National University

OfComputer&EmergingSciencesFaisalabad-ChiniotCampus

AI 2002 Artificial Intelligence Course Instructor Ms. Mahzaib Younas		
Time allowed = 30 min	**Quiz 4**	**Total Marks = 25**

BCS Section A

_____	_____	_____
Roll No	**Name**	**Signature**

Question No 01: For each English sentence below, write the FOL sentence that best expresses its intended meaning. **[10]**

a) All persons are mortal. [Use: Person (x), Mortal (x)]

b) There exists some persons who are not mortal [Use: Person (x), Mortal (x)]

c) Fifi has a sister who is a cat. [Use: Sister (Fifi, x), Cat (x)]

d) All cats are Fifi's sisters. [Use: Sister (Fifi, x), Cat (x)]

e) For every food, there is a person who eats that food. [Use: Food (x), Person (y), Eats(y, x)]

f) For every person, there exists a food eaten by that person. [Use: Food (x), Person (y), Eats(y, x)]

g) Every person eats every food [Use: Person (x), Food (y), Eats(x, y)]

h) All greedy kings are evil [Use: King (x), Greedy (x), Evil (x)]

i) There exists some kings who are greedy and evil [Use: King (x), Greedy (x), Evil (x)]

j) Everyone has a favourite food [Use: Person (x), Food (y), Favourite(y, x)]

Question No 02:

Let's imagine a scenario in a company where every employee reports to exactly one manager. How can we represent this relationship using first-order logic? **[5]**

1) **Define unary relations: [2]**

2) **Define a binary relation: [1]**

3) **Express the relationship using quantifiers: [2]**

Question No 03:

Let's consider a scenario where every student in a school is either a member of the math club or the science club. How can we represent this using first-order logic? **[7]**

1) **Define unary relations: [3]**

2) **Define binary relations: [2]**

3) **Express the relationship using quantifiers and logical connectives: [2]**

Question No 04:

Let's consider each scenario and formulate an atomic sentence to express their relationships. **[3]**

1) **Richard the Lionheart was the brother of King John. Formulate an atomic sentence using the Brother relation to express this relationship.**

2) **King John wore a crown. Using the OnHead relation, create an atomic sentence to represent this fact.**

3) **It is known that the left legs of Richard and John were different. Utilize the LeftLegOf function to construct an atomic sentence highlighting this dissimilarity.**