THE BRITISH COMPUTER SOCIETY

THE BCS PROFESSIONAL EXAMINATION
Professional Graduate Diploma

KNOWLEDGE BASED SYSTEMS

18th April 2001 – 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. Describe and explain the five basic components of Natural Language Processing. Give examples of the actions performed by each component. **(25 marks)**

2. *a)* Describe how a neural network functions and, using diagrams, describe different network shapes. **(17 marks)**

b) Describe how a neural network learns. **(8 marks)**

3. *a)* A US Forces' research project was intended to build neural network models that could detect hidden tanks located in photographs of the landscape. Pictures of landscapes with and without tanks were presented to the neural network during the training phase and a model was built that – to the researchers – looked accurate. However, on further examination, the model proved to be very poor. Instead of detecting tanks it detected whether or not the sun was shining.

Suggest why this happened and how this problem could be overcome. **(15 marks)**

b) What applications are neural networks best suited to? **(10 marks)**

4. As a discipline, artificial intelligence has been in existence for many years. Discuss the impact the field of AI has had on the world today and the potential that the field has in the next five to ten years. Your answer can relate to either research or business based applications, and should include relevant examples. **(25 marks)**

5. Give a detailed description of a genetic algorithm. Describe an application that is suited to the use of a genetic algorithm. **(25 marks)**