Student Name: _____

SOFTWARE DEVELOPMENT

Written examination

TSSM™
Creating VCE Success

2020 - 2024 Trial Examination

Reading time: 15 minutes
Writing time: 2 hours

QUESTION & ANSWER BOOK

Structure of book

Section	*Number of questions*	*Number of questions to be answered*	*Number of marks*
A	20	20	20
B	4	4	20
C	14	14	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 liquid/tape.

Materials supplied

- Question and answer book of 23 pages with detachable insert containing a case study for Section C.

Instructions

- Print your name in the space provided on the top of this page.

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

The type of software that is installed on a system without a user's knowledge or consent, with the purpose of stealing personal information is known as:

A. a virus.

B. a worm.

C. a Trojan.

D. spyware.

Question 2

In a use case diagram, a stick figure would represent:

A. an actor.

B. a process.

C. an external entity.

D. a system boundary.

Question 3

Ryan is writing user documentation for a program that he recently created. What stage of the problem solving methodology is he currently in?

A. Analysis

B. Design

C. Development

D. Evaluation

Question 4

Which of the following is **not** considered a non-functional requirement?

A. Response rate

B. Processing rate

C. User-friendliness

D. Reliability

SECTION A - continued

Question 5

What can a data flow diagram (DFD) include that a context diagram cannot?

A. Multiple entities

B. Multiple processes

C. Direct data store to data store communication

D. Direct entity to entity communication

The following algorithm applies to questions 6-8

```
1    BEGIN
2    IF grade > 50 THEN
3         result ← 'pass'
4    ELSE
5         result ← 'fail'
6    END IF
7    END
```

Question 6

The algorithm above is an example of:

A. Sequence

B. Iteration

C. Selection

D. Moderation

Question 7

A table that lists the variables `grade` and `result`, along with their type, size, scope and description is known as:

A. a data structure diagram.

B. an object description.

C. pseudocode.

D. a data dictionary.

Question 8

The data type for the variable `result` is most likely:

A. a string.

B. a character.

C. a Boolean.

D. an integer.

Question 9

A marketing organisation in Western Australia has purchased personal details of the clients of a local mining supplies store. They have then sent out letters to the addresses of these customers trying to get them to purchase similar goods.

Which law is this in breach of?

A. Charter of Human Rights and Responsibilities Act 2012

B. Spam Act 2003

C. Privacy Act 1988

D. Information Privacy Act 2000

Question 10

Which of the following evaluation criteria would you use to measure the effectiveness of a new software solution?

A. Are results produced quicker than in the past?

B. How much downtime has the software experienced?

C. Is the software easy to use and navigate?

D. Are the correct results produced?

Question 11

Stuart has created a module of code that accepts two numbers and returns the sum of them. This is known as a:

A. procedure.

B. function.

C. method.

D. control structure.

Question 12

Which of the following statements is **not true** about internal documentation?

A. It can assist future programmers to add modules to the application.

B. It describes a line of code to make it easier to find.

C. It is very useful, but takes slightly longer when compiling an application.

D. It can assist the current programmer when they are debugging.

The following algorithm applies to questions 13-15

```
1    BEGIN
2    x ← 12
3    y ← 3
4    REPEAT
5         x ← x / 2
6         y ← y + 1
7    UNTIL y > x
8    DISPLAY y, x
9    END
```

Question 13

What is the output from the algorithm above?

A. 5, 3

B. 6, 4

C. 3, 5

D. 4, 6

Question 14

Lines 4-7 in the algorithm are known as:

A. sequence.

B. iteration.

C. selection.

D. moderation.

Question 15

What is line 2 of the algorithm known as?

A. A method

B. A function

C. An event

D. A statement

Question 16

Aleisha wishes to store a user's first name, surname, street address, suburb, postcode and whether they have paid. Which data structure should she use?

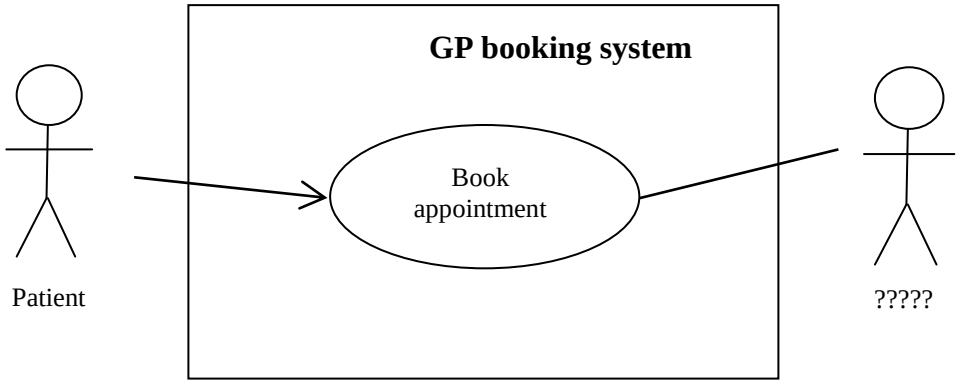
A. Record

B. Selection structure

C. 2D array

D. 1D array

The following Use Case Diagram applies to questions 17-18



The UCD above represents a patient booking an appointment with their local doctor. When the patient calls the practice to book their appointment with Dr. Edwards, the receptionist, Mrs. Johnston, answers the phone to make the booking.

Question 17

What should replace the question marks in the diagram above?

A. Doctor

B. Dr. Edwards

C. Receptionist

D. Mrs. Johnston

SECTION A - continued

Question 18

What are the stick figures known as?

A. Entities

B. Use cases

C. Processes

D. Actors

Question 19

John is developing a website called *FleaBay* that will be used to sell dog grooming products. Customers will be required to login and complete the transaction entirely online, which John believes will save him a significant amount of money over renting a shop.

When developing the website, which factor is least likely to affect the customer?

A. Security of transactions

B. Consistent placement of navigation

C. Speed of processing transactions

D. Cost of developing the site

Question 20

Chris, a network technician, is running a packet tracer on his school network. What is Chris most likely checking?

A. If there is any unwanted packets from external sources entering the network

B. The flow of packets across the network

C. If there is any malware or spyware on the network

D. To see if any unauthorised users have been accessing the network

END OF SECTION A
TURN OVER

SECTION B - Short-answer questions

Instructions for Section B

Answer **all** questions in the spaces provided

Question 1

Identify two searching techniques. Explain which you would recommend using when searching for a surname in an unsorted list. Give reasons.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

4 marks

Question 2

A program is being written to be used at trials for shot-put for the upcoming Commonwealth games. It receives the length of the throw and indicates whether the throw has qualified or not. The distance required to be thrown is 16m.

a. Julio, the programmer is currently working electronic validation into the program. Which stage of the problem solving methodology is he currently undertaking?

_____

1 mark

SECTION B – **Question 2** - continued

b. Suggest, with reasons, a set of suitable test data that Julio could use to test this program.

4 marks

c. The program accepts the input (length) and compares it against the required distance, then sets another variable (qualified) to true or false, depending on whether the throw is on or above the qualifying distance. It then displays a message to inform the user of whether or not they have qualified.

In the space below, write this as pseudocode.

6 marks

SECTION B – continued

TURN OVER

Question 3

A receptionist at a doctor's office in Melbourne, Melissa, finds that she is nearly out of space on her hard drive. As all patient records are currently saved there and taking up a lot of room, she decides that she needs to free up space by removing some of the records.

a. Which law applies to Melissa dealing with the patient records?

_____

1 mark

b. Melissa is trying to decide whether to archive or delete the records. Explain the difference between archiving and deleting, and identify a process that she could go through to decide which records to delete and which to archive.

_____

_____

_____

_____

_____

_____

_____

_____

_____

4 marks

END OF SECTION B

SECTION C – Case study

Instructions for Section C

Answer **all** questions in the spaces provided. Remove the case study insert and read **all** the information provided before you answer these questions. Answers must apply to the case study.

Question 1

Identify three mistakes in the use case diagram contained within the case study, and explain what needs to be done to correct them.

Mistake 1: _____

Correction:_____

_____

_____

Mistake 2: _____

Correction:_____

_____

_____

Mistake 3: _____

Correction:_____

_____

_____

6 marks

SECTION C – continued

TURN OVER

Question 2

Before the app can be designed, *Programmability* would like to get a better understanding of the current system and the user requirements. To do this, they need to undertake data collection. Identify three appropriate methods of data collection that *Programmability* should use, and which stakeholder(s) will be involved in each.

Data collection method 1: _____

_____

_____

_____

Data collection method 2: _____

_____

_____

_____

Data collection method 3: _____

_____

_____

_____

6 marks

SECTION C - continued

Question 3

Julie has told *Programmability* that parents will not require a username for the system as they have received the parents' Medicare numbers from their visits with the maternal and child health care centre, which is next door and also a council initiative.

Explain to Julie why this is not the case and why she should have usernames for each parent, referring to at least two National Privacy Principles that may have been breached.

_____

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_____

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_____

_____

_____

4 marks

Question 4

a. Identify two functional requirements of the app.

_____

_____

2 marks

SECTION C – Question 4 – continued

TURN OVER

b. Identify a non-functional requirement of the app, and explain why it important to its success.

_____

_____

_____

_____

_____

_____

3 marks

Question 5

Julie and her team now have to decide on the most appropriate mobile computing device that they should use to manage the system. This will include interacting with the database, adding new toys to the library and to view, create, delete and amend current bookings.

Key Features	**Device 1**	**Device 2**	**Device 3**
Input	Qwerty keyboard	Touch screen	Qwerty keyboard
RAM	2GB RAM	1GB RAM	4GB RAM
Processor	2GHz dual core	1GHz	2GHz dual core
Connectivity	Wi-fi and 3G enabled	Wi-fi	Wi-fi
Battery	6 hours	8 hours	4 hours
Resolution	1024 x 768 pixels	1024 x 768 pixels	2,048 x 1,536 pixels
Camera	Yes, rear and front facing	Yes, rear facing	No
Weight	950 grams	570 grams	850 grams

SECTION C – Question 5 - continued

a. Using the table on the previous page, identify one positive and one negative of each device that Julie is looking at. Ensure that you refer to the solution requirements in your response.

6 marks

b. Using your response to the previous question, recommend which device Julie should choose.

2 marks

SECTION C – continued

TURN OVER

Question 6

Below is the code that will be used for viewing whether a particular toy is available. It will not currently be used for making bookings.

```
1     BEGIN
2     GET toyRequired
3     toyAvailable ← FALSE
4     toyFound ← FALSE
5     toyNum ← 0
6     READ currToy from toyFile
7           IF currToy(toyNum) = toyRequired THEN
8                 toyFound ← TRUE
9           END IF
10          toyNum ← toyNum + 1
11    UNTIL End of File
12    IF toyFound = TRUE THEN
13          IF toyAvailable = TRUE THEN
14                DISPLAY currToy(toyNum) & " is available for pickup"
15          ELSE
16                DISPLAY currToy(toyNum) & " is not available"
17    END IF
18    END
```

a. The table below lists some of the variables above. Select the most appropriate data type for each from the following: Floating point, integer, Boolean, string, array, character.

Variable	**Data type**
toyRequired	
toyAvailable	
toyNum	

3 marks

SECTION C – **Question 6** - continued

b. When testing the system, it sometimes displays toys as available when they are not and as not available when they are available. Identify the line where the error is occurring and recommend a suitable fix.

_____

_____

_____

_____

_____

_____

3 marks

Question 7

After fixing up all of the other errors, they decide to create the algorithm to check if an overdue fee is owing and returns the amount. The pseudocode is below:

```
1     FUNCTION checkFees(dueDate)
2     BEGIN
3           daysOverdue ← 0
4           feesOwing ← 0
5           IF returnDate <> NULL
6                 IF dueDate < returnDate THEN
7                       daysOverdue = dueDate - returnDate
8                 END IF
9           END IF
10          feesOwing = daysOverdue * 0.5
11          RETURN feesOwing
12    END
```

a. Complete the table on the next page by selecting appropriate values for returnDate that would test the function along with a reason for selecting each. You can assume that dueDate is 30/06/2016. You must select values that broadly test the function.

returnDate	**Expected feesOwing**	**Actual feesOwing**	**Reason for selecting test data**

8 marks

b. At which line number is the mistake with the algorithm, and what has it resulted in?

_____

_____

_____

_____

2 marks

c. Write the pseudocode to correct the mistake indicated above.

_____

1 mark

SECTION B – **Question 7** - continued

d. Why is the pseudocode for calculating the fees known as a function and not an event?

_____

_____

_____

_____

2 marks

Question 8

Now that the app is in full working order, *Programmability* is in the process of creating user documentation for each type of user. For each user identified below, recommend and justify a type of user documentation:

User	**Documentation**	**Justification**
Library staff		
Network technicians		
Parents		

6 marks

SECTION C – continued

TURN OVER

Question 9

Now that much of the solution has been developed, Julie has decided that she would like extra functionality added to search for a particular toy using its unique ID number. *Programmability* has said that this will mean the solution will take longer to develop and they will be charged more. Julie is unhappy with this as she thought it should have been included from the start.

Explain how creating a thorough software requirements specification at the beginning of the process could have avoided this problem.

_____

_____

_____

_____

_____

_____

_____

_____

3 marks

Question 10

As part of user acceptance testing, Julie and her team have been given the app to test on their mobile device.

a. What is the purpose of user acceptance testing?

_____

_____

_____

1 mark

b. One of the main criteria for the app is that it should be easy to use. Outline a strategy that could be used to determine if this criterion is being met.

_____

_____

_____

_____

2 marks

END OF QUESTION AND ANSWER BOOK

CASE STUDY INSERT FOR SECTION C

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

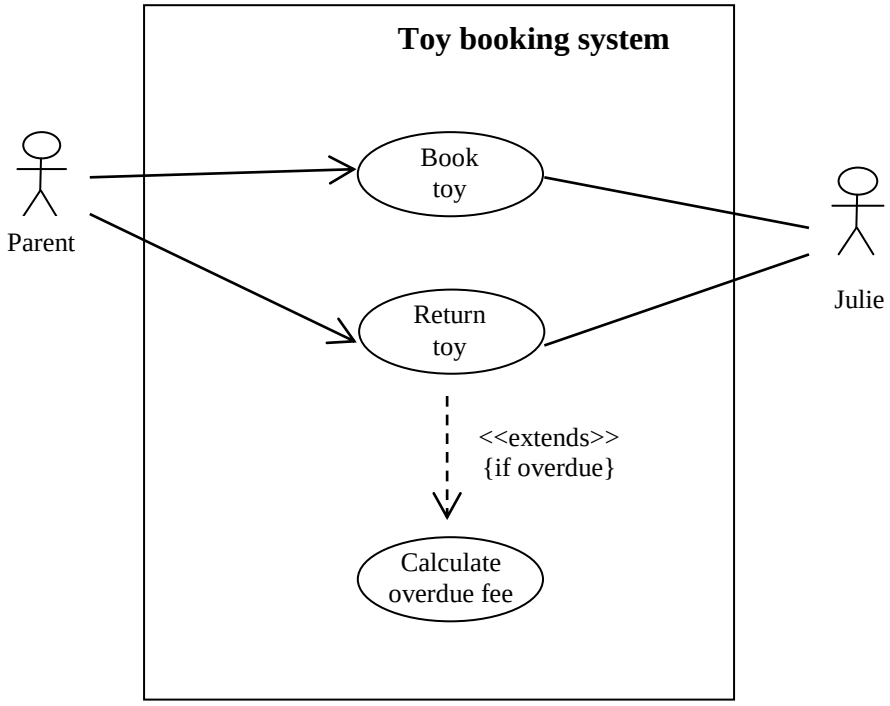
Case Study

The City of Greater Dandenong Toy Library was established in 1994 to cater for the number of young families in the region. Parents can come in and borrow toys for their children for a fortnight and then return them or extend their borrowing period for another fortnight.

In some cases, there are toys that are very popular (generally the ones that make the most noise) and if a parent is on the waiting list to borrow a toy then it cannot be borrowed by another parent at the end of their fortnight. A fee of 50 cents per day is applied for toys returned after their due date.

Recently there has been an increase of young families in the area and the Toy Library is more popular than ever. This has led to them struggling to keep up with bookings, losing bookings and occasionally failing to keep track of toys, which are sometimes not returned.

The current system has been documented in the following use case diagram, created by Ben Lannigan (a current Year 12 Software Development student) who is the son of Julie (the library's manager).



Mark (the council's IT technician) recently created a database to store the bookings, and is planning on having an app created by a company called *Programmability* that parents can use to manage their bookings, which will receive data from and send data to the database. It will also allow parents to sign up to the library if they are not already a member.

Julie, Mark and the other two library staff (Sharon and Rebecca) will be involved in testing the app and the council has kindly offered to purchase them a mobile device each for this purpose. This device will also be used for them to view, create, delete and amend current bookings.

END OF CASE STUDY INSERT FOR SECTION C