TECHNICAL UNIVERSITY OF MOMBASA

Institute of Computing & Informatics

UNIVERSITY EXAMINATION FOR:

BSIT/SEP 2012/J-FT Y4S2

BIT 2319 ARTICIAL INTELLIGENCE Paper 1

END OF SEMESTER EXAMINATION

SERIES: APRIL 2016

TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of Five questions. Attempt Question One and any two other

Do not write on the question paper.

Answer Question 1 and any other two questions.

QUESTION ONE

a) With suitable examples differentiate between forward and backward chaining rule inference. [6marks]

b) What is the Turing test and what is it supposed to prove. [4marks

c) Briefly describe iterative deepening search, and describe how it attempts to get the best performance features of both breadth-first and depth-first. [4marks]

d) What is the fundamental difference between informed search algorithm and uninformed search algorithm? [4marks]

e) Describe briefly the four basic components of a learning AI agent, and their roles. [2marks]

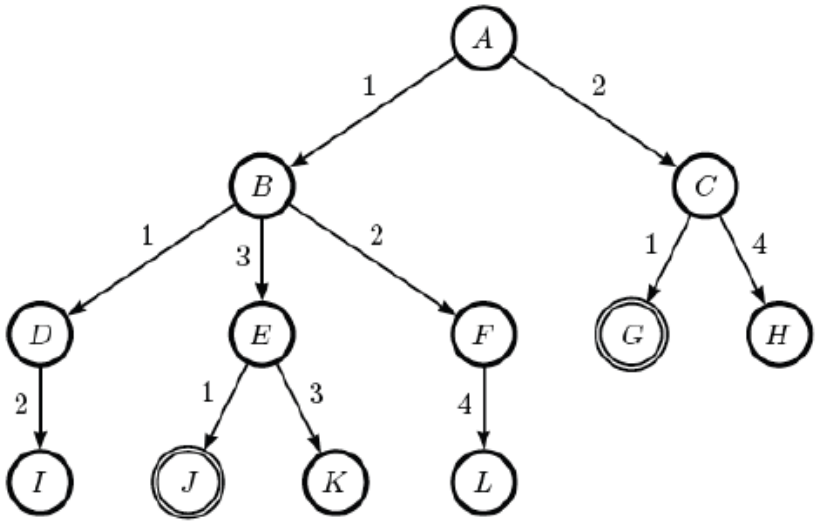
f) Briefly explain how artificial intelligence can be used in telecommunication and industry [6marks]

g) List and discuss any two factors that determine the behaviour and performance of intelligent agent. [4marks]

QUESTION TWO

a) Demonstrate how Breath-First-Search and Depth-First-Search can be implemented using some appropriate pseudo-code. [8 marks]

b) The following is a search tree for some state space. Arc labels denote costs, double circles indicate goal nodes.



For each of the following search strategies, indicate the order in which nodes will be chosen and expanded up to the first found goal node.
i) Breadth first search; [2marks]
ii) Depth First search; [2marks]
iii) Iterative deepening search. [2marks]
iv) Has the cost associated with the arcs influenced the above expansions? [2marks]
v) Describe the terms complete and optimal with regards to evaluating search strategies. Are either Breath-First-Search or Depth-First-Search complete? Is either of them optimal discuss. [4marks]

QUESTION THREE

a) At the top Floor of a building there are three couples (husband and wife). The stairway is not accessible, the building can only be evacuated through the elevator. The elevator can only carry up to three persons, and has to be operated by at least one person. Husbands do not accept that their wives go in the elevator with other men, if they are not present.

How can the building be evacuated without provoking jealousy crisis? Formulate the problem as a search problem.
(i) Describe the states, the initial state and the final state; [3marks]

(ii) Describe the operators and the conditions for their applicability; [3marks]

(iii) Describe the states that can be reached from the initial state by means of a single application of an operator; [4marks]

(iv) Show a solution path and the operators used to generate it. [3marks]

b) Discuss giving examples of the four views of A.I [4marks]

c) What are the **three** principal differences between a *searching algorithm* and a *planning algorithm*? [3marks]

QUESTION FOUR

a).Translate into predicate logic:

i) *All birds that are not penguins fly".* [2marks]

ii) *Every child has exactly two parents."* [2marks]

b) Falcons and eagles are birds. All birds have wings, feathers and a beak. In particular eagles have light feathers and long beaks. Birds fly and use aerodynamic principles. Gliding is a principle used by eagles. Planes also fly, have wings and use aerodynamic principles. A plane has an engine and a pilot. An engine uses petrol. A Boeing 747 is a plane.
i) Construct a semantic network to represent the information. [4marks]
ii) Construct a frame to represent the information. [4marks]

c) Alice, Bob, Camilla and Dan are making plans for spring break. They go to the travel agency, but there are only 2 tickets left. Alice will only go if Bob goes too. Dan will only go if Camilla goes too. Bob has found out that he has to work on the AI project, so he cannot go.

i).Using 4 literals, write the propositional logic formulas corresponding to this text[4marks]
ii).Alice will go only if Bob goes: [2marks]
iii).Dan goes only if Camilla goes: [2marks]

QUESTION FIVE

(a) What is knowledge acquisition? (2 marks)
(b) Describe the knowledge acquisition process. (3 marks)
(c) State any two problems with knowledge acquisition. (2 marks)
(d) Use an outline diagram to describe the structure of the main parts of an expert system. (3 marks)
(e) State two conditions that must hold for an expert systems implementation project to succeed. (2 marks)
f) Demonstrate your understanding on the significance of A.I as an enabler to the realization of the Government of Kenya Vision 2030 millennium goals. (8 mark)