# X206/201

NATIONAL QUALIFICATIONS 2010

THURSDAY, 3 JUNE 9.00 AM – 10.30 AM

# COMPUTING INTERMEDIATE 2

Attempt Section I and Section II and **one** Part of Section III.

Section I – Attempt all questions.

Section II – Attempt all questions.

Section III – This section has three parts:

Part A – Artificial Intelligence
Part B – Computer Networking
Part C – Multimedia Technology

Choose **one** part and answer **all** of the questions in that part.

Read each question carefully.

Write your answers in the answer book provided. **Do not** write on the question paper.

Write as neatly as possible.

Answer in sentences wherever possible.

*Marks*

## SECTION I

**Attempt ALL questions in this section.**

**1.** Name a code that is used to represent text in a computer system. **1**

**2.** State which type of computer system would be used by a bank to process large amounts of data at high speed. **1**

**3.** Name the part of the processor that carries out calculations. **1**

**4.** Jane saves her geography report at home using a *standard file format*.

State **one** standard file format suitable for saving word processed files. **1**

**5.** Nile Books is upgrading the computer network in its warehouse.

(*a*) Name this type of computer network. **1**

(*b*) State **one** reason why fibre-optic cable may be used as the *transmission medium*. **1**

**6.** State **one** reason why an *interface* is needed between the processor and a peripheral device. **1**

**7.** High level languages are translated into machine code using an *interpreter* or a *compiler*.

Describe **one** difference between an interpreter and a compiler. **1**

**8.** A school is having a sponsored walk to raise money for charity. State which **one** of the following algorithms would be used to find the pupil who raised the most money:

- Input validation
- Linear search
- Find maximum
- Find minimum
- Count occurrences. **1**

**9.** Orla uses *pre-defined functions* in her program code.

(*a*) State what is meant by the term "pre-defined function". **1**

(*b*) Give **one** example of a pre-defined function. **1**

*Marks*

**10.** Software is evaluated in terms of *fitness for purpose*.

State what is meant by the term "fitness for purpose". **1**

**11.** A *structure diagram* is used to design a solution to a programming problem.

Name and describe **one** other design notation that could be used to design a solution to a programming problem. **2**

**12.** A program stores pupils' contact details. State a suitable data type for storing the postcode EH22 1LE. **1**

**(15)**

[*END OF SECTION I*]

**[Turn over for Section II**

*Marks*

## SECTION II

**Attempt ALL questions in this section.**

**13.** Oro Computers is a company that assembles computer systems according to customer specifications. Some of the options available are shown below.

| PROCESSOR | RAM | BACKING STORE |
|---|---|---|
| 2·4 GHz<br>2·6 GHz<br>3·8 GHz | 1 Gb<br>2 Gb<br>4 Gb | 250 Gb Hard drive<br>500 Gb Hard drive<br>CD-RW drive<br>DVD-RW drive |
| **NUMBER OF USB INTERFACES** | **SOFTWARE** | |
| 2<br>5 | Graphics package requires 400 Mb RAM<br>Word processor requires 150 Mb RAM<br>Operating System requires 512 Mb RAM<br>Expel anti-virus requires 512 Mb RAM | |

(*a*) State the **fastest** *clock speed* shown above. **1**

(*b*) A customer chooses 2 Gb RAM. He also buys the *operating system* and the *anti-virus program* listed above.

(i) If both these programs are stored in RAM at the same time, how much RAM is available for other programs? **1**

(ii) State **two** functions of an operating system. **2**

(iii) State the law that is broken by deliberately sending a virus. **1**

(*c*) A customer buys a computer system with 5 USB interfaces.

Suggest **one** reason why he wants 5 interfaces rather than 2 interfaces. **1**

(*d*) State a task that may require a DVD-RW drive rather than a CD-RW drive. **1**

(*e*) Apart from a hard drive, state **one** magnetic storage device that would be suitable for storing a backup copy of a 40 Mb file. **1**

**13. (continued)**

(*f*) The company will deliver to addresses within a distance of between 15 miles and 60 miles inclusive from the warehouse.

(i) The Test Data Table below is not complete.

| Type | Test data | Expected result |
|---|---|---|
| A → | 19 | Can deliver |
| Extreme | | Can deliver |
| Exceptional | 75 | → C |

B

State what is missing from the table at A, B and C. **3**

(ii) Create the *complex condition* missing from the conditional statement below.

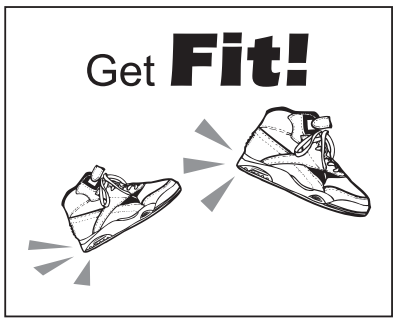
IF _____ then display Can Deliver **2**

**(13)**

**[Turn over**

*Marks*

**14.** Pupils and staff at Sabio High School are planning a "Get Fit" campaign and have produced the following logo.




(*a*) Pupils used a graphics package to produce the logo.

Identify **one** *object* and **one** *operation* that may have been carried out on that object. **2**

(*b*) Allan uses an electronic sewing machine to attach the logos to T-shirts.

(i) State the type of computer that is built into the sewing machine. **1**

(ii) State **one** suitable output device that could warn Allan of an error when he starts to sew. **1**

(*c*) Pupils write a computer program that can calculate a person's Body Mass Index (BMI) from their height in metres and weight in kilograms.

**Example:**

| | |
|---|---|
| Height | 1·67 |
| Weight | 58·9 |
| BMI | 21·1 |

(i) State the type of variable that should be used to store the weight. **1**

(ii) Using a programming language with which you are familiar, write code for the formula: **2**

BMI = weight divided by $(\text{height})^2$

(iii) Describe **one** way to make a program *readable*. **1**

(iv) Describe why poor *readability* in a program affects the *maintenance* of the program. **1**

(*d*) The school website gives access to information on the "Get Fit" campaign. Parents can also receive updates by e-mail.

(i) Describe the most efficient way for the school to send the latest update to all the parents by e-mail. **1**

(ii) State **one** way of directing people from the school website to other websites for further information. **1**

(iii) State the law that may make it illegal for the school to give the parents' e-mail addresses to companies who sell fitness equipment. **1**

**(12)**

*Marks*

**15.** One hundred runners are taking part in a charity fun race.

Companies can sponsor individual runners.

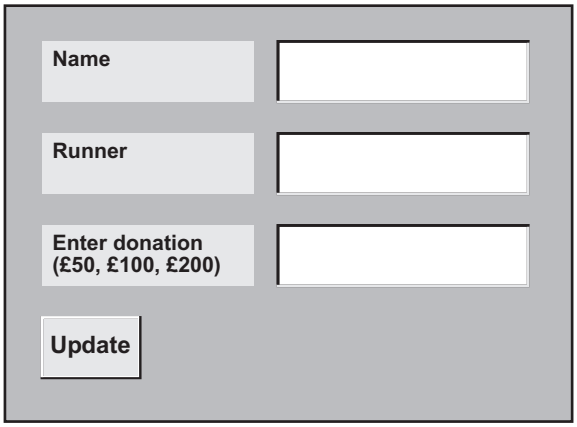
There are three levels of sponsorship:

Bronze – £50
Silver – £100
Gold – £200

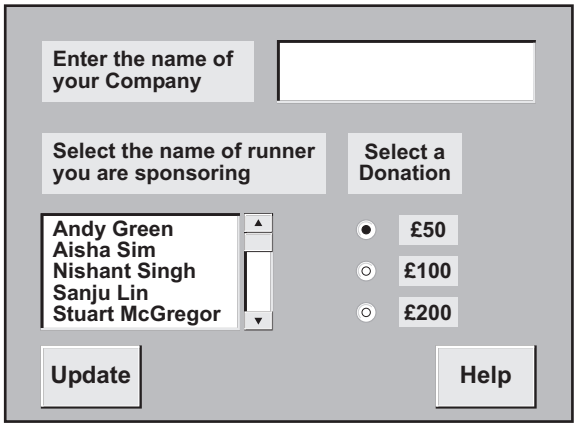
A program to process donations is being developed.

Two different versions of the user interface have been designed. These are shown below.

**Interface A**




**Interface B**




(*a*) State **two** reasons why Interface B is a more user-friendly interface than Interface A. **2**

(*b*) Only Interface A will need to use an *input validation* algorithm when donations are entered.

(i) Explain why input validation will be needed with Interface A. **1**

(ii) Explain why input validation is **not** required with Interface B. **1**

(*c*) State the data structure that should be used to store the one hundred runners' names. **1**

**(5)**

[*END OF SECTION II*]

**[Turn over**

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## SECTION III

**Attempt ONE part of Section III**



Choose **one** part and answer **all** of the questions in that part.

**[Turn over**

*Marks*

## SECTION III

### Part A—Artificial Intelligence

**Attempt ALL questions in this section.**

**16.** (*a*) Mateusz wants to invest money by buying shares in a company. He uses an *Artificial Neural System* to help decide which shares to purchase.

(i) Describe what is meant by an "Artificial Neural System". **1**

(ii) Explain why an Artificial Neural System is used in the stock market. **1**

(iii) State **one** other use of an Artificial Neural System. **1**

(*b*) Mateusz is advised to buy shares in Intellicombat who make multi-player computer games that use artificial intelligence.

(i) State **one** aspect of human intelligence that artificial intelligence applications aim to copy. **1**

(ii) In a game that shows intelligent behaviour, describe what should happen to the abilities of the characters as the game progresses. **1**

(iii) Name the type of network to which a player must be connected in order to play against a person in another country. **1**

**(6)**

*Marks*

**17.** Serena has a palmtop computer. The software installed includes a diary, e-mail and *speech recognition* software. The palmtop also has a *chatterbot* facility.

(*a*) Describe **one** example of a **command** that Serena may issue when e-mailing using speech recognition. **1**

(*b*) Serena would like to use *handwriting recognition* software to enter text.

State the input device that her palmtop must have for this to be possible. **1**

(*c*) A chatterbot is a current example of *language processing*.

State **one** early example of a program that used language processing. **1**

(*d*) Describe **one** way that a chatterbot could help Serena to be organised at the start of her working day. **1**

**(4)**

**[Turn over**

*Marks*

**18.** Scotia Forest has a large plantation of trees. Part of the forest was flooded to create a reservoir that is 250 metres deep.

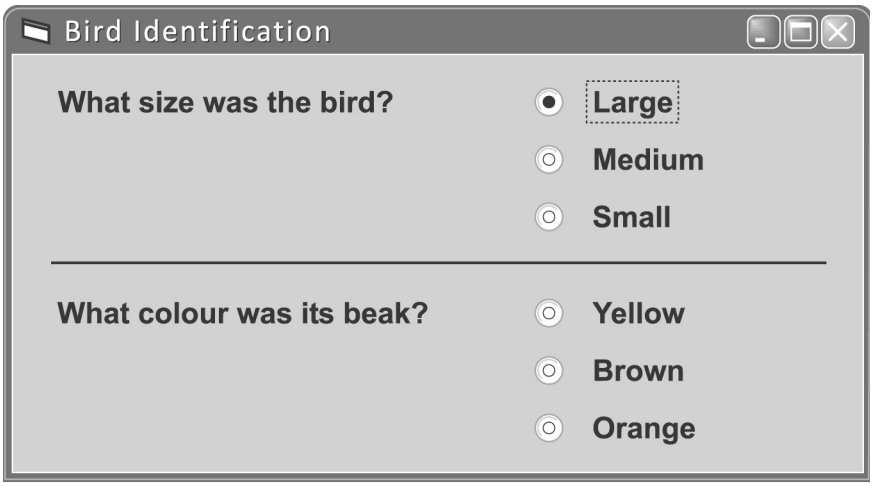
(*a*) The owners of the forest want to remove trees from under the water.

Describe **one** advantage of using *intelligent robots* for this task rather than robots with no intelligence. **1**

(*b*) The owners of the forest use *satellite photo interpretation* to monitor the health of the trees in the forest.

State the area of artificial intelligence that is being used for this task. **1**

(*c*) The forest has a Visitor Centre. Visitors can use a program to identify birds they have spotted in the forest.




Visitors answer questions about the appearance of the bird. The program identifies the bird, then explains how it reached its conclusion.

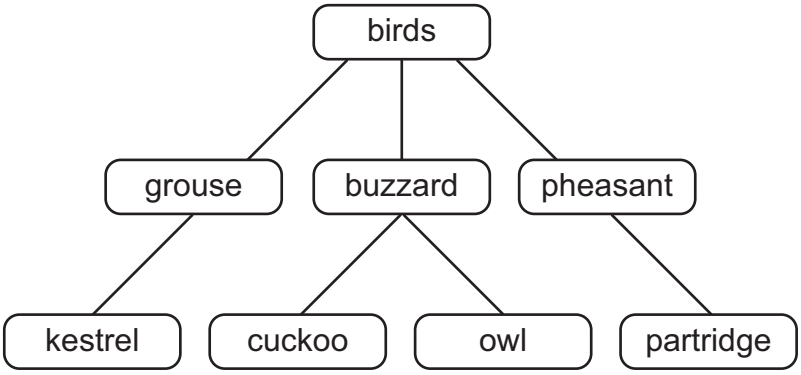
(i) State the type of artificial intelligence program that is being used to identify the birds. **1**

(ii) Describe **one** advantage to the visitors of using this type of software, rather than asking a human specialist in wildlife. **1**

*Marks*

**18. (continued)**

(*d*) The diagram below shows a search tree for a problem.




The solution to the problem is **cuckoo**. To reach this solution the nodes were visited in the following order:

**birds, grouse, buzzard, pheasant, kestrel, cuckoo**

State the type of search that was used here. **1**

**(5)**

**[Turn over**

*Marks*

**19.** The Castello Cruise Company has three cruise ships—Anka, Perla and Marisa. It uses a knowledge base to store facts about the cruises and rules about destinations and special offers. Part of the knowledge base is shown below.

```
1 departs(anka, southampton).
2 departs(perla, greenock).
3 departs(marisa, greenock).
4 sails_in(anka, july).
5 sails_in(perla, july).
6 sails_in(marisa, august).
7 destination(X, mediterranean):- sails_in(X, july).
8 destination(X, baltic):- sails_in(X, august).
9 special_offer(X):- departs(X, greenock), sails_in(X, august).
```

(*a*) State the result of the query:

```
? departs(anka, southampton).
```

**1**

(*b*) State the **first** result of the query:

```
? destination(X, mediterranean).
```

**1**

(*c*) Using the numbering system to help you, trace how the system evaluates the query:

```
? special_offer(perla).
```

**3**

(*d*) The Castello Cruise Company updates the knowledge base to include facts about the following extra cruise.

The Anka departs from Rosyth for the Baltic in August.

Write the **two** facts that should be added to the knowledge base. **2**

(*e*) Draw a *semantic net* to represent the facts:

```
has(anka, casino).
has(anka, cinema).
seats(cinema, 400).
```

**3**

**(10)**

[*END OF SECTION III—PART A—ARTIFICIAL INTELLIGENCE*]

## SECTION III

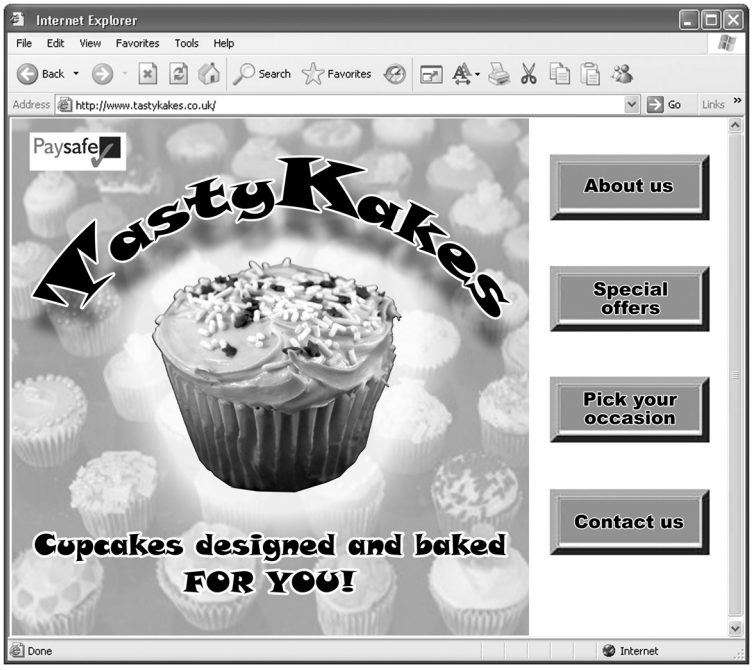
## Part B—Computer Networking

**Attempt ALL questions in this section.**

**20.** TastyKakes has created a website to sell its luxury cupcakes.

(*a*) Describe **two** economic benefits for the company in having a website. **2**

(*b*) The website for TastyKakes has been designed with *hyperlinks*.




(i) State **one** function of hyperlinks on the web page. **1**

(ii) Name the type of software that will allow the user to view this web page. **1**

(*c*) The URL for the special offers page is given below.

http://www.tastykakes.co.uk/specialoffers

(i) State the domain name of this web page. **1**

(ii) State the term used for the process of changing a domain name into an Internet Protocol Address (IP Address). **1**

(*d*) Customers can order and pay for cupcakes online using a credit card. The website uses *data encryption*.

(i) Describe what is meant by the term "data encryption". **1**

(ii) State **one** reason why data encryption is required. **1**

(*e*) TastyKakes sends a monthly e-mail to customers on a mailing list.

State what term is used to describe this method of data transmission. **1**

**(9)**

*Marks*

**21.** The charity ActiveMind has installed a wireless local area network (WLAN) in its head office.

(*a*) Describe **one** advantage to the charity of a WLAN compared to a LAN. **1**

(*b*) State **one** item of hardware that is required so that a laptop can be connected to a WLAN. **1**

(*c*) The charity is organising a sponsored fun run to raise funds. The sponsor form is available to download at the address:

ftp://activemind.org

(i) Name the Internet service provided at this address. **1**

(ii) Describe **one** problem that can result from downloading files. **1**

(iii) Describe **one** other method of transferring a file across the Internet. **1**

(*d*) The charity is worried about the effect of hardware failure on the operation of the network.

(i) State **two** other potential threats to the computer network. **2**

(ii) Describe an effective backup strategy that would minimise the effect of a hardware failure to the network. **2**

(*e*) ActiveMind monitors their employees' use of computer technology at work. Describe **two** types of monitoring allowed under the Regulation of Investigatory Powers Act 2000. **2**

**(11)**

*Marks*

**22.** Cook-E software allows users to control the operation of their cooker at home from their computer at work.

(*a*) Cook-E software is an example of *converging technology*.

Describe what is meant by the term "converging technology". **1**

(*b*) Describe **one** reason why a broadband connection would be recommended for controlling the operation of their cooker. **1**

(*c*) Cook-E software can also be accessed from a mobile phone.

(i) Name the protocol that allows the software to be accessed from a mobile phone. **1**

(ii) Name the type of software that is needed to access the World Wide Web using a mobile phone. **1**

(*d*) After testing Cook-E software for two months, the user interface is updated.

State which stage in the software development process is being carried out. **1**

**(5)**

[*END OF SECTION III—PART B—COMPUTER NETWORKING*]

*Marks*

## SECTION III

### Part C—Multimedia Technology

**Attempt ALL questions in this section.**

**23.** Marcus is a final year fashion student who has created a multimedia presentation of his fashion show. He recorded a video of his fashion show and then transferred it to the computer to be edited.

(*a*) State **one** item of hardware that is needed to capture video. **1**

(*b*) State **one** file type that could be used to store the video of the fashion show. **1**

(*c*) Marcus created a MIDI soundtrack to play over the images of his fashion show.

(i) State **one** advantage of using a MIDI soundtrack rather than digitised sound. **1**

(ii) State **two** attributes of a MIDI instruction. **2**

(*d*) The video clip of the fashion show is high quality but the file size is too large. To reduce the size of the video clip, Marcus changes the length of the video clip.

(i) Describe **two** other ways of reducing the video file size. **2**

(ii) The final size of the file is 4·2 Gigabytes.

State an appropriate backing storage medium for distributing the presentation to all fashion stores in Britain. **1**

**(8)**

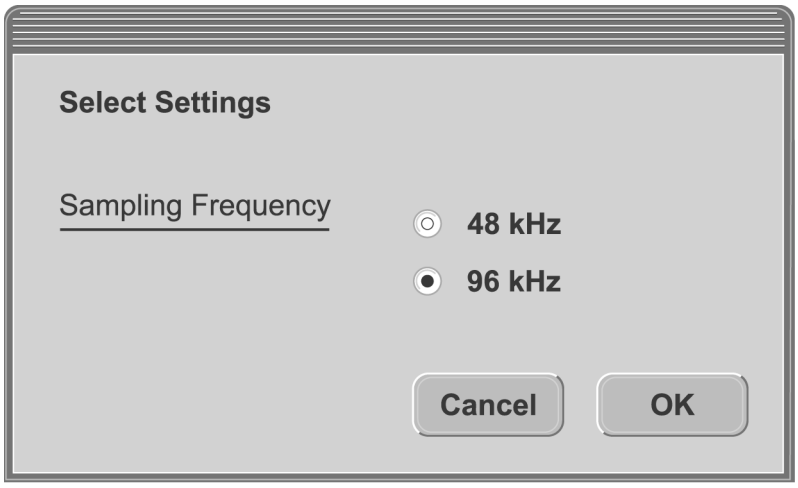
*Marks*

**24.** Brian is using a *WYSIWYG editor* to create a website for a new band.

(*a*) State **one** other method of creating the website. **1**

(*b*) Name **one** device that would allow Brian to capture images of the band for the website. **1**

(*c*) Brian records the band's new song "Young Spirit" at their concert. Brian uses audio software to change the *sampling frequency*. He selects the highest frequency for recording the song.




(i) State **one** effect on the size of the sound file of recording the song at the higher setting. **1**

(ii) State **one** effect on the quality of the sound of recording the song at the higher setting. **1**

(*d*) Brian wants to include part of the song "Young Spirit" on the website.

(i) State the feature of the sound editing software that will allow Brian to create a 60 second sample of the song. **1**

(ii) State **one** other feature of the sound editing software that Brian could use to enhance the sound. **1**

(*e*) An interview with the band is available to download from the website as a compressed audio file. The audio file uses *lossy compression*.

(i) Explain what is meant by the term "lossy compression". **1**

(ii) State a sound file type that uses lossy compression. **1**

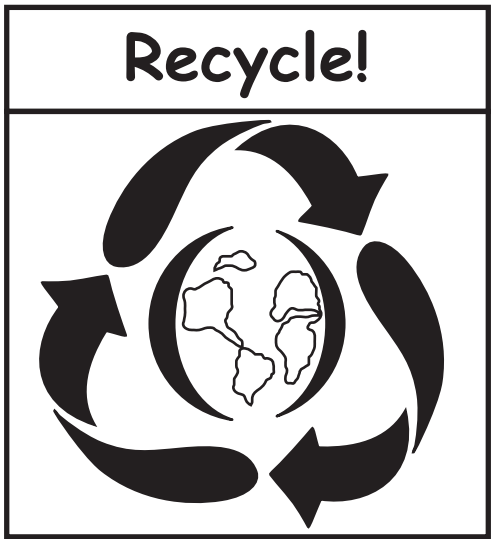
**(8)**

**[Turn over for Question 25 on *Page twenty***

*Marks*

**25.** Naila designed a black and white logo for the local recycling campaign using a *bit-mapped graphics package*.

**Logo A**




**Logo B**

(*a*) State **two** changes that were made to Logo A to create Logo B. **2**

(*b*) Logo B measures 640 pixels across by 480 pixels down.

Calculate the storage requirements of Logo B in Kilobytes.
**Show all working.** **2**

(*c*) Naila creates a colour version of Logo B. She then increases the *colour depth* of Logo B.

(i) State what is meant by the term "colour depth". **1**

(ii) Describe the effect of increasing the colour depth on the size of the file. **1**

(*d*) When the logo was enlarged and then printed, it did not appear as expected.

State **one** reason why bit-mapped graphics lose their quality when enlarged. **1**

(*e*) Naila could save Logo B as either a JPEG file or a GIF file.

Describe **one** difference between JPEG files and GIF files. **1**

(*f*) The logo could have been created using a *vector graphics package*.

State the effect that this would have had on the file size. **1**

**(9)**

[*END OF SECTION III—PART C—MULTIMEDIA TECHNOLOGY*]

[*END OF QUESTION PAPER*]