COMP 3005
Assignment #2
Due: October 5

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 Tuple Relational Calculus (TRC) to expression the following queries. Submit your query expressions as well as the query results for each query. Each query is 5 marks.

Person

P#	Name	Age
P1	Smith	20
P2	Jones	30
P3	Blake	25
P4	*Lastname*	20
P5	Adams	30

Hobby

H#	Name
H1	Bowling
H2	Chess
H3	Dancing
H4	Hiking
H5	Skating
H6	Ski

Play

P#	H#	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

For queries 1-13, students should use only one query and use more than one will not get any mark.

1. Get the names of hobbies that "*lastname*" plays.

   {H.name| H in Hobby and (exists P in person, Y in Play) (P.P#=Y.P# and Y.H#=.H.H# and P.name=' Lastname')};
   Results:
   Chess
   Dancing

2. Get the names of persons who play Bowling.

   {P.name| P in Person and (exists Y in Play, H in Hobbies) (P.P#=Y.P# and Y.H#=.H.H# and H.name=' Bowling')};

Results:
Smith
Jones

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

   {P.name| P in Person and (exists H in Hobby, Y in Play) (P.P#=Y.P# and Y.times > 3')};
   Results:
   Smith
   Jones
   Lastname

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

   {P.name | P in Person and (exists H in Hobby, Y in Play)(P.P#=Y.P# and Y.H#=H.H# and (H.name = 'Chess' or H.name = 'Dancing'))};

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

   {P.name| P in Person and (exists Y1 in Play, H1 in Hobby) (P.P#=Y1.P# and Y1.H#=.H1.H# and H1.name='Chess')
   and (exists Y2 in Play, H2 in Hobby) (P.P#=Y2.P# and Y2.H#=.H2.H# and H2.name='Dancing') };
   Note here we can use just one Y and one H:
   {P.name| P in Person and (exists Y in Play, H in Hobby) (P.P#=Y.P# and Y.H#=.H.H# and H.name='Chess')
   and (exists Y in Play, H in Hobby) (P.P#=Y.P# and Y.H#=.H.H# and H.name='Dancing') };

   Results:
   Smith
   Jones
   Blake
   Lastname

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

   {P.name, H.name| P in Person and (exists Y in Play) (P.P#=Y.P# and Y.H#=.H.H#)};

   Results:

Smith	Bowling
Smith	Chess
Smith	Dancing
Smith	Hiking
Smith	Skate
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.

```
{P.name| P in Person and not (exists Y in Play, H in Hobbies) (P.P#=Y.P# and Y.H#=.H.H# and H.name=' Ski')};
```

Results:
Jones
Blake
Lastname
Adams

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

```
{P.name| P in Person and not (exists Y in Play) (P.P#=Y.P#)};
```

Results:
Adams

9. Get the names of persons who play all hobbies.
10. Get the names of persons who play all hobbies that "*lastname*" plays.

```
{P'.name| P' in Person and P'.name != 'Lastname' and
        (exists P in Person)(P.Name = 'Lastname' and
        (forall H in Hobbies)
                (exists Y in Play, Y' in Play) (P.P#=Y.P# and Y.H#=.H.H# and P'.P#=Y'.P# and Y'.H#=Y.H#)
                or
                not (exists Y in Play) (P.P#=Y.P# and Y.H#=.H.H#)}
```

Results:
Smith
Jones
Blake

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

```
{P'.name| P' in Person and P'.name != 'Lastname' and
        (exists P in Person)(P.Name = 'Lastname' and
        (forall H in Hobbies)
                (exists Y in Play, Y' in Play) (P.P#=Y.P# and Y.H#=.H.H# and P'.P#=Y'.P# and Y'.H#=Y.H#)
                or
                not (exists Y in Play, Y' in Play) (P.P#=Y.P# and Y.H#=.H.H# and P'.P#=Y'.P# and Y'.H#=Y.H#)}
```

Results:
Blake

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

```
{P.name| P'in Person and
```

(forall H in Hobbies)
(H.name='Ski' or H.name='ski) and not (exists Y in Play) (P.P#=Y.P# and Y.H#=.H.H#)
or
(H.name !='Ski' and H.name != 'ski') and (exists Y in Play) (P.P#=Y.P# and Y.H#=.H.H#))

Results:
Jones

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

{P.name, count(Y.H#), sum(Y.times) | P in Person and Y in Play and P.P#=Y.P#}
Results:

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.

T(name, no):= {P.name, count(Y.H#) | P in Person and Y in Play H in Hobby and P.P#=Y.P# and Y.H#=H.H#}
{P.name | P in T and min(T.no)}
Results:

Blake	2
Lastname	2