

SIR SYED UNIVERSITY OF ENGINEERING & TECHNOLOGY
SOFTWARE ENGINEERING DEPARTMENT

SPRING 2021

Artificial Intelligence (SWE-314)
Assignment 3

Semester: V
Due Date: 2nd/May/2021

Batch: 2019
Max Marks: 10

Instructions:

- Solution must be **hand written** and submitted in form of **Softcopy on VLE** otherwise not accepted.
- Assignment must be submitted in **Group (4 max.)**.
- **Late Submissions** will not be acknowledged.

Question#01

Consider the following sentences. Translate to propositional sentences and use enumeration/truth table method to prove the goal.

- a. If the cake is made with sugar, then the cake is sweet.
- b. The cake is made with sugar.

Goal: The cake is sweet.

Question#02

Use the truth table method to verify the following sentences are valid (tautology), satisfiable (contingency) or unsatisfiable (contradiction).

- a. $(P \Rightarrow Q) \wedge \neg Q \Rightarrow \neg P$
- b. $(P \Rightarrow Q) \Rightarrow (P \Rightarrow \neg Q)$

Question#03

Formalize the following sentences using FOL formulas.

- a. All Students are smart.
- b. Everyone likes someone
- c. There exists a smart student.
- d. All dolphins are mammal.
- e. Albert takes either OOP or Calculus (but not both).
- f. Albert takes OOP and Calculus.
- g. Bill doesn't take Software Requirement Engineering.
- h. Every student who takes Artificial Intelligence also takes Computer Communication Network.
- i. Ahmed has at least one sister.
- j. Someone bought everything

Question#04

Consider the following knowledge base and solve using Forward Chaining.

- a. If x is a parent of y, then x is older than y
- b. If x is the mother of y, then x is a parent of y
- c. Lulu is the mother of Fifi

Prove: Lulu is older than Fifi

Question#05

Convert given sentences into FOL and through backward chaining derived "**John is isolated**".

- a. If the patient has red-spots and fever, then patient of measles
- b. If the patient has measles, then patient of contagious
- c. If the patient has runny-nose, then the patient has cold
- d. If the patient has meningitis, then patient of contagious

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- e. If the patient has cold, then patient of contagious
- f. If the patient has contagious and dangerous, then patient is isolated
- g. If the patient has fever and stiff-neck, then patient of meningitis
- h. If the patient has meningitis, then patient of dangerous
- i. Mary has runny-nose and fever and red-spots
- j. John has fever and stiff-neck

Question#06

Discuss the following.

- a. Artificial Neural Network with the help of an example.
- b. Define Supervised learning, unsupervised learning and reinforcement learning.
- c. Difference between Machine Learning and Deep Learning.
- d. List 5 applications areas of Artificial Intelligence.

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