<table>
<thead>
<tr>
<th>Centre Number</th>
<th>Candidate Number</th>
<th>Name</th>
</tr>
</thead>
</table>

**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
International General Certificate of Secondary Education

**INFORMATION TECHNOLOGY**  
0418/01

**Paper 1**  
With Answers  
October/November 2006  
2 hours

Candidates answer on the Question Paper.  
No Additional Materials are required.

**READ THESE INSTRUCTIONS FIRST**

Write your Centre number, candidate number and name on all the work you hand in.  
Write in dark blue or black pen.  
You may use a soft pencil for any diagrams, graphs or rough working.  
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer all questions.

At the end of the examination, fasten all your work securely together.  
The number of marks is given in brackets [ ] at the end of each question or part question.
1. Name the items A, B, C, D and E using the words from the list.

- A: Laptop computer
- B: Speakers
- C: Inkjet printer
- D: Web cam
- E: Monitor

2. Name **two** media which are used to store many megabytes of data.

- Memory stick
- Magnetic stripe
3 Tick whether the following statements are true or false.

<table>
<thead>
<tr>
<th>Statement</th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMR is used in a bank for reading cheques</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Bar code readers are used at point of sales terminals</td>
<td>✗</td>
<td>✔</td>
</tr>
<tr>
<td>Sensors are used in a computerised weather station</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Cash machines use on-line processing</td>
<td>✔</td>
<td>✗</td>
</tr>
</tbody>
</table>

4 Draw five lines on the diagram to match the hardware to what it would be used for.

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical mark reader</td>
<td>printing out car designs</td>
</tr>
<tr>
<td>Plotter</td>
<td>reading information from credit cards</td>
</tr>
<tr>
<td>Magnetic stripe reader</td>
<td>choosing from a set of options</td>
</tr>
<tr>
<td>Touch screen</td>
<td>making backup copies of data</td>
</tr>
<tr>
<td>Zip drive</td>
<td>reading information from students’ exam answers</td>
</tr>
</tbody>
</table>

5 A local football club wants to use a computer to store all its members’ records. It wants to keep the club accounts as well as send letters to its members. Tick the three types of software it will need.

- Presentation software ✔
- Measurement software
- Database software ✔
- Spreadsheet software ✔
- Word processing software ✔
- Control software
6 Complete the sentences using words from the list below.

(a) Text is read from a document directly into a computer using **OCR**.

(b) One item can be accessed from a magnetic disk without reading all the preceding items. This is called **direct** access.

(c) An item of hardware which is connected to a computer so that it can read data such as temperatures is called a **sensor**.

7 (a) Name each type of network

(i) **Ring**

(ii) **Bus**

(b) Circle the type of network that does not need to have a modem.

**Local Area Network**  **Wide Area Network**
A floor turtle can use the following instructions:

<table>
<thead>
<tr>
<th>INSTRUCTION</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORWARD $n$</td>
<td>Move $n$ mm forward</td>
</tr>
<tr>
<td>BACKWARD $n$</td>
<td>Move $n$ mm backward</td>
</tr>
<tr>
<td>LEFT $t$</td>
<td>Turn left $t$ degrees</td>
</tr>
<tr>
<td>RIGHT $t$</td>
<td>Turn right $t$ degrees</td>
</tr>
<tr>
<td>PENUP</td>
<td>Lift the pen</td>
</tr>
<tr>
<td>PENDOWN</td>
<td>Lower the pen</td>
</tr>
<tr>
<td>REPEAT $n$</td>
<td>Repeat the following instructions $n$ times</td>
</tr>
<tr>
<td>END REPEAT</td>
<td>Finish the REPEAT loop</td>
</tr>
</tbody>
</table>

Complete the set of instructions to draw these shapes by filling in the blank lines.
The owner of several mobile phone shops wants to computerise the records of the stock and customers. The systems analyst will need to find out how the existing systems work. She will need to find out how records of phones and customers are kept at the moment.

(a) There are four ways she could find out this information. Describe in detail two of these ways.

1. Observation 1 mark, Watching people in their work practices – 1 mark
2. Questionnaires 1 mark, recording of responses to questions to users about the system – 1 mark
3. Interviews 1 mark, face to face questions to users about the system – 1 mark
4. Examining documents 1 mark, looking at/through current paperwork – 1 mark

(b) After analysing the existing system the systems analyst will design a database consisting of the customer file and the stock file. Apart from the structure of these files, describe four items that the systems analyst will need to design for the database.

1. data capture forms
2. input screens/user interface
3. report layouts
4. output screens
5. validation routines
6. queries/searches
7. macros
10 Using examples, describe each of these two terms.

**On-line processing**
- booking systems, cash machines, EFTPOS 1 mark
- description: input data is acted upon immediately and files updated immediately 1 mark

**Batch processing**
- cheque processing, payroll, utility bills, overdue debts/overdue books reminders 1 mark
- description such as data is collected altogether before being input to the system/ data is processed in one go

11 RAM and ROM are types of storage.

(a) Explain the major difference between RAM and ROM.

- ROM cannot be changed/RAM can be changed
- RAM can be read from and written to
- ROM is read only memory and RAM is random access memory
- ROM is non-volatile/RAM is volatile

(b) Give one way a computer uses ROM.

- holds instructions that computer needs to start up/boot the system
- holds instructions that need to be unchanged such as BIOS (Basic Input Output System)/program cycles in a washing machine
- holds program instructions in games such as gameboys, playstations.
Pupils in a school are sitting an exam paper in IT. The IT teacher wishes to keep the results in a spreadsheet using the column headings shown below. The exam will be marked out of 60 and the pupils’ scores will be typed into the Exam Score column.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Name</td>
<td>Form</td>
<td>Gender</td>
<td>Exam Score</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(a) The teacher wants to use a validation check which only allows numbers between 0 and 60 to be typed in. What is the name of this type of validation check?

range check [1]

(b) She types in the following exam scores to test that the validation works:

0, 45, 60 and 87.

Using the data above write down one example of:

(i) normal data

0, 45, 60

(ii) extreme data

0, 60

(iii) abnormal data

87 [3]
(c) The teacher decides that the pass mark for the exam should be 35. Depending on the number of marks each pupil gets, the word ‘Pass’ or the word ‘Fail’ will appear in the Pass/Fail column.

Write down the formula which should appear in cell E2.

\[
\text{if(d2<35,} \text{"Fail"}, \text{"Pass"})
\]

or

\[
\text{if(d2>=35,} \text{"Pass"}, \text{"Fail"})
\]

She wants to repeat the formula for 30 cells below E2. She does not want to type in 30 formulae. What is the best way for her to do it?

2

highlight e2 to e32 – 1 mark
click on fill down – 1 mark
OR
highlight e2 and show fill handle – 1 mark
drag down to e32 – 1 mark
OR
highlight e2 and click on copy – 1 mark
highlight e3 to e32 and click on paste – 1 mark

(d) Spreadsheets are also used to model situations such as financial planning. Tick which piece of software is the best for doing the following things:

<table>
<thead>
<tr>
<th></th>
<th>Spreadsheet</th>
<th>Word processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making predictions</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Storing numeric data</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Writing reports</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Sorting data using several criteria</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

(e) Give two reasons why computer models are used rather than the real thing.

1

two from:

- real thing may be too dangerous

2

or

- real thing may be too large a time scale required
- wasteful of materials/too expensive to build
- It’s easier to alter/amend/change in a model
A hospital's intensive care department uses a computer to monitor patients' conditions.

(a) Analogue temperature and heart monitor sensors are used. Explain why computers are unable to read the data directly from these sensors.

- Computers work with digital data 1 mark
- Analogue data must be converted into data which the computer can understand 1 mark

(b) What device is needed to enable the computer to read the data?

- Analogue to digital converter/ADC 1 mark

(c) Give two advantages of using a computer to collect the data rather than having it done by nurses.

1. Computer readings are more accurate.
2. Readings can be taken more frequently/continuously.
   - Nurses can get tired and forget to take readings.
   - Nurses are so busy they might not be able to take readings regularly.

- Up to date readings
14 (a) A company searches for minerals. They use an expert system to help them to predict which minerals are present. Describe how this expert system would be used.

input screen asking for soil sample details
sample details are typed in
expert system compares them with those in the knowledge base
using inference engine
percentage probability is suggested for each mineral
user makes decisions based on output

(b) Name two other applications which involve the use of expert systems.

1. Car fault diagnosis
   Medical diagnosis
   Tax
2. Chess games
   Animal/Plant identification
   Weather forecasting
Pupil records are kept on a computer in the head teacher’s office. It is not connected to a network of any description.

(a) Occasionally, a pupil’s record will need to be altered. In order to do this efficiently, individual records have to be retrieved straight away.

(i) What form of file access is this called?

[1] direct/random access

(ii) What type of magnetic medium allows this type of access?

[1] hard/floppy disc/zip disc/jaz disc

(b) Give two occasions when a pupil’s record will need to be altered.

[2] 1 pupil changes phone number
    pupil changes address
    pupil changes form/year/grade
    medical history changes

[2] 2 pupil gains qualifications
    pupil leaves school

(c) Pupils are worried that their personal data could be misused. Name two things the head teacher could do to make sure that the personal data is kept secure.

[2] 1 put password on computer
    put password on file
    lock office door when not in use
    encrypt data

[2] 2 stores data on removable medium/device/removes data to secure location

(d) The head teacher needs to keep a backup copy of the data. Describe what is meant by a backup and why it is needed.

[3] A copy of file(s)/data
    stored on alternative medium/in a separate room
    to be used in case original is corrupted
16 An international bank has a website. It allows customers to transfer money from one account to another and pay bills.

(a) Name two items of information that customers would have to type in before the system will let them use it.

1. user id/account number 1 mark  
2. password/PIN

(b) Give two advantages to the customer of using this method rather than visiting a branch of the bank.

1. Don’t have to waste time travelling long distances to banks.  
2. Don’t have to spend money on travelling expenses travelling long distances to banks.  
   No embarrassment of having to ask for loans face to face.  
2. Can bank when banks are closed.  
2. Personal security reasons.  
   People with disabilities find it easier

(c) Give two advantages to the bank of using this method rather than the customer visiting a branch of the bank.

1. fewer cashiers needed – less spent on wages  
2. fewer branch offices needed – less spent on rates/rent  
   less actual cash handled – fewer robberies

(d) To prevent the customers’ bank details from being intercepted by hackers, the bank uses encryption. Explain what is meant by encryption.

use of encryption key  
encoding of data  
so that data is unintelligible  
needs translating using a special key
(e) Describe two problems which might arise from the customer using the Internet at home.

   - Lose personal touch.
   - Less opportunity for socialising with friends/neighbours.
   - More expensive phone bills.
   - Lack of exercise.

2. Might not be able to use the phone if Internet is dialup.
   - Might be domestic disputes over whose turn it is to use the Internet.

17 Noreen Patel owns several book shops around the country. She wants to keep details of each book on a computer database. All the details of each book will be typed into a screen input form.

Design a screen input form which could be used for typing in one book’s details.

| ISBN: [..........................] |
| Reference number: [..................] |
| Branch number: [..................] |
| Book Title: [..........................] |
| Author’s name: [..........................] |
| Publisher: [..........................] |
| Dewey number: [.......] |
| genre: [..........................] |
| Target age group: [.........] |
| date published: [...../...../.......] |
| summary of contents: [..........................] |
| Selling price: [.........] |
| Cost price: [.........] |
| no. of copies: [.........] |

Help  Menu  Save  Delete  OK  Cancel  Exit
18 A supermarket uses EFTPOS terminals. When goods are bought, the product numbers of the goods and the customer’s bank card number are input.

(a) What input devices are used to input:

(i) the product numbers of the goods bought?
- bar code reader/keyboard

(ii) the customer’s bank card number?
- magnetic stripe reader/Chip reader/smart card reader/keypad

(b) The supermarket’s stock file contains information like this.

<table>
<thead>
<tr>
<th>Product number</th>
<th>Product name</th>
<th>Number in Stock</th>
<th>Re-order level</th>
<th>Re-order quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>002136987421</td>
<td>Oatabix</td>
<td>163</td>
<td>150</td>
<td>400</td>
</tr>
<tr>
<td>001467326581</td>
<td>Brick bat tea</td>
<td>135</td>
<td>100</td>
<td>300</td>
</tr>
<tr>
<td>002145236891</td>
<td>Mines baked beans</td>
<td>243</td>
<td>195</td>
<td>600</td>
</tr>
</tbody>
</table>

Describe the computer processing involved in updating the stock file every time a packet of Oatabix is sold and how the computer would know when it is time to order some more. Include in your answer any checks that take place on the input data.
(c) Describe the computer processing involved in taking payment from the customer’s bank account including any checks that are made.

- PIN is checked
- supermarket computer contacts bank computer
- using sort code present on card
- expiry date check carried out on card
- existence check carried out on card/account number
- matching account details looked up on file
- balance/credit check is carried out on account
- if available funds present money is deducted from account and added to supermarket bank account/transfered from customer account to supermarket account

19 A school’s football team have been producing some excellent results. The team captain has been asked to produce a multimedia presentation for the head teacher to use in an assembly.

(a) Describe two methods that he could use to obtain images for the presentation.

1. take photos using a digital camera – 1 mark
   download from camera and save – 1 mark
   OR
   take photos using traditional camera – 1 mark
   scan the developed photo/develop onto CD ROM and save – 1 mark
   OR
   find images on the Internet – 1 mark
   copy and paste/download images – 1 mark
2. find appropriate images of Clipart – 1 mark
   copy and paste/download images from a CD ROM – 1 mark
   OR
   use of art/drawing package – 1 mark
   scan images – 1 mark
   save image – 1 mark

(b) He stores the images on the computer’s hard disc. He closes all applications and opens the presentation software. Describe how he will produce the multimedia presentation using these images, sound and text.

- create new slide
- import/insert/copy and paste images
- insert sound file
- create text box
- type in text (in text box)
20 Many schools are encouraging teachers and students to use the Internet to improve teaching and learning. Is this a good thing or a bad thing? Discuss this development giving the advantages and the disadvantages to students, teachers and the school.

**pupils:**

_advantages:_
- much wider source of knowledge
- up to date information
- better quality diagrams/charts
- easier to find relevant information
- (use of emails) so no need to carry bags

_disadvantages:_
- can easily get sidetracked looking at irrelevant sites
- can be lullled into plagiarism
- need to acquire skills in searching techniques

**teachers:**

_advantages:_
- can set more demanding tasks
- can have work emailed to them
- work is more presentable – easier to mark
- pupils find learning more interesting
- more interesting resources available

_disadvantages:_
- difficult to know if it is the pupil’s own work
- too many emails can overload teacher and/or system
- viruses can cause system to break down

**school:**

_advantages:_
- pupils more motivated – better exam results
- pupils more motivated – better school environment

_disadvantages:_
- pupils may access unsavoury sites
- pupils may download coursework
- expense of networking/ISP rentals
- expense of phone bills

(one mark for reasoned conclusion)