

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										



General Certificate of Secondary Education
June 2014

Computer Science

4512/CB4

Component 1: Practical programming

Candidate Booklet

Scenario 4: Traditional Application

Flash Card Quiz

For candidates entering for the 2014 examination
To be issued to candidates on or after 1 September 2012

*This scenario is one of four available. Each of the four scenarios is available in a separate candidate booklet. You must complete **two** of the four scenarios.*

- You have approximately 25 hours in which to complete this scenario.
- Before starting work on the problem, read the whole of this Candidate Booklet thoroughly. You can ask your teacher to explain anything in this booklet, except Computer Science specific terms, that you do not understand.
- There are restrictions on when and where you can work on this problem. Your teacher will explain them to you. For example, you should only do work that you intend to hand in for marking when a teacher is present, so that he or she can confirm that the work is your own. The Candidate Booklet must **not** be taken outside your school/college.
- You may need to use the Internet to research certain parts of the problem. This does not have to be within the 25 hours recommended time.
- You will need to complete and sign a Candidate Record Form which your teacher will provide.

Information

You will also be marked on your use of English. It is important to:

- make sure that all your work is legible
- use correct spelling, punctuation and grammar
- use a style of writing which suits the person you are writing for
- organise your information clearly, so that you make yourself understood
- use Computer Science terms where they are needed.

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Scenario 4: Flash Card Quiz

Flash cards are a well-known tool for learning and revision. They normally consist of a piece of card with a keyword on one side and the definition of the keyword on the other side, for example:

Keyword	Definition
Cellulose	Tough substance that makes up the cell walls of green plants

A teacher wants her students to use a computerised version of a flash card quiz to help them remember Key Stage 3 Biology definitions. The program should display a series of keywords to a student and ask them to choose the correct definition for each keyword. The quiz is completed once a student has matched each keyword with its definition twice.

An external file containing the keywords and definitions to be used in the quiz will be provided by your teacher.

Tasks

- 1) Develop the part of the program that loads the keywords and definitions from the external file your teacher has given you.
- 2) Develop the part of the program that displays a randomly chosen keyword and three possible definitions (all taken from the data you have been given). The three definitions must include the correct one and two other randomly chosen definitions. The three definitions shown to the student must be different from each other.
- 3) Develop the part of the program that will allow the student to choose one of the definitions.
 - a. If they choose the correct definition a 'success' message is displayed.
 - b. If they choose an incorrect definition, they are told they are wrong and are shown the correct definition.
- 4) Develop the program so that tasks 2 and 3 are repeated continuously until the student has correctly matched every keyword with its definition exactly **twice**.
 - a. Once the keyword has been correctly matched with its definition twice, it should not be displayed again.
 - b. The three definitions should be displayed in a random order each time. This is to make sure that the correct definition is not easily identified by its position.
- 5) Extend the program so that when the student has identified all keywords correctly twice the following information is displayed.
 - a. The total number of incorrect attempts at matching keywords with their definitions.
 - b. The total time, displayed in minutes and seconds, it took for the student to complete the quiz.
 - c. The student should be given the option to either start the quiz again or exit the program.

Keywords and definitions to be used in the Flash Card Quiz

Keyword	Definition
Cellulose	Tough substance that makes up the cell walls of green plants
Respiration	A chemical reaction that causes energy to be released from glucose
Haemoglobin	A substance which joins to oxygen and carries it round the body in the blood
Ventilation	Breathing
Cartilage	Tough, smooth substance covering the ends of bones to protect them
Cytoplasm	Jelly-like part of a cell where chemical reactions happen
Nucleus	Controls what happens inside a cell
Alveoli	Tiny air sacs in the lungs
Amino acids	Produced when proteins are digested
Virus	The smallest type of microbe
White blood cells	Can engulf bacteria or make antibodies
Photosynthesis	The process of turning carbon dioxide, water and light into glucose and oxygen
Stomata	Small holes in the underside of a leaf
Vaccine	Dead or inactive forms of a microorganism
Fibre	A nutrient that cannot be digested

Turn over for information on organising your portfolio

Turn over ►

In addition

1. Your Portfolio

Remember that you are looking to provide an application that will meet the needs of the Biology teacher.

You are free to use whatever software tools and techniques are available to you.

What your teacher will be looking for and how to provide that evidence for your Portfolio

In preparing you for this unit of work, your teacher will have provided you with more information about the section headings below.

Part 1 – Design of solution

Design of solution (0–9 marks available)

What you must do

- Show an understanding of what the problem involves with reference to the user's needs.
- Produce an overview plan that shows how the problem is to be solved.
- Produce pseudo code (or suitable alternative) showing the main blocks within the proposed solution.

Part 2 – Solution development

Solution development (0–9 marks available)

What you must do

- Show evidence of an understanding of how the final solution meets the needs of the user.
- Produce annotated code that demonstrates an understanding of the programming techniques used.

Part 3 – Programming techniques used

Programming techniques used (0–36 marks)

What you must do

- Show an understanding of the programming techniques used and how the different parts of the solution work together.
- Explain/justify the choice of programming techniques used to create a solution that has been coded efficiently.
- Show evidence for the purpose and use of data structures.
- Show the techniques used (appropriate to the language used) within the code to make the solution robust.

Part 4 – Testing and evaluation

Testing and evaluation (0–9 marks available)

What you must do

- Produce a test plan that shows the expected tests, test data and expected results.
- Show that the planned tests have been carried out and provide a record of the actions taken.
- Evaluate how the final solution meets the needs of the user.

2. Organising your Portfolio of work

Your Portfolio is where you keep the evidence that you have produced.

You should imagine that the Portfolio is to be used by another person who is interested in how you produced your solution. It is to help them to do something similar. It is important that you organise work for the Portfolio as shown below.

- You must keep all the work you produce for the organiser in hard copy in a Portfolio (or save your work electronically in folders which you will later copy onto a CD or DVD). Your teacher will have instructed you what to do.
- If you are putting hard copy printouts in your Portfolio make sure that you number each page and fasten it all together. Take your work out of any plastic sleeves before you hand it in to your teacher for marking.
- Each page should have your name, centre number and candidate number clearly shown on it.
- When you have completed this scenario, if you are putting your work on a CD or DVD, put the work for each heading on page 4 of this booklet in a separate folder. Each folder must be clearly named (*for example, 'Design of solution', 'Solution development' etc*). Inside each folder the work must have a filename (*for example, 'What the problem involves', 'Control statements' etc*) which should be a final version for each heading. The CD or DVD should have your name, centre number and candidate number clearly shown on it. Your teacher will have advised you what to do.

END OF CANDIDATE BOOKLET

