



COMPUTER SCIENCE STAGE 2 SAMPLE EXAMINATION

Section 7 of the *New WACE Manual: General Information 2006–2009* outlines the policy on WACE examinations.

Further information about the WACE Examinations policy can be accessed from the Curriculum Council website at http://newwace.curriculum.wa.edu.au/pages/about_wace_manual.asp.

The purpose for providing a sample examination is to provide teachers with an example of how the course will be examined. Further finetuning will be made to this sample in 2007 by the examination panel following consultation with teachers, measurement specialists and advice from the Assessment, Review and Moderation (ARM) panel.

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Western Australian Certificate of Education, Sample External Examination
Question/Answer Booklet

COMPUTER SCIENCE
WRITTEN PAPER
STAGE 2

Please place your student identification label in this box

Student Number: In figures

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In words

Time allowed for this paper

Reading time before commencing work:

Ten minutes

Working time:

Three hours

Material required/recommended for this paper

To be provided by the supervisor

This Question/Answer Booklet

USB flash drive or CD with necessary resources

One Computer

To be provided by the candidate

Standard Items: Pens, pencils, eraser or correction fluid, ruler.

Special Items: Mathematical and/or system templates.

Non-programmable calculators may be used.

Important note to candidates

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

Structure of this paper

Section	Suggested working time	Number of questions available	Number of questions to be attempted	Marks available
Section One: Written	90 minutes	21	ALL	50
Section Two: Computer-based	90 minutes	3	ALL	50
[Total marks]				100

Instructions to candidates

1. The usual rules for the conduct of examinations apply to this examination. Note especially there is to be no talking whatsoever to any other candidate. The penalty for breach of any of the rules may include immediate on-the-spot cancellation of the examination script.
2. Answer the questions according to these specifications:

SECTION 1 Write your answers in the spaces following each question.
SECTION 2: Use the computer provided to answer the required questions.
3. An extra page for answering or making rough notes is available at the back of this booklet.
4. Clearly label any answers on the extra page at the end of the booklet.
5. It is strongly recommended that you **do not use pencil** except in diagrams.
6. Space provided for an answer does not necessarily indicate the proper length of the answer.

SECTION ONE—WRITTEN QUESTIONS

Answer **ALL** questions. Write your response in the spaces provided in this Question/Answer booklet.

Allow approximately 90 minutes for this section [50 marks].

Question 1

(a) Explain the difference between primary and secondary storage.

[2 marks]

(b) Give an example of each.

[1 mark]

Question 2

What is encryption?

[1 mark]

Question 3

What is the difference between a switch and a NIC?

[1 mark]

Question 4

Name one purpose of file compression?

[1 mark]

Question 5

(a) What is a computer virus?

[1 mark]

(b) Describe one method for protecting a computer from a computer virus.

[1 mark]

Question 6

Describe the role of the System Analyst in the development of a computer-based system.

[1 mark]

Question 7

In analysing a computer-based system, what is the purpose of a feasibility study?

[1 mark]

Question 8

Explain two ways that a new computer-based system can be implemented.

[2 marks]

Question 9

Describe the main differences between shareware and freeware software licences.

[1 mark]

Question 10

(a) Why is it necessary to protect data on a computer network? (1)

[1 mark]

(b) Explain one technique that can be used to do this.

[1 mark]

Question 11

What is the binary representation of the decimal number 197? Show all working.

[2 marks]

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Question 12

Refer to the following pseudocode.

```

Rate ← 0.1
For Wages ← 1 to 3

    Input (Income)
    If Income <= 10000 then
        TaxPayable ← 0
    Else
        TaxPayable ← Income * Rate
    End If
    Output ("Your income is " Income)
    Output ("Your tax payable is " TaxPayable)

Next Wages
    
```

Use examples from the pseudocode above to explain the following terms.

[2 marks]

constant	
repetition control structure	

Question 13

Refer to the pseudocode in the previous question:

Complete the following trace table that will show how all variables flow through the above algorithm with the following incomes - \$5,700, \$10,000, \$15,000, \$20,000 and \$35,000.

[2 marks]

Rate	Wages		

Question 14

(a) What is the difference between data integrity and data redundancy?

[2 marks]

(b) What is normalisation?

[1 mark]

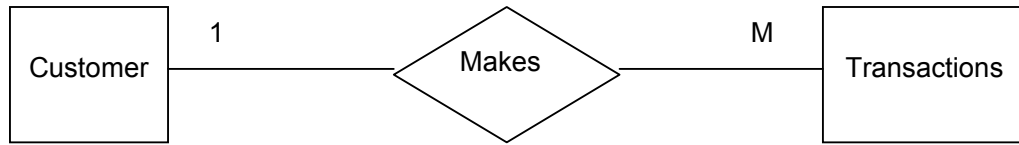
Question 15

What is a primary key and a foreign key in a relational database?

[2 marks]

Question 16

Referring to the Entity Relationship Diagram below:



(a) Give an example of a possible primary key in the Transactions entity.

[1 mark]

(b) Give an example of a possible foreign key.

[1 mark]

Question 17

(a) Traditionally computer networks have been wired. Describe two advantages of wireless networking.

[2 marks]

(b) Describe two networking devices that are necessary to set up a wireless network.

[2 marks]

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Questions 18–21 relate to the following scenario.

Johnny Gibb, well known recording artist from the popular Perth rock band GB's, has decided that selling CD music will be a more relaxing way to spend the later part of his life. He recently rented premises in Joondalup and plans to set up a music store that will allow customers Internet access to the latest rock music, listen to music in store via a network and receive the information about current artists and new release albums.

Johnny is not familiar with information technology or computer systems and has heard that you are able to help him set up the required hardware and software.

He would like customers to walk into the store and be able to listen to music from any current album on one of ten computers set up around the store. The music will be stored in digital format on the store's main server and distributed to the computers using a network. While listening to music, customers will be able to browse the Internet and view artists' web sites and video clips. Customers will also be able to complete an in-house survey form, where they enter their contact details, including their name, age, email and mailing address, favourite artists and music types. They could also indicate if they would like to receive the newsletter via email or post. This information will be stored on a relational database system, allowing for information to be stored in multiple tables, where a customer is linked to their favourite artist, which in turn links to the many albums that an artist has produced.

Customers will also have access to a self serve purchasing system, where they can run an in-house software program. This program allows them to select the albums they intend to purchase and calculates the total price and gives a discount of 10% when they four or more CDs are purchased.

When an artist releases a new album, Johnny uses the CD details from the Music Company to update the albums database. He then looks up the customers in the system who like either that form of music or the artist, and generate a list of relevant customers. This list is then used to create mailing labels and to send newsletters to customers.

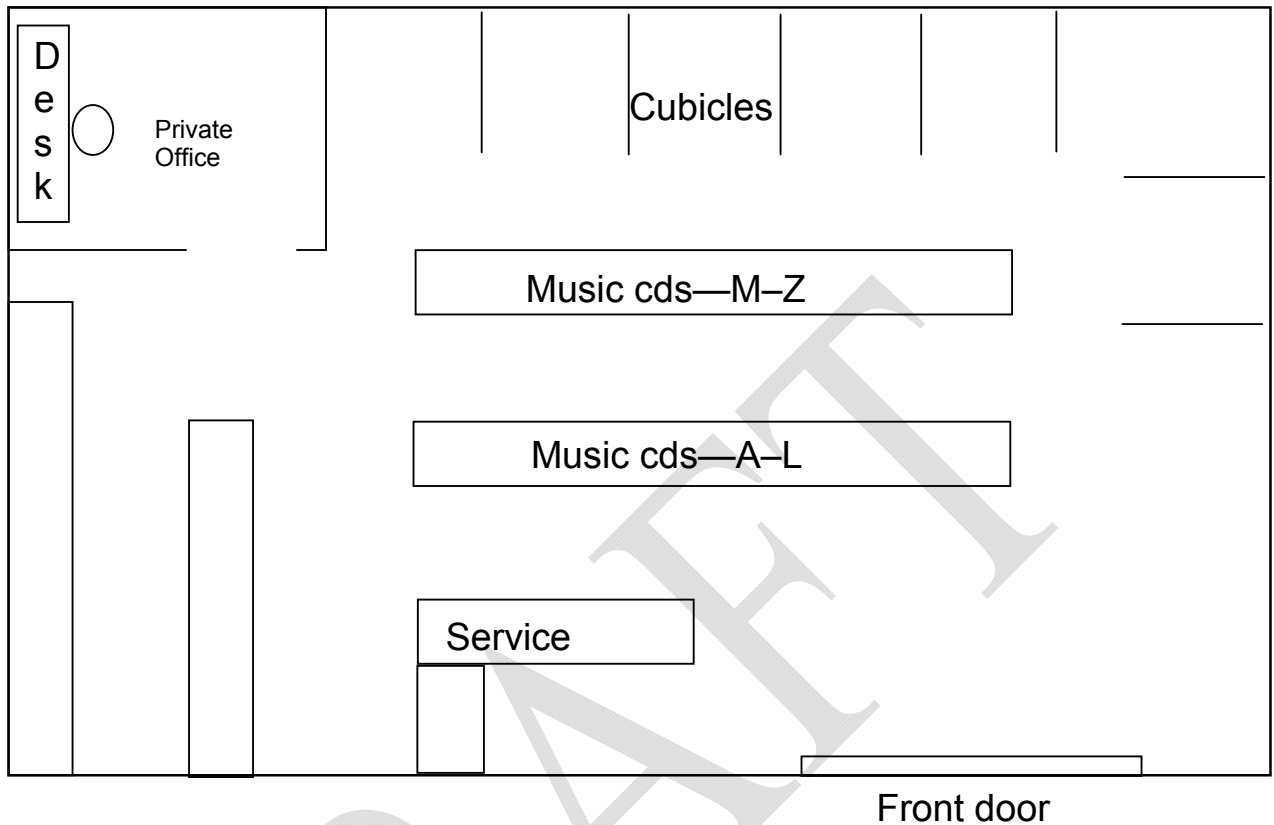
Question 18

- (a) List four computer hardware and communication devices that Johnny will need to purchase to set up his new music store. Briefly explain the purpose of each device.

[2 marks]

- (b) On the following diagram of the shop layout sketch and label the computer network devices needed to accomplish the requirements.

[2 marks]



Question 19

- (a) Detail two preventative maintenance techniques that will need to be established to ensure that customers can access all computers, digital music and Internet facilities as described.

[2 marks]

(b) Explain one issue that Johnny needs to consider regarding the storing of customers' personal details and artists' digital music on the store's computer systems.

[1 mark]

(c) Describe one procedure that Johnny could use to ensure that customer data and digital music is secure?

[1 mark]

(d) Name two current Australian laws that Johnny must adhere to in relation to the storing of digital music and customer data? Explain the purpose for each.

[2 marks]

Question 20

Create a data dictionary for the music store, listing 4 different data types, with an example attribute and validation rule for each.

[4 marks]

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Question 21

Johnny also needs you to clearly document the system for mailing out the newsletters to customers. Draw and clearly label a data flow diagram for the following:

When an artist releases a new album, Johnny uses the CD details from the Music Company to update the albums database. He then looks up the customers in the system who like either that form of music or the artist, and generate a list of relevant customers. This list is then used to create mailing labels and to send newsletters to customers.

[4 marks]

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END OF SECTION ONE

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SECTION TWO—COMPUTER-BASED QUESTIONS

Answer **ALL** questions in Parts A and B.

Allow approximately 90 minutes for this section [50 marks].

PART A—DATABASE

Question 22

Dogville Council Dog Registration: (10 Marks)

A local council, Dogville, requires dog owners to register their dogs. Each owner needs to pay a license fee to have a dog. The fee is based on whether or not the dog has been desexed. The fee can be paid annually or for three years with a discount given for paying the three year fee. The council needs a way of recording these details to be able to send out a renewal notice when the license is about to expire.

As an employee of the Dogville Council your job is it to maintain a computerised database that contains records for dog licences and issuing renewal notices.

Instructions:

1. Open the Dogville database
2. Open the Tables, *tblDogs* and *tblOwners* (see below)
3. Complete the following tasks using these tables.
4. When you close a table ensure that you save your work.

tblDogs						
DOGID	OwnerID	Breed	Sex	BeenDesexed	Fee	ExpiryDate
1	GREENTOM1	Cavalier King Charles	F	Yes	\$15	10-Aug-09
2	PARTHOSS	Kelpie	M	Yes	\$40	11-Aug-09
3	QUINCYN1	German Shepherd	F	No	\$25	12-Aug-09
4	QUINCYN1	German Shepherd	M	No	\$80	14-Aug-10

tblOwners							
OwnerID	Surname	FirstName	StreetNo	StreetAddress	Suburb	Postcode	Phone
GREENTOM1	Green	Tom	34	Butler Street	Dogville	6777	08 9977 8147
PARTHOSS	Parthos	Sylvia	450	Main Street	Dogtown	6778	08 9978 9875
QUINCYN1	Quincy	Nancy	23A	Dogville Terrace	Dogville	6777	08 9977 1236

(a) Set an appropriate data type for each field in the tables.

[4 marks]

(b) Set appropriate Primary Keys for the two tables.

[1 mark]

- (c) In the properties of *tblDogs*
- (i) create a validation rule for *ExpiryDate* to ensure that the Expiry date entered is in the future. If a user enters a date in the past, the following warning message should be displayed:

Invalid Date—Please re-enter.

- (ii) Set the *ExpiryDate* to display as a medium date.
 - (iii) Set the number of decimal places for *Fee* to 0.
- [3 marks]
- (d) Create a relationship between the two tables. [1 mark]
- (e) Create a data entry form for the *Dogs* table naming it *frmDogs*. [1 mark]

Final instructions:

1. Save your work
2. Close the Dogville database

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Question 23

Fun Food Corporation: [15 marks]

Fun Food Corporation is a local company that sells snacks and desserts to delis, coffee shops and small supermarkets. *Fun Food* carries various categories of products (see below) from four main suppliers (see below). Some items will require cold storage and therefore will use transport vehicles that have refrigeration to deliver to shops that purchase from *Fun Food*.

As the Database Administrator of *Fun Food* it is your responsibility to maintain an interactive database for the supply and delivery of these products.

tblProducts						
ProductID	ProductName	SupplierID	Category	PricePerUnit	ExpiryDate	ColdStorage
1	Coffee Crème Cookies	CC	Snack	\$2.50	1/08/2008	No
2	Lemon Zippy Bar	FT	Snack	\$3.50	1/08/2008	No
3	Rum Butter Ice Cream Bars	CR	Dessert	\$5.60	15/09/2008	Yes
4	Custard Cream Delights	CR	Dessert	\$4.35	15/09/2008	Yes
5	Pa's Peach Conserves	FR	Preserve	\$2.75	6/06/2009	No
6	Nana's Strawberry Jam	FR	Preserve	\$3.15	6/06/2009	No
7	Walnut Cocoa Cookies	CC	Snack	\$2.50	1/08/2008	No
8	Peach Jam Drops	FR	Snack	\$2.50	1/08/2008	No
9	Mango Mania Sorbet	FR	Dessert	\$5.60	15/09/2009	Yes

tblSuppliers						
SupplierID	SupplierName	Address	Suburb	Postcode	Phone	Fax
CC	Coffee n Cakes	32 Wanneroo Rd	Wanneroo	6065	9405 0505	9405 0515
CR	Creamies	134A Canning Hwy	East Fremantle	6163	9355 7869	9355 7899
FR	Fruities	76 East Rd	Midland	6061	9271 8888	9271 9998
TD	Tea Delights	455 West Coast Hwy	Floreat	6018	9370 7856	9370 0000

Instructions:

1. Open the FoodFun database
2. Open the Tables *tblProducts* and *tblSuppliers*
3. Complete the following tasks based on these tables.
4. When you close a Table, Form, Query or Report ensure that you save your work.

- (a) (i) In the table *tblProducts* create a drop down list box for the field *Category* based on a value list with the values: Snack, Dessert, Preserve
- (ii) In the table *tblProducts* create a drop down combo box for the field *SupplierID* based on a lookup to the table *tblSupplier*. Show all supplier details in the combo box.
- (iii) Create a data entry form for the table *tblProducts*. Name the form *frmProducts*.
- (iv) Add the following data using the form *frmProducts*:

ProductID	ProductName	SupplierID	Category	PricePerUnit	ExpiryDate	ColdStorage
10	Apple Teacake	TD	Dessert	\$3.90	06/06/09	No
11	Lemon Teacake	TD	Dessert	\$4.15	06/06/09	No

[4 marks]

(b) Create the following queries:

[7 marks]

	Query name	Find all products that
i.	<i>qrySnacks</i>	are snacks
ii.	<i>qry2to4</i>	cost between \$2.00 and \$4.00
iii.	<i>qryDessertSnack</i>	are a dessert or are a snack
iv.	<i>qryPeaches</i>	made with peaches
v.	<i>qryColdOver5</i>	that require cold storage and cost more than \$5.00
vi.	<i>qrySnackSuppliers</i>	are snacks (display the Supplier name, the Product name and the price and sort the price from highest to lowest)

- (c) (i) Create a tabular report called *rptAllProducts* that lists all the suppliers (by Supplier Name) with the products they supply in alphabetical order. Edit the report with an appropriate title.
- (ii) Create a report called *rptAveragePrice* based on *tblProducts* that groups products according to their category. The report should show the category, the product name and the price per unit. It should calculate the average price per unit in each grouping.

[4 marks]

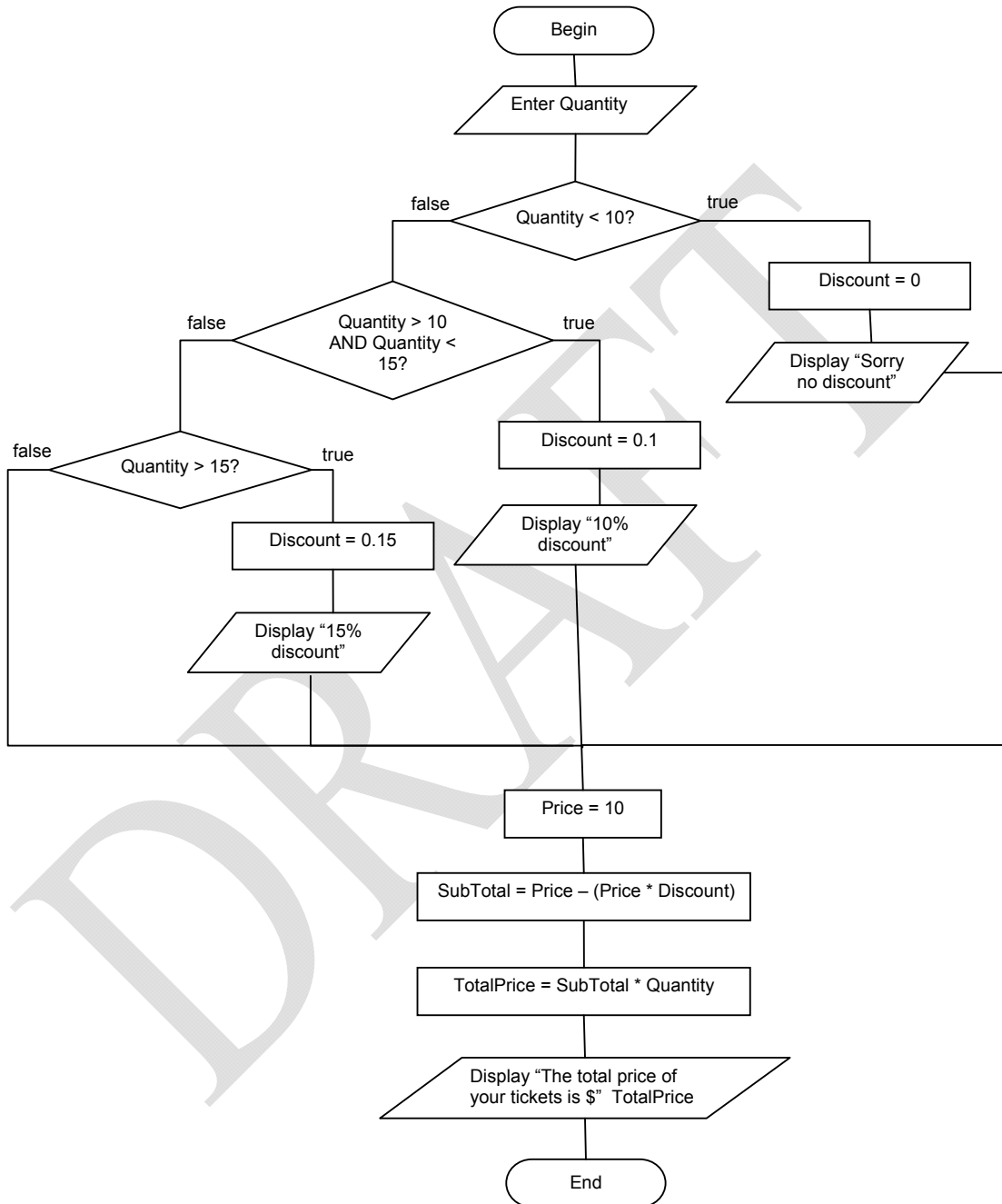
Final instructions:

1. Save your work
2. Close the FoodFun database

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Question 24

The flow chart algorithm below is used to determine the total price of a given quantity of tickets, while applying discounts for customers when purchasing 10 to 15 tickets (10%) and for more than 15 tickets (15%).



- (a) Convert the flow chart above into a program module. Ensure all variable names are exactly as in the flow chart above. Save this version of your module as “Part A”.

[7 marks]

- (b) Modify this module code to ensure that only positive values will be accepted for Quantity.
[3 marks]
- (c) Test your module, by using appropriate test data, to determine specific errors in the code.
Record the test results in the table below.
[4 marks]

Correct Results (calculated)			Program Test Results		
Tickets	Discount	Total Price	Tickets	Discount	Total Price
0	0	\$0	0	0	\$0
1	0	\$10	1	0	\$10
9	0	\$90	9	0	\$90
10	10	\$90			
11	10	\$99	11	10	\$99
14	10	\$126	14	10	\$126
15	10	\$135			
16	15	\$136	16	15	\$136

- (d) Find any error(s) that prevent the module functioning correctly and list them below.
Implement the corrections needed to your module.
[3 marks]

- (e) i. List below any other corrections or enhancements that would be considered good programming practice
ii. Implement your suggestions in your module.
[5 marks]

- (f) Modify the module to include a discount of 20% for customers who purchase 20 or more tickets. Save this version of your module as “Part E”.

[3 marks]

Save this document using your full name.

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ACKNOWLEDGEMENTS

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