| PAPER CODE NO. | EXAMINER | : | Dr P Dunne | |
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| **2CS20** | DEPARTMENT | : | Computer Science | Tel. No. 3521 |

THE UNIVERSITY
*of* LIVERPOOL

# SEPTEMBER 1999 EXAMINATIONS

Degree of Bachelor of Science: Year 1
Degree of Bachelor of Science: Year 2

## TOPICS IN INFORMATION PROCESSING

**TIME ALLOWED:** Two Hours

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**INSTRUCTIONS TO CANDIDATES**

Candidates should answer Q1. Credit will be given for the best **2** answers from Questions 2, 3 and 4.

If you attempt to answer more than the required number of questions (in any section), the marks awarded for the excess questions will be discarded (starting with your lowest mark).

Each part of Q1 is worth **4 marks**. Each of Q2, Q3 and Q4 is worth **30 marks**.

1. a. What is a cladogram?

    b. In social science data processing what is meant by temporal and spatial granularity? What impact does different levels of granularity make on the data processing requirement?

    c. Briefly describe two of the business pressures on companies in the financial sector which might influence their decision to introduce computerised information systems.

    d. Describe the structure of double-stranded DNA.

    e. In the context of molecular biology, what is meant by "transcription".

    f. Briefly explain "protein-folding prediction".

    g. Briefly outline the principal aim of a Mathematical Model of Computation, such as a Turing Machine.

    h. Describe two ways in which the mathematical theory of Boolean Algebra has contributed to the development of computer systems.

    i. State two benefits arising from Computer Algebra Systems.

    j. What benefits did improvements in the engineering technology of switching devices produce for the construction of computer systems?

2. Explain, giving a small example, how genetic algorithms may be applied to the problem of protein structure prediction.

3. i. What is electronic money and what are the pressures that encourage its existence ?

    **(18  marks)**

    ii. Comment especially on how these pressures influence the development of equity dealing and settlement systems.

    **(12 marks)**

4. Computer Algebra Systems and computer-assisted proof of theorems are now widely used within mathematics. Nevertheless, some mathematicians are uncomfortable about results obtained using such approaches. Discuss, with respect to extant examples of Computer Algebra Systems and computer-assisted proofs, to what extent this attitude is justified.

End