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STUDENT NUMBER

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COMPUTING: SOFTWARE DEVELOPMENT

Written Examination

Sample Exam 2, 2016

Reading time: *.** to *.** (15 minutes)

Writing time: *.** to *.** (2 hours)

QUESTION AND ANSWER BOOK

Structure of book

<i>Section</i>	<i>Number of questions</i>	<i>Number of questions to be answered</i>	<i>Number of marks</i>
A	20	20	20
B	7	7	20
C	15	15	60
			Total 100

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners, rulers and one scientific calculator.
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or white out fluid/tape.

Materials supplied

- Question and answer booklet of 22 pages.
- Detachable insert containing a case study for Section C in the centrefold.
- Answer sheet for multiple choice questions.

Instructions

- Detach the insert from the centre of this book during reading time.
- Write your **student number** in the space provided above on this page.
- Check that your **name** and **student number** as printed on your answer sheet for multiple-choice questions are correct, **and** sign your name in the space provided to verify this.
- All written responses must be English.

At the end of the examination

- Place the answer sheet for multiple-choice questions inside the front cover of this book.

Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic communication devices into the examination room.

SECTION A – Multiple choice questions**Instructions for Section A**

Answer **all** questions in pencil on the answer sheet provided for multiple-choice questions.

Choose the response that is **correct** or that **best answers** the question.

A correct answer scores 1, an incorrect answer scores 0.

Marks will **not** be deducted for incorrect answers.

No marks will be given if more than one answer is completed for any question

Question 1

Which of the following is **not** a valid organisational objective?

- A. Reduce customer complaints by 60%
- B. Maintain an employee retention rate of 98%
- C. Provide care and support for the staff within the organisation
- D. Make a profit of \$10K per calendar month

Question 2

An agile process is one that:

- A. Begins at the start and continues through to the end
- B. Can begin and end anywhere in the cycle
- C. Is very cost effective
- D. Can revisit previous stages to refine the solution further

Question 3

Which of the following is a functional requirement of a solution?

- A. User friendly
- B. Robust
- C. Calculates the tax payable for the financial year
- D. Can be easily maintained

Question 4

A milestone in a Gantt chart is used to show:

- A. How many people will be working on a task
- B. The resources needed for a task
- C. How tasks flow from one to another
- D. A point in time when a certain stage must be reached

Question 5

The term UCD stands for:

- A. Use Case Diagram
- B. Used Cases Diagrammatic
- C. Use Case Drawing
- D. Unlinked Carrier Diagram

SECTION A – continued
TURN OVER

The following information is required for Questions 6 and 7.

Table 1

btnProcess

Name	Type	Description
btnProcess_Click	Event	Calculate the final result
btnProcess_DblClick	Event	Lock the button
btnProcess.Enabled	Method	Lock or enable the button

Question 6

The tool displayed in Table 1 can best be described as a:

- A. Context Table
- B. Data Flow Diagram
- C. Object Description
- D. Data Dictionary

Question 7

The person coding this object wants to add a tool tip that will appear when the mouse hovers over the object. This would be classified as:

- A. A method
- B. A variable
- C. A boolean value
- D. An event

Question 8

A characteristic of a software solution can be 'robustness'. This term refers to:

- A. The colour of the UI
- B. How resistant the software solution is to viruses
- C. The ability of a software solution to run without crashing
- D. The ways in which a software solution caters to those with disabilities

Question 9

At the beginning of a project, Danny decides that it would be good for the software development team to brainstorm possible solutions. Which of the following would be a valid brainstorming technique?

- A. Creating a mock-up
- B. Writing a pseudo-code algorithm
- C. Drawing a mind-map
- D. Researching current trends and products

SECTION A – continued
TURN OVER

Question 10

The winners of a tennis tournament are to have their names and photos published on the club website. This is **not** a breach of privacy legislation as long as:

- A. Other tennis clubs are doing it as well
- B. The players are members of the club
- C. The players have a social media account
- D. The players have given their permission for this to happen

The following information is required for Questions 11, 12 and 13.



*The advertising blurb for this device states:
"This 4G in-car wifi router allows up to 10 devices to connect and is 802.11g/n compatible. It has a built in firewall and you will find in metro areas that the bandwidth is excellent!"*

Question 11

802.11n is:

- A. An open standard for file storage
- B. An electrical connection type
- C. A type of network cable
- D. A wireless network protocol

Question 12

One of the functions of a firewall is:

- A. To prevent unauthorised users from accessing the network
- B. To ensure that the Internet is protected from viruses on the internal network
- C. To provide a method of logging people in
- D. To run network software

Question 13

The term bandwidth refers to:

- A. The times that the device can be accessed
- B. How much the device costs
- C. How much data can be downloaded at once
- D. The maximum downloadable file size

**SECTION A – continued
TURN OVER**

Question 14

Open Office, VLC and Audacity are examples of Open Source software packages. This means:

- A. The software and source code is free to use and access
- B. A small licence fee is required to use the software
- C. The software can only be used by developers
- D. The software has to be programmed for it to be used

The following information is required for Questions 15, 16 and 17.

After being alerted to an issue by a customer, Emily examines some code in a software solution that has been published by one of her employees. Emily is very surprised to find a number of syntax errors as well a large logic error in a financial year tax calculation.

Question 15

The syntax errors surprised Emily as:

- A. They rarely occur
- B. The software solution would not have worked
- C. They could have deleted data from the customer's hard drive
- D. They are not allowed to exist in the language being used by the customer

Question 16

The logic error would most likely have meant that when the software was run without syntax errors:

- A. It would have crashed
- B. It would not have performed the calculation at all
- C. It would have run a number of times and then stopped
- D. It would have given the incorrect results to the tax calculation

Question 17

If the software solution were able to run and the logic error resulted in an incorrect tax declaration for the customer, who would be legally liable?

- A. No-one
- B. Emily's company
- C. The person who tested the code
- D. The programmer who wrote the code

Question 18

A new App asks users to create an account and supply an address for security verification. This is in breach of the Privacy Act because:

- A. it is a unique identifier
- B. it could result in spam
- C. the owners of the App would be unable to check the accuracy of the address
- D. the owners of the App have no valid reason to collect this information

**SECTION A – continued
TURN OVER**

Question 19

Which of the following is an example of a logical security measure?

- A. Biometrics
- B. Security cameras
- C. Passwords and levels of access
- D. Doors with swipe card locks installed

Question 20

The acronym GIGO (Garbage In, Garbage Out) is referring mainly to:

- A. Validation
- B. Searching routines
- C. Security authentication
- D. The timeliness of data

END OF SECTION A

SECTION B – Short-answer questions**Instructions for Section B**

Answer **all** questions in the spaces provided.

Question 1

What is a mission statement?

1 mark

Question 2

Eliza is a Network Administrator for LeVeon Secondary College. She has been trying to troubleshoot a connection issue between a notebook and the school network. The notebook has been configured to have a static IP address of 192.168.1.1, yet this is also the IP address of the main firewall.

a. What is an IP address?

1 mark

b. What does it mean for an IP address to be static?

1 mark

c. Why is it a problem for two devices on a network to have the same IP address?

1 mark

SECTION B – continued
TURN OVER

Question 3

What is an attribute listing and what is its main purpose?

2 marks

Question 4

a. What is internal documentation?

1 mark

b. Describe a situation in which not having any internal documentation would be a problem.

1 mark

c. Martin and Julee are having a debate about internal documentation. Martin believes that every line of code should be accompanied by at least one line of internal documentation. Julee argues that a few lines of documentation per event procedure is enough.

Discuss the pros and cons of each point of view.

4 marks

SECTION B – continued
TURN OVER

Question 5

Study the pseudo-code algorithm below:

```

Begin
  intAccessLevel  $\leftarrow$  0
  boolAuthorised  $\leftarrow$  False
  Loop
    Input Name
    If Name = "Rebecca" or Name = "Tony" or Name = "Thien" Then
      Display "Authorised – Level 1 access"
      boolAuthorised  $\leftarrow$  True
      intAccessLevel  $\leftarrow$  1
    Else
      Display "Access denied"
    End If
  Until boolAuthorised
End

```

- a. What condition needs to be met for the algorithm to pass by 'Until boolAuthorised' and go to the end of the program?

1 mark

- b. This algorithm is not very intuitive for the user. Suggest one improvement that could make it easier to use.

1 mark

Question 6

Geoff is in charge of a large software implementation in his workplace, and has constructed a detailed Gantt chart to manage the process. Two weeks into the implementation, Geoff's colleague Regina has noticed that he has not updated the chart. When she questions him about this, he states that he has no intention of modifying the chart at all. List **three** problems that could arise as a result of this.

Problem 1: _____

Problem 2: _____

Problem 3: _____

3 marks

SECTION B – continued
TURN OVER

Question 7

What is the difference between full backup, differential backup and incremental backup?

3 marks

END OF SECTION B

SECTION C – Case Study**Instructions for Section C**

Please remove the insert from the centre of this book during reading time.
 Use the case study provided in the insert to answer the questions in this section.
 Answer **all** questions in the spaces provided.

Question 1

One of the first things that Nancy noticed when she visited *WeCare*, was that they did not have any goals defined for their information system. Write **two** goals that would be suitable for the *WeCare* information system.

Goal 1: _____

Goal 2: _____

2 marks

Question 2

In the month prior to being contacted by Nancy, Josh created a questionnaire for clients to fill out so that they could evaluate the service that they are providing. Josh designed it to be quick and easy to complete. The questionnaire is shown below:

*Would you like to give us feedback? 1 serendipitous person will win a \$100
 Coles Myer voucher!*

Name: _____

Address: _____

Do you think our service was good?

Rate our service from 1-10

What did you like about our service?

What didn't you?

Nancy tells Josh that she feels the questionnaire was poorly designed. List two aspects of the questionnaire that Nancy could be referring to.

Aspect 1: _____

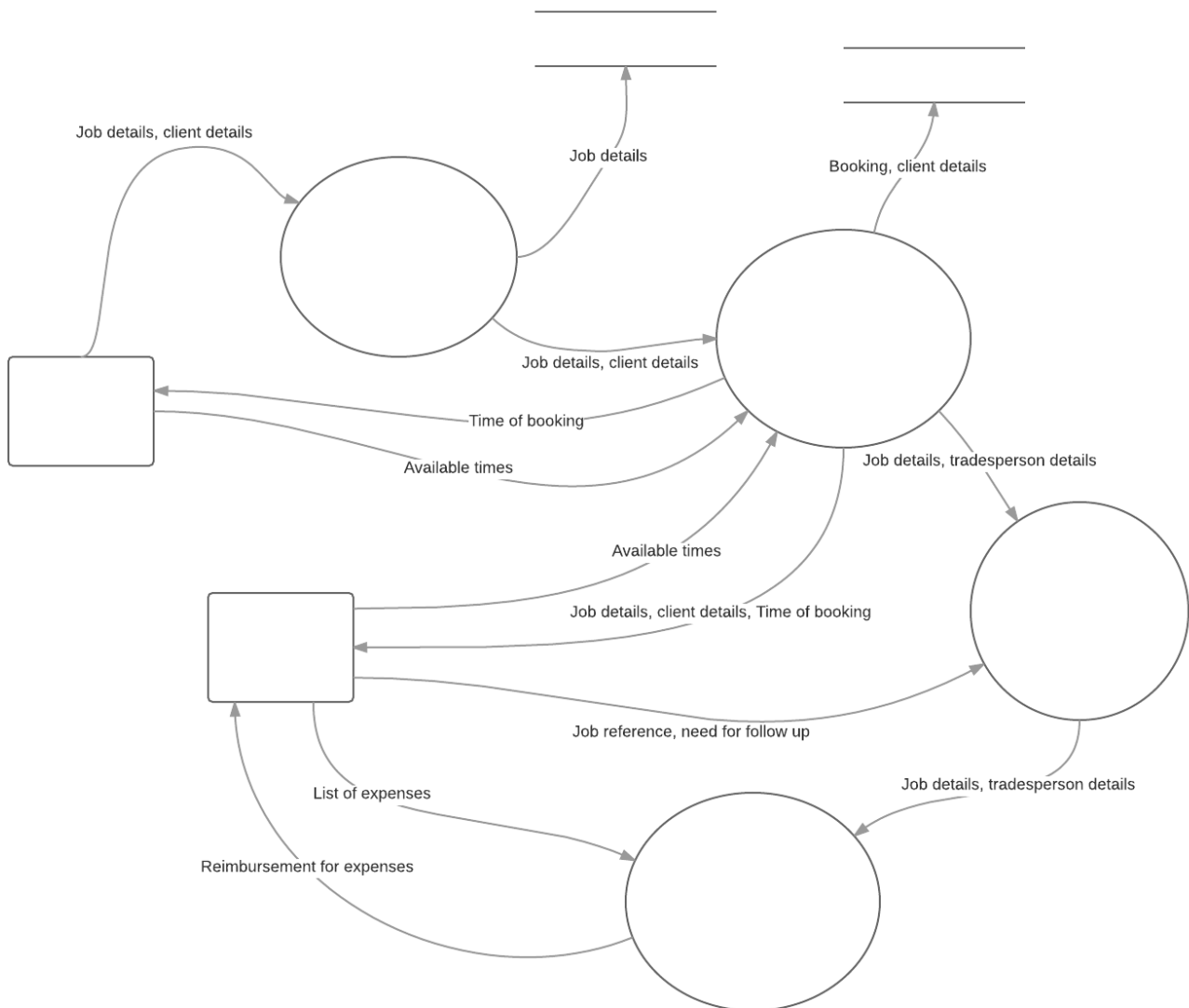
Aspect 2: _____

2 marks

**SECTION C – continued
 TURN OVER**

Question 3

Nancy tries to understand how the job booking system works by drawing a data flow diagram. On the diagram below, label the **two** entities, **two** data stores and **four** processes.



8 marks

Question 4

Nancy has some ideas about potential solutions, but is also mindful of the constraints that will be placed upon it. What is the biggest constraint on the solution for *WeCare* are why?

2 marks

SECTION C – continued
TURN OVER

Question 5

Nancy proposes that a mobile App be developed that will allow clients to register new jobs via their phones. She creates the screen design below:

WeCare Portal

Job Register

All in the details below to register your job with WeCare and we will respond to your request as soon as we can.

NAME:

Please include a full name in this box.

ADDRESS:

The address of your current residence regardless of whether you have used WeCare for jobs in the past.

JOB:

What is the job about?

SUBMIT

Identify **three** concerns that you have with this interface and explain how they could be corrected.

Concern 1: _____

Correction 1

Concern 2: _____

Correction 2

Concern 3: _____

Correction 3

6 marks

SECTION C – continued
TURN OVER

Question 6

When a job is submitted via the App, the data will appear in the main interface. The first task in the main interface involves determining how urgent the job is and which category of trades-person will be required. The algorithm shown in the extra material in the case study has been written to perform this process.

- a. What is the purpose of the 'LocateClient' function?

1 mark

- b. What is the purpose of the condition that begins 'If ClientID is null'?

1 mark

- c. For each of the following variables, identify what data type they most likely are.

JobID: _____

JobClient: _____

PriorityFlag: _____

3 marks

- d. In transferring the job details to the 'Job' arrays, why is the name of the client and their address not copied across?

1 mark

- e. The algorithm is designed to automatically assign a priority of '1' if the job involves 'electric', 'gas', 'heat' or 'water', as these are considered to be very urgent. Explain why the algorithm does not do this and how you could correct this.

Error: _____

Correction: _____

2 marks

SECTION C – continued
TURN OVER

Question 7

During one of their scheduled meetings, Nancy presents Josh with a MOU (Memorandum of Understanding) that she wants him to sign. The MOU states that the work that Nancy is doing will remain under her ownership though she gives permission to *WeCare* to use it indefinitely. The MOU also states that she is to be the primary contact for any technical or support issues and that no other person has permission to inspect or alter the code.

Discuss the pros and cons of this MOU as proposed by Nancy.

4 marks

Question 8

Nancy talks to the staff of *WeCare* about the integrity of data. Specifically, she discusses how it will be very important to ensure that the data is timely, accurate and authentic. With reference to the mobile App and what you know about the data being collected, suggest features that could be added to ensure that these are met.

Timely: _____

Accurate: _____

Authentic: _____

3 marks

SECTION C – continued
TURN OVER

Question 9

Charlotte is approached by the GoodWill Army who have a proposal for *WeCare*. If *WeCare* place a GoodWill Army banner on their website, they will be willing to allow *WeCare* to share their data with them to allow them to provide *WeCare*'s clients with additional support. Charlotte feels that the proposal has merit, but also knows that there are some things to be careful of legally.

- a. What piece of legislation is most relevant to this issue?

1 mark

- b. Describe what Charlotte needs to do in order to ensure that this proposal is implemented legally.

2 marks

Question 10

The App has been in operation for just over a week. Nancy is shocked to learn of two incidents that occurred to clients and feels that the App may be partly responsible.

25 job requests have been made so far. Within 24 hours of these requests being made, ten of these properties were broken into and all at times that the clients mentioned they would not be home. Josh and Charlotte have been upset by this but have not seen any connection with the new App and these events.

List three questions you could ask Nancy or *WeCare* to determine if the App is related to these break-ins?

Question 1: _____

Question 2: _____

Question 3: _____

3 marks

SECTION C – continued
TURN OVER

Question 11

Nancy sets up a backup routine that sends all of the current data in the 'Jobs' database to a cloud server in XML format. A sample of this data is shown below:

```
<Job>
  <JobID>1012</JobID>
  <ClientID>320</ClientID>
  <Date>070716</Date>
  <Time>2315</Time>
  <JobDetail>"Gas heater has failed"</JobDetail>
  <Priority>1</Priority>
</Job>
```

Each time the data is sent, it overwrites any data that is there already.

- a.** What is the name given to this form of backup?

_____ 1 mark

- b.** If this was changed to a differential backup routine, how would this change the backup process?

_____ 1 mark

- c.** If the 'Client' and 'Trades-people' databases are also backup in the same way, suggest a tag that need to be added to each XML file to ensure that they are all connected?

'Jobs' database: _____

'Client' database: _____

'Trades-people' database: _____ 3 marks

SECTION C – continued
TURN OVER

Question 12

Nancy is discussing her *WeCare* project at her full-time workplace with a colleague of hers. Her colleague asked to have a look at the SRS that she had produced and Nancy had to admit that she hadn't written one.

In regards to the evaluation of the project, list **three** aspects of the project that would be very hard to assess given that there is no SRS to refer back to.

Aspect 1: _____

Aspect 2: _____

Aspect 3: _____

3 marks

Question 13

Nancy did not conduct formal testing of the App prior to its release. Two weeks into its operation, a serious bug in the code caused it to crash. Data was lost and *WeCare* had to take calls for jobs as they had before, while the problem was fixed. Nancy was in Hong Kong with her full-time job and didn't return for a week. On her return, she set about fixing the problem (in her own time), but this took another couple of weeks. Once fixed, the App was re-released.

- a.** List **three** things that have potentially occurred as a result of this crash?

3 marks

- b.** Propose a testing strategy that could have prevented this?

2 marks

SECTION C – continued
TURN OVER

Question 14

Josh reads on the Internet how data mining techniques in Apps can make it easier to tailor specific advertising inside the App itself, and generate additional income. Nancy is away in San Francisco for an extended time, so Josh hires a software development firm to incorporate this change to the App. The changes are made and Josh publishes a new version of the App to the various App Stores for users to download.

Discuss if this is a breach of Nancy's copyright and your reasons why.

2 marks

Question 15

Charlotte is interested in gathering some feedback on the what people think of the App.

Name **two** groups that should be approached to provide feedback and describe the feedback that they could provide.

Group 1: _____

Feedback : _____

Group 2: _____

Feedback : _____

4 marks

END OF QUESTION AND ANSWER BOOK

Insert for Section C – Case study

Please remove from the centre of this book during reading time.

TURN OVER

The existing system

WeCare is a small not for profit start-up located in Elsternwick. It is owned and operated by Josh and Charlotte Ferguson who both work there in a managerial capacity. *WeCare* has a number of full time employees, part time (volunteer) employees as well as a number of trades-people that volunteer their time.

WeCare is a support service for those that need urgent maintenance work to be done in and around their home or residence, but cannot afford to pay for it. Many of the clients are either elderly or out of work. The types of maintenance work that is done by *WeCare* includes items such as: fixing broken windows, repairing roofs, fixing electrical problems, heating and cooling as well as doors and security. However, *WeCare* has a number of general trades-people on their books that can come and fix a wide variety of problems.

The current maintenance process takes place as follows. *WeCare* have a help line and (for convenience), requires that all maintenance jobs be called in via this line. One of the staff members takes the call and starts a new job (appended to the file of the person making the call). If the person making the call is a new client, then they must be registered with *WeCare* – which requires a detailed application to be completed. At present, the job file is a MS Word document placed into a folder with the client's name on it. A time is booked (that is suitable for the client) for a tradesperson to visit and attend to the problem. The tradesperson then advises *WeCare* of the success (or otherwise) of the job and whether a follow up is needed. Though the tradespeople work on a volunteer basis, *WeCare* does cover the expenses that the trades-people incur, so this is taken care of at the end of the job.

Josh and Charlotte were excited when they were contacted by Nancy Phillips – the friend of one of the trades-people that volunteer their time. Nancy works as a software development for a large multi-national company, but contacted *WeCare* to see if she could volunteer her time and help in some way. Josh and Charlotte eagerly accepted this offer of help and began by scheduling a meeting so that they could show Nancy what they have in place currently.

Extra material for Question 6

An algorithm has been designed that will assist in the management of jobs that are submitted via the mobile App:

```

Subroutine ModerateJob(ClientName, ClientStreet, Date, Time, JobDetail)
    ClientID ← LocateClient(ClientName, ClientStreet)
    If ClientID is null Then
        RegisterFlag ← True
        Exit Sub
    End if
    JobID ← JobID + 1
    Display ClientID, ClientName, ClientStreet, Date, Time, JobDetail
    JobClient(JobID) ← ClientID
    JobDate(JobID) ← Date
    JobTime(JobID) ← Time
    JobDetail(JobID) ← JobDetail
    PriorityFlag ← False
    If InStr(JobDetail, "electric") Then PriorityFlag ← True
    PriorityFlag ← False
    If InStr(JobDetail, "water") Then PriorityFlag ← True
    PriorityFlag ← False
    If InStr(JobDetail, "gas") Then PriorityFlag ← True
    PriorityFlag ← False
    If InStr(JobDetail, "heat") Then PriorityFlag ← True
    If Not PriorityFlag Then
        Input Priority
    Else
        Priority ← 1
    End if
End Subroutine

```

END OF CASE STUDY INSERT