Faculty of Engineering and Computer Science
Expectations of Originality

This form sets out the requirements for originality for work submitted by students in the Faculty of Engineering and Computer Science. Submissions such as assignments, lab reports, project reports, computer programs and take-home exams must conform to the requirements stated on this form and to the Academic Code of Conduct. The course outline may stipulate additional requirements for the course.

1. Your submissions must be your own original work. Group submissions must be the original work of the students in the group.
2. Direct quotations must not exceed 5% of the content of a report, must be enclosed in quotation marks, and must be attributed to the source by a numerical reference citation[1]. Note that engineering reports rarely contain direct quotations.
3. Material paraphrased or taken from a source must be attributed to the source by a numerical reference citation.
4. Text that is inserted from a web site must be enclosed in quotation marks and attributed to the web site by numerical reference citation.
5. Drawings, diagrams, photos, maps or other visual material taken from a source must be attributed to that source by a numerical reference citation.
6. No part of any assignment, lab report or project report submitted for this course can be submitted for any other course.
7. In preparing your submissions, the work of other past or present students cannot be consulted, used, copied, paraphrased or relied upon in any manner whatsoever.
8. Your submissions must consist entirely of your own or your group's ideas, observations, calculations, information and conclusions, except for statements attributed to sources by numerical citation.
9. Your submissions cannot be edited or revised by any other student.
10. For lab reports, the data must be obtained from your own or your lab group's experimental work.
11. For software, the code must be composed by you or by the group submitting the work, except for code that is attributed to its sources by numerical reference.

You must write one of the following statements on each piece of work that you submit:
For individual work: **"I certify that this submission is my original work and meets the Faculty's Expectations of Originality",** with your signature, I.D. #, and the date.
For group work: **"We certify that this submission is the original work of members of the group and meets the Faculty's Expectations of Originality",** with the signatures and I.D. #s of all the team members and the date.

A signed copy of this form must be submitted to the instructor at the beginning of the semester in each course.

I certify that I have read the requirements set out on this form, and that I am aware of these requirements. I certify that all the work I will submit for this course will comply with these requirements and with additional requirements stated in the course outline.

Course Number:	Comp 353	Instructor:	Prof. Khaled Jababo
Name:	Andre Hei Wang Law	I.D. #	4017 5600
Signature:		Date:	2023-07-22

[1] Rules for reference citation can be found in "Form and Style" by Patrich MacDonagh and Jack Bordan, fourth edition, May, 2000, available at http://www.encs.concordia.ca/scs/Forms/Form&Style.pdf.
Approved by the ENCS Faculty Council February 10, 2012

Andre Hei Wang Law

4017 5600

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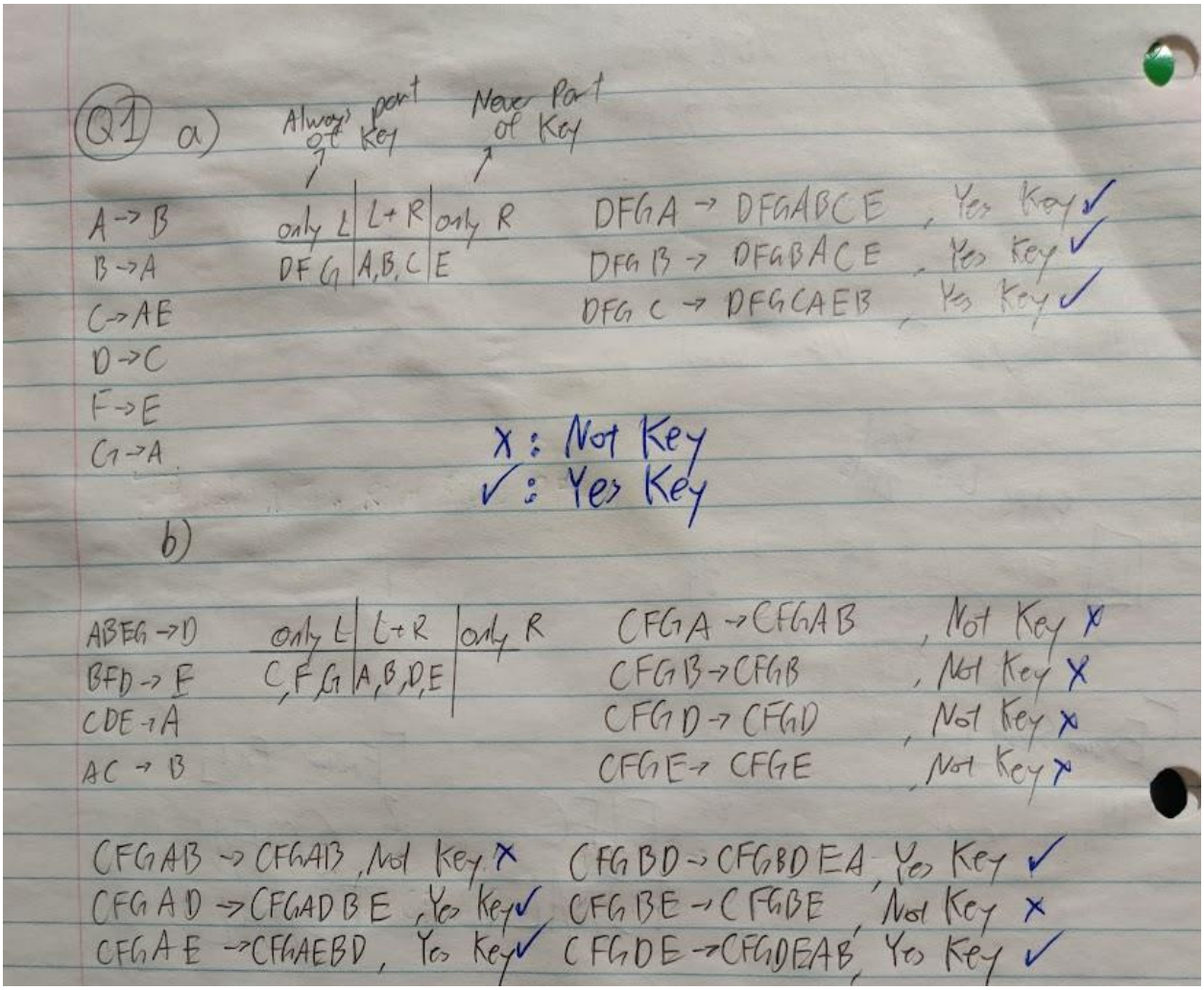
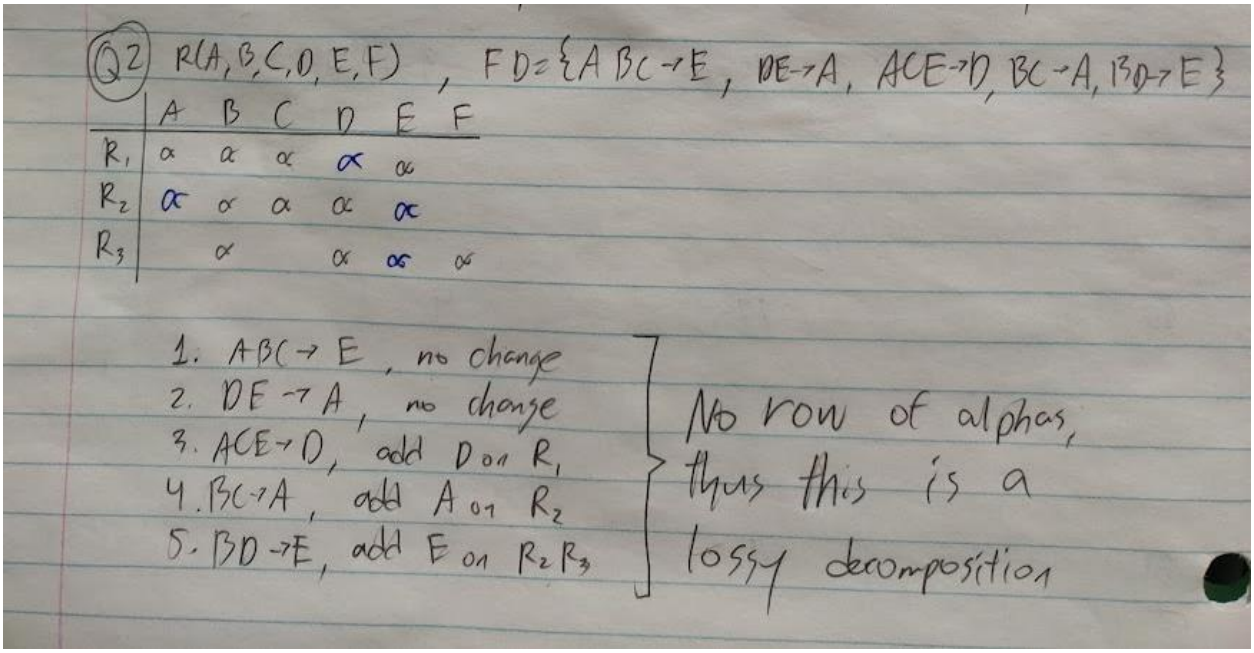
Comp 353 Assignment 3

Question 1:



Question 2:



(Q2) R(A, B, C, D, E, F), FD = {AB → E, DE → A, ACE → D, BC → A, BD → E}

	A	B	C	D	E	F
R_1	α	α	α	α	α	
R_2	α	α	α	α	α	
R_3		α		α	α	α

1. AB → E, no change
2. DE → A, no change
3. ACE → D, add D on R_1
4. BC → A, add A on R_2
5. BD → E, add E on R_2 R_3

No row of alphas, thus this is a lossy decomposition

Question 3:

Q3 a)

Always part of Key	Maybe	Never
only L	L + B	only R
H	A, B, C, E, F	D, G

AB → D
E → C
C → E
F → BG
BC → AD
H → CF
B → A

HA → HACFBGDE, Yes Key
HB → HBCFEGAD, Yes Key
HC → HCFBGEAD, Yes Key
HE → HECFBGAD, Yes Key
HF → HFCEBGAD, Yes Key
} All has H

H → HCFEBGAD, Yes Key (Candidate Key)

b)

AB → D
E → C
C → E, Removed, because of E → C
F → BG
BC → AD, Removed, because of AB → D
H → CF
B → A

Canonical Form:
F = {AB → D, E → C, F → BG, H → CF, B → A}

c) R = ABCDEFGH, F = {AB → D, E → C, C → E, F → BG, BC → AD, H → CF, B → A}

AB → D

R_1 = ABD
F_1 = {AB → D}

R_2 = CEFGH, F_2 = { //, //, //, //, //, // }

E → C

R_{21} = EC
F_{21} = {E → C}

R_{22} = FGH
⋮

d) R = ABCDEFGH
F = {AB → D, E → C, C → E, F → BG, BC → AD, H → CF, B → A}

AB → D

R_1 = ABD
F_1 = {AB → D}

R_2 = ABCDEFGH
F_2 = {E → C, C → E, F → BG, BC → AD, H → CF, B → A}

E → C

R_{21} = EC
F_{21} = {E → C}

R_{22} = ABCDEFGH
F_{22} = {C → E, F → BG, BC → AD, H → CF, B → A}
⋮

Decomposition into BCNF goes until the last relation. Two repeatitive. But same logic until the end. Thank You

Question 4:

a)

```
a = π type, gender, locName, name ((Animals ⋈ Admission)
⋈[dateAdmitted >= 20 January 2021 AND dateAdmitted <= 20 February
2021](Adoption ⋈ Adopter))
```

b)

```
adopted = π aID (Animals ⋈ Adoption)
multi_adopted = π aID ((adopted) ⋈ π aID (adopted))
b = π aID, type, gender, chipNo (Animals ⋈ multi_adopted)
```

c)

```
adopters = π SIN, name, phone (Adopter)
adopters_locations = adopters ⋈ Admission ⋈ HSO_Location
c = adopters ⋈[province ≠ province](Adoption ⋈ Admission ⋈
HSO_Location)
```

d)

```
f_animals = π aID (Animals | gender = "Female")
adopters_f_animals = π SIN ((Adoption ⋈ Animals) ⋈ f_animals)
adopters_only_f_animals = adopters_f_animals - π SIN (Adoption ⋈ π
SIN, aID (Adoption ⋈ (f_animals - Animals)))
d = adopters ⋈ adopters_only_f_animals
```

e)

```
all_type = π type (Animals)
adopters = π SIN, name, phone (Adopter)
adopters_with_all_type = adopters ÷ π SIN (Adoption ⋈ all_type)
e = adopters ⋈ adopters_with_all_type
```