



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## University Examinations 2013/2014

FOURTH YEAR, FIRST SEMESTER EXAMINATION FOR DEGREE OF BACHELOR OF  
SCIENCE IN COMPUTER SCIENCE

AND

THIRD YEAR, SECOND SEMESTER EXAMINATION FOR DEGREE OF BACHELOR OF  
SCIENCE IN COMPUTER SCIENCE

### ICS 2405: KNOWLEDGE BASED SYSTEMS

**DATE: APRIL 2014**

**TIME: 2 HOURS**

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**INSTRUCTIONS:** Answer question *one* and any other *two* questions

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#### QUESTION ONE – (30 MARKS)

- (a) Several strategies may be used to choose the rules to fire from the conflict set: Discuss these strategies. (5 marks)
- (b) Describe the architecture of a typical rule based expert system. (6 marks)
- (c) Discuss four benefits of Expert systems (4 marks)
- (d) Discuss the following uninformed search methods (Blind)
- i. Depth –first search (2 marks)
  - ii. Iterative deepening search (2 marks)
  - iii. Bi-directional search (2 marks)
- (e) Explain the following terms as used in Artificial intelligence.
- i. Intelligence (1 mark)

- ii. Initial state (1 mark)
  - iii. Successor function (1 mark)
  - iv. Path cost (1 mark)
- (f) Distinguish between data-directed and goal-directed analysis in rule-based systems.  
Which is preferred for medical diagnostic systems and why? (5 marks)

**QUESTION TWO – (20 MARKS)**

- (a) A knowledge based systems (KBSs) are developed to deal with particular application domain in which alternative techniques are unable to produce reliable and manageable solutions. Identify and discuss five aspects of human intelligence that could be used to characterize intelligent knowledge-based systems (10 marks)
- (b) List the persons who determine the success of expert system and development. (4 marks)
- (c) Discuss how they can guarantee the failure of expert systems project. (6 marks)

**QUESTION THREE – (20MARKS)**

- (a) Use A\* algorithm to find the path from city S to city G by using the following functions. (10 marks)

- (b) Discuss any two applications of Search Methods. (2 marks)
- (c) It is argued that semantic network representation is closer to the way humans structure knowledge by building mental links between things than the predicate logic. Use the information below to create a semantic network. (8 marks)

Tom is a cat.

Tom caught a bird.

Tom is owned by John.

Tom is ginger in colour.

Cats like cream.

The cat sat on the mat.

A cat is a mammal.

A bird is an animal.

All mammals are animals.

Mammals have fur.

#### **QUESTION FOUR – (20 MARKS)**

- a) Using a suitable example show how Backward Chaining and Forward chaining Algorithm works? (10 marks)
- b) Using suitable examples discuss the following knowledge representation schemes.
  - i. Frames (5 marks)
  - ii. Production rules (5 marks)

#### **QUESTION FIVE – (20 MARKS)**

- a) Reasoning is the process of drawing inferences or conclusions; moving from what is known (fact) to what is unknown (inference). Discuss any four types of reasoning. (8 marks)
- b) Giving examples, Briefly describe the following terms as used in prolog.
  - i. Atom (1 mark)
  - ii. Variables (1 mark)
  - iii. Compound terms (1 mark)
- c) Discuss nay five ways in which agent is different from other software. (5marks)
- d) What is search? (2 marks)
- e) Write the following using wff. “It is raining today so I will not go to work”.(2 marks)