Coursework Task
C206 12

Higher Computing

Valid for session 2012/2013 only

Coursework Task

Subject: Computing

Level: Higher

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The assessment material and marking scheme in this Coursework pack can be used by staff in approved SQA centres for the purposes of assessment of candidates in accordance with the Course Assessment Specification. The pack must not be released to candidates or distributed for other purposes. SQA distributes these materials only to centres; these materials are not distributed more widely and are not publicly available from SQA's website on the Internet.

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Section 1

Organisation and Conditions for Assessment

Organisation and Conditions for Assessment

The assessment is designed to test the candidates' ability to apply knowledge and understanding and practical skills, developed through study of the Computer Systems and Software Development Units.

The notional design length for the assessment is 8–10 hours. However, a candidate may be allowed longer than this if required. Section 2 and the Marking Grid in Section 3 should be given to the candidates.

The assessment is to be undertaken under "open book" conditions, but under supervision to ensure that the work submitted is the candidate's own work. The tutor may give the candidate hints and/or help if requested. Any such help should be reflected in the marks awarded. Once the task has been completed and marked, it should not be returned to the candidate for further work.

The task is designed to discriminate between candidates and, therefore, would be expected to provide a wide range of marks. Stronger candidates should be able to complete the task successfully, and without tutor assistance, within the suggested time. Weaker candidates might not complete all aspects of the task within a reasonable time, or may require significant assistance, and so would achieve a lower total mark. Note that there is no requirement for a candidate to achieve a threshold to "pass" the assessment.

The mark obtained out of 60 should be submitted to the SQA unscaled. This will be combined with the Question Paper mark out of 140 to establish the candidate's overall grade of award. The Coursework mark should also be used in preparation of estimate grades.

Marking Guidelines (Section 3)

In addition to the Marking Grid, which can be issued to candidates, further guidelines for teachers have been included in Section 3. These are included to give further assistance to teachers and must **not** be issued to candidates.

Section 2

Coursework Task

Coursework Task

Higher Computing Coursework Task 2012–2013

Introduction

Calibre Academy's Higher Biology class are going on a field trip. They have been given the task of cataloguing the number of common minibeasts found within one square metre of woodland. To do this, they lay a quadrat over an area of ground, note the coordinates of each minibeast they find and take a close-up digital photograph as evidence.

The class will create a program to store the name and grid position of 6 common minibeasts.

Part 1

The students from Calibre Academy will write a program to store the position of each common minibeast.

The software will

- Allow one of six minibeasts to be selected from a menu.
- Enter and store the name and grid coordinate of the selected minibeast.
- Display how often each minibeast was found.
- Display the minibeasts found at a selected coordinate.

How the program should work

Entering the log data

The user should select the name of each minibeast found from the menu shown below:

1. Slug
2. Centipede
3. Ladybird
4. Snail
5. Woodlouse
6. Worm
7. Exit

Selection is made by entering the relevant number.

Once a minibeast is selected the coordinate of where the minibeast was found should be input and validated.

The data shown below should be entered into the program.

Minibeasts	Coordinates
2	A6
1	D1
6	H7
4	B3
4	A2
3	J2
6	H0
1	B3
1	F9
7	

Displaying how often each minibeast was found

How often each minibeast was found should be displayed as shown below.

Minibeast	Number found
1	3
2	1
3	1
4	2
5	0
6	2

Displaying the minibeast found at a selected coordinate

The user will enter a coordinate (for example B3).

The minibeasts found at the selected coordinate should be displayed as shown below.

At coordinate B3 the following minibeasts were found:
1
4

Main Algorithm

1.   Start Loop
2.   Select valid number from menu
3.   If number is not 7
4.   Enter a valid grid coordinate
5.   End if
6.   End conditional loop when 7 is chosen
7.   Display how many of each minibeast were found
8.   Ask user to enter a coordinate and display the minibeasts found at that coordinate

What you have to do:

	Tasks	Evidence required	Marks
1	Indicate data flow on the main algorithm.	Algorithm with data flow.	2
2	Refine steps 4, 7, 8.	Pseudocode for steps	7
3	Using a software development environment of your choice, implement the algorithm. Use separate sub-programs where appropriate. Use parameter passing where appropriate.	Listing of implemented program.	16
4	Test the program with the data provided. <table><tr><td>Minibeasts</td><td>Coordinates</td></tr><tr><td>2</td><td>A6</td></tr><tr><td>1</td><td>D1</td></tr><tr><td>6</td><td>H7</td></tr><tr><td>4</td><td>B3</td></tr><tr><td>4</td><td>A2</td></tr><tr><td>3</td><td>J2</td></tr><tr><td>6</td><td>H0</td></tr><tr><td>1</td><td>B3</td></tr><tr><td>1</td><td>F9</td></tr><tr><td>7</td><td></td></tr></table>	Hard copy of results for given test run.	1
5	Test the program with your own test data to ensure robustness.	Hard copy of your test results and report on the robustness of the program.	2
6	Evaluate maintainability.	Brief report on maintainability of program code.	2

Part 2

The class have been awarded a school grant of £1500 to purchase equipment they require for their field trip.

To record the results the class will purchase a tablet PC. To ensure sustainability of the project with future classes a minimum specification for the tablet is stated.

To keep a visual record of each minibeast found, the class will require a high resolution, digital SLR camera capable of capturing close up images with a magnification of 1:1. To obtain this magnification an additional lens may have to be purchased for the camera. As pictures may often be taken in low light, the camera should be capable of taking pictures at an ISO (light sensitivity) setting of at least 1600.

To catalogue the captured images a database application should be purchased for the tablet PC.

An external solid state drive should be purchased to back up the program data and photographs on site.

- Tablet PC
    - Dual Core 1Ghz Processor
    - Minimum 1Gb RAM
    - Minimum 32Gb of backing storage
    - Minimum screen resolution of 1280 × 800

- Digital SLR Camera
    - Minimum 15 megapixel resolution
    - Maximum ISO setting of at least 1600
    - Macro Lens capable of 1:1 (or ×1) magnification
    - Built in Flash

- External Solid State Drive
    - Minimum 128Gb
    - Minimum data transfer rate of 500Mbit/s
    - Robustness

- Database software to catalogue digital camera images
    - Capable of storing several field types including images
    - One other software feature

What you have to do:

	Tasks	Evidence required	Marks
1	Produce a report which: • Clearly identifies two suitable tablet PCs and uses a table to show that they match the stated criteria. • Compares the tablet PCs according to processing capability, RAM capacity, backing storage capacity and screen resolution, in the context of the Biology field trip. • Recommends one tablet and justifies your recommendation in terms of your comparison/analysis.	A report detailing your findings and recommendations. Printouts/photocopies of source materials eg web pages, magazine articles.	8
2	Produce a report which: • Clearly identifies two suitable digital SLR cameras and uses a table to show that they match the stated criteria. • Compares the cameras according to resolution, magnification and ISO settings, in the context of the Biology field trip. • Recommends one digital camera and justifies your recommendation in terms of your comparison/analysis.	A report detailing your findings and recommendations. Printouts/photocopies of source materials, eg web pages, magazine articles.	7
3	Produce a report which: • Clearly identifies two suitable external, solid state drives and uses a table to show that they match the stated criteria. • Compares the solid state drive according to storage capacity, transfer rate and robustness, in the context of the Biology field trip. • Recommends one solid state drive and justifies your recommendation in terms of your comparison/analysis.	A report detailing your findings and recommendations. Printouts/photocopies of source materials, eg web pages, magazine articles.	7
4	Produce a report which: • Clearly identifies two suitable database software packages and uses a table to show that they match the stated criteria. • Compares the database software in terms of their field types and one other feature, in the context of the Biology field trip. • Recommends one software package and justifies your recommendation in terms of your comparison/analysis.	A report detailing your findings and recommendations. Printouts/photocopies of source materials, eg web pages, magazine articles.	6
5	Produce a report which shows that the total expenditure for the purchases is within £1500 Highlight the relevant sections of any printouts/photocopies of source materials, to show where the details in your report come from.	A report summarising costs.	2

Section 3

Marking Guidelines

Marking Grid – Part 1

Name _____ **Date** _____

Topic		Out of	Mark	Comment
Part 1				
Design (9)	Indication of data flow	2, 1, 0		
	Pseudocode for step 4	2, 1, 0		
	Pseudocode for step 7	2, 1, 0		
	Pseudocode for step 8	3, 2, 1, 0		
Implementation (16)	Main program	2, 1, 0		
	Sub-program for step 4	2, 1, 0		
	Sub-program for step 7	2, 1, 0		
	Sub-program for step 8	3, 1, 0		
	Formatted output	2, 1, 0		
	Use of parameters	3, 2, 1, 0		
	Maintainability	2, 1, 0		
Correcting errors (5)	Testing using data provided	1, 0		
	Evaluate robustness	2, 1, 0		
	Evaluating maintainability	2, 1, 0		

Allocation of marks

Award full marks if achieved successfully without assistance.
Award less than the maximum if task achieved partially without assistance.
Award one mark if completed with some assistance or hints.
Award no marks if item not achieved, or completed only with significant assistance.

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Marking Grid – Part 2

Name _____ **Date** _____

Part 2				
Identify and justify a tablet PC (8)	Clearly identifies two suitable tablet PCs and uses a table to show that they match the stated criteria.	2, 1, 0		
	Compares the processing capability, RAM capacity, backing storage capacity and screen resolution, in the context of the Biology field trip.	4, 3, 2, 1, 0		
	Recommends one tablet PC and justifies recommendation in terms of comparison/analysis.	2, 1, 0		
Identify and justify a digital SLR camera (7)	Clearly identifies two suitable digital cameras and uses a table to show that they match the stated criteria.	2, 1, 0		
	Compares the resolution, magnification and ISO settings, in the context of the Biology field trip.	3, 2, 1, 0		
	Recommends one digital camera and justifies your recommendation in terms of comparison/analysis.	2, 1, 0		
Identify and justify an external solid state drive (7)	Clearly identifies two external, solid state drives and uses a table to show that they match the criteria.	2, 1, 0		
	Compares the storage capacity, data transfer rate and robustness, in the context of the Biology field trip.	3, 2, 1, 0		
	Recommends one solid state drive and justifies recommendations in terms of comparison/analysis.	2, 1, 0		
Identify and justify a database software package (6)	Identifies two database software packages and uses a table to show that they match the stated criteria.	2, 1, 0		
	Compares the database software in terms of their field types and one other feature, in the context of the Biology field trip.	2, 1, 0		
	Recommends one software package and justifies recommendation in terms of comparison/analysis.	2, 1, 0		
Overall report (2)	The itemised total cost of all recommended hardware is within the £1500 budget.	1, 0		
	Highlight printouts of hardware and software.	1, 0		
	Overall total	**60**		

Allocation of marks

Award full marks if achieved successfully without assistance.
Award less than the maximum if task achieved partially without assistance.
Award one mark if completed with some assistance or hint and enter comment stating reason for deduction.
Award no marks if item not achieved, or completed only with significant assistance.

Further Guidelines for Teachers/Lecturers
(Not to be distributed to candidates)

General Guidelines

It would be considered good practice to distribute the marking scheme to candidates. Candidates may find the breakdown of marks in the marking scheme useful when working through their Coursework Task.

When completing the marking scheme, teachers should ensure they complete the comments column to explain why marks have been deducted or awarded.

Part 1

Teacher's notes

It may be necessary, in some programming environments, to introduce a "step zero" into the algorithm to initialize the variables.

Selection of minibeasts should be by inputting the relevant number.

With some visual programming languages users may wish to implement the menu system as buttons. In this case the supplied data could be inputted using either a keyboard or a mouse.

Marking Scheme

Evaluating fitness for purpose includes the candidate's own tests for robustness through the use of exceptional test data.

When evaluating maintainability candidates should consider the use of:

- White space – indentation and blank lines
- Meaningful identifiers eg procedure, variable names
- Internal commentary
- Modularity
- Parameter passing/local variables (use of array rather than individual variables)

Two marks should be awarded if the evaluation refers to three or more of the above points.
One mark should be awarded if the evaluation refers to two of the above.
No marks should be awarded if the evaluation refers to fewer than two of the above.

Part 2

Teacher's notes

Should candidates select a digital camera not capable of the required magnification an **additional** lens **must** be purchased and included in the cost of the camera. The magnification capability of the lens may then be used in the comparison of the two digital cameras.

Candidates should be encouraged to list the specification of their hardware/software in the form of a table. Note that a table on its own should **not** be regarded as a comparison.

Please note that when identifying two suitable external solid state drives, hard disk drives are **not** suitable.

The data transfer rate of the solid state drive may be taken from the type of interface (eg USB 3.0 or Firewire). Evidence of this must be included.

Marking Scheme

Each hardware/software requirement should be marked as follows:

- Identification – candidates should show evidence that they have correctly identified two items that have matched the requirements. A table is recommended for this purpose.
- Comparison – candidates should discuss the specification of each item *in terms of the context* of the Biology field trip.
- Recommendation – candidates should identify one item and clearly justify why they have selected that item over the other.

Section 4

Advice on Recording and Retention of Evidence

Advice on Recording and Retention of Evidence

For each candidate, the following evidence should be retained for possible verification by SQA:

1   written reports, program designs, program listings, printouts and other evidence as detailed in the Coursework Task

2   completed marking grid, with comments where appropriate.

The summary form overleaf may be copied for each candidate undertaking the Higher Computing Course.

Candidate assessment summary

Name _____ Year of presentation _____

Centre _____ Candidate number _____

Unit assessment

Unit title	Software Development			
	Mark		**Date passed**	**Initials**
	1st attempt	2nd attempt		
Assessment 1 (Outcome 1)				
Assessment 2 (Outcome 2)				

Unit title	Computer Systems			
	Mark		**Date passed**	**Initials**
	1st attempt	2nd attempt		
Assessment 1 (Outcome 1)				
Assessment 2 (Outcome 2)				

Unit title				
	Mark		**Date passed**	**Initials**
	1st attempt	2nd attempt		
Assessment 1 (Outcome 1)				
Assessment 2 (Outcome 2)				

Course assessment

	Mark	**Date completed**	**Initials**
Coursework Task (out of 60)			
Estimate examination mark (out of 140)			
Total (out of 200)		**Teacher/Lecturer signature**	
Estimate grade			