THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)
(A Centre of Excellence)
Faculty of Engineering & Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY (BSIT SEP2010)

BIT 2319: ARTIFICIAL INTELIGENCE (A.I)

END OF SEMESTER EXAMINATION
SERIES: DECEMBER 2012
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer Booklet*
This paper consist of **FIVE** questions
Answer question **ONE (COMPULSORY)** 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) (i) In problem solving, we have the two main search techniques. State and explain the **TWO** main
categories of the search techniques. **(4 marks)**

(ii) Explain the following search conditions in relation to the searching as a problem solving technique:
    (i) Current state
    (ii) Goal state
    (iii) The solution **(6 marks)**

b) (i) Define the term knowledge representation. **(4 marks)**

(ii) Acknowledge representation language is defined by two aspects. State and explain the two aspects. **(4 marks)**

(iii) Translate the following into first order Logic (FOL) **(12 marks)**

  (i)   Some dogs bark
  (ii) All dogs have four legs
  (iii) Everybody like ice cream
  (iv) All barking dogs are irritating

Question Two

a) According to your knowledge of programming languages, what other programming language would you consider suitable for writing AI programs? Give supporting reasons for your answer. **(5 marks)**

b) State any **FOUR** implications of AI **(5 marks)**

c) What advances do you think need to be made in order for the Turning Test to be passed? **(5 marks)**

d) Discuss using your own words your understanding of the term pattern recognition. **(2 marks)**

e) Drug trafficking is a worldwide problem. Lately, Kenya has been described to be nub for this activity. Hard drug users in Nairobi are also said to be on the increase. Imagine you are a drug enforcement officer at the JKIA, Nairobi airport. Describe how you would apply pattern recognition in your professional work. **(3 marks)**

Question Three

a) Describe what is meant by the following search strategies giving the properties of each.
  (i)   State-space search
  (ii) Breadth first search
  (iii) Informed search **(12 marks)**

b) Give any **TWO** real life examples of a search problem. **(2 marks)**

c) Based on the algorithm of Depth-first search, trace the search of the following path. **(8 marks)**

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Question Four

a) (i) What is a expert system shell and how it it used? **(3 marks)**

(ii) What is the function of the Inference Engine in an expert systems? **(3 marks)**

(iii) Why is the prototyping approach used in Expert System development? **(2 marks)**

(iv) Why is knowledge sometimes difficult to extract from experts? **(3 marks)**

(v) Describe briefly the **FOUR** primary phases of building an Expert System. **(3 marks)**

b) What is the widely used criterion for determining the success of an AI system? Explain the working of this criterion. **(3 marks)**

c) Using the fundamental facilities of intelligence designing an agent that can wipe the wind screen of a car when needed. **(3 marks)**

Question Five

a) Demonstrate your understanding on the significance of A.I as enables to the realization of the Government of Kenya Vision 2030 millennium goals.

b) Suppose you have the following search space:

State	Next	Cost
A	B	4
A	C	1
B	D	3
B	E	8
C	C	0
C	D	2
C	F	6
D	C	2
D	E	4
E	G	2
F	G	8

(i)   Draw the state space of this problem. **(4 marks)**

(ii)   Show at each step what nodes are in the queue for the Breadth-First-Search. Show the list of nodes that are expanded. Required use a table for analysis. **(5 marks)**

(iii)   What is the worst-case time and space complexity of the above algorithm? **(2 marks)**