

# CS 431 Programming Languages Lab

## Prolog Assignment # 1

**Due Date: Sunday, 19 October 2014, Midnight**

### Objectives:

- To become familiar with the declarative nature of Prolog by writing simple programs in terms of facts and rules, which define the problem statement and not some algorithm to solve the problem
- To understand recursive rules.

### Exercise 1

**Max. Marks 10**

#### The stolen ring.

Mary noticed that her wedding diamond ring is missing from the hotel room. Find out who is the thief considering the following information:

The thief had long brown hair and wearing black shoes.

A person has long black hair if he/she is staying in room 100.

A person has short brown hair if he/she is staying in room 102.

A person has long brown hair if he/she is staying in room 205.

A person has long brown hair if he/she is staying in room 210.

A person is in room 205 if he/she wore black coat.

A person is in room 102 if he/she wore blue shirt.

A person is in room 210 if she wore red gown.

A person wore blue shirt if he was wearing a black tie.

A person wore a red gown if she is bridesmaid.

A person wore black shoes if she was wearing a silver bracelet.

A person wore black shoes if he was wearing a black tie.

James was wearing black coat.

Joe was wearing black shoes.

Jenny was wearing silver bracelet.

Jenny is bridesmaid.

Joy is bridesmaid.

Jacy is bridesmaid.

For example, here is a sample query:

```
?- thief(X).
```

## Exercise 2

Max. Marks 5

Consider the following facts about the area of five Indian states.

Rajasthan is larger than Madhya Pradesh.

Madhya Pradesh is larger than Maharashtra.

Maharashtra is larger than Andhra Pradesh.

Andhra Pradesh is larger than Uttar Pradesh.

Write a recursive program to determine the following:

- (a) List all the states that are larger than Andhra Pradesh. [Hint: see the usage of ';' in Prolog]
- (b) Is Rajasthan larger than Uttar Pradesh?

## Exercises 3

Max. Marks 5

CITY 1 → CITY 2 → CITY 3 → CITY 4 → CITY 5 → CITY 6

A one way road links 6 cities. Write a recursive program that can determine if you can travel from one city to another. For example, here are two sample queries:

```
?- can_get(city1,city4).
```

*yes*

```
?- can_get(city3,city1).
```

*no*