TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

BIT 2319: ARTIFICIAL INTELIGENCE

SPECIAL/SUPPLEMENTARY EXAMINATION
SERIES: OCTOBER 2013
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer Booklet*

This paper consists of **FIVE** questions. Attempt question **ONE** and any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

Question One (Compulsory)

a) Discuss any FOUR critical success factors for the successful implementation of expert systems: **(4 marks)**

b) Explain the importance of Artificial intelligence in industry and the military using one example or reason in each case **(4 marks)**

c) With a suitable example, differentiate between forward chaining and backward chaining rule based inference control **(6 marks)**

d) Define the term knowledge representation and show how rules qualify to be a knowledge representation formalism. Discuss ONE advantage of using rues as a representation formalism. **(7 marks)**

e) Define the term "pattern recognition" and describe one application area where it can be used. **(4 marks)**

f) Answer the following questions by indicating whether the statements are true (T) or false (F) and justify your answer **(5 marks)**

(i) Depth first search is often slower than breadth fist search
(ii) Draughts (checkers) and scabble are both deterministic games
(iii) When playing games, the horizon effect can be solved by limiting the search depth
(iv) A rational intelligent agent acts in such a way as to minimize its expected value of performance measure given the percept sequence to date.
(v) "Two primary school children, Dennis and Sam are playing the Tick-tac-toe game. Dennis makes the first move (starts the game)", The minimum number of moves that Sam could make is 2 for Dennis to win the game.

Question Two

a) Discuss any TWO reasons why psychology may be regarded as a foundation of Artificial Intelligence. State TWO other foundation of Artificial Intelligence. **(8 marks)**

b) Discuss ONE advantage and ONE disadvantage of exhaustive search as a problem solving technique **(2 marks)**
(i) Show how a search problem may be specified **(3 marks)**
(ii) Describe the best-first search. Explain why you would recommend such a search method. **(4 marks)**
(iii) State any TWO real life applications of the search technique **(2 marks)**

c) Describe predicate Calculus as knowledge representation formalisms. State ONE advantage and ONE disadvantage of the knowledge representation formalism. **(5 marks)**

Question Three

a) What is knowledge acquisition **(2 marks)**

b) You have been selected to be part of a team that is assigned the task of developing a knowledge based system. Describe the phases your team must undertake in the process of acquiring knowledge for your system **(10 marks)**

c) Use an outline diagram to describe the structure of the main parts of an expert system **(8 marks)**

Question Four

a) Discuss why agents in Artificial Intelligence need not only be software entities **(2 marks)**

b) Explain any FOUR characteristics of intelligent agents **(2 marks)**

c) Describe statistical classification technique **(2 marks)**

d) Formulate propositional logic sentences that explains the following concepts

Q => P
P => Q
Q v R

Given the semantics for the three prepositional symbols as follows:
(i) P means "it is hot"
(ii) Q means "it is humid"
(iii) R means "It is raining" **(6 marks)**

e) A search tree is shown below where each circle represents a mode corresponding to a state in the search space. The estimated cost (i.e. function) for finding a solution from a rate is shown in its circle. The two nodes with h = 0 are goal states and the other terminal nodes are dead ends. i.e. states that can never reach a goal). Actual ink costs are marked on the inks between the nodes. Thus the path cost (i.e. g function) of a node is equal to the sum of the ink costs from the root to that node.

a) Using the (blind) depth-first search algorithm, give the sequence of nodes expanded before a goal state is reached. What is the path cost.

Question Five

Demonstrate your understanding on the significance of A.I as an enabler to the realization of the Government of Kenya Vision 2010 millennium goals **(8 marks)**