Coursework Task
C206 12

Higher Computing

Valid for session 2008/2009 only

Publication code: BB3416

Coursework Task

Subject: Computing

Level: Higher

Publication date: October 2008

Publication code: BB3416

Published by the Scottish Qualifications Authority

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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. Sections 2 and 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 should **not** be issued to candidates.

Section 2

Coursework Task

Coursework Task

Higher Computing Coursework Task 2008-2009

Part 1

Erica McKenzie runs a business from her home in a small village in the highlands of Scotland designing custom-built computer systems for businesses in her area.

A local software design company wants to develop software to help her grade and select suitable processors for her customers. This software will . . .

- allocate points based on clock speed, data bus width and cache size
- use the points to allocate a star rating to each processor
- calculate the number of processors at each star rating
- display a table showing the points and rating for each processor
- display a table showing the number of processors at each star rating
- select the processor with the highest number of points
- display the points and rating for the selected processor

The program will be tested using the details of five processors (see below).

How the program should work:

Entering processor details

The data on the five processors which should be used in testing is given below. For the purposes of this program you may assume that all entered data is valid.

You may use any suitable method available in your programming environment to enter the following data into the system. All data should be stored in suitable data structures.

Test Data

The following table of test data should be used.

Processor Name	Clock Speed (GHz)	Data Bus Width (bits)	Cache size (kilobytes)
Intium II	2·8	24	128
Celerisc I	1·6	32	256
Ethloan III	2·6	32	128
Powerup II	1·9	64	512
Mitduo III	3·1	24	128

Allocating points to each processor

Points will be awarded to each processor as follows:

Clock Speed Points

- clock speed is less than 2 GHz, award 10 points
- clock speed is between 2 GHz and 3 GHz inclusive, award 20 points
- clock speed is greater than 3 GHz, award 30 points

Data Bus Points

- 1 point for each line on the data bus eg 24 bit data bus, award 24 points

Cache Size Points

- 1 point for each whole 10 Kb of cache eg 128 Kb cache, award 12 points

128/10 = 12·8, which is rounded down to 12

Calculate star ratings

The processors should then be given a star rating. Processors with less than 60 points gain one star. Between 60 and 80 points inclusive earns a processor two stars. Processors with more than 80 points gain three stars.

Calculating the number of processors for each rating

The number of processors should be counted for each star rating.

Displaying the results

The output from the program should be in tables similar to the following:

Processor	**Points**	**Rating**
Intium II	56	*
Celerisc I	67	**
Ethloan III	64	**
Powerup II	125	***
Mitduo III	66	**

Rating	**Number of Processors**
*	1
**	3
***	1

The Processor selected is the PowerupII with 125 points.

Algorithm

The top level of the design is shown below:

1. Loop for all processors
2. Enter processor data
3. Calculate and store points and rating
4. End loop
5. Calculate totals for each rating
6. Select the processor with the highest points
7. Display results

What you have to do:

	Tasks	Evidence required	Marks
1	• Indicate data flow on the algorithm.	Algorithm with data flow.	3
2	• Refine steps 3, 5 and 6 of the algorithm.	Pseudocode for steps 3, 5 and 6.	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.	Hard copy of test results.	1
5	• Evaluate the software for fitness of purpose and maintainability	Brief report on test results.	3

Part 2

Erica's laptop has a backing storage capacity of 32 Gigabytes. Even with a new battery she often runs out of power. She has badly damaged the hard drive on her laptop by dropping it accidentally, losing critical data.

She decides to buy a new laptop with a minimum of 32 Gigabytes of storage, but cannot decide whether to buy one with integrated solid-state backing storage **or** one with a hard drive.

Erica will purchase **one** of the following:

- a laptop with internal solid-state backing storage
- a laptop with a hard drive.

Before making her selection she will judge the laptops according to:

- their battery life
- how robust the backing storage is
- the access speed of the backing storage.

While out meeting clients, she has found that occasionally she needs to access sensitive customer data stored on her home PC. She decides to set up a client/server home network to enable her to improve security, set up an efficient backup system and provide remote access to her data and files.

Erica decides to purchase:

- A server to enable her to set up a client/server network at home. This server should have the following **minimum** specifications:
  - 1 GHz processor
  - 512 Megabytes of RAM
  - Network interface card capable of 100 Megabits per second
  - 500 Gigabytes of backing storage, expandable to 1 Terabyte

- A network operating system which will enable her to:
  - set up network security
  - maintain a backup system
  - provide remote access

- Additional security software to protect her network. This package, or set of packages, must enable her to:
  - encrypt her data stored on the server
  - encrypt her e-mail
  - provide protection against viruses, Trojans and worms.

The total budget for all Erica's purchases is set at £2000.

What you have to do:

	Tasks	Evidence required	Marks
1	• Identify one suitable laptop fitted with solid state backing storage and one fitted with a hard drive • Compare the laptops in terms of the identified criteria • Recommend one laptop and justify your recommendation	A report detailing your findings and recommendation. Printouts/photocopies of source materials, eg Web pages, magazine articles.	7
2	• Identify two suitable servers • Compare the servers in terms of the identified criteria • Recommend one server and justify your recommendation	A report detailing your findings and recommendation. Printouts/photocopies of source materials, eg Web pages, magazine articles.	7
3	• Identify two suitable network operating systems • Compare the operating systems in terms of identified criteria • Recommend one operating system and justify your recommendation	A report detailing your findings and recommendation. Printouts/photocopies of source materials, eg Web pages, magazine articles.	7
4	• Identify two suitable sets of security software packages • Compare the security software packages in terms of the identified criteria • Recommend one set of security software packages and justify your recommendation	A report detailing your findings and recommendation. Printouts/photocopies of source materials, eg Web pages, magazine articles.	7
5	• Ensure the total expenditure for the purchases is within £2000	A report summarising costs.	2

Note: It is advisable to highlight the relevant sections of any printouts/photocopies of source materials.

Section 3

Marking guidelines

Marking Grid

Name _____ **Date** _____

Topic		Out of	Mark	Comment
Part 1				
Design (10)	Indication of data flow	3, 2, 1, 0		
	Pseudocode for step 3	3, 2, 1, 0		
	Pseudocode for step 5	2, 1, 0		
	Pseudocode for step 6	2, 1, 0		
Implementation (16)	Main program	2, 1, 0		
	Sub-program for step 3	3, 2, 1, 0		
	Sub-program for step 5	2, 1, 0		
	Sub-program for step 6	2, 1, 0		
	Formatted output	2, 1, 0		
	Use of parameters	3, 2, 1, 0		
	Maintainability	2, 1, 0		
Testing and evaluating (4)	Testing	1, 0		
	Evaluating fitness for purpose	1, 0		
	Evaluating maintainability	2, 1, 0		
Part 2				
Identify and justify laptop (7)	Identify two suitable laptops	2, 1, 0		
	Compare the laptops in terms of robustness, backing storage transfer rates and battery life	3, 2, 1, 0		
	Justify a recommendation in terms of the context	2, 1, 0		
Identify and justify a server (7)	Identify two suitable servers	2, 1, 0		
	Compare two servers according to clock speed, backing storage capacity and RAM	3, 2, 1, 0		
	Justify a recommendation in terms of the context	2, 1, 0		
Identify and justify a network operating system (7)	Identify two suitable network operating systems	2, 1, 0		
	Compare two network operating systems in terms of network security, backup system and remote access	3, 2, 1, 0		
	Justify a recommendation in terms of the context	2, 1, 0		
Identify and justify security software (7)	Identify two suitable sets of security software packages	2, 1, 0		
	Compare two sets of security software packages in terms of encryption features, virus protection etc	3, 2, 1, 0		
	Justify a recommendation in terms of the context	2, 1, 0		
Overall report (2)	The total cost of all recommended purchases is within budget	1, 0		
	Completeness and clarity of report	1, 0		
	Overall total	**60**		

Allocation of marks

Award full marks if achieved successfully without assistance. Subtract up to 3 marks, depending on the marks allocated in the marking scheme to the item in question, if achieved **partially** without assistance. Subtract 1 mark if completed with **some** assistance or hints. Award 0 marks if item not achieved, or completed only with significant assistance.

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

Part 1

Data entry

All data entered should be assumed to be valid.

Use of Parameters

Full marks awarded if all parameters are correct without assistance. Two marks if all correct with some assistance. Partial success, **most** of the parameters correct, is to be awarded 1 mark.

Maintainability

The marks for maintainability should be awarded for the use of:

- a modular approach/sub-programs
- meaningful identifiers
- comments
- white space.

Formatted output

Award 1 mark for output of processor, points and rating as a table.
Award 1 mark for the output of the number of processors for each rating as a table.

Part 2

Statements justifying a recommendation **must** refer to the context in order to be awarded full marks. It is advisable to highlight relevant sections of any printouts/photocopies of source materials.

Allocation of marks

Award full marks if achieved successfully without assistance.
Subtract up to 3 marks, depending on the marks allocated in the marking scheme to the item in question, if achieved **partially** without assistance.
Subtract 1 mark if completed with **some** assistance or hints.
Award 0 marks if item not achieved, or completed only with significant assistance.

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.

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			