Coursework Task
C206 12

Higher Computing

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Coursework Task

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The Optima Building
58 Robertson Street
Glasgow
G2 8DQ

Ironmills Road
Dalkeith
Midlothian
EH22 1LE

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 2011–2012

Introduction

Suretest employ people to test computer games. New employees are given a budget to buy a suitable computer system for testing the games. Each tester plays the games on their own desktop computer system and logs the faults they encounter while playing each game. To help collate the test data generated by their testers, Suretest wish to create a program to store and process test results.

Part 1

Suretest decide to commission a software development company to develop a program to log faults found by their testers. The program will be tested on the game, "Hamster Commanders".

The software will

- Input the game levels which crashed during each test session.
- Count the number of times each level has crashed.
- Produce a list of the number of crashes in each level.
- Calculate which level/levels had the greatest number of crashes.

The data below should be entered into the programme.

Test Run	Levels which Crashed
1	e,e,d,b,d,b,a,a,a,e
2	e,f,a,a,a,b,d,a,b,e
3	d,e,d,c,d,a,f,f,e,a

How the program should work

Entering the log data

Hamster Commanders has 6 levels (a to f). The data should be entered as a 10 character string.

For example the data for test run 1 should be entered as "eedbdbaaae".

Displaying the total crashes for each level

The total crashes should be displayed as shown below.

Level	Number of Crashes
a	3
b	2
c	0
d	2
e	3
f	0

Displaying the level/levels which crashed the greatest number of times

The information on the level/levels with the most crashes should be displayed as shown below.

```
The levels with the most number of crashes were:
Level a
Level e
These levels crashed 3 times
```

Main Algorithm

1. Get valid test run data
2. Count and display the total number of crashes for each level
3. Find greatest number of crashes and display the levels where they occurred

What you have to do:

	Tasks	Evidence required	Marks
1	Indicate data flow on the main algorithm.	Algorithm with data flow.	2
2	Refine step 1.	Pseudocode for step	1
3	Refine step 2.	Pseudocode for step	3
4	Refine step 3.	Pseudocode for step	3
5	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
6	Test the program with the data provided.	Hard copy of results for three given test runs.	1
7	Test the program with your own test data to ensure robustness.	Hard copy of your test results and report on test results.	2
8	Evaluate maintainability.	Brief report on maintainability of program code.	2

Part 2

When new testers are employed by Suretest they are given £2000 to purchase a new desktop computer suitable for the hardware demands of computer gaming.

To ensure that their testers are using a variety of platforms, Suretest do not specify a particular make or model of computer system. They do however insist that the purchased desktop computers must meet the minimum specification detailed below.

A high quality graphics card should be purchased along with a high resolution monitor to ensure games are tested using their highest display settings.

Benchmarking software should be purchased to measure the desktop computer's CPU performance. Details of the desktop computer's performance will be sent to Suretest.

- Desktop Computer
  - Minimum Six Core Processor
  - Minimum 6 Gb RAM
  - Minimum 1 Terabyte of backing storage
  - Sound Card with Surround Sound capability

- Graphics Card
  - Minimum 800 Mhz Graphics Processor
  - Minimum 1 Gb onboard Video RAM
  - Minimum of two outputs from HDMI, DVI and DisplayPort
  - Capable of displaying 1920×1080 pixel video outputs

- High Resolution widescreen LED Monitor
  - Capable of displaying screen resolution of 1920×1080
  - Maximum 5 ms response time
  - Minimum contrast ratio of 1000:1
  - Minimum of two inputs from HDMI, DVI and DisplayPort

- Benchmarking Software to measure the desktop computer's CPU performance

What you have to do:

	Tasks	Evidence required	Marks
1	Produce a report which: • Clearly identifies two suitable desktop computers and uses a table to show that they match the stated criteria. • Compares the desktops according to processing capability, backing storage capacity, RAM capacity and sound output capability, in the context of the tester's needs. • Recommends one desktop and justifies the recommendation in terms of the 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 graphics cards and uses a table to show that they match the stated criteria. • Compares the processor speed, onboard memory and video outputs, in the context of the tester's needs. • Recommends one graphics card and justifies the recommendation in terms of the 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 widescreen LED monitors and uses a table to show that they match the stated criteria. • Compares the output resolution, contrast ratio and response time, in the context of the tester's needs. • Recommends one graphics card and justifies the recommendation in terms of 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: • Identifies two benchmarking software packages and uses a table to show that they match the stated criteria. • Compares the benchmarking software in terms of their CPU performance test and one other feature, in the context of the tester's needs. • Recommends one software package and justifies the recommendations in terms of the 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 £2000	A report summarising costs.	2

Note:	Highlight the relevant sections of any printouts/photocopies of source materials, to show where the details in your report come from.

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 1	1, 0		
	Pseudocode for step 2	3, 2, 1, 0		
	Pseudocode for step 3	3, 2, 1, 0		
Implementation (16)	Main program	2, 1, 0		
	Sub-program for step 1	1, 0		
	Sub-program for step 2	3, 2, 1, 0		
	Sub-program for step 3	3, 2, 1, 0		
	Formatted output	2, 1, 0		
	Use of parameters	3, 2, 1, 0		
	Maintainability	2, 1, 0		
Correcting errors (5)	Testing	1, 0		
	Evaluating fitness for purpose	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.

Marking Grid – Part 2

Name _____ **Date** _____

Part 2				
Identify and justify a desktop computer (8)	Clearly identifies two suitable desktop computers and uses a table to show that they match the stated criteria.	2, 1, 0		
	Compares the desktops according to processing capability, backing storage capacity, RAM capacity and sound output capability, in the context of the tester's needs.	4, 3, 2, 1, 0		
	Recommends one desktop and justifies recommendation in terms of comparison/analysis.	2, 1, 0		
Identify and justify a graphics card (7)	Clearly identifies two suitable graphics cards and uses a table to show that they match the stated criteria.	2, 1, 0		
	Compares the processor speed, onboard memory and video outputs, in the context of the tester's needs.	3, 2, 1, 0		
	Recommends one graphics card and justifies recommendations in terms of comparison/analysis.	2, 1, 0		
Identify and justify a monitor (7)	Clearly identifies two widescreen LED monitors and uses a table to show that they match the criteria.	2, 1, 0		
	Compares the output resolution, contrast ratio and refresh rate, in the context of the tester's needs.	3, 2, 1, 0		
	Recommends one monitor and justifies recommendations in terms of comparison/analysis.	2, 1, 0		
Identify and justify benchmarking software package (6)	Identifies two benchmarking software packages and uses a table to show that they match the stated criteria.	2, 1, 0		
	Compares the benchmarking software in terms of their CPU performance test and one other feature, in the context of the tester's needs.	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 £2000 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.

The supplied data should be inputted using a keyboard.

Marking Scheme

For users of Pascal, the marks for parameter passing may be awarded where candidates have recognised that a global variable would be declared.

When marking the refinement and implementation of algorithm step 1, a mark should be awarded for validating the content of the string (ie each character is either a, b, c, d, e or f). No marks have been allocated for checking the length of the string.

Evaluating fitness for purpose includes the candidate's own tests for robustness.

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 that two of the above.

Part 2

Teacher's notes

Should candidates select a desktop computer without surround sound capability an additional sound card may be purchased and included in the cost of the desktop computer. The surround sound capability of the additional card may be used in the desktop computer comparison.

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.

Response time for monitors may also be called refresh rate.

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 Suretest scenario.
- 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			