

Information technology in a global society
Standard level
Paper 1

Monday 16 May 2016 (morning)

1 hour 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]**.

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

1. Public access to art museum databases

Museums around the world provide access to public databases containing information about the items in their collections. Some museums, like the British Museum in London, put the information on their websites. Others, like the Tate Modern (also in London) allow users to select and download part of the database and create reports using their own criteria. Most of the information can be accessed without restriction; however, some of the information is covered by Creative Commons licences.

People who download the data are sharing their results in innovative ways. One user made graphs of the number of artworks by individual artists, while another created a graph with the height and width of the paintings in the Tate Modern.

(a) (i) Identify **two** different types of field that can be included in a database. [2]

(ii) Describe **two** characteristics of Creative Commons licensing. [4]

(b) Previously the information in the museum’s database was only accessible to people working at the museum. Any changes will have implications for the museum’s IT department.

Analyse the implications for a museum’s IT department of allowing public access to selected information in the museum’s database. [6]

(c) People who use the museum database are sharing the reports they create via blogs, social media and collaborative documents. For example, reports may show that the museum prefers artworks from artists of a specific gender, or show the differences in the frequency of loans of certain collections, or even the budget assigned for restoration and maintenance of certain museum pieces.

Discuss the advantages and disadvantages for the museums’ managers of providing public access to the museum database. [8]

2. Online learning on your own device

Mountains University, Australia, uses a virtual learning environment (VLE) to enable students to access its resources both within and outside of the classroom.

The university wants to use the VLE to provide distance learning programmes, so that students can participate in its courses from anywhere in the world. However many of these students have unreliable internet access and limited access to technology. As one way of addressing this issue, the university is considering whether to design courses that are suitable for m-learning.

- (a) (i) The distance learning programme requires that each student spends three hours a week on online activities.

Identify **three** online activities that the university course could use as part of the distance learning programme.

[3]

- (ii) Students have to prepare work that will be assessed by the professors at the university. Much of this work will be done in groups, and group members may be located in different countries.

Identify **three** different IT tools that could be used by students to complete their group work.

[3]

- (b) On the final degree certificate, Mountains University is required to state whether the course was either:
- an online course
 - a course completed by attending class at the university.

Analyse the impact of this statement for the student when using the degree certificate to apply for a job.

[6]

- (c) Some professors at Mountains University have been working with schools in the area as consultants on the use of online activities for education. Some of the local schools have a number of mobile equipment carts that may be pushed to the different classrooms when needed. However the number of devices available is not enough for the number of students in the school. Mountains University is recommending that, instead of purchasing more devices, schools should ask students to bring their own mobile devices or laptops to school as part of a Bring Your Own Device (BYOD) scheme.

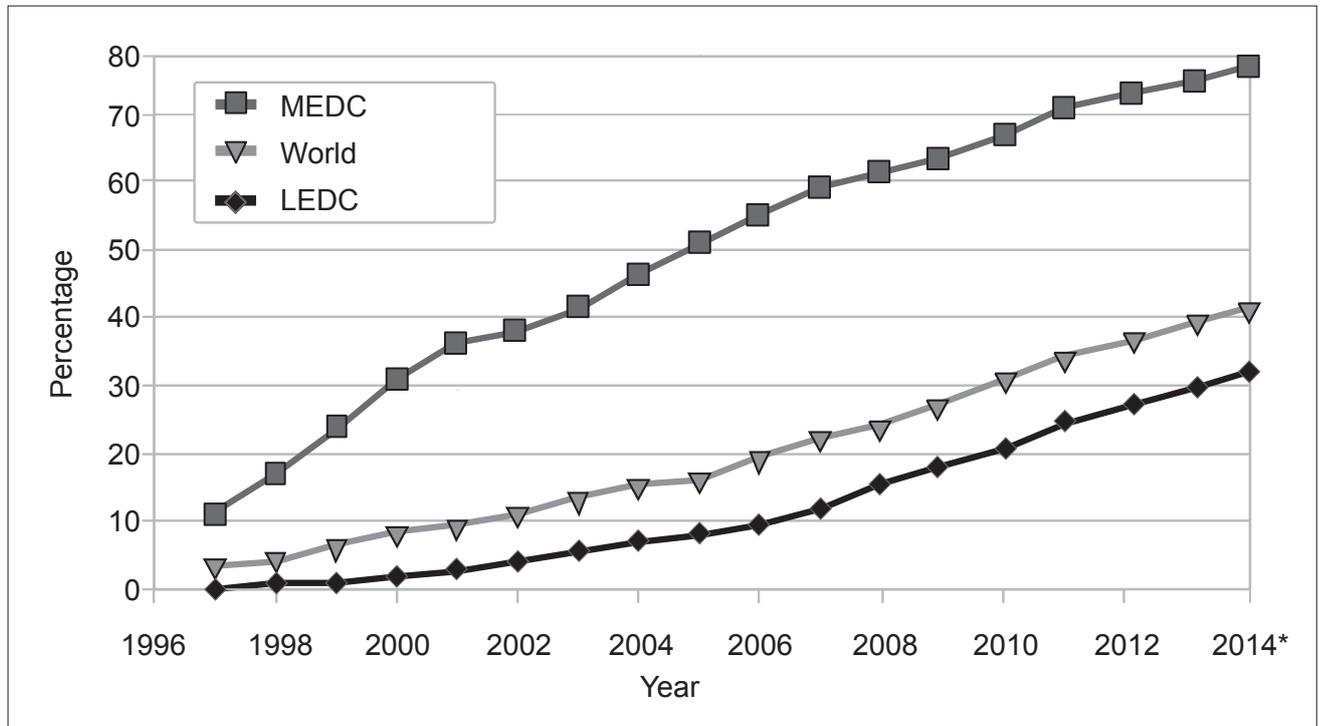
Discuss the implications for a school of implementing a BYOD scheme.

[8]

3. Our interconnected world

Access to the internet and World Wide Web (WWW) has now become essential for many people. **Figure 1** shows the percentage of internet users in more economically developed countries (MEDCs) and in less economically developed countries (LEDCs).

Figure 1: Percentage of internet users in MEDCs and LEDCs (*estimated)



[Source: https://en.wikipedia.org/wiki/File:Internet_users_per_100_inhabitants_ITU.svg#file, by Jeff Ogden.]

Figure 2 shows the affordability of a broadband connection by giving the cost of a broadband subscription as a percentage of average annual income. Affordable broadband is necessary for users to be able to utilize the possibilities the World Wide Web offers.

People can connect to the internet in different ways, such as those listed below:

- At home or work through a router provided by an internet service provider (ISP), either by physically using an ethernet connection or by connecting with Wi-Fi.
- By using a “hotspot”.

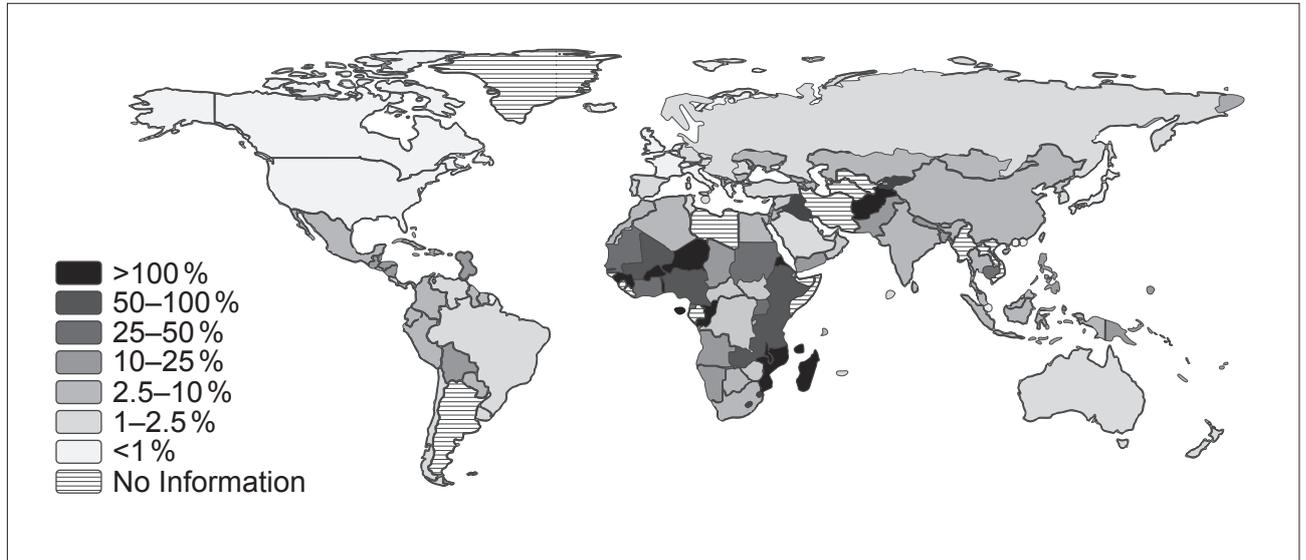
Hotspots are wireless access points that provide internet access to mobile devices, but can be used by desktop computers if they are close enough to the hotspot. They are typically available in public locations. Free hotspots can be found in cafes, shops and hotels, as well as on the street in many cities.

This growth in the number of hotspots offers a great advantage to all citizens who need an internet connection, but it also brings great risks.

(This question continues on the following page)

(Question 3 continued)

Figure 2: Broadband affordability



[Source: www.geography.oii.ox.ac.uk]

- (a) (i) Outline the difference between the internet and the World Wide Web. [2]
- (ii) Identify **two** characteristics of a router. [2]
- (iii) Identify **two** pieces of information that the following URL provides about the site it connects to: <https://www.khanacademy.org/math> [2]

- (b) A group of university students has rented a house near a free hotspot that can be used from inside the house. Some of the students want to sign a contract with a local ISP so that they can have their own Wi-Fi in the house, while others want to continue using the free hotspot.

Analyse the advantages and disadvantages of home internet connections and hotspots. [6]

- (c) Tim Berners-Lee, creator of the World Wide Web, believes that the ability to access and use the World Wide Web is necessary for the benefit of everyone in our global society.

To what extent do you agree with this statement? [8]

4. Is that the original photograph?

Juliana and Teresa are two professional photographers who have been creating videos called “Wonders of Life”. These are 10 minute videos of events that may take days to happen in real time. Their latest video shows a caterpillar creating a cocoon and then appearing as a butterfly (see **Figure 3**).

Figure 3: Image from video of a caterpillar turning into a butterfly



They have just purchased a new trail camera*, because their next project is to photograph a bird’s nest to capture the moment the chicks break the eggshells, and to then follow their growth until they leave the nest. The camera comes with a number of sensors to assist the software in the camera in producing the best possible image.

The trail camera will take up to two photographs per second and save them as approximately 700 megabyte (MB) image files. The image is transmitted to the computer by Wi-Fi.

At the end of the project, the individual photos are then compiled into a video. Juliana and Teresa are considering whether to manipulate some images to improve the quality of the video.

* trail camera: cameras that are placed in a specific spot to take photographs of anything that changes over time.

(This question continues on the following page)

(Question 4 continued)

- (a) (i) Identify **two** sensors that the trail camera might have. [2]
- (ii) The images taken by the trail camera need to be transferred to a computer to create the video. These are high resolution images, so they will need to be compressed using lossy or lossless compression before being sent over the internet.
- Outline the difference between lossy and lossless compression. [2]
- (iii) Identify **two** techniques that can be used to digitally manipulate a photograph. [2]
- (b) Explain the importance of the requirements specification, project schedule and product design to the success of the video. [6]
- (c) After the success of the video of a caterpillar turning into a butterfly, Juliana and Teresa were hired by a fashion company to create a brochure showing fashion models wearing the latest clothing designs. Juliana and Teresa were asked to consider manipulating some of the images to enhance the products or to make the models look more attractive.
- Discuss the social and ethical implications of the fashion company using manipulated images. [8]
-