

R18

Code No: 158EF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech IV Year II Semester Examinations, June - 2024

COGNITIVE COMPUTING

(Computer Science and Engineering (Artificial Intelligence and Machine Learning))

Time: 3 Hours

Max. Marks: 75

- Note:** i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

- 1.a) What is the main focus of IBM's Watson? [2]
- b) How does design for human cognition contribute to user experience in technology?[3]
- c) What are the two main types of memory discussed in cognitive science? [2]
- d) How do computational models contribute to understanding psycholinguistics? [3]
- e) Name two aspects of cognition that cognitive modeling seeks to understand. [2]
- f) Explain the significance of classical models of rationality in decision-making and problem-solving. [3]
- g) What is the primary focus of cognitive development in children? [2]
- h) How do formal models of categorization and similarity contribute to our understanding of cognitive processes? [3]
- i) Name one key component of the Unstructured Information Management Architecture (UIMA). [2]
- j) How does UIMA process unstructured data and transform it into structured knowledge? [3]

PART – B

(50 Marks)

- 2.a) Analyze the role of cognitive modeling paradigms in understanding human thought processes, providing examples to support your argument.
- b) Evaluate the effectiveness of declarative/logic-based computational cognitive modeling in solving complex problems, using specific case studies to illustrate your points. [5+5]

OR

3. Discuss the significance of the dynamical systems approach to cognition in understanding how humans perceive and interact with the environment, providing examples from different domains such as psychology, neuroscience, or robotics. [10]
- 4.a) Design a computational model of semantic memory that incorporates concepts such as spreading activation and semantic networks.
- b) Critically assess the limitations of computational models of memory and language, considering factors such as complexity, scalability, and ecological validity. [5+5]

OR

- 5.a) Evaluate the role of connectionist models in explaining the relationship between memory and language processing.
- b) Design a study to validate a computational model of memory or language using empirical data. [5+5]

- 6.a) Analyze the impact of cognitive modeling on understanding the interaction between language, memory, and learning processes.
- b) Analyze the role of cognitive modeling in understanding the cognitive processes involved in problem-solving and decision-making under constraints or time pressure. [5+5]

OR

- 7. Analyze how cognitive modeling can contribute to the development of artificial intelligence systems with human-like cognitive abilities. [10]
- 8. Critically evaluate the role of inductive generalization in cognitive processes. Discuss its importance in learning and problem-solving, and analyze how formal models contribute to our understanding of this cognitive mechanism. [10]

OR

- 9.a) Evaluate the effectiveness of artificial cognitive architectures such as ACT-R, SOAR, OpenCog, and CopyCat in simulating human-like cognition.
- b) Assess the impact of cognitive development theories on education and learning strategies. [5+5]

- 10.a) Using the Unstructured Information Management Architecture (UIMA), design a cognitive application for analyzing customer reviews in the hospitality industry.
- b) Utilize the DeepQA architecture to create a cognitive system for analyzing legal documents and providing legal assistance. [5+5]

OR

- 11.a) Apply cognitive computing techniques to build a recommendation system for personalized learning in online education.
- b) Design a cognitive computing system for analyzing social media data to predict consumer trends and preferences for a marketing campaign. [5+5]

---ooOoo---