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STUDENT NUMBER

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COMPUTING: SOFTWARE DEVELOPMENT

Written Examination

Sample Exam 1, 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 19 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 goal?

- A. Be profitable
- B. Ensure 99% network uptime
- C. Manufacture quality products
- D. Provide excellent customer service

Question 2

The purpose of the Problem Solving Methodology is:

- A. To give form to what goes on in completing a task
- B. To document a process within an organisation
- C. To create a solution to a problem
- D. To provide a structure by which a solution can be found to an information problem

Question 3

Which of the following lists contain measures of efficiency?

- A. readability, cost, attractiveness
- B. speed of processing, cost, level of automation
- C. speed of processing, usability, accuracy
- D. cost, productivity, timeliness

Question 4

Data can be classified as being qualitative or quantitative. Which of the following data sets would be an example of qualitative data?

- A. “Yes”, “No”
- B. “Didn’t like the interface”, “Instructions weren’t clear”, “Colour scheme great!”
- C. “120”, “567”, “34”
- D. “Richmond”, “South Yarra”, “Berwick”

Question 5

The term UML stands for:

- A. Unified Modelling Link
- B. Unified Modem Linkage
- C. Unlinked Mode Linkage
- D. Unified Modelling Language

SECTION A – continued
TURN OVER

Question 6

The process of breaking a problem down into smaller parts is known as:

- A. an algorithm
- B. top down design
- C. bottom up design
- D. sideways refinement

Question 7

A hash function can be used to:

- A. sort data
- B. make data in a list easier to find
- C. remove data that is no longer current
- D. create a copy of a set of data

Question 8

A character data type stores data that is:

- A. A single ASCII character
- B. A prime number
- C. A positive integer
- D. True or false

Question 9

An item of hardware that is used to send signals from one network point directly to another is:

- A. A hub
- B. A switch
- C. A repeater
- D. A network cable

Question 10

Which of the following would you classify as an event based threat?

- A. Incorrect file formats leading to files being deleted
- B. Loss of hardware devices
- C. Water damage due to flood
- D. Viruses damaging data

Question 11

The validation process known as type checking is:

- A. Used to prevent data of the incorrect variable type being accepted as input
- B. Only effective if used as a method after a range check
- C. Is used to check to see if a number has been entered with the correct number of decimals
- D. Is only applicable when considering postcodes

Question 12

A difference between CSV and XML file formats is:

- A. XML files are much harder to visually read than CSV files
- B. CSV files do not contain any delimiters
- C. CSV files are much larger than XML files for the same data set
- D. XML contains tags which define field names and structure

SECTION A – continued
TURN OVER

The following information is required for Questions 13, 14, 15 and 16.

Consider the following array of data:

Index	0	1	2	3	4	5	6	7	8	9	10	11	12
List(Index)	33	29	76	32	3	17	91	28	30	85	19	64	52

Question 13

If the array above were to be searched using a linear search method, the maximum number of comparisons to find an item would be:

- A. 5
- B. 12
- C. 13
- D. 11

Question 14

For the array above to be searched using a binary search, it must first be:

- A. Copied to another array
- B. Sorted
- C. Placed into a hash table
- D. Analysed for duplicates

Question 15

If the array of data was prepared correctly for a binary search, the maximum number of comparisons to find an item would be:

- A. 1
- B. 3
- C. 4
- D. 5

Question 16

If the array above was prepared correctly for a binary search, the maximum number of comparisons to determine if an item was not present would be:

- A. 1
- B. 3
- C. 4
- D. 5

Question 17

Which of the following is **not** a benefit of writing an algorithm?

- A. Find errors in logic before coding
- B. Test features of the user interface
- C. Makes the processing more efficient
- D. Makes it easy to divide the project amongst members of a team

SECTION A – continued
TURN OVER

Question 18

Which of the following is **not** a structure available in an algorithm?

- A. Manipulation
- B. Sequence
- C. Iteration
- D. Selection

Question 19

Which of the following would be a good example of the use of a file naming convention?

- A. Document1
- B. File050613
- C. Smith_AuditData_Expenses_070416
- D. Smithfamilyauditexpenses56

Question 20

Julie has written a program that will guess gmail email addresses with the purpose of sending them direct mail specials. This is a breach of which legislation?

- A. Spam Act
- B. Privacy Act
- C. Copyright Act
- D. Charter of Human Rights

END OF SECTION A

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

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

Question 1

With reference to the stages of the Problem Solving Methodology, the stage that involves writing evaluation criteria is called the _____ stage.

1 mark

Question 2

TCP/IP is the main protocol used on the Internet.

a. What is a protocol?

1 mark

b. Though we call TCP/IP a protocol, it really consists of two protocols: TCP and IP. What is the difference between them?

2 marks

Question 3

Each of the items described below have been taken from a DFD. State whether the description involves a **process** or a **data store**.

Item Description	Process or Data Store
Combine this year's financial figures with those of previous years.	
Retrieve the number of items from the inventory database.	
Archive the month's data for future reference.	
Discard the daily calculations.	
Calculate the profit margin for each stock item.	

5 marks

SECTION B – continued
TURN OVER

Question 4

What is a trace table and what is its' main purpose?

2 marks

Question 5

Study the pseudo-code algorithm below:

```

Begin
  A ← 1
  B ← 1
  C ← 2
  Display "1, 1, 2, "
  While C <> 21 Do
    A ← B
    B ← C
    C ← A + B
    Display C & ", "
  End While
End

```

- a. The initial value of the variable 'C' is '2'. What are the next two values for 'C'?

Values: _____

2 marks

- b. Work out what the algorithm is doing and then calculate how many times the 'While' loop will be executed.

Number of loops: _____

1 mark

Question 6

The beta version of a new software solution has just been completed by Killabrew Solutions for their client #NoLimits Real Estate. Ameer has been managing the project and is now trying to determine what criteria should be used for the acceptance testing with the client. List **two** criteria that must be included.

Criteria 1: _____

Criteria 2: _____

2 marks

SECTION B – continued
TURN OVER

Question 7

It is always good programming practice to use a naming convention.

- a.** Describe one naming convention that can be used when naming variables.

1 mark

- b.** Give **two** advantages of using a naming convention.

Advantage 1:

Advantage 2:

2 marks

- c.** Explain how not using a naming convention can lead to increased development costs in the future.

1 mark

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

Paul would like to begin the process of developing the App by gathering some data from both the presenters and listeners about what they would like to see included. For each of these groups, list **one** functional requirement that may be put forward as well as **one** non-functional requirement.

Group	Requirements
Presenters	Functional: Non-functional:
Listeners	Functional: Non-functional:

4 marks

Question 2

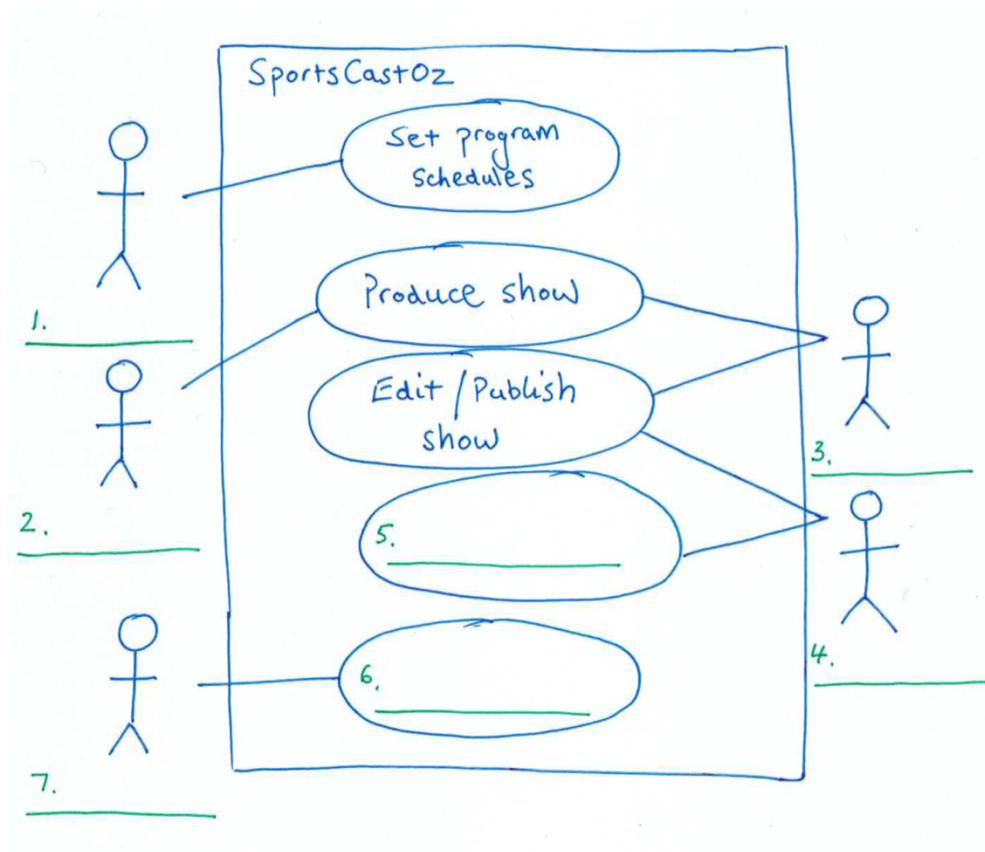
Paul employs Maxine to create the App for *SportsCastOz*. The first thing that Maxine sets about doing is creating a project plan. When she presents this plan to Paul, the first thing that is obvious to him is that she has left a gap between the end of one task and the start of the next one. Explain why she has done this and the effect it may have on the finish date of the project.

2 marks

SECTION C – continued
TURN OVER

Question 3

Paul was once given this Use Case Diagram by a friend of his that works in IT. Paul's friend explained that a diagram like this helps to visually represent what people are doing and how their roles can overlap. Some information is missing from the diagram and Paul would like it to be complete to pass on to Maxine. On the diagram below, label the **five** actors and **two** use cases.



7 marks

Question 4

Maxine is considering either using a rich client application architecture or developing the App as an Internet application. What would be the pros and cons of both of these choices when considering listening to podcast audio on a mobile device?

4 marks

SECTION C – continued
TURN OVER

Question 5

When the wifi network at *SportsCastOz* was set up, it was left open without any security or encryption on it at all. This enabled the large number of staff to easily connect and with staff leaving and new staff joining the station, it saved Paul the time of setting up each person on the network. Traci, who has only joined the station recently, has been critical of this aspect of the setup.

- a. What is the difference between a network password and encryption?

2 marks

- b. List **two** reasons why Traci might be critical of this.

Reason 1: _____

Reason 2: _____

2 marks

Question 6

Maxine shows some of her screen designs to Paul and asks for his feedback. In doing so, she mentions to him that he needs to ensure that his feedback is accurate as she does not believe in agile development.

- a. What is agile development?

1 mark

- b. Discuss the differences between agile and linear development.

4 marks

SECTION C – continued
TURN OVER

Question 7

An algorithm has been designed that will work out when to collect a 'listen' count from a podcast in the App. An episode is counted as having been listened to if a listener listens to more than 70% of the length of the podcast.

Function CountListen(ShowID, Progress, TotalLength, ListenerID, StartedFlag, ListenedFlag)

 If Progress > TotalLength Then

 ListenedFlag $\leftarrow$ True

 RemoveFromPlaylist(ShowID)

 End If

 If StartedFlag = True and ListenedFlag = False Then

 If Progress > 0.8 * TotalLength Then

 IncreaseCount(ShowID, 1)

 End If

 End If

End Function

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

StartedFlag: _____

ListenerID: _____

Progress: _____

ShowID: _____

4 marks

- b.** Identify **two** errors in the algorithm and explain what would happen if these errors were not corrected.

Error 1: _____

Error 2: _____

4 marks

SECTION C – continued
TURN OVER

Question 8

One of the key benefits that the App will provide *SportsCastOz* is revenue via advertising. Paul wants to make the advertising as targeted as possible by accessing the browsing history of those using the App, as well as their location details. Maxine advises Paul this is technically very easy to code, but that some things need to be done in order to ‘make it legal’.

- a. What would be the best way to ensure that this data is able to be obtained legally?

1 mark

- b. List **two** potential negatives that could arise from implementing such a feature.

Negative 1: _____

Negative 2: _____

2 marks

Question 9

AFLellofAGame is an AFL based show that is recorded weekly hosted by Dave and Sharon. The show is broadcast live and then a recording is placed on the show’s website as well as via the iTunes podcast directory. Dave has taken to starting the show with a pop song to represent what has happened during the week. Two weeks ago, he played most of “Take it to the limit” by The Eagles. Last week the song he selected was “Firework” by Katy Perry. Paul was initially concerned that this might be a breach of copyright, but Dave reassured him saying that by stopping the song just before the end meant they weren’t playing the whole song. He also said that as they weren’t selling the song, that it was OK.

Discuss any problems with Dave’s reasoning, with reference to any relevant legislation.

2 marks

SECTION C – continued
TURN OVER

Question 10

Paul shows Maxine the following design that he has drawn for the GUI of the App.



Maxine does not consider this to be an effective user interface design and tells Paul that it is not clear, responsive, familiar nor consistent. For each of these categories, state the problem and how it could be fixed.

Clear: _____

Responsive: _____

Familiar: _____

Consistent: _____

8 marks

SECTION C – continued
TURN OVER

Question 11

Maxine mentions to Paul that when testing to see if listening to more than 70% of a show triggers the addition to the listener count, that boundary value analysis should be performed.

- a. What is boundary value analysis?

1 mark

- b. Describe how you would use this technique to check to see if the 70% is applied correctly.

2 marks

Question 12

Maxine is not 'a fan' of writing internal documentation. She feels that it adds to the development time of the App and ultimately costs money for the client.

Explain why this practice is not in the best interests of either Maxine nor *SportsCastOz*.

2 marks

Question 13

The App is very close to completion. Maxine would like to release the App to the public as a beta release that expires after 6 months.

Discuss the pros and cons of releasing a beta version of the App so that is available for anyone to download and use.

2 marks

SECTION C – continued
TURN OVER

Question 14

Feedback from the beta testing has shown that users of the App report very slow downloads and a massive amount of data being used. Maxine thinks this might be as a result of the SSL encryption that the App uses.

- a. What is SSL encryption?

1 mark

- b. Put forth an argument for removing SSL encryption from the App completely.

2 marks

Question 15

After the App has been in use for a while, Maxine and *SportsCastOz* will need to evaluate how successful it has been. Suggest a strategy that might be used to evaluate this.

3 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

SportsCastOz is a small Internet radio station that delivers a number of sports based shows either live or via podcast. The business rents a floor in a small office block, where they have a recording studio, a meeting room, an editing suite and an office. Costs are kept to a minimum and all income is obtained via advertising and sponsorship. There are up to 20 presenters involved with the station at any one time and the bulk of them work on a voluntary basis. Paul is the director of *SportsCastOz* and works full-time managing the station and occasionally presenting on the shows. Emily, Traci and Steven work part-time as producers (editing and publishing podcasts as well as managing the live streams). Jay works part time and handles advertising and marketing. Some of this advertising is placed into the edits of the podcasts and some is placed on the website.

At present, the content for the advertising, program schedules, program notes, graphics and website is shared via a small network. This network has both wired and wireless connections. A variety of software packages are used, however Paul would like to employ a software development company to develop a package to combine some of these tasks.

Paul would also like to employ someone to develop an App for the radio station. The App would allow the user to listed to all of the shows, read articles published by people at the station as well as provide reviews and feedback.