Diploma Programme
Programme du diplôme
Programa del Diploma

Information technology in a global society
Standard level
Paper 1

Tuesday 6 November 2018 (afternoon)

1 hours 30 minutes

Instructions to candidates

- Do not open this examination paper until instructed to do so.
- Answer two questions. Each question is worth **[20 marks]**.
- The maximum mark for this examination paper is **[40 marks]**.

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Answer **two** questions. Each question is worth [20 marks].

1. *Google* healthcare data

Google is developing an app* to help hospital staff monitor patients with kidney disease. In order to develop this app, *Google* has signed an agreement with the UK's National Health Service (NHS) that will give *Google* access to data on 1.6 million patients held in the NHS database.

The database includes health-related data as well as personal data, some of which is sensitive.

Google plans to use data mining techniques to analyse the data and provide information that can be used to improve the app. Once the app has been developed, it will be provided to the NHS.

(a) (i) Identify **two** items of health-related data that could be used to improve the treatment of patients. [2]

(ii) Identify **two** characteristics of *data mining*. [2]

(iii) Identify **two** reasons why NHS records are stored in a database rather than a spreadsheet. [2]

(b) The agreement between *Google* and the NHS includes policies for the **collection**, **storage** and **sharing** of patient data.

Explain why it is important that the agreement between *Google* and the NHS includes policies for the **collection**, **storage** and **sharing** of patient data. [6]

(c) Evaluate the decision by the NHS to share patient data with *Google*. [8]

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* app: application software, typically small, specialized programs downloaded onto mobile devices; apps can also run on the internet, on a computer, or on a cell/mobile phone or other electronic device

2. Cell phone farmers

Many farmers in Cameroon are not able to use the internet due to the very limited communication infrastructure in their country. In addition, accessing the internet is expensive for most farmers.

As many farmers have cell/mobile phones, they could make better use of technologies such as text messaging (texting or SMS*) to access information that would assist them in their farming.

Recent research has suggested that a lack of internet access is not the main factor limiting the development of farming in Cameroon. The main factor is farmers' lack of IT knowledge.

Some farmers in Cameroon are trialling a system called Agritexte that uses SMS to provide information on the market prices of produce such as cassava leaves and cocoa, see **Figure 1**.

[Source: © International Baccalaureate Organization 2018]

Figure 1: An example of a text message

[Source: © International Baccalaureate Organization 2018]

* SMS: Short Message Service

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(Question 2 continued)

(a) (i) Identify **two** advantages of using text messaging to communicate. [2]

(ii) Identify **two** items that contribute to the cost of accessing the internet. [2]

(iii) Outline the difference between the internet and the World Wide Web. [2]

(b) Analyse the effectiveness of using face-to-face (F2F) training compared to distance learning to train farmers to use Agritexte. [6]

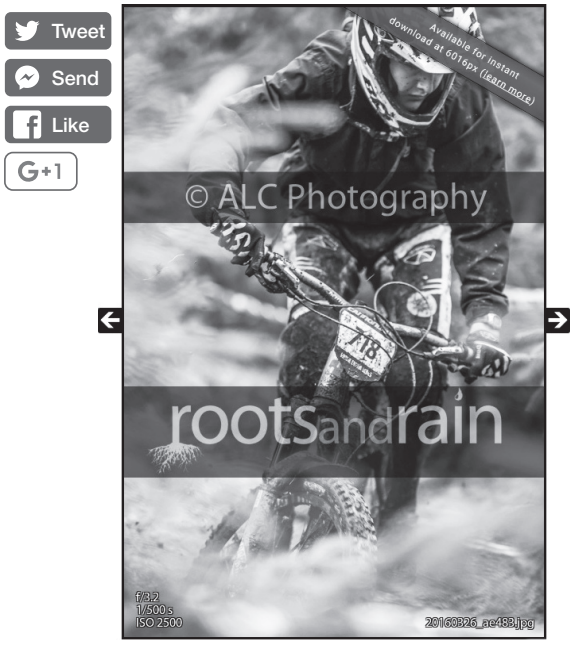
(c) The government of Cameroon is watching the results of the Agritexte initiative. It is considering two options:
- Extend the functionality of Agritexte into a web-based information system.
- Invest in education and training on the use of the existing Agritexte SMS system.

Evaluate these **two** options. [8]

3. Sports photographs

Action Link Click Photography (*ALC Photography*) is a company that specializes in taking photographs of participants in large sporting events, such as cycling and running events. *ALC* recently photographed the participants in a cycle event, see **Figure 2**.

Figure 2: An example of a low-resolution image from the *ALC* website



[Source: Image provided with permission from ALC Photography]

ALC's photographers were positioned at five different points on the course, including the start and finish lines. Each photographer was equipped with a digital camera that takes high-resolution images. The photographer's job is to photograph as many participants as possible.

After the event, the photographs are compressed using lossless compression and transferred from the cameras' memory cards to the *ALC* database. The photographs have tags added by the software, which recognizes the race participant by the number pinned to their bike.

The images for each participant have their resolution reduced and are watermarked before they are added to *ALC*'s website. The participants are then able to purchase high-resolution copies of the photographs that do not have watermarks.

It is also possible for anybody who views the image to purchase and download a high-resolution copy.

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(Question 3 continued)

(a) (i) Identify **two** image file formats that *ALC* could use for its photographs. [2]

(ii) Define the term *resolution*. [2]

(iii) Outline the differences between lossless and lossy compression. [2]

(b) Explain why each image has its resolution reduced and is watermarked before it is uploaded to the *ALC*'s website. [6]

(c) Some people feel uncomfortable about having their photographs taken and posted on a public website.

To what extent is it acceptable for *ALC Photography* to take photographs of participants, post them online and sell them? [8]

4. Uber taxis

Uber Technologies Inc is a company that has developed an app* that allows a customer to submit a trip request on their smartphone. The app allows the customer to select the starting point and final destination of the journey, and uses a global positioning system (GPS) to determine the route.

Figure 3: Taxis in the vicinity of Franklin Street

The app captures the real-time details of the journey, including the starting point, route, distance travelled, the speed of the car and the final destination. The app integrates this information with real-time traffic information, such as closed roads or accidents. Fares can be estimated before the journey and the customer can pay with their credit card or by PayPal.

Some traditional taxi drivers in cities such as Paris and Rio de Janeiro have campaigned against the introduction of the Uber app. They claim these new private drivers, using their own cars, do not have the same knowledge and training as taxi drivers working for a taxi company.

* app: application software, typically small, specialized programs downloaded onto mobile devices; apps can also run on the internet, on a computer, or on a cell/mobile phone or other electronic device

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(Question 4 continued)

(a) (i) Identify **two** characteristics of real-time processing. [2]

(ii) Identify the steps that a global positioning system (GPS) follows to give an accurate location. [4]

(b) The Uber app was created using the product development life cycle (PDLC). Explain why the developers would have included a **feasibility study**, **project schedule** and **user evaluation**. [6]

(c) To what extent should the taxi driver rely on the Uber app rather than their own knowledge of the city when determining the best route? [8]