INTERNATIONAL BACCALAURÉAT BACHILLERATO BACCALAUREATE INTERNATIONAL INTERNACIONAL

N99/390/S(2)

INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY

Standard Level

Wednesday 10 November 1999 (morning)

Paper 2 — 2 hours

This examination paper consists of 2 sections, Section A and Section B.

Section A consists of a single compulsory question. The maximum mark for Section A is 20.

Section B consists of 4 questions. The maximum mark for each question is 20 with 18 marks available for content and 2 marks for the quality of the construction of the essay.

The maximum mark for this paper is 60.

INSTRUCTIONS TO CANDIDATES

Do NOT open this examination paper until instructed to do so.

Answer Section A and TWO questions from Section B.

EXAMINATION MATERIALS

Required:
None

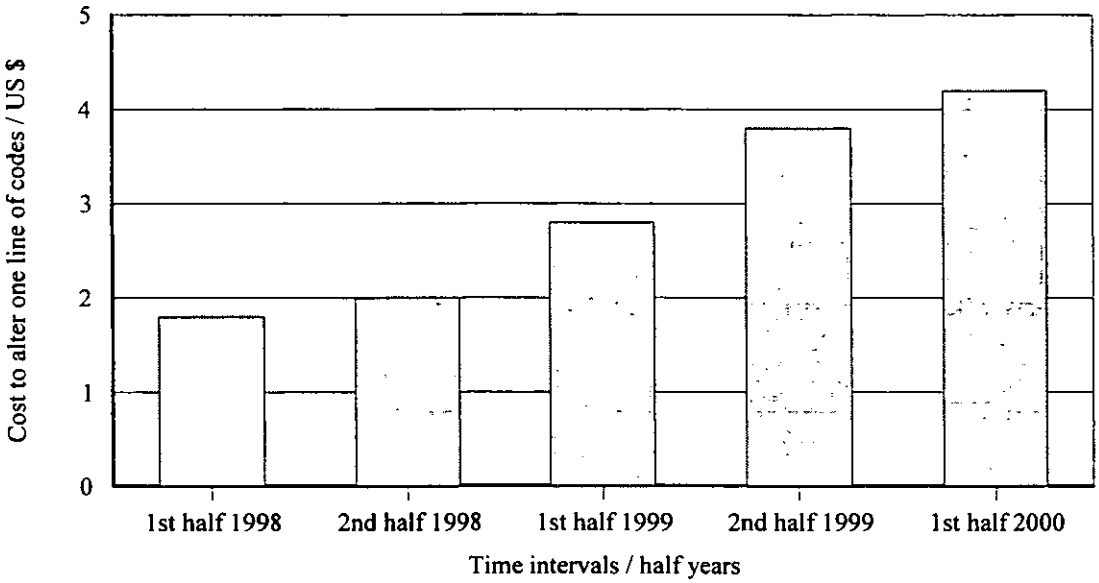
Allowed:
A simple translating dictionary for candidates not working in their own language

SECTION A

1. The 2M problem - a millenium bug.

Many old programs allocated only two digits for the year, so that 99 represents 1999, 66 represents 1966, and so on. However, 00 represents 1900 and not 2000. The effect is that on 1 January 2000 computers will 'think' it is 1900 and this will result in program crashes or false output data. This situation is referred to as 'The Millenium Bomb', Y2K or year 2000 bug. The consequences vary according to the business or organisation concerned. The problem is only a few weeks away!

The graph shows the costs of altering one line of code with time.



The table below shows the possible effects of the 'millenium bug' on New York in January 2000. These are based on the assumption that all problems remain unsolved. The estimates were based on the work done to correct the problem by the summer of 1997.

Service Area	Effect or Predicted Results
Electricity	50% of the amount of electrical power will be available
Transport	Air, rail and bus services will be disrupted
Hospitals	Only emergency services will be available
Education	Schools and universities will be closed for two weeks
Stock Market	Closed for two weeks
Banks	Closed for two weeks
Postal Deliveries	Disrupted
Telecommunications	50% of services will be available

(a) Suggest **one** reason why only two digits were originally allocated for the year. *[2 marks]*

(b) Assume that a company has **one million** lines of code that need to be altered.

(i) Calculate the actual cost to the company to fix the problem if they started in the second half of 1998. *[1 mark]*

(ii) Calculate how much **more** it would have cost if they started exactly one year later. Show your working. *[2 marks]*

(c) Using the graph, outline how the cost changes. *[3 marks]*

(d) The graph includes costs other than simply changing the lines of source code. Suggest **two** other possible actions that a company must take that will also contribute to the final cost. *[2 marks]*

(e) Explain why banks and the stockmarket must close while transport and postal services will only be disrupted. *[4 marks]*

(f) Hospitals rely heavily on databases that contain dates. List **two** date fields that might be found in such databases. *[2 marks]*

(g) Assume that by the end of the month of January 2000, all of the problems must be resolved. The local government has to decide the service area of highest priority (from the table). Discuss the ethical considerations that must contribute to the decision-making process. *[4 marks]*

SECTION B

Answer two questions from this section.

2. The increased storage of personal information in databases has had considerable impact on the private and professional lives of individuals.

(a) Outline **two** items of personal data which could be regarded as highly confidential. *[2 marks]*

(b) Explain **two** situations in which the privacy of a person can be invaded through data recorded in databases. *[4 marks]*

(c) Discuss **three** concerns which an individual should have whenever their personal data is entered into a computerised database. *[12 marks]*

3. The playing of computer games and network games has been a source of constant concern for both parents and educators. Games have ranged from Nintendo to Tamagotchi, from stand-alone computer to network games, from keyboard input to virtual reality.

(a) List **two** input devices designed especially for the playing of some electronic games. *[2 marks]*

(b) Explain **two** reasons why some games use expert systems. *[4 marks]*

(c) Discuss **three** effects that electronic games have had on individuals or organisations. *[12 marks]*

4. 'Telecommuting' refers to the ability of a number of workers to do their jobs from home rather than at their normal place of employment. This has a number of implications for both employers and employees.

(a) Outline **two** items necessary for telecommuting. *[2 marks]*

(b) Explain **two** skills or attitudes which employees (workers) may need if telecommuting is to be successful. *[4 marks]*

(c) Discuss **three** social impacts on society that could result from widespread telecommuting. *[12 marks]*

5. Large amounts of data are now stored in digital form.

(a) State **two** advantages and **one** disadvantage of storing sound data in digital form. *[3 marks]*

(b) Outline **three** methods of transferring data from one computer to another. *[3 marks]*

(c) Discuss **three** consequences (ethical and/or social) arising from copying intellectual property from digital sources. *[12 marks]*