



EASTERN UNIVERSITY, SRI LANKA

THIRD YEAR FIRST SEMESTER EXAMINATION IN SCIENCE - 2005/2006

(DEC., 2006)

CS 304 – Artificial Intelligence

(Special Repeat)

Answer all questions

Time Allowed: 02 Hours

Q1)

- i) Briefly explain what is mean the by state space.
- ii) Describe the Depth-first search procedure
- iii) Consider the following problem: three cannibals and three missionaries are standing on the west bank of a river. A boat is available that will hold either one or two people. If the missionaries are ever outnumbered-on either bank or in the boat-the cannibals will eat them. You have to determine a sequence of trips that will get everyone across the river to the east bank.
  - a) Choose a suitable state representation and show how you would use it to encode the state and the goal state?
  - b) How many distinct states occur in this problem?
  - c) Show the state space graph. Do not draw any illegal state. Number all distinct states and terminals the search at any repeated state (if any path). Clearly mark a possible path from the state to the goal state.

Q2)

What are the five main components in the most of the planning systems?

Describe the major principles involved in goal stack planning.

Show how goal stack planning may be used to solve the following simple blocks world stacking problem:

Initial state:

on ( C, A), on (D,B), onTable (A), onTable (B).

Goal state:

on (B,A), on (C,D), onTable (A), onTable (D).

### Q3)

Describe the resolution proof procedure, also describe the following strategies for resolution and compare them

- a) The set of support strategy
- b) The unit preference strategy
- c) The linear input strategy

Consider the following statement: the law says that it is crime for an American to sell weapons to hostile nations. The country, Nano, an enemy of America, has some missiles, and all of its missiles were sold to it by colonel west, who is American

Represent these sentences as predicate calculus expression, and change them into clausal form, then answer the question “**is West a criminal?**”

What is the strategy you have used for the above proof?

### Q4)

Consider the following story:

Fido is a dog. Fido does not bark. Fido wags its tail. Dog is an animal. Mowser mews. Anybody that mews is a cat. Cat is an animal. A dog that wags its tail is friendly. Nobody will be afraid of anybody who is friendly and does not bark.

- a) Translate the story into predicate calculus expressions, and then translate them to clausal form.
- b) Using resolution refutation prove that “there exists a cat and a dog such that the cat is not afraid of the dog”.
- c) Represent the fact that “Dogs bark” as a predicate calculus expression, and change it to clausal form. Now prove that “Fido is not a dog”, and state briefly how you would handle such a situation in representing a general fact like “dogs bark” and a special fact like “Fido does not bark” which may cause a contradiction.