

COMP 3005
Assignment #1
Due: September 21

Solution and Marking Scheme

Instruction

1. You should do the assignments independently. Copying is not allowed
2. Submit your assignment as a single word/PDF document on culearn.

Queries (70 marks)

Given the **Person-Hobby** database shown below. Use relational algebra (ALG) to expression the following queries. Submit your query expressions as well as the query results for each query. Each query is 4 marks and the result is 1 mark.

Person

<u>P#</u>	Name	Age
P1	Smith	20
P2	Jones	30
P3	Blake	25
P4	<i>Lastname</i>	20
P5	Adams	30

Hobby

<u>H#</u>	Name
H1	Bowling
H2	Chess
H3	Dancing
H4	Hiking
H5	Skating
H6	Ski

Play

<u>P#</u>	<u>H#</u>	Times
P1	H1	3
P1	H2	2
P1	H3	4
P1	H4	2
P1	H5	1
P1	H6	1
P2	H1	3
P2	H2	4
P2	H3	5
P2	H4	2
P3	H2	2
P3	H3	3
P4	H2	3
P4	H3	4

As Person and hobby both have Name, cannot njoin Person, Play and Hobby. If so deduct 1 mark for the answer. Note there are many different ways for each query.

1. Get the names of hobbies that “*lastname*” plays.

T1:= SELECT NAME='Lastname' (PERSON NJOIN PLAY)
T2:= PROJECT H# (T2)
PROJECT NAME (HOBBY NJOIN T2)

T1:= RENAME PERSON to PERSON(P#,Pname,Age)
T2 := T1 NJOIN PLAY NJOIN HOBBY
PROJECT NAME (SELECT PNAME =”Lastname” (T2))

NAME

CHES

DANCING

2. Get the names of persons who play Bowling.

```
T1 := PROJECT P# (SELECT NAME='Bowling' (HOBBY NJOIN PLAY)
PROJECT NAME (PERSON NJOIN T1)
```

NAME

Smith

Jones

3. Get the names of persons who play a hobby more than 3 times.

```
T1:= PROJECT P# (SELECT TIMES>3 (HOBBY NJOIN PLAY)
PROJECT NAME (PERSON NJOIN T1)
```

NAME

Smith

Jones

Lastname

4. Get the names of persons who play either chess or dancing.

```
T1:= PROJECT P# (SELECT NAME='Chess' OR NAME='Dancing' (PLAY NJOIN HOBBY)
PROJECT NAME (PERSON NJOIN T1)
```

NAME

Smith

Jones

Blake

Lastname

5. Get the names of persons who play both chess and dancing.

```
T1 := PROJECT H# (SELECT NAME='Chess' OR NAME='Dancing' (HOBBY));
T2 := PROJECT P#, H# (PLAY);
T3 := T2 DIVIDEBY T1;
PROJECT NAME (PERSON NJOIN T3)
```

NAME

Smith

Jones

Blake

Lastname

6. Get the person name/hobby name pairs such that the indicated person plays the indicated hobby.

```
T1(P#, HNAME) := PROJECT P#, NAME (PLAY NJOIN HOBBY)
PROJECT NAME, HNAME (PERSON NJOIN T1)
```

NAME HOBBYNAME

Smith, Bowling
Smith, Chess
Smith, Dancing
Smith, Hiking
Smith, Skating
Smith, Ski
Jones, Bowling
Jones, Chess
Jones, Dancing
Jones, Hiking
Blake, Chess
Blake, Dancing
Lastname, Chess
Lastname, Dancing

7. Get the names of persons who do not play Ski.

```
T1 := PROJECT P# (SELECT NAME='Ski' (PLAY NJOIN HOBBY))
T2 := PROJECT P# (PERSON)
T3 := T2 MINUS T1;
PROJECT NAME (PERSON NJOIN T3)
```

NAME

Jones
Blake
Lastname
Adams

8. Get the names of persons who do not play any hobby.

```
T1 := PROJECT P# (PERSON)
T2 := PROJECT P# (PLAY)
T3 := T1 MINUS T2
PROJECT NAME (PERSON NJOIN T3)
```

NAME

Adams

9. Get the names of persons who play all hobbies.

```
T1 := PROJECT P#,H# (PLAY)
T2 := PROJECT H# (HOBBY)
T3 := T DIVIDEBY T2
```

PROJECT NAME (PERSON NJOIN T3)

NAME

Smith

10. Get the names of persons who play all hobbies that “*lastname*” plays.

```
T1 := PROJECT H# (SELECT NAME='Lastname' (PLAY NJOIN PERSON))
T2 := PROJECT P#, H# (SELECT NAME!='Lastname' (PLAY NJOIN PERSON))
T3 := T2 DIVIDEBY T1
```

PROJECT NAME (PERSON NJOIN T3)

NAME

Smith
Jones
Blake

11. Get the names of persons who play only all the hobbies that “*lastname*” plays.

```
-- H# for hobbies that that “lastname” plays
T1 := PROJECT H# (SELECT NAME='Lastname' (PLAY NJOIN PERSON))
-- P#,H# without “lastname”
T2 := PROJECT P#, H# (SELECT NAME!='Lastname' (PLAY NJOIN PERSON))
-- P# for persons who play all hobbies with H# in T1
T3 := PROJECT P# (T2 DIVIDEBY T1);
PROJECT NAME (PERSON NJOIN T3)
```

NAME

Blake

12. Get the names of persons who play all hobbies except Skating and Ski.

```
-- P# for persons who play Skating or Ski
T1 := PROJECT P# (SELECT NAME='Skating' OR NAME='Ski' (HOBBY NJOIN PLAY))
-- H# for hobbies other than Skating and Ski
T2 := PROJECT H# (SELECT NAME!= 'Skating' OR NAME='Ski' (HOBBY))
T3 := PROJECT P#, H# (PLAY);
-- P# for persons who play all hobbies in T2
T4 := T3 DIVIDEBY T2;
-- Exclude persons in T1
T5 := T4 - T1;
PROJECT NAME (PERSON NJOIN T5)
```

NAME

Jones

13. Get the names of persons, the number of hobbies and total number of times they play those hobbies.

```
T1(P#, HOBBYCNT, TOTALNO) := AGGREGATE P#, COUNT(*), SUM(TIMES) (PLAY);  
PROJECT NAME, HOBBYCNT, TOTALNO (PERSON NJOIN (T1))
```

NAME	HOBBYCNT	TOTALNO
Smith	6	13
Jones	4	14
Blake	2	5
Lastname	2	7

14. Get the names of persons who play hobbies but play the least number of hobbies.

```
-- GET THE NUMBER OF HOBBYS EACH PERSON PLAYS
```

```
T1(P#, HOBBYCNT) := AGGREGATE P#, COUNT(*) (PLAY);
```

```
-- GET THE LEAST AMOUNT OF HOBBYS THAT WHERE CHECKED OUT:
```

```
PROJECT NAME (SELECT MIN(HOBBYCNT)(PERSON NJOIN T1))
```

```
NAME
```

```
-----
```

```
Blake
```

```
Lastname
```