarrow \sigma\{gender = \text{'male'}\}\ T_2$

-4

$T_4 \rightarrow T_3 \bowtie \{name = p\_name\}\ T_1$

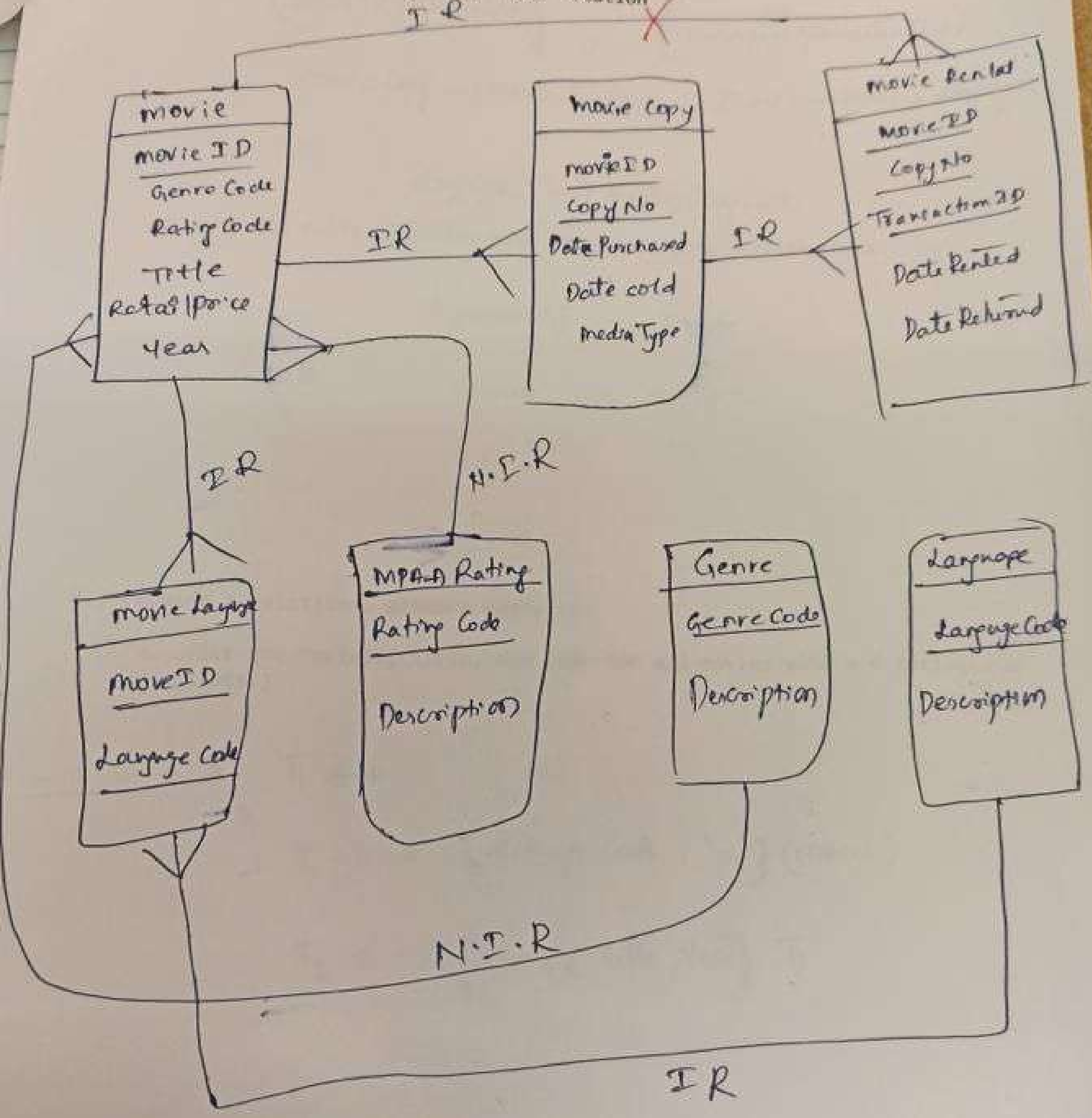
~~{pizzeria} $\mathcal{F}$ {avg(price)} T_4~~

$T_5 \rightarrow T_4 \bowtie \{pizzeria = f\_pizzeria\}(serves)$

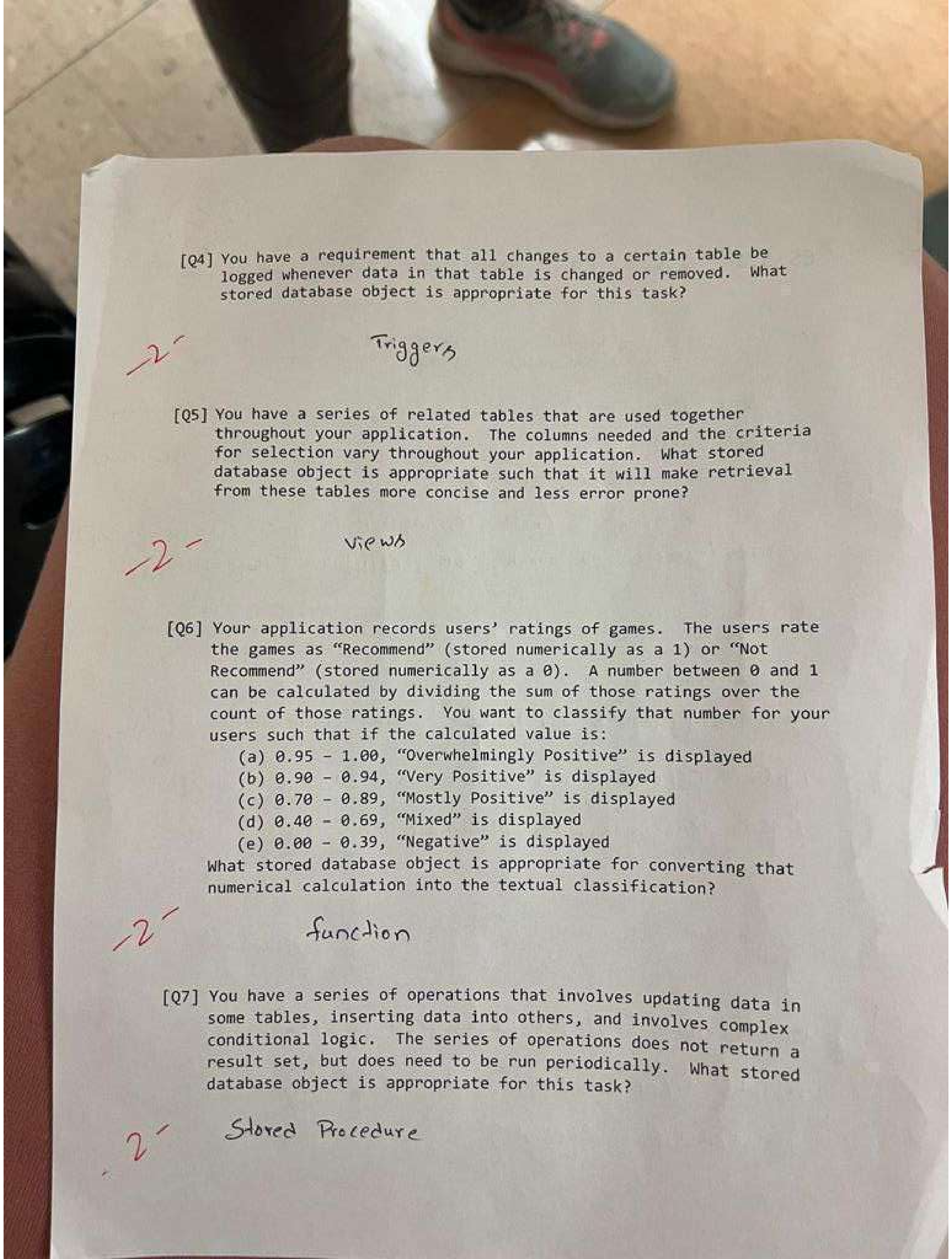
$(Pizzeria)\ \mathcal{F}\{avg(price)\}\ T_5$

6.) Entity-Relationship Model (19 pts.)

a. Draw the ERD using crows' feet notation



19



[Q4] You have a requirement that all changes to a certain table be logged whenever data in that table is changed or removed. What stored database object is appropriate for this task?

-2'   Triggers

[Q5] You have a series of related tables that are used together throughout your application. The columns needed and the criteria for selection vary throughout your application. What stored database object is appropriate such that it will make retrieval from these tables more concise and less error prone?

-2 -   views

[Q6] Your application records users' ratings of games. The users rate the games as "Recommend" (stored numerically as a 1) or "Not Recommend" (stored numerically as a 0). A number between 0 and 1 can be calculated by dividing the sum of those ratings over the count of those ratings. You want to classify that number for your users such that if the calculated value is:

(a) 0.95 - 1.00, "Overwhelmingly Positive" is displayed
(b) 0.90 - 0.94, "Very Positive" is displayed
(c) 0.70 - 0.89, "Mostly Positive" is displayed
(d) 0.40 - 0.69, "Mixed" is displayed
(e) 0.00 - 0.39, "Negative" is displayed

What stored database object is appropriate for converting that numerical calculation into the textual classification?

-2'   function

[Q7] You have a series of operations that involves updating data in some tables, inserting data into others, and involves complex conditional logic. The series of operations does not return a result set, but does need to be run periodically. What stored database object is appropriate for this task?

2'   Stored Procedure

5.) Keys (14 pts / 1 pt. each)

a. Matching:

A. A key derived from attributes actually naturally existent on the entity.
B. A key made up of a single attribute.
C. A type of uniqueness constraint that there can be more than one of on a table.
D. A constraint enforced between two tables.
E. A synonym for superkey that tends to be used more often than superkey in practice.
F. A superkey for which the removal of any attribute would render the key no longer unique.
G. A type of uniqueness constraint that there can be only one of on a table.
H. A key made up of more than one attribute.
I. A made-up key; not related to the entity in a natural sense.
J. A set of attributes for which it is true that no two distinct tuples have the same values for the attributes in the relation.
K. A key made up of all of the attributes in the relation.

D Foreign Key

I Surrogate Key

B Simple Key

E Candidate Key

H Compound Key

J Superkey

C Unique Key

A Natural Key

F Minimal Superkey

K Trivial Superkey

G Primary Key

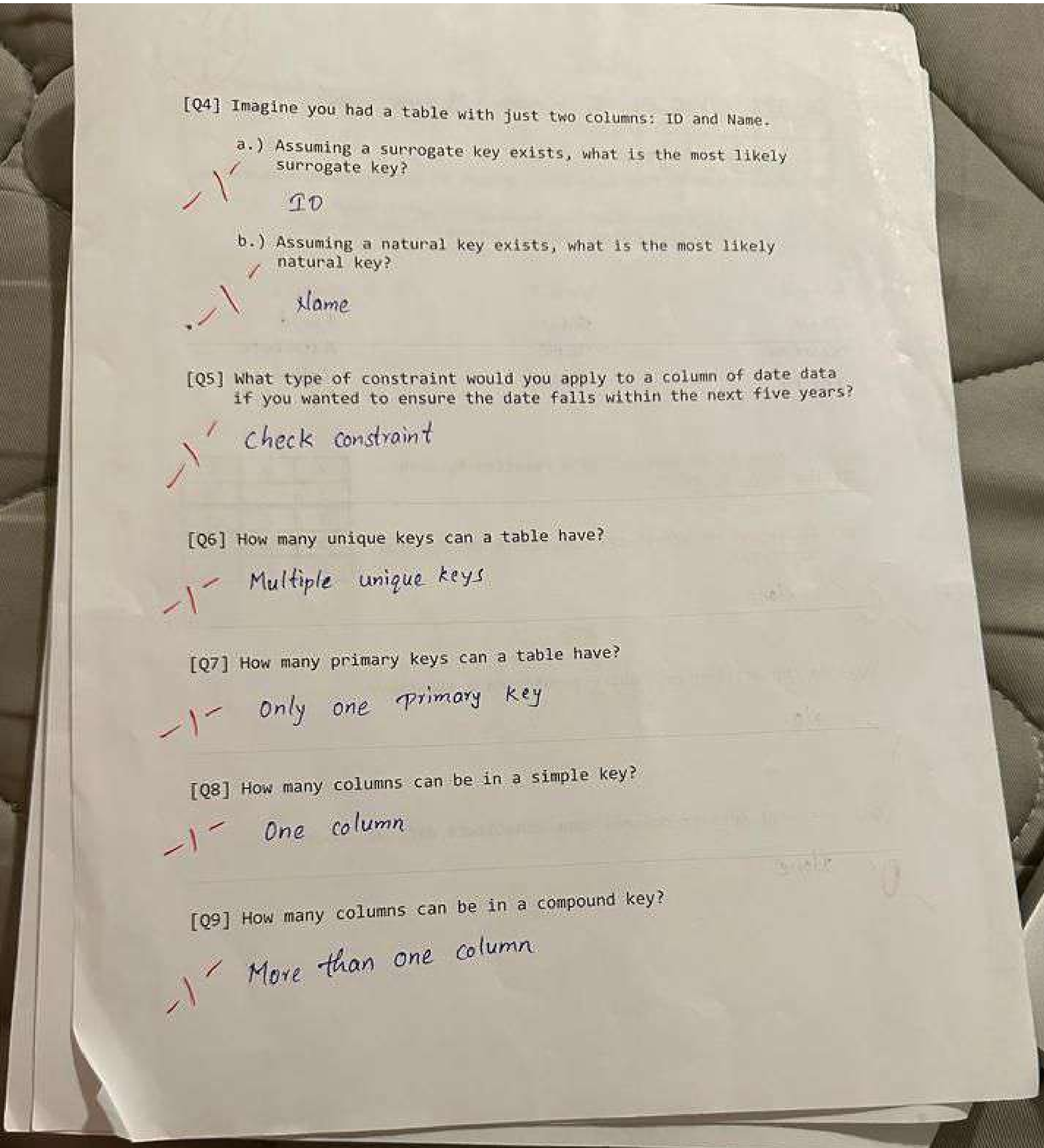
b. (True or False) A primary key can contain nullable attributes.

False

c. (True or False) A natural key is often an auto-incrementing integer.

False

16



[Q4] Imagine you had a table with just two columns: ID and Name.

a.) Assuming a surrogate key exists, what is the most likely surrogate key?

✓ ID

b.) Assuming a natural key exists, what is the most likely natural key?

✓ Name

[Q5] What type of constraint would you apply to a column of date data if you wanted to ensure the date falls within the next five years?

✓ Check constraint

[Q6] How many unique keys can a table have?

✓ Multiple unique keys

[Q7] How many primary keys can a table have?

✓ Only one primary key

[Q8] How many columns can be in a simple key?

✓ One column

[Q9] How many columns can be in a compound key?

✓ More than one column

c. Define third normal form and provide a set of functional dependencies for a relation R(A, B, C, D) that indicates a violation of 3NF (3 pts.):

Third Normal Form:- A Relation is said to be in 3NF if it is 2NF. ~~and~~ If the non-trival functional Dependencies of the Relation satisfies any one of the given below condition then it is in 3NF

-1

(1) L.H.S ~~must~~ should be a super key (2) R.H.S should be a prime attribute.

AB→C, B→D

Ex:- ~~A→B, B→C, C→D~~ | There should be no ~~partial~~ transitive dependency. Transitive dependency :- (Non-prime attributes → Non-prime attributes)

d. Define Boyce-Codd normal form and provide a set of functional dependencies for relation R(A, B, C) that indicates a violation of BCNF (3 pts.):

Boyce-Codd Normal Form:- A Relation is said to be in BCNF if it ~~satis~~ satisfies the criteria of 3NF and the non-trival functional dependencies of the relation should follow the below condition i.e L.H.S must be a super key. Then only it is said to be in BCNF.

-1

Eg:- ~~A→B~~
~~B→C~~
(or)
AB→C
C→B

e. Define fourth normal form (2 pts.):

Fourth Normal Form:- A relation is said to be in 4NF if it is in BCNF and there are no non-trival multi dependences except the candidate key.

For A→B, for every single value of A there exists multiple values of B.

f. There are two distinct types of trivial multi-valued dependencies. Describe one of them. (2 pts.)

Trivial Multi-Valued Dependencies :- Trivial multi-valued Dependencies are also called Non-problematic dependencies. These exists and are required for 1:N relationships.

~~Eg~~ $x \twoheadrightarrow y$ is trival, if y is the subset of X or there are no attributes that are not in X or Y.

8

d. Jist the MovieID, Title, and Year for all movies that have a description of "Action" for their Genre. (5 pts.)

$T_1 \rightarrow \sigma$ { Description = 'Action'} (Genre)

~~T_2 →~~ ~~Movie~~ $T_2 \rightarrow \rho$ (Genre_codeto GenreCode) movie,

$T_3 \rightarrow$ Movie $\bowtie$ (Genre_Code) = GenreCode Genre

$T_4 \rightarrow \pi$ (movieID, Title, Year) T_3

8.) Normal Forms, Normalization, Functional Dependencies, and Multivalued Dependencies

a. Define first normal form (2 pts.):

First Normal Form :- A Normal Form is said to be in 1st Normal Form it has no non-atomic values. It cannot hold multi-valued varibles or composite value. It holds just single valued varibles.

b. Define second normal form and provide a set of functional dependencies for a relation R(A, B, C, D) that indicates a violation of 2NF (3 pts.):

Second Normal Form:- A relation will be in 2NF if it is in 1NF and no non-~~key~~ key/ ~~prime~~ prime attributes should be functionally determined by any ~~key~~ part of the key.

* There should be no parital functional Depedency.

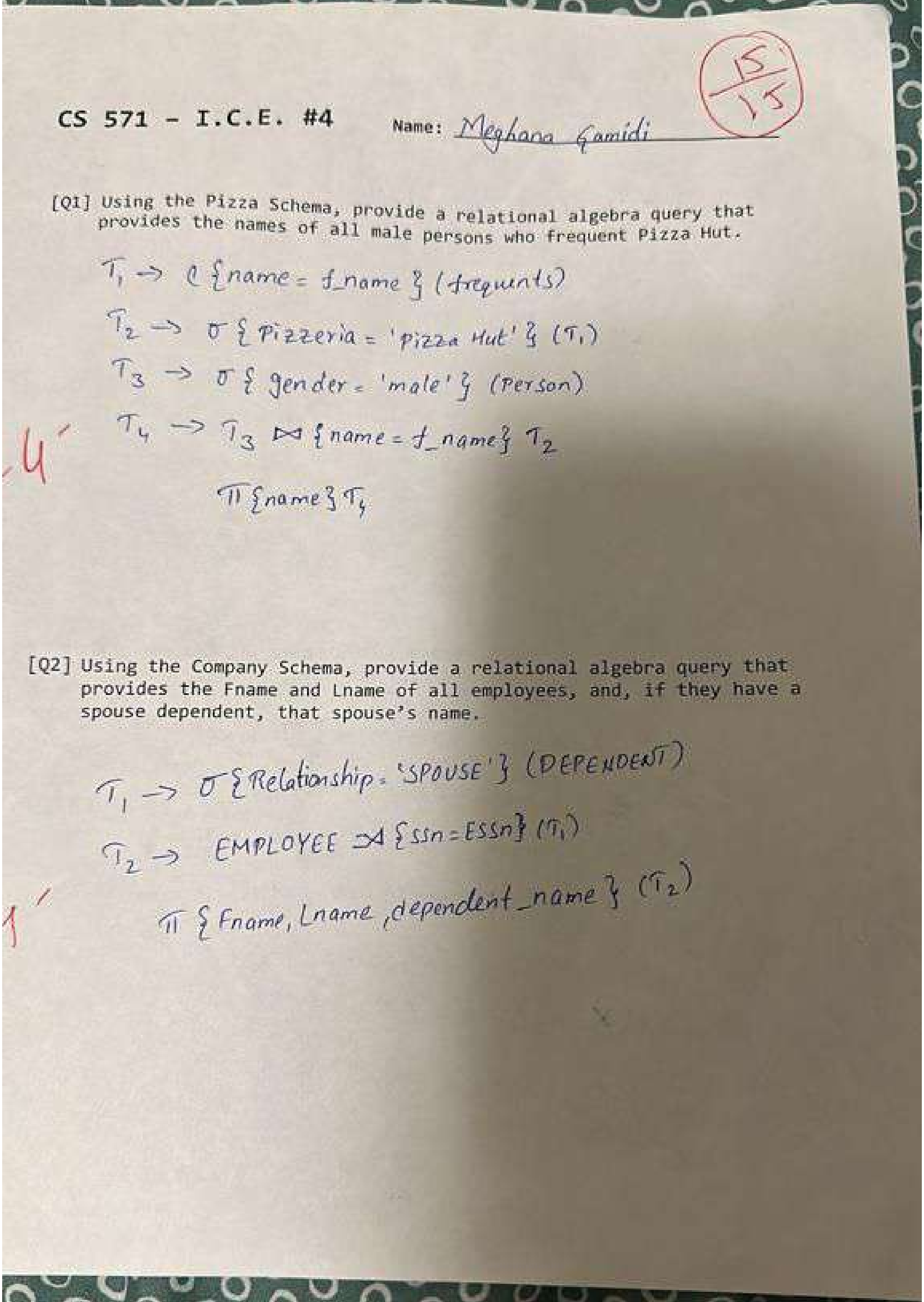
partial Depedency:- proper subset of Candiate key → not prime attribute

Ex:- ~~A→B~~ ~~B→C~~ ~~C→D~~

AB → C

A → D

10



CS 571 – I.C.E. #4 Name: Meghana Gamidi

$\frac{15}{15}$

[Q1] Using the Pizza Schema, provide a relational algebra query that provides the names of all male persons who frequent Pizza Hut.

$T_1 \rightarrow \rho\{name = f\_name\}(frequents)$

$T_2 \rightarrow \sigma\{Pizzeria = \text{'pizza Hut'}\}(T_1)$

$T_3 \rightarrow \sigma\{gender = \text{'male'}\}(Person)$

-4´ $T_4 \rightarrow T_3 \bowtie \{name = f\_name\}\ T_2$

$\pi\{name\}\ T_4$

[Q2] Using the Company Schema, provide a relational algebra query that provides the Fname and Lname of all employees, and, if they have a spouse dependent, that spouse's name.

$T_1 \rightarrow \sigma\{Relationship = \text{'SPOUSE'}\}(DEPENDENT)$

$T_2 \rightarrow EMPLOYEE ⟕ \{ssn = ESSn\}(T_1)$

1´ $\pi\{Fname, Lname, dependent\_name\}(T_2)$

[Q4] Imagine you had a table with just two columns: ID and

key exists, what is the most likely

CS 571 - I.C.E. #3

Name: Meghana Gamidi

14/16

[Q1] Using the Pizza Schema, provide a list of all female persons who are at least 18 years old.

$T_1 \longrightarrow \sigma \{ \text{gender} = \text{'female'} \} (\text{Person})$

$T_2 \longrightarrow \sigma \{ \text{age} >= 18 \} (T_1)$

$\pi \{ \text{name} \} (T_2)$

(or)

$T_1 \rightarrow \sigma \{ \text{gender} = \text{'female'} \text{ AND } \text{age} >= 18 \} (\text{Person})$

$\pi \{ \text{name} \} (T_1)$

[Q2] Using the Company Schema, provide a relational algebra query that provides a list of the Fname and Lname of all employees with sex 'M' who do not work in Dno 5.

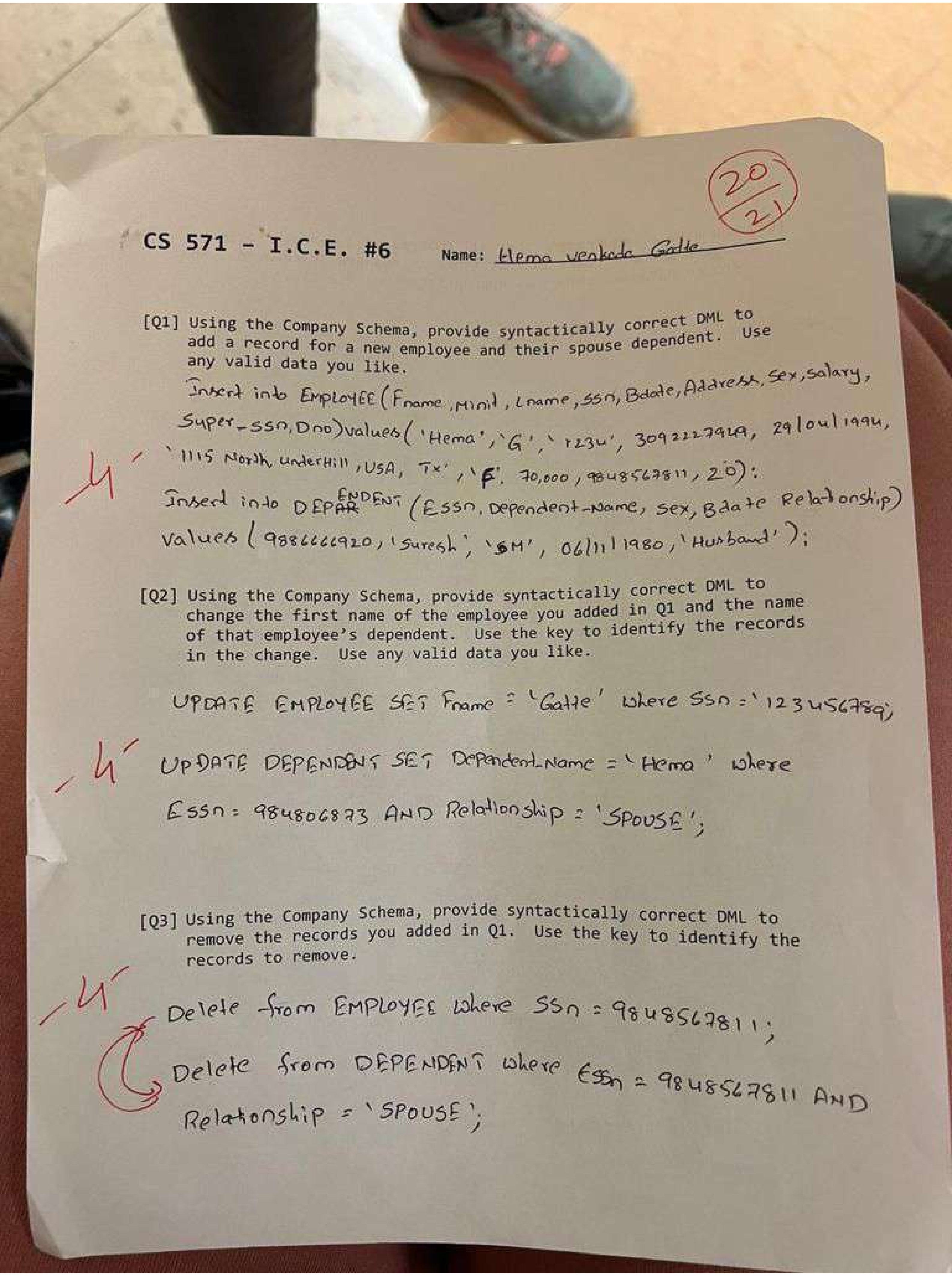
$T_1 \rightarrow \sigma \{ \text{sex} = \text{'M'} \} (\text{Employee})$

$T_2 \rightarrow \sigma \{ \text{D.no is not equal to } 5 \} (\text{Employee})$

$T_3 \rightarrow \pi \{ \text{Fname}, \text{Lname} \} (T_1)$

$T_4 \rightarrow \pi \{ \text{F.name}, \text{Lname} \} (T_2)$

$T_3 \cap T_4$



20/21

CS 571 – I.C.E. #6 Name: Hema venkata Gatte

[Q1] Using the Company Schema, provide syntactically correct DML to add a record for a new employee and their spouse dependent. Use any valid data you like.

Insert into EMPLOYEE (Fname, Minit, Lname, ssn, Bdate, Address, Sex, Salary, Super_ssn, Dno) values ('Hema', 'G', '1234', 3092227929, 29/04/1994, '1115 North underHill, USA, TX', 'F', 70,000, 9848567811, 20):

4

Insert into DEP~~AR~~ENDENT (Essn, Dependent-Name, sex, Bdate Relationship) values (9886666920, 'Suresh', '~~S~~M', 06/11/1980, 'Husband');

[Q2] Using the Company Schema, provide syntactically correct DML to change the first name of the employee you added in Q1 and the name of that employee's dependent. Use the key to identify the records in the change. Use any valid data you like.

UPDATE EMPLOYEE SET Fname = 'Gatte' where Ssn = '123456789;

4

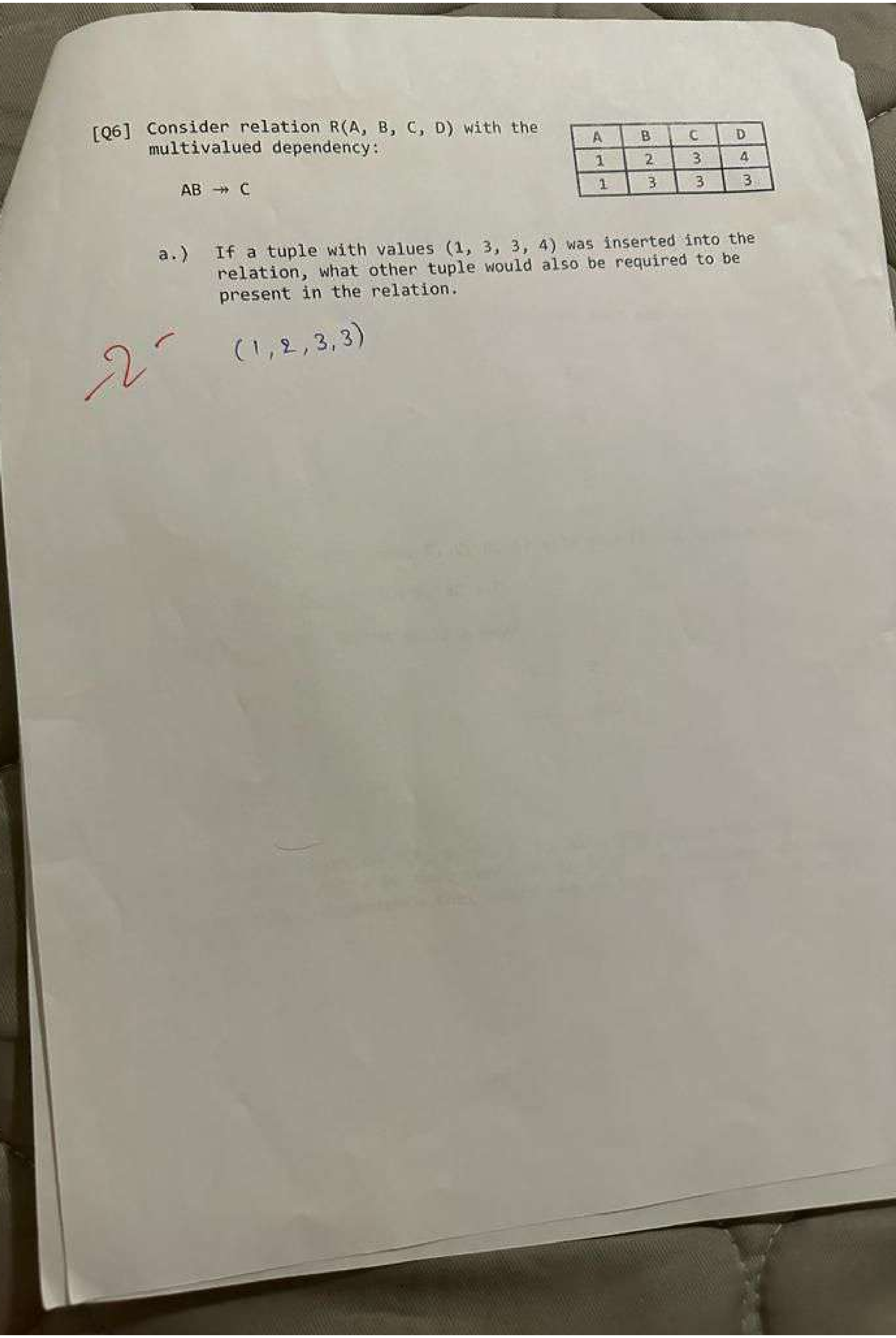
UPDATE DEPENDENT SET Dependent_Name = 'Hema' where Essn = 984806873 AND Relationship = 'SPOUSE';

[Q3] Using the Company Schema, provide syntactically correct DML to remove the records you added in Q1. Use the key to identify the records to remove.

4

Delete from EMPLOYEE where Ssn = 9848567811;

Delete from DEPENDENT where Essn = 9848567811 AND Relationship = 'SPOUSE';



[Q6] Consider relation R(A, B, C, D) with the multivalued dependency:

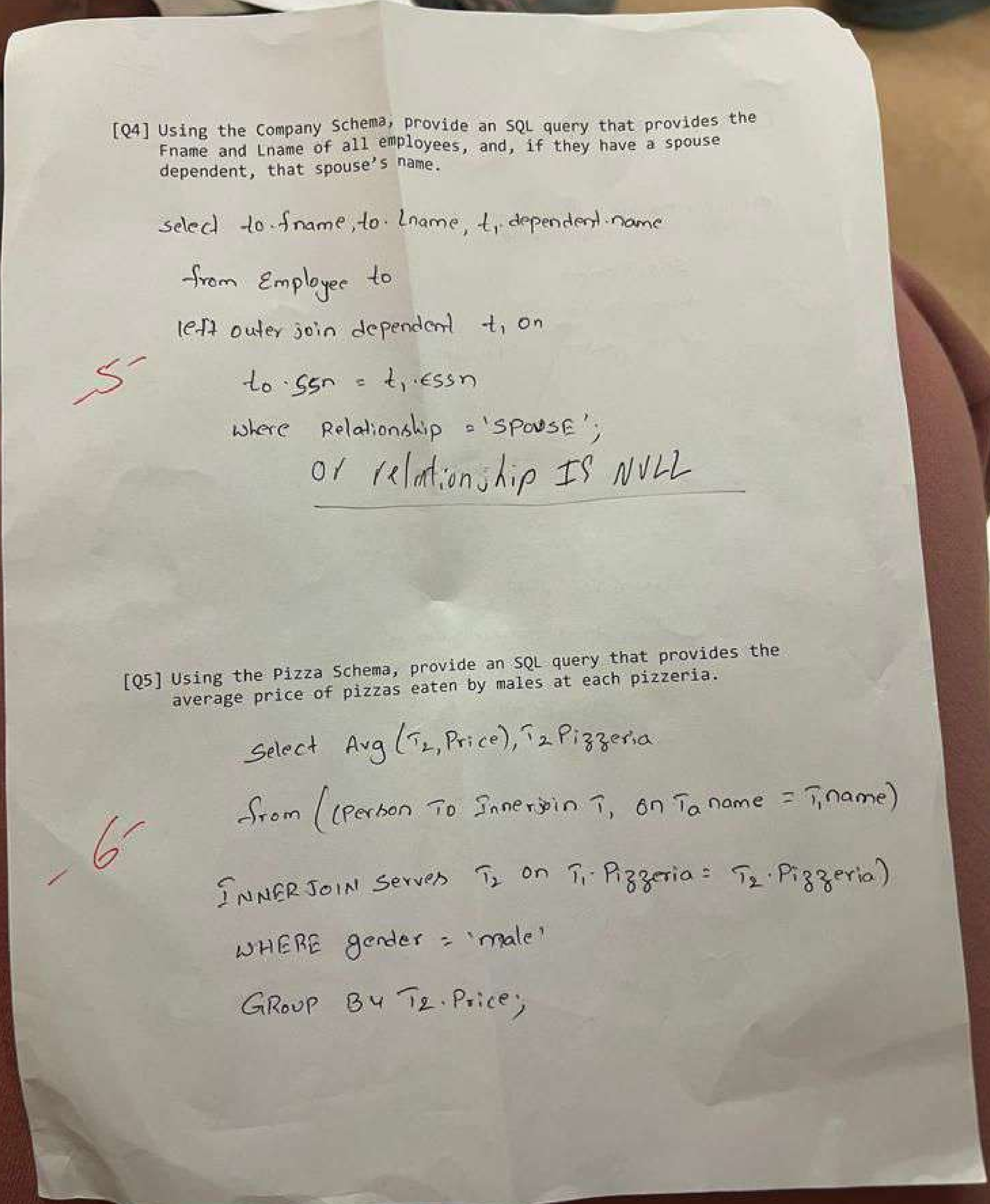
$AB \twoheadrightarrow C$

A	B	C	D
1	2	3	4
1	3	3	3

a.) If a tuple with values (1, 3, 3, 4) was inserted into the relation, what other tuple would also be required to be present in the relation.

2

(1, 2, 3, 3)

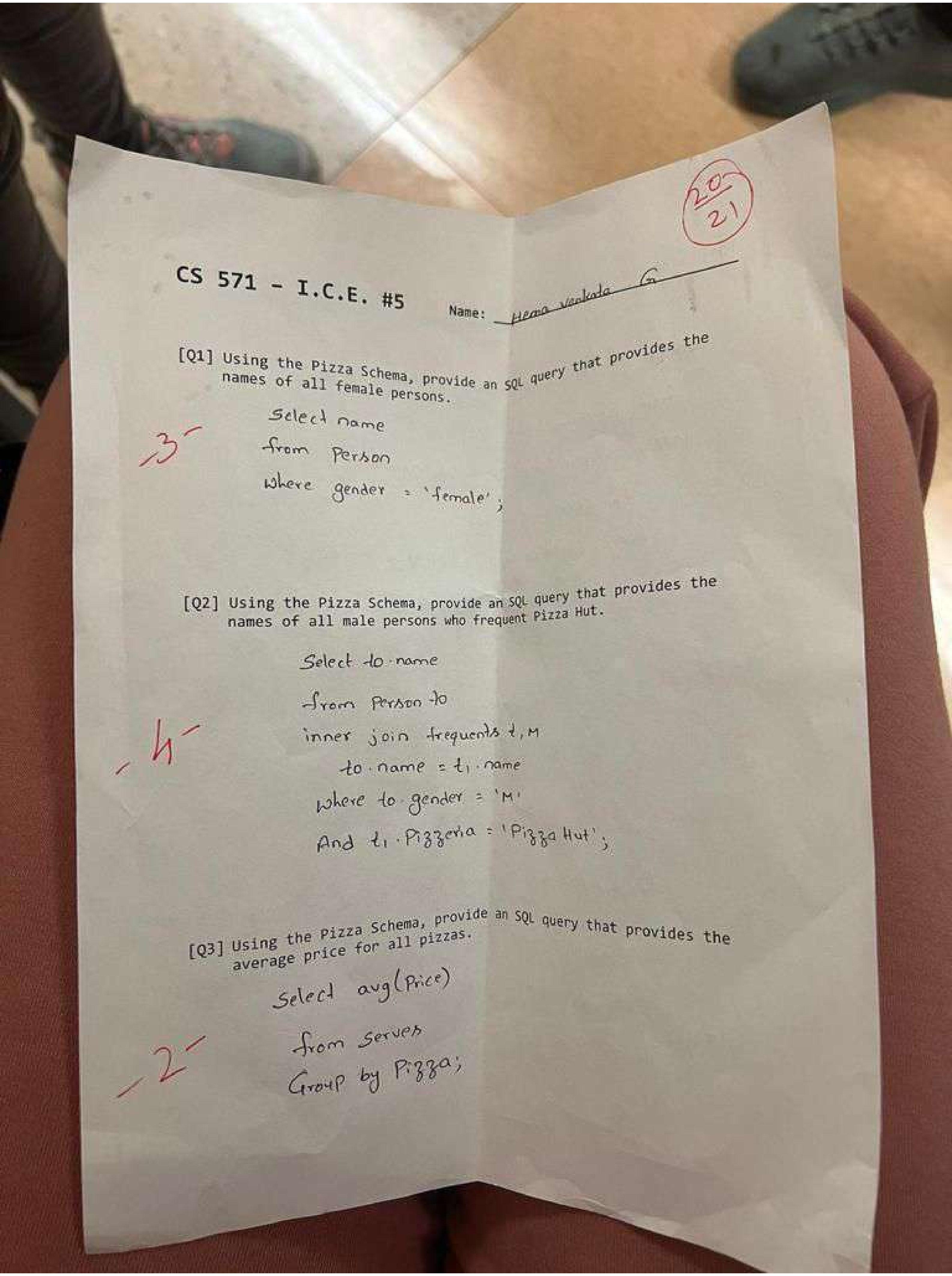


[Q4] Using the Company Schema, provide an SQL query that provides the Fname and Lname of all employees, and, if they have a spouse dependent, that spouse's name.

```
select to.fname, to. Lname, t1.dependent.name
 from Employee to
 left outer join dependent t1 on
-5     to.ssn = t1.essn
       where Relationship = 'SPOUSE';
          or relationship IS NULL
```

[Q5] Using the Pizza Schema, provide an SQL query that provides the average price of pizzas eaten by males at each pizzeria.

```
     Select Avg (T2, Price), T2 Pizzeria
     from ((Person To Innerjoin T1 on Ta name = T1name)
-6
   INNER JOIN Serves T2 on T1.Pizzeria = T2.Pizzeria)
     WHERE gender = 'male'
     GROUP BY T2.Price;
```



20
21

CS 571 – I.C.E. #5

Name: Hema venkata G

[Q1] Using the Pizza Schema, provide an SQL query that provides the names of all female persons.

```
Select name
from Person
where gender = 'female';
```

3

[Q2] Using the Pizza Schema, provide an SQL query that provides the names of all male persons who frequent Pizza Hut.

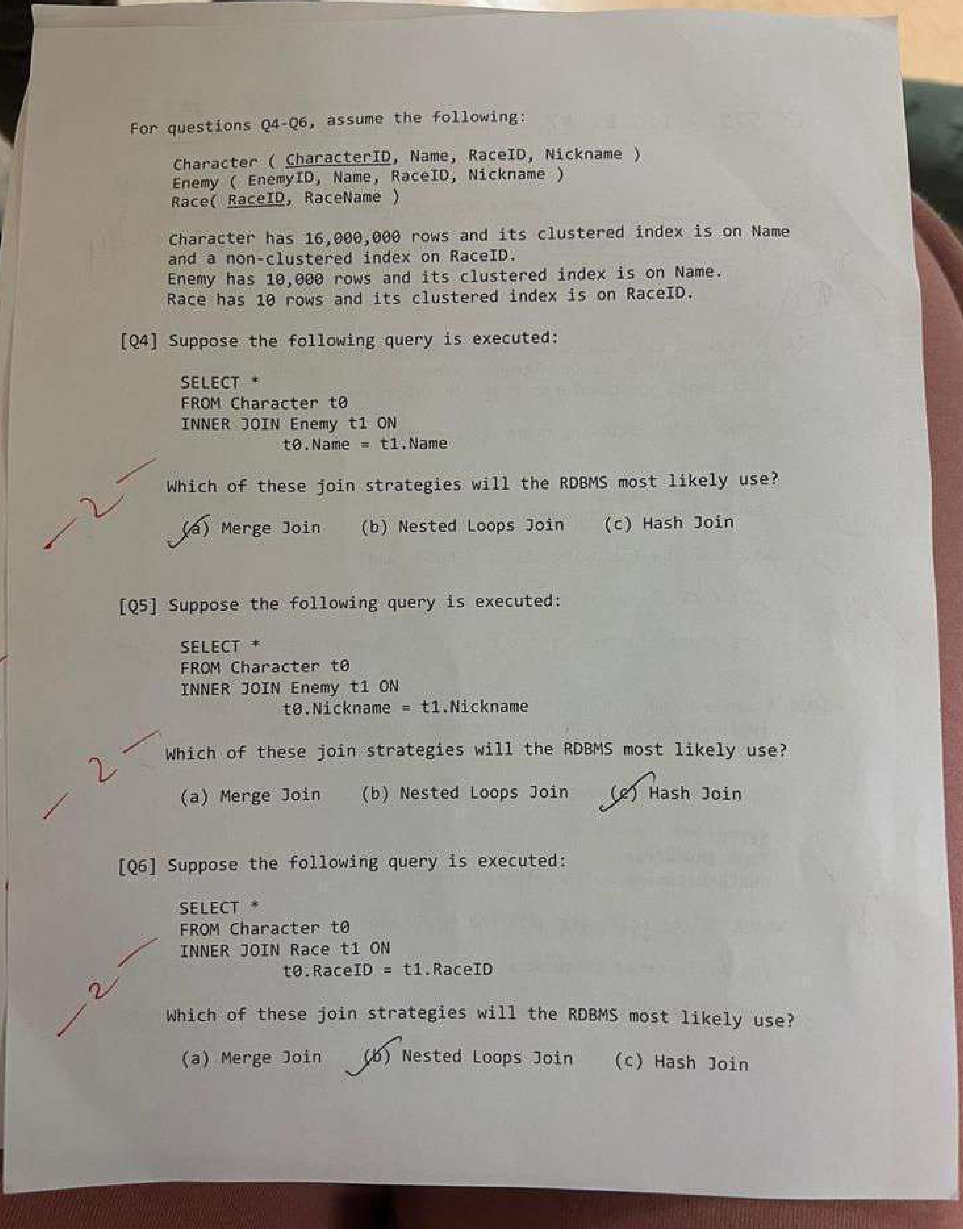
```
Select to.name
from Person to
inner join frequents t1 M
  to.name = t1.name
where to.gender = 'M'
And t1.Pizzeria = 'Pizza Hut';
```

4

[Q3] Using the Pizza Schema, provide an SQL query that provides the average price for all pizzas.

```
Select avg(Price)
from Serves
Group by Pizza;
```

2



For questions Q4-Q6, assume the following:

```
Character ( CharacterID, Name, RaceID, Nickname )
Enemy ( EnemyID, Name, RaceID, Nickname )
Race( RaceID, RaceName )
```

Character has 16,000,000 rows and its clustered index is on Name and a non-clustered index on RaceID.
Enemy has 10,000 rows and its clustered index is on Name.
Race has 10 rows and its clustered index is on RaceID.

[Q4] Suppose the following query is executed:

```
SELECT *
FROM Character t0
INNER JOIN Enemy t1 ON
          t0.Name = t1.Name
```

2

Which of these join strategies will the RDBMS most likely use?

[✓ (a) Merge Join]   (b) Nested Loops Join   (c) Hash Join

[Q5] Suppose the following query is executed:

```
SELECT *
FROM Character t0
INNER JOIN Enemy t1 ON
          t0.Nickname = t1.Nickname
```

2

Which of these join strategies will the RDBMS most likely use?

(a) Merge Join   (b) Nested Loops Join   [✓ (c) Hash Join]

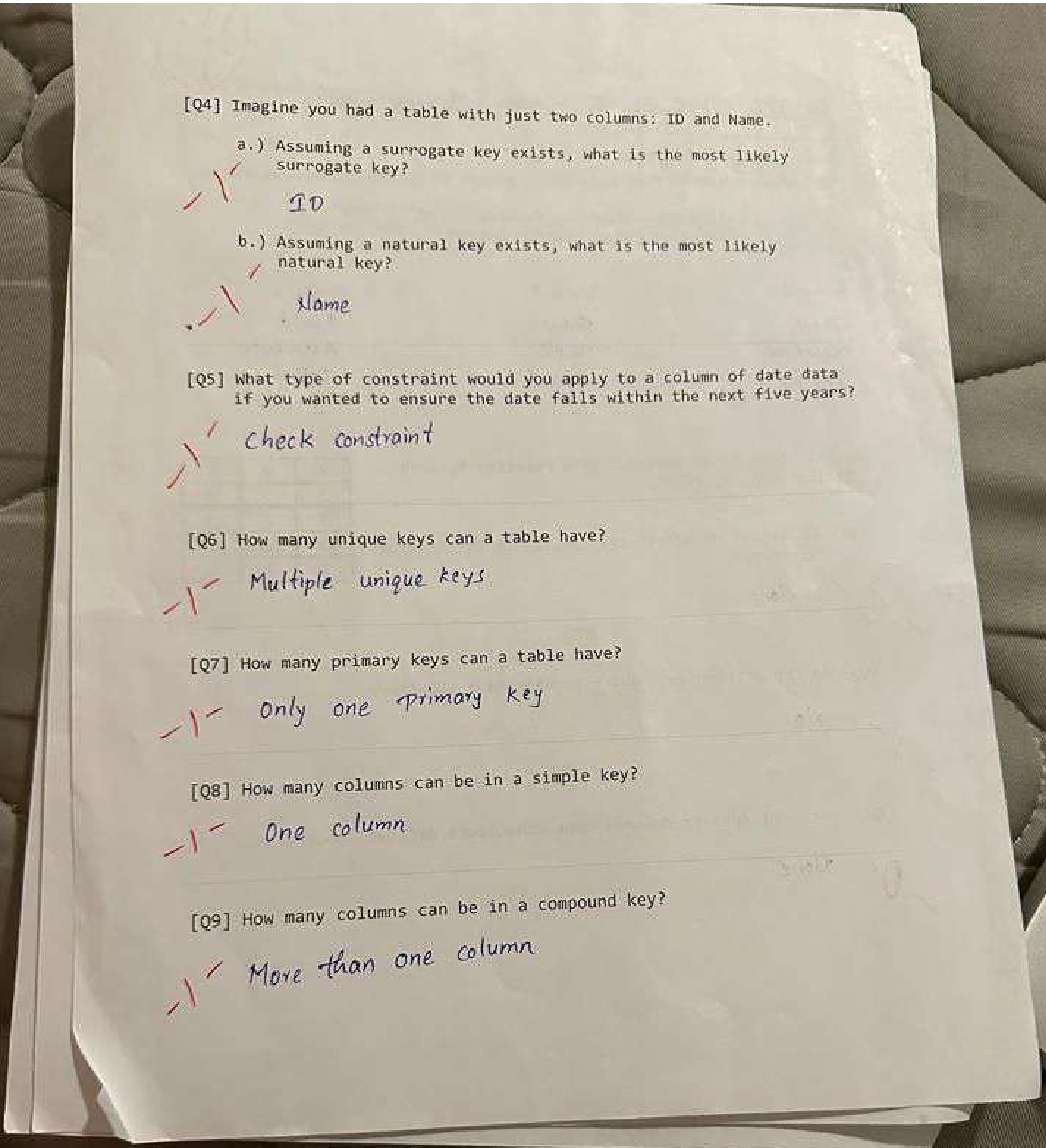
[Q6] Suppose the following query is executed:

```
SELECT *
FROM Character t0
INNER JOIN Race t1 ON
          t0.RaceID = t1.RaceID
```

2

Which of these join strategies will the RDBMS most likely use?

(a) Merge Join   [✓ (b) Nested Loops Join]   (c) Hash Join



[Q4] Imagine you had a table with just two columns: ID and Name.

a.) Assuming a surrogate key exists, what is the most likely surrogate key?

ID

b.) Assuming a natural key exists, what is the most likely natural key?

Name

[Q5] What type of constraint would you apply to a column of date data if you wanted to ensure the date falls within the next five years?

Check constraint

[Q6] How many unique keys can a table have?

Multiple unique keys

[Q7] How many primary keys can a table have?

Only one primary key

[Q8] How many columns can be in a simple key?

One column

[Q9] How many columns can be in a compound key?

More than one column

[Q3] Using the Pizza Schema, provide a relational algebra query that provides a list of all pizzerias that serve cheese pizza and at least one pizza priced at $12 or more.

$T_1 \rightarrow \sigma\{pizza = \text{'cheese'}\}$ (server)

$T_2 \rightarrow \sigma\{price >= 12\}$ (server)

$\pi\{pizzeria\}$ $(T_1 \cap T_2)$

[Q4] Using the Pizza Schema, provide a relational algebra query that provides a list of all pizzas eaten by Amy unless those pizzas are served by Dominos.

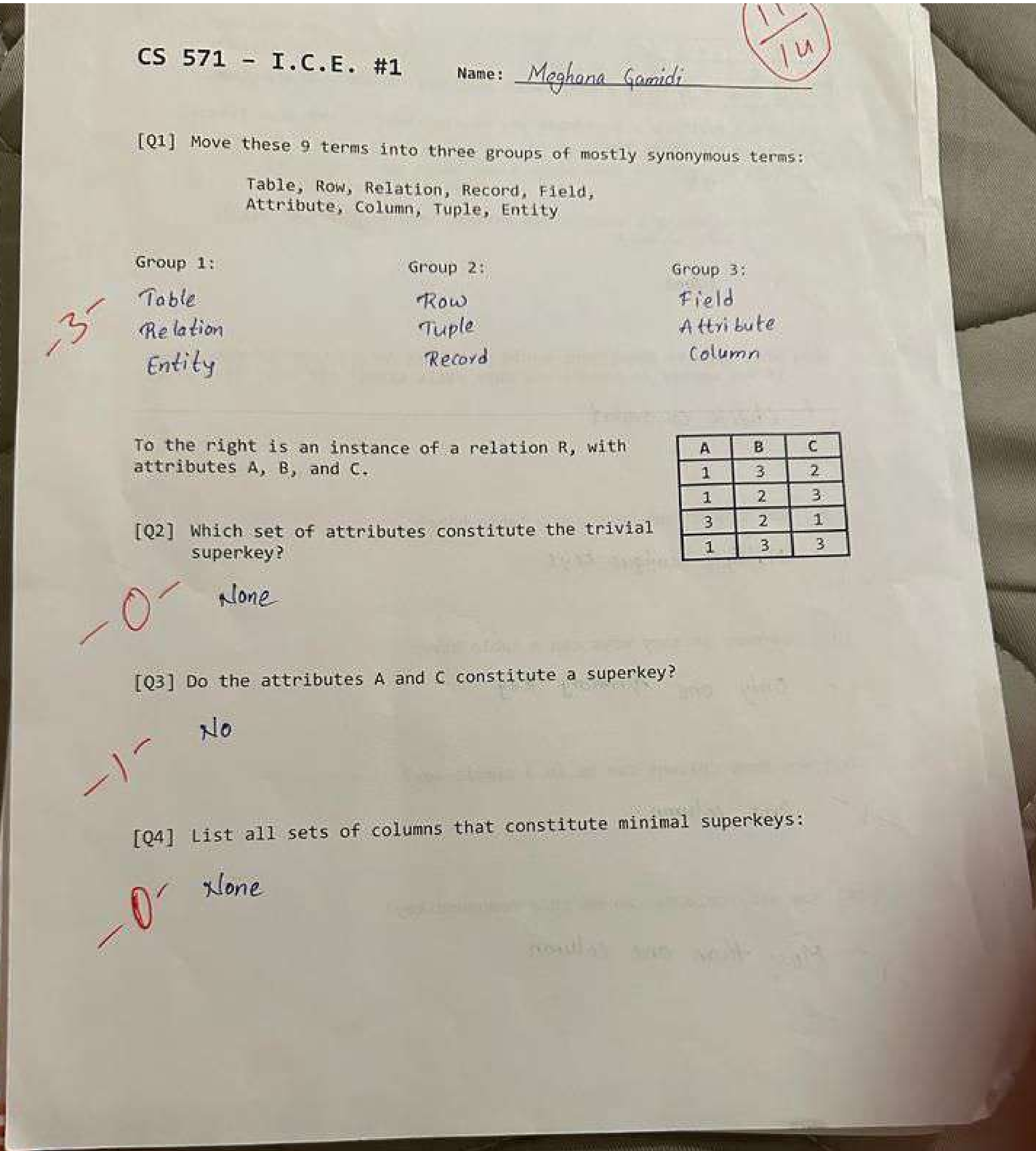
$T_1 \rightarrow \sigma\{name = \text{'Amy'}$ AND $pizzeria = \text{'Dominos'}\}$ (Frequents)

-2

$T_2 \rightarrow \sigma\{name = \text{'Amy'}\}$ (Eats)

$T_3 \rightarrow \pi\{pizza\}$ (T_2)

$T_4 \rightarrow T_1 \cup T_3$



11/14

CS 571 - I.C.E. #1

Name: Meghana Gamidi

[Q1] Move these 9 terms into three groups of mostly synonymous terms:

Table, Row, Relation, Record, Field, Attribute, Column, Tuple, Entity

-3

Group 1:	Group 2:	Group 3:
Table	Row	Field
Relation	Tuple	Attribute
Entity	Record	Column

To the right is an instance of a relation R, with attributes A, B, and C.

A	B	C
1	3	2
1	2	3
3	2	1
1	3	3

[Q2] Which set of attributes constitute the trivial superkey?

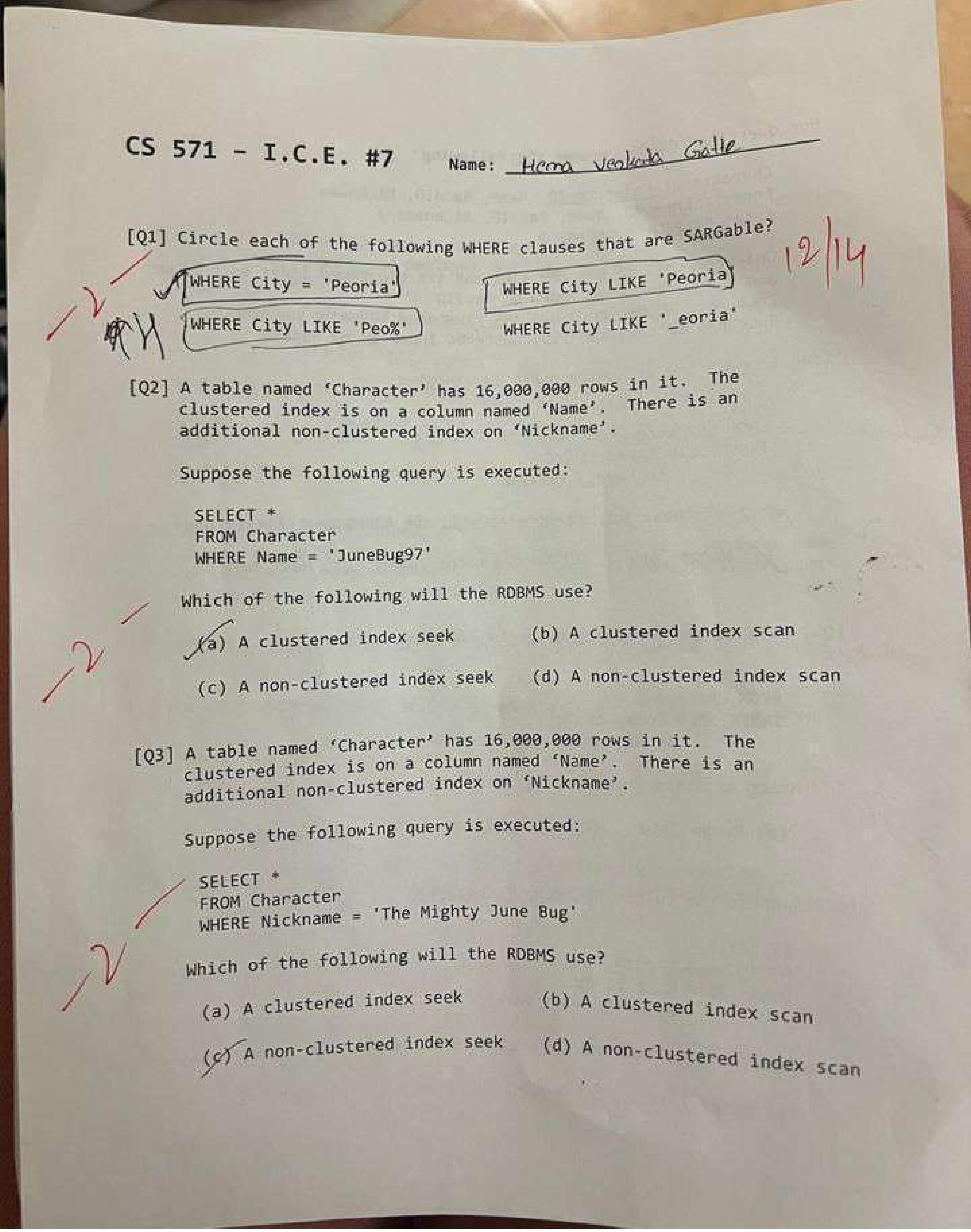
-0 None

[Q3] Do the attributes A and C constitute a superkey?

-1 No

[Q4] List all sets of columns that constitute minimal superkeys:

-0 None



CS 571 - I.C.E. #7

Name: Hema Veakata Galle

12/14

[Q1] Circle each of the following WHERE clauses that are SARGable?

/2

[✓ WHERE City = 'Peoria'] ✓   [✓ WHERE City LIKE 'Peoria']

[✓ WHERE City LIKE 'Peo%']   WHERE City LIKE '_eoria'

[Q2] A table named 'Character' has 16,000,000 rows in it. The clustered index is on a column named 'Name'. There is an additional non-clustered index on 'Nickname'.

Suppose the following query is executed:

```
SELECT *
FROM Character
WHERE Name = 'JuneBug97'
```

Which of the following will the RDBMS use?

/2

[✓ (a) A clustered index seek]   (b) A clustered index scan

(c) A non-clustered index seek   (d) A non-clustered index scan

[Q3] A table named 'Character' has 16,000,000 rows in it. The clustered index is on a column named 'Name'. There is an additional non-clustered index on 'Nickname'.

Suppose the following query is executed:

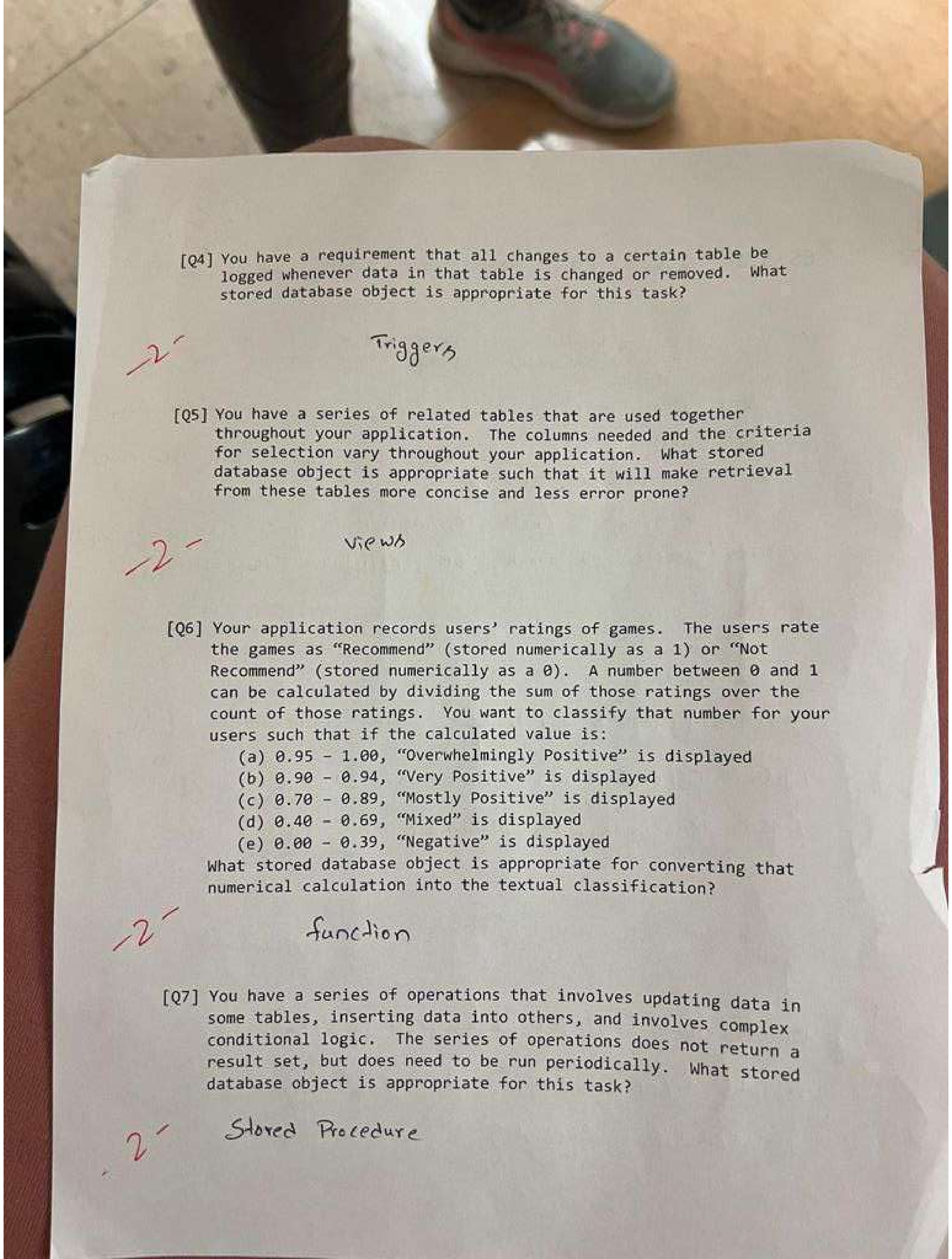
```
SELECT *
FROM Character
WHERE Nickname = 'The Mighty June Bug'
```

Which of the following will the RDBMS use?

/2

(a) A clustered index seek   (b) A clustered index scan

[✓ (c) A non-clustered index seek]   (d) A non-clustered index scan



[Q4] You have a requirement that all changes to a certain table be logged whenever data in that table is changed or removed. What stored database object is appropriate for this task?

-2´ Triggers

[Q5] You have a series of related tables that are used together throughout your application. The columns needed and the criteria for selection vary throughout your application. What stored database object is appropriate such that it will make retrieval from these tables more concise and less error prone?

-2´ views

[Q6] Your application records users' ratings of games. The users rate the games as "Recommend" (stored numerically as a 1) or "Not Recommend" (stored numerically as a 0). A number between 0 and 1 can be calculated by dividing the sum of those ratings over the count of those ratings. You want to classify that number for your users such that if the calculated value is:

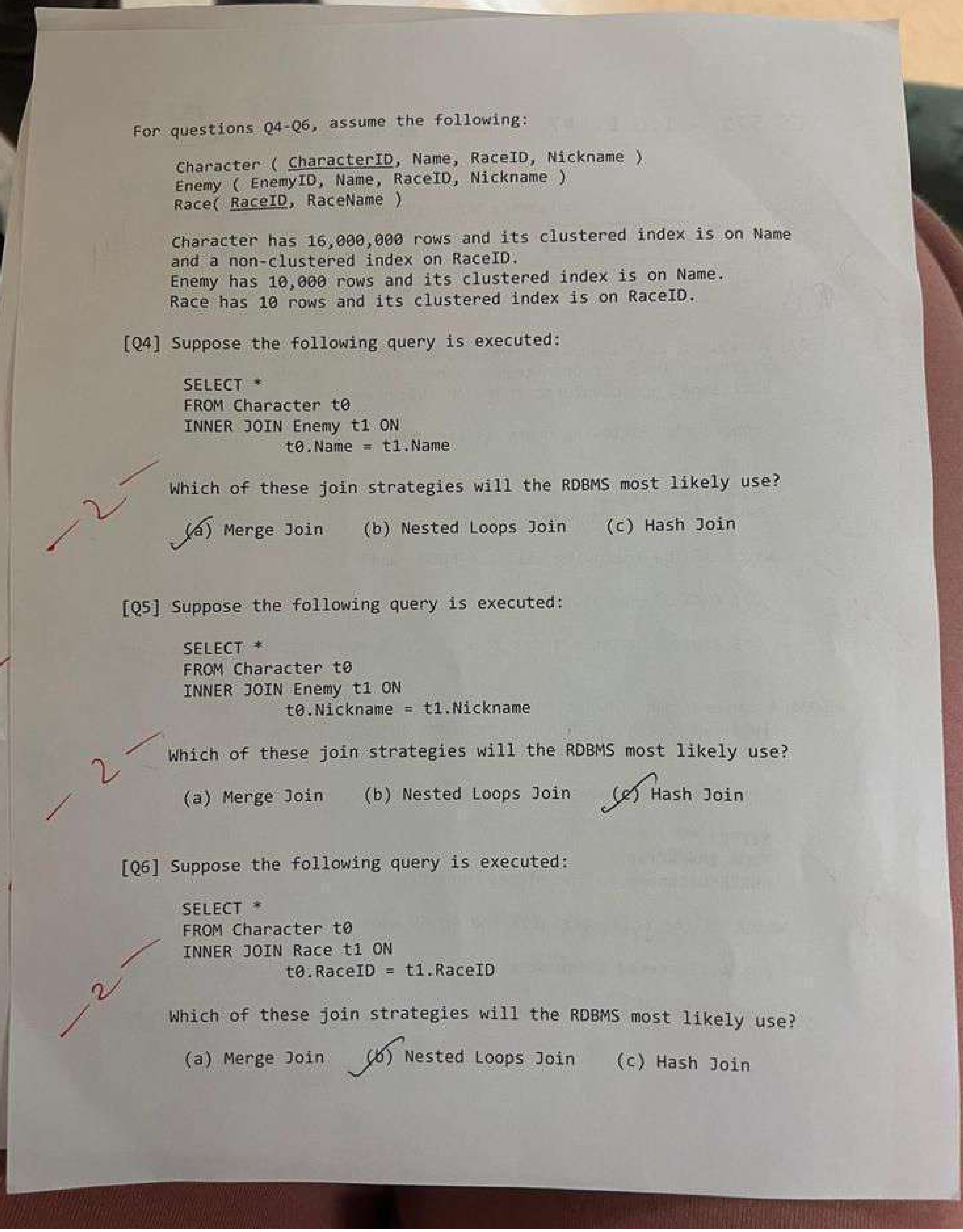
(a) 0.95 - 1.00, "Overwhelmingly Positive" is displayed
(b) 0.90 - 0.94, "Very Positive" is displayed
(c) 0.70 - 0.89, "Mostly Positive" is displayed
(d) 0.40 - 0.69, "Mixed" is displayed
(e) 0.00 - 0.39, "Negative" is displayed

What stored database object is appropriate for converting that numerical calculation into the textual classification?

-2´ function

[Q7] You have a series of operations that involves updating data in some tables, inserting data into others, and involves complex conditional logic. The series of operations does not return a result set, but does need to be run periodically. What stored database object is appropriate for this task?

2´ Stored Procedure



For questions Q4-Q6, assume the following:

```
Character ( CharacterID, Name, RaceID, Nickname )
Enemy ( EnemyID, Name, RaceID, Nickname )
Race( RaceID, RaceName )
```

Character has 16,000,000 rows and its clustered index is on Name and a non-clustered index on RaceID.
Enemy has 10,000 rows and its clustered index is on Name.
Race has 10 rows and its clustered index is on RaceID.

[Q4] Suppose the following query is executed:

```
SELECT *
FROM Character t0
INNER JOIN Enemy t1 ON
          t0.Name = t1.Name
```

2

Which of these join strategies will the RDBMS most likely use?

[✓ (a) Merge Join]   (b) Nested Loops Join   (c) Hash Join

[Q5] Suppose the following query is executed:

```
SELECT *
FROM Character t0
INNER JOIN Enemy t1 ON
          t0.Nickname = t1.Nickname
```

2

Which of these join strategies will the RDBMS most likely use?

(a) Merge Join   (b) Nested Loops Join   [✓ (c) Hash Join]

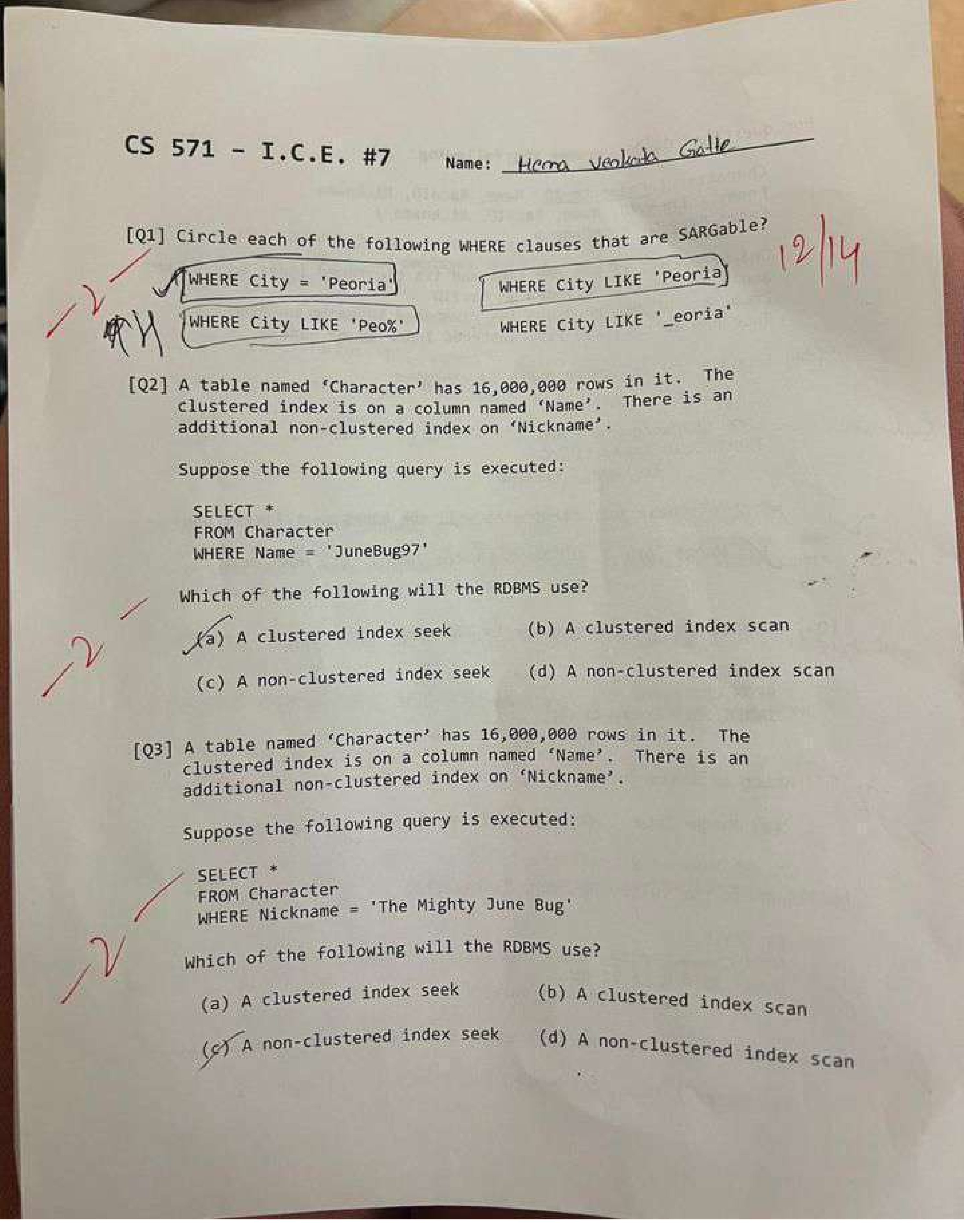
[Q6] Suppose the following query is executed:

```
SELECT *
FROM Character t0
INNER JOIN Race t1 ON
          t0.RaceID = t1.RaceID
```

2

Which of these join strategies will the RDBMS most likely use?

(a) Merge Join   [✓ (b) Nested Loops Join]   (c) Hash Join



CS 571 - I.C.E. #7

Name: Hema Venkata Gotte

12/14

[Q1] Circle each of the following WHERE clauses that are SARGable?

/2

[✓ WHERE City = 'Peoria'] ✓ [✓ WHERE City LIKE 'Peoria']

[✓ WHERE City LIKE 'Peo%'] WHERE City LIKE '_eoria'

[Q2] A table named 'Character' has 16,000,000 rows in it. The clustered index is on a column named 'Name'. There is an additional non-clustered index on 'Nickname'.

Suppose the following query is executed:

```
SELECT *
FROM Character
WHERE Name = 'JuneBug97'
```

Which of the following will the RDBMS use?

/2

[✓ (a) A clustered index seek] (b) A clustered index scan

(c) A non-clustered index seek (d) A non-clustered index scan

[Q3] A table named 'Character' has 16,000,000 rows in it. The clustered index is on a column named 'Name'. There is an additional non-clustered index on 'Nickname'.

Suppose the following query is executed:

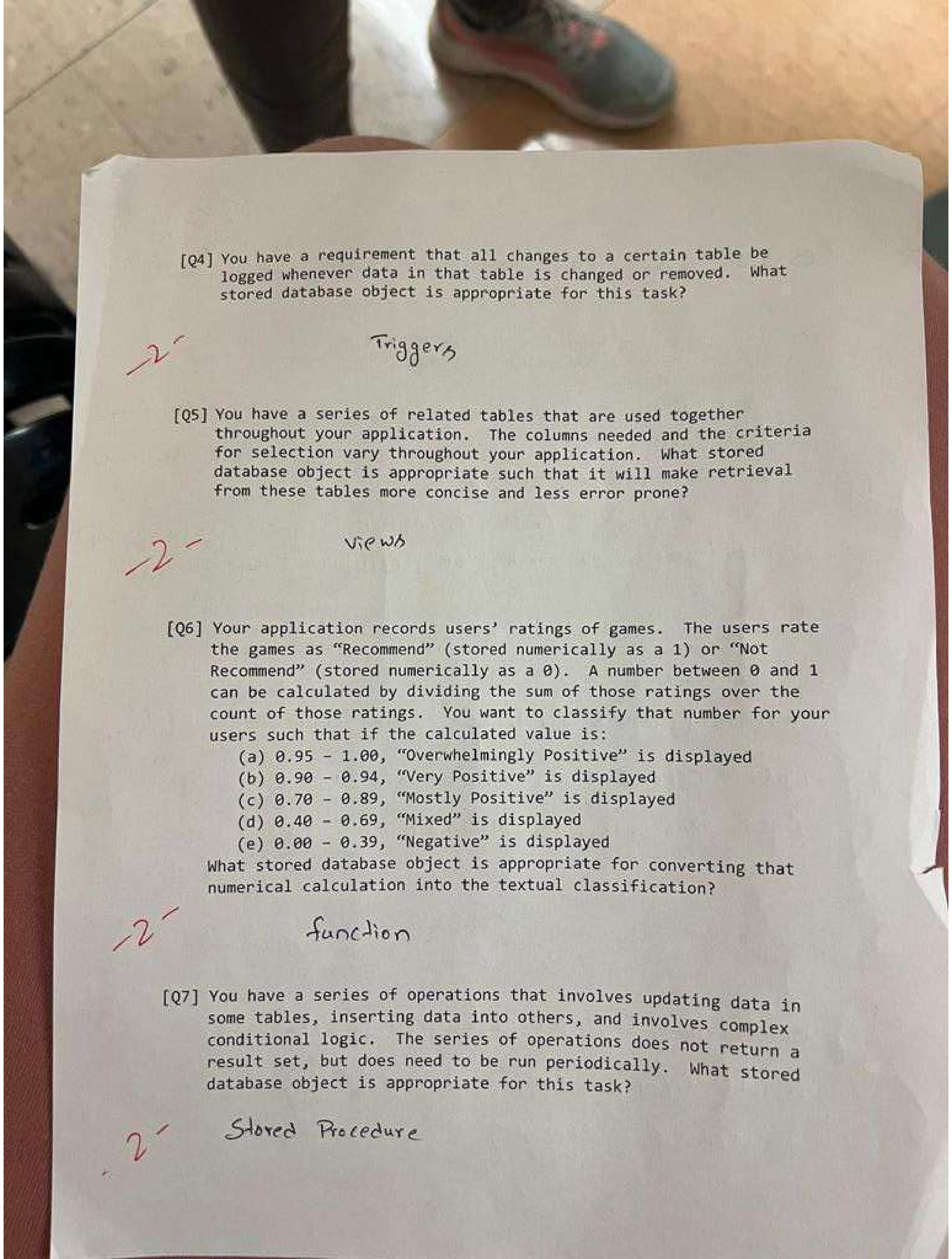
```
SELECT *
FROM Character
WHERE Nickname = 'The Mighty June Bug'
```

Which of the following will the RDBMS use?

/2

(a) A clustered index seek (b) A clustered index scan

[✓ (c) A non-clustered index seek] (d) A non-clustered index scan



[Q4] You have a requirement that all changes to a certain table be logged whenever data in that table is changed or removed. What stored database object is appropriate for this task?

-2'

Triggers

[Q5] You have a series of related tables that are used together throughout your application. The columns needed and the criteria for selection vary throughout your application. What stored database object is appropriate such that it will make retrieval from these tables more concise and less error prone?

-2'

views

[Q6] Your application records users' ratings of games. The users rate the games as "Recommend" (stored numerically as a 1) or "Not Recommend" (stored numerically as a 0). A number between 0 and 1 can be calculated by dividing the sum of those ratings over the count of those ratings. You want to classify that number for your users such that if the calculated value is:

(a) 0.95 - 1.00, "Overwhelmingly Positive" is displayed
(b) 0.90 - 0.94, "Very Positive" is displayed
(c) 0.70 - 0.89, "Mostly Positive" is displayed
(d) 0.40 - 0.69, "Mixed" is displayed
(e) 0.00 - 0.39, "Negative" is displayed

What stored database object is appropriate for converting that numerical calculation into the textual classification?

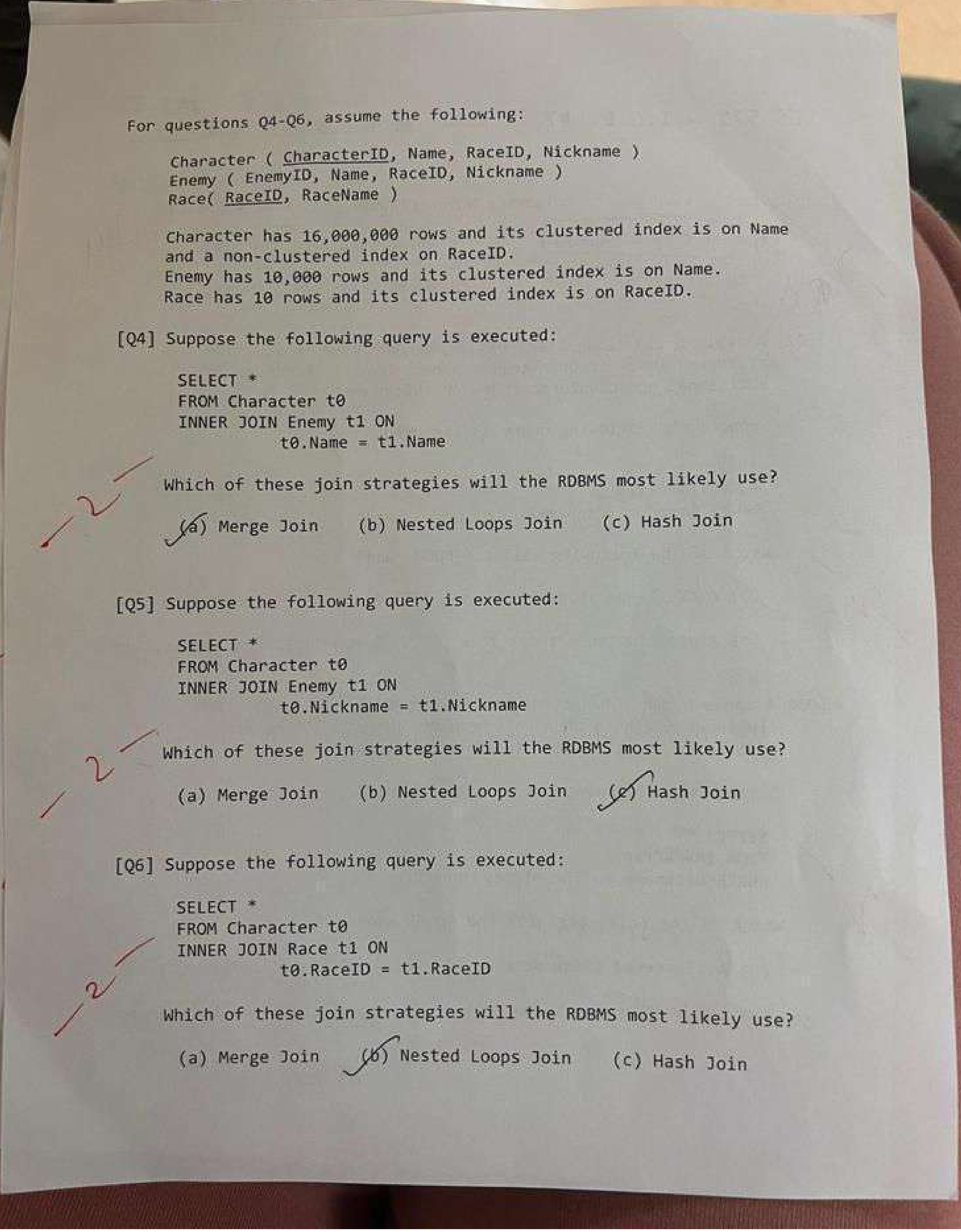
-2'

function

[Q7] You have a series of operations that involves updating data in some tables, inserting data into others, and involves complex conditional logic. The series of operations does not return a result set, but does need to be run periodically. What stored database object is appropriate for this task?

2'

Stored Procedure



For questions Q4-Q6, assume the following:

```
Character ( CharacterID, Name, RaceID, Nickname )
Enemy ( EnemyID, Name, RaceID, Nickname )
Race( RaceID, RaceName )
```

Character has 16,000,000 rows and its clustered index is on Name and a non-clustered index on RaceID.
Enemy has 10,000 rows and its clustered index is on Name.
Race has 10 rows and its clustered index is on RaceID.

[Q4] Suppose the following query is executed:

```
SELECT *
FROM Character t0
INNER JOIN Enemy t1 ON
          t0.Name = t1.Name
```

2

Which of these join strategies will the RDBMS most likely use?

[✓ (a) Merge Join]   (b) Nested Loops Join   (c) Hash Join

[Q5] Suppose the following query is executed:

```
SELECT *
FROM Character t0
INNER JOIN Enemy t1 ON
          t0.Nickname = t1.Nickname
```

2

Which of these join strategies will the RDBMS most likely use?

(a) Merge Join   (b) Nested Loops Join   [✓ (c) Hash Join]

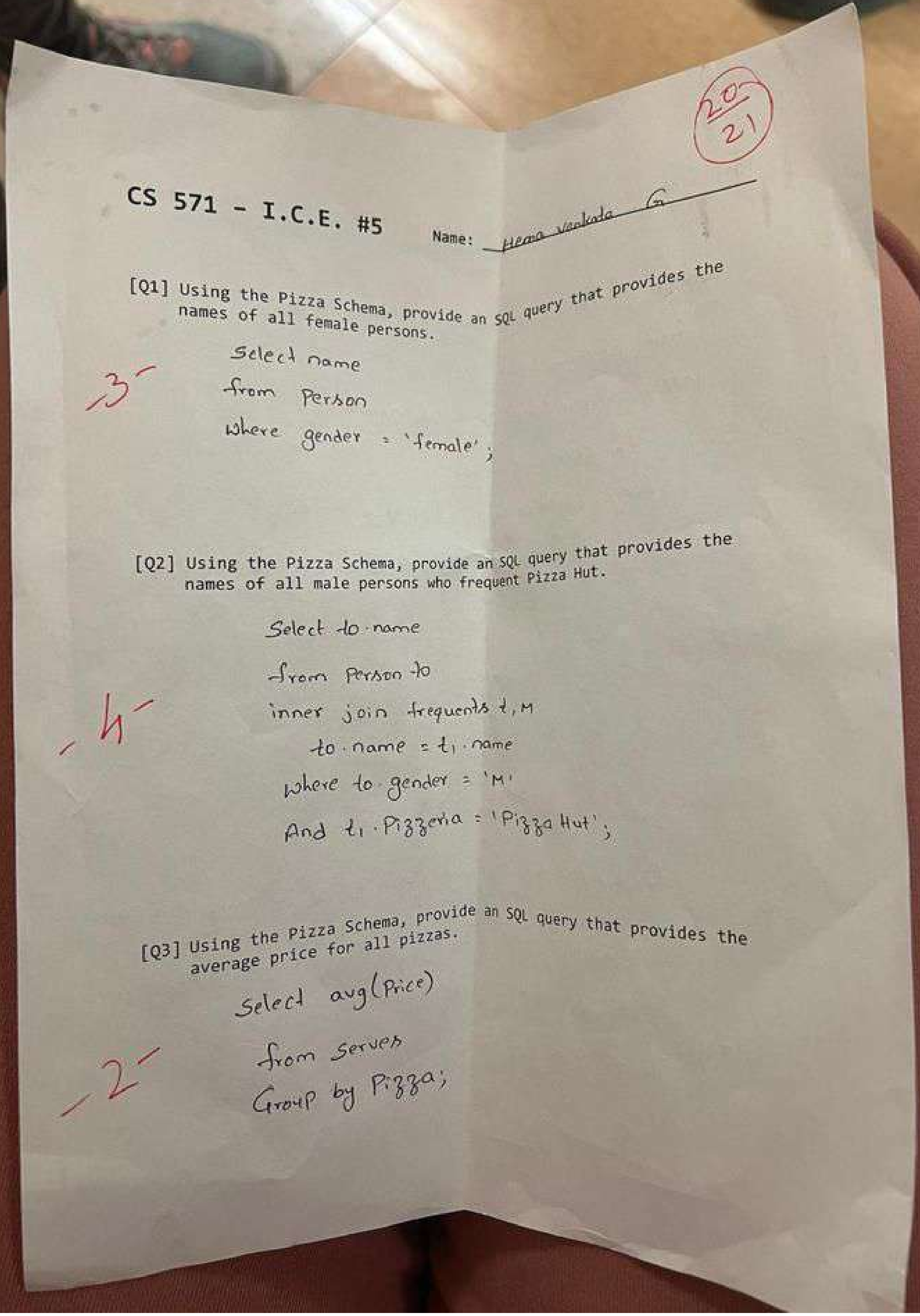
[Q6] Suppose the following query is executed:

```
SELECT *
FROM Character t0
INNER JOIN Race t1 ON
          t0.RaceID = t1.RaceID
```

2

Which of these join strategies will the RDBMS most likely use?

(a) Merge Join   [✓ (b) Nested Loops Join]   (c) Hash Join



20/21

CS 571 - I.C.E. #5

Name: Hema Venkata G

[Q1] Using the Pizza Schema, provide an SQL query that provides the names of all female persons.

-3-

```
Select name
from Person
where gender = 'female';
```

[Q2] Using the Pizza Schema, provide an SQL query that provides the names of all male persons who frequent Pizza Hut.

-4-

```
Select to.name
from Person to
inner join frequents t1,M
   to.name = t1.name
where to.gender = 'M'
And t1.Pizzeria = 'Pizza Hut';
```

[Q3] Using the Pizza Schema, provide an SQL query that provides the average price for all pizzas.

-2-

```
Select avg(Price)
from Serves
Group by Pizza;
```

CS 571 - I.C.E. #2

Name: Meghana Gamidi

14/16

[Q1] Consider relation R(A, B, C, D, E) with functional dependencies:

DE → B, B → C, CE → A

Which of the following sets of attributes does not functionally determine A?

a.) BED b.) EBC

c.) BE d.) BC

(d)

[Q2] Consider relation R(A, B, C, D, E) with functional dependencies:

C → A, AD → C, C → B, BD → C

Which of the following is a key?

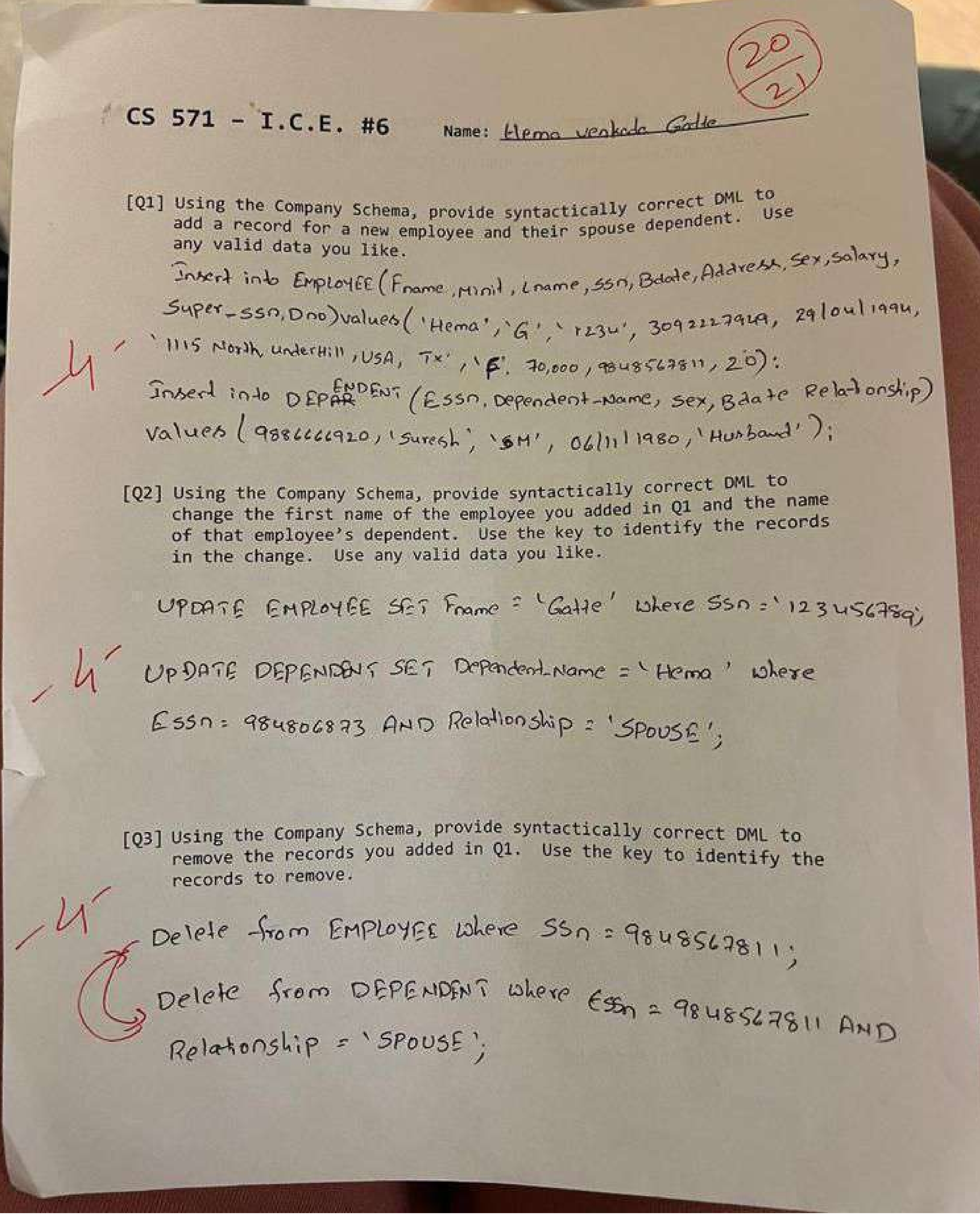
a.) EAD b.) B

c.) AD d.) ACD

(a)

[Q3] Consider relation R(A, B, C, D, E) with the single functional dependency ABC → DE that conforms to BCNF. Provide one additional functional dependency that would render the relation no longer in BCNF.

D → E ,



20/21

CS 571 – I.C.E. #6 Name: Hema venkada Gatte

[Q1] Using the Company Schema, provide syntactically correct DML to add a record for a new employee and their spouse dependent. Use any valid data you like.

Insert into EMPLOYEE (Fname, Minit, Lname, ssn, Bdate, Address, Sex, Salary, Super_ssn, Dno) values ('Hema', 'G', '1234', 3092227929, 29/04/1994, '1115 North underHill, USA, Tx', 'F'. 70,000, 9848567811, 20):

Insert into DEP~~AR~~ENDENT (Essn, Dependent-Name, sex, Bdate Relationship) values (9886666920, 'Suresh', '~~S~~M', 06/11/1980, 'Husband');

4

[Q2] Using the Company Schema, provide syntactically correct DML to change the first name of the employee you added in Q1 and the name of that employee's dependent. Use the key to identify the records in the change. Use any valid data you like.

UPDATE EMPLOYEE SET Fname = 'Gatte' where Ssn = '123456789;

4

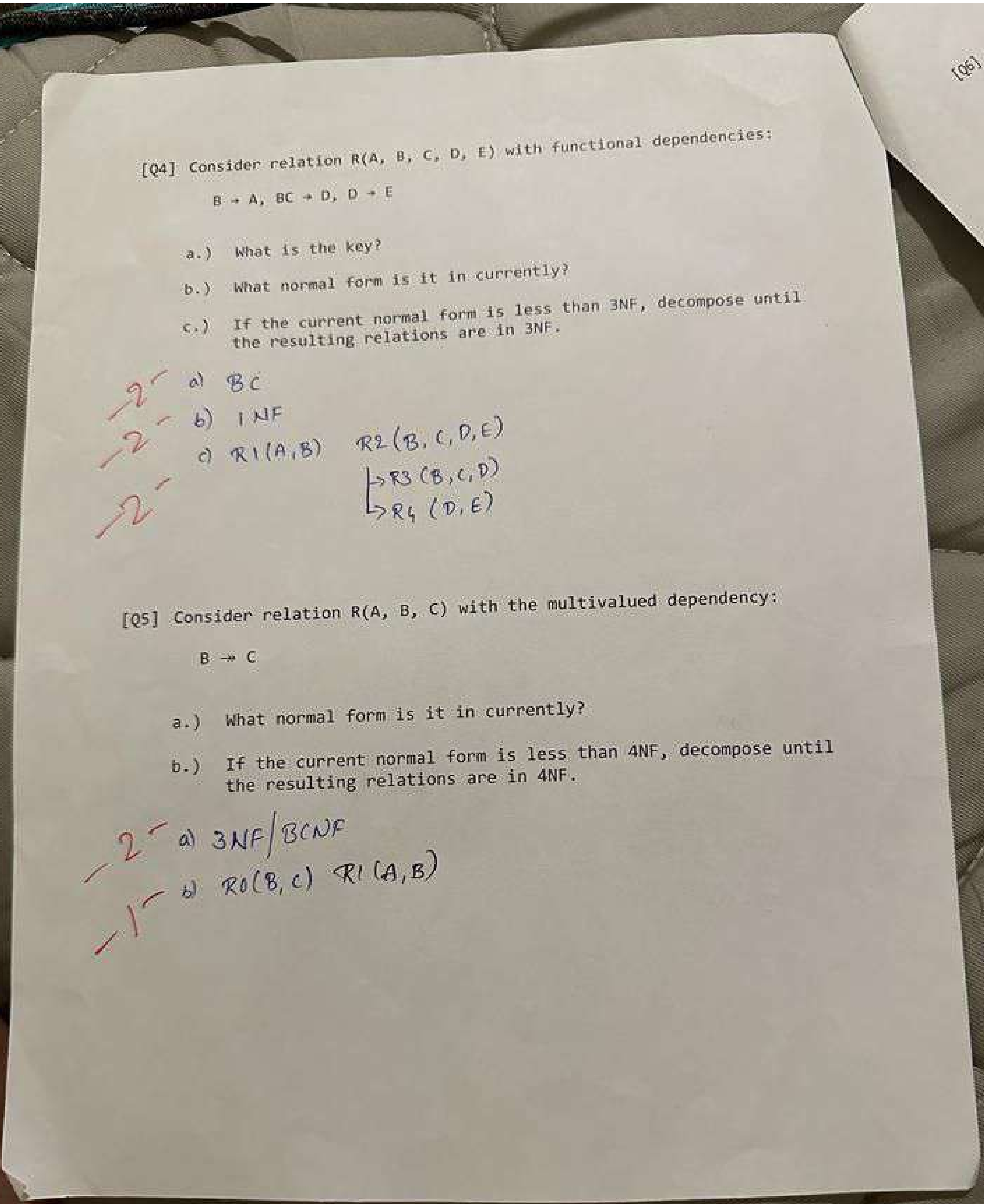
UPDATE DEPENDENT SET Dependent_Name = 'Hema' where Essn = 984806873 AND Relationship = 'SPOUSE';

[Q3] Using the Company Schema, provide syntactically correct DML to remove the records you added in Q1. Use the key to identify the records to remove.

4

Delete from EMPLOYEE where SSn = 9848567811;

Delete from DEPENDENT where ESSn = 9848567811 AND Relationship = 'SPOUSE';



[Q4] Consider relation R(A, B, C, D, E) with functional dependencies:

$B \rightarrow A$, $BC \rightarrow D$, $D \rightarrow E$

a.) What is the key?

b.) What normal form is it in currently?

c.) If the current normal form is less than 3NF, decompose until the resulting relations are in 3NF.

✓2✓ a) BC

✓2✓ b) 1NF

✓2✓ c) R1(A,B) R2(B,C,D,E)

↳R3(B,C,D)

↳R4(D,E)

[Q5] Consider relation R(A, B, C) with the multivalued dependency:

$B \twoheadrightarrow C$

a.) What normal form is it in currently?

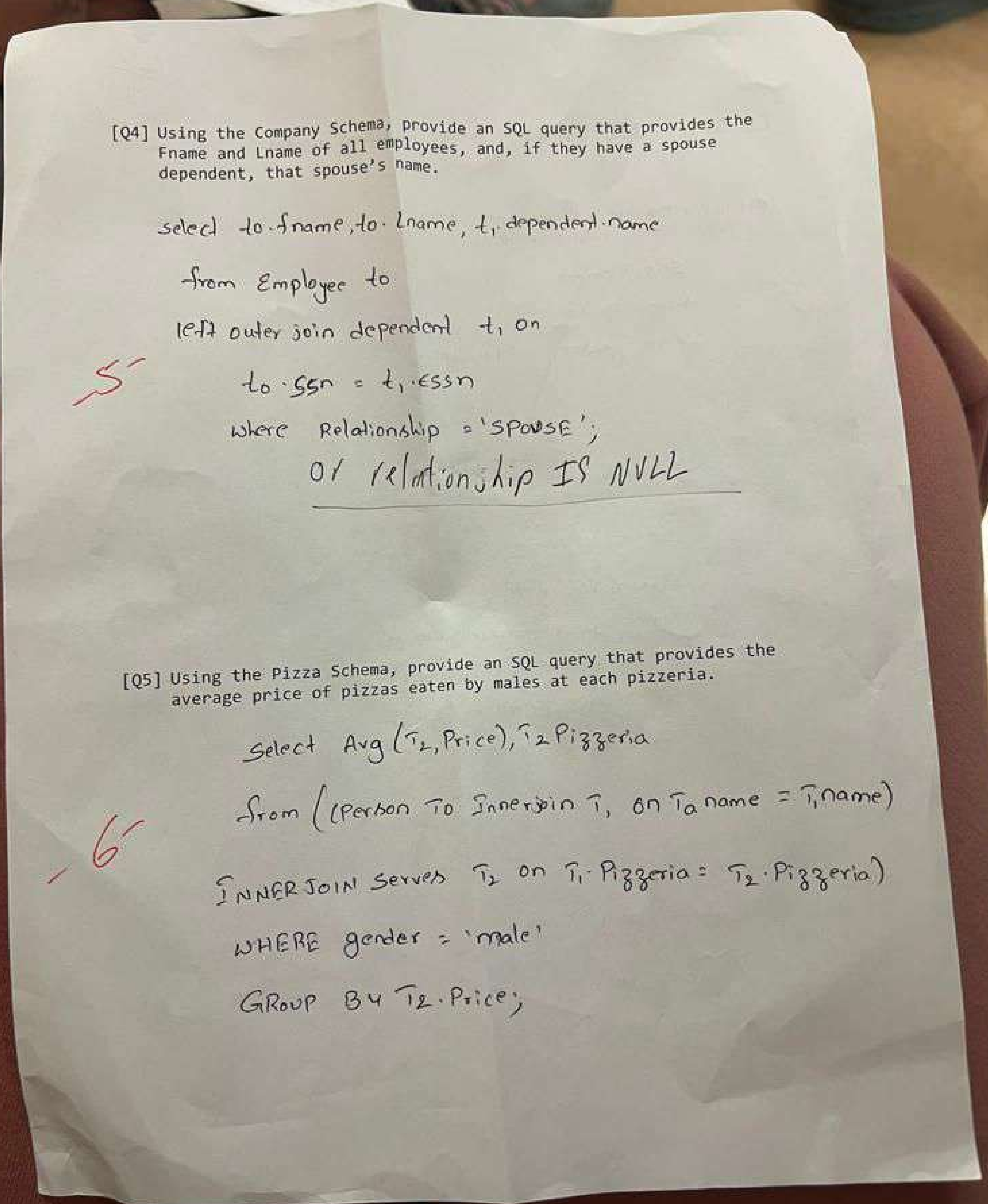
b.) If the current normal form is less than 4NF, decompose until the resulting relations are in 4NF.

✓2✓ a) 3NF/BCNF

✓1✓ b) R0(B,C) R1(A,B)

[Q6] Conside

multi



[Q4] Using the Company Schema, provide an SQL query that provides the Fname and Lname of all employees, and, if they have a spouse dependent, that spouse's name.

```
select to.fname, to. Lname, t1.dependent.name
 from Employee to
 left outer join dependent  t1 on
-5      to.ssn = t1.essn
        where  Relationship = 'SPOUSE';
           or relationship IS NULL
```

[Q5] Using the Pizza Schema, provide an SQL query that provides the average price of pizzas eaten by males at each pizzeria.

```
        Select  Avg (T2, Price), T2 Pizzeria
        from ((Person To Innerjoin T1  on Ta name = T1name)
 -6
      INNERJOIN Serves  T2  on T1.Pizzeria = T2.Pizzeria)
        WHERE gender = 'male'
        GROUP BY T2.Price;
```

[Q4] You have a requirement that all changes to a certain table be logged whenever data in that table is changed or removed. What stored database object is appropriate for this task?

-2'

Triggers

[Q5] You have a series of related tables that are used together throughout your application. The columns needed and the criteria for selection vary throughout your application. What stored database object is appropriate such that it will make retrieval from these tables more concise and less error prone?

-2'

views

[Q6] Your application records users' ratings of games. The users rate the games as "Recommend" (stored numerically as a 1) or "Not Recommend" (stored numerically as a 0). A number between 0 and 1 can be calculated by dividing the sum of those ratings over the count of those ratings. You want to classify that number for your users such that if the calculated value is:

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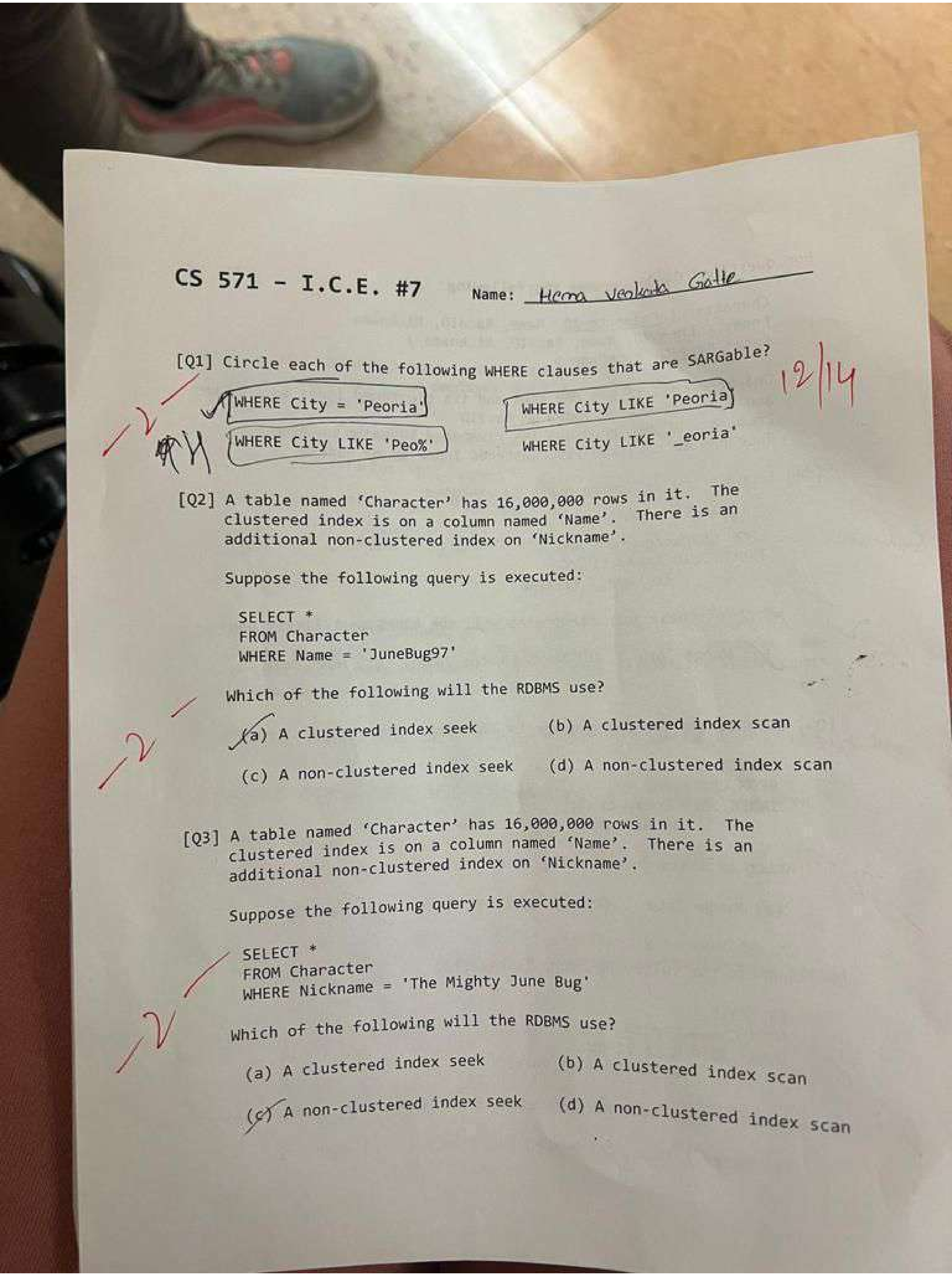
[Q7] You have a series of operations that involves updating data in some tables, inserting data into others, and involves complex conditional logic. The series of operations does not return a result set, but does need to be run periodically. What stored database object is appropriate for this task?

2'

Stored Procedure



CS 571 - I.C.E. #7

Name: Hema Venkata Gatle

12/14

[Q1] Circle each of the following WHERE clauses that are SARGable?

/2

[✓ WHERE City = 'Peoria'] [✓ WHERE City LIKE 'Peoria']

[✓ WHERE City LIKE 'Peo%'] WHERE City LIKE '_eoria'

[Q2] A table named 'Character' has 16,000,000 rows in it. The clustered index is on a column named 'Name'. There is an additional non-clustered index on 'Nickname'.

Suppose the following query is executed:

```
SELECT *
FROM Character
WHERE Name = 'JuneBug97'
```

Which of the following will the RDBMS use?

/2

[✓ (a) A clustered index seek] (b) A clustered index scan

(c) A non-clustered index seek (d) A non-clustered index scan

[Q3] A table named 'Character' has 16,000,000 rows in it. The clustered index is on a column named 'Name'. There is an additional non-clustered index on 'Nickname'.

Suppose the following query is executed:

```
SELECT *
FROM Character
WHERE Nickname = 'The Mighty June Bug'
```

/2

Which of the following will the RDBMS use?

(a) A clustered index seek (b) A clustered index scan

[✓ (c) A non-clustered index seek] (d) A non-clustered index scan