

THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATION Professional Graduate Diploma

KNOWLEDGE BASED SYSTEMS

19th April 2004, 10.00 a.m.-1.00 p.m.

Answer THREE questions out of FIVE. All questions carry equal marks.

Time: THREE hours.

*The marks given in brackets are **indicative** of the weight given to each part of the question.*

1. Data mining is the activity of finding patterns and relationships in data. Describe in detail one AI technique that could help you predict who is likely to respond to a particular marketing campaign (i.e. make a prediction) and one AI technique that identifies similar groups of customers (i.e. classification). **(15 marks)**

Individual techniques are rarely used in isolation. Why? **(5 marks)**

2. You have been asked to manage the development project of a system that will automatically monitor a busy seaport. The remit for the project is to raise an alarm if the level of activity in the harbour becomes too great, thus risking damage to the vessels using the harbour.

You have decided to use a vision-based system to take pictures of the harbour at 5 minute intervals. Write a document describing how you will use Neural Network techniques to process the images that are taken. Your document should outline how you will train the Neural Networks and should also provide a list of potential problems. **(20 marks)**

3. “Historically, building an expert system has been a higher risk project than building a more traditional system such as payroll applications. However, as expert systems become more widely used in research and business, by 2005 this statement will no longer be true”. Discuss. **(20 marks)**

4. Explain and illustrate how a genetic algorithm works by giving an example. You can choose your own example. You may like to answer this question by finding the maximum value of a simple function with a single parameter x in the range of 0 to 31. **(20 marks)**

5. Describe and explain the five basic components in Natural Language Processing with examples in each component. **(20 marks)**