Two hours

UNIVERSITY OF MANCHESTER
SCHOOL OF COMPUTER SCIENCE

Management Support Systems

Date: Wednesday 27th May 2009

Time: 09:45 – 11:45

Please answer any THREE Questions from the FIVE questions provided

This is a CLOSED book examination

The use of electronic calculators is permitted provided they are not programmable and do not store text.
1. a) Summarise the major features of Expert Systems (ES). Draw a diagram of the architecture of a generic ES and explain the functions of each component. (12 marks)

b) A feedlot operator has a herd of 200 cows, each weighing 600 lb. The cost of keeping one cow for a day is 80 cents. The cows are gaining weight at a rate of 8 lb per day. The market price for cows is now $1.25 per pound, but is dropping one cent a day. How many days should the operator wait in order to sell his cows for the largest profit? What is the value of that profit? (8 marks)

2. a) Summarise the major features of Decision Support Systems (DSS). Draw a diagram of the architecture of a generic DSS and explain the functions of each component. (12 marks)

b) Some people argue that intelligent decision support systems will evolve until they replace human decision makers. Others argue that machines will never have the ability to think (when thinking is defined as the process of understanding why a particular decision is made). Take one side in this argument and support your position. (8 marks)

3. a) Explain the main steps of the min-max inference method in Fuzzy Expert Systems. (12 marks)

b) Compare and contrast Artificial Neural Networks (ANN) with Expert Systems (ES) using 8 different factors. What deficiencies of ES can be overcome by ANN? (8 marks)
4. a) Describe the primary operations of Genetic Algorithms (GAs) and provide a flow diagram of the GAs process. (12 marks)

b) The rule-base of a Fuzzy Expert System contains the following rules:
R1: IF inflation is high THEN unemployment is high
R2: IF inflation is high AND interest rate is high THEN unemployment is medium
R3: IF gold price is high OR dollar exchange rate is low THEN unemployment is medium
R4: IF interest rate is high THEN unemployment is low

The truth values of the uncertain facts are: TV(high inflation)=0.8, TV(high interest rate)=0.6, TV(high gold price)=0.5, TV(low dollar exchange rate)=0.7.

i) Determine the strength of the rules and the values of the fuzzy output Unemployment, provided that the inflation is high, the interest rate is high, the gold price is high and the dollar exchange rate is low.

ii) The fuzzy output sets for Unemployment are represented as singletons and are: Low=4%, Medium=6% and High=8%. Using the Center of Gravity formulae, find the crisp value of Unemployment. (8 marks)

5. a) Your company is considering opening a new factory in UK, Eastern Europe or Asia. Follow Simon’s four-phase model and describe the activities at each phase of the decision-making process in this specific example situation. (12 marks)

b) Management is often equated with decision-making. Why? Discuss the major trends that affect managerial decision-making and justify the need for computerised decision support. (8 marks)