TSSM
Creating VCE Success

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2017 Trial Examination

STUDENT NUMBER | | | | | | | | | Letter |

COMPUTING: SOFTWARE DEVELOPMENT

Unit 3 & 4 – Written examination

Reading time: 15 minutes
Writing time: 2 hours

QUESTION AND ANSWER BOOK

Structure of book

Section	*Number of questions*	*Number of questions to be answered*	*Number of marks*
A	20	20	20
B	6	6	30
C	8	8	50
		Total	100

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners and rulers
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or white out liquid/tape.
- No calculator is permitted in this examination.

Materials supplied

- Question and answer book of 19 pages.

Instructions

- Print your name in the space provided on the top of this page.
- All written responses must be in English.

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 section A.
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.

Use the following information to answer Questions 1 to 3

Alice has never been comfortable with technology and she is looking for a simple app for her iPhone which will display the number of the steps completed, kilometres walked/jogged and calories burnt during the activity. The program will store the data and therefore Alice will be able to monitor the history of her activities.

Question 1

What would be the main non-functional requirements of this program?

A. Ease of use, response rate

B. Robustness, maintainability

C. Response rate

D. Display the total number of steps

Question 2

The data type for '*number of steps'*, '*kilometres'* and '*calories*' respectively would be:

A. float, float and float

B. float, float and integer

C. integer, integer, float

D. integer, float, float

Question 3

Conventionally, the index to the start of an array is:

A. 0

B. 1

C. Undefined

D. Any number, if it is defined

SECTION A - continued

Question 4

Which of the following data is an example of an integer data type?

A. -25

B. 14.52

C. Twenty

D. 3rd

Question 5

For code to be compiled, it must be:

A. sorted

B. parsed

C. stored as a text file

D. None of the above are correct

Question 6

Which of the following best describes the Analysis stage of the PSM?

A. Examination of the current system to determine the issues and how they can be solved.

B. The writing of functional and non-functional requirements.

C. Data collection to determine the current situation.

D. A process that can be completed at any stage of the PSM.

Question 7

Which of the following control structures refer to iteration?

A. If… Then – For Next

B. For… Next – While…Do

C. Action 1, Action 2, Action 3

D. Repeat… Until - If… Then

SECTION A – continued

TURN OVER

Use the following information to answer Questions 8 and 9.

```
For Count ← first to last
        Action 1
        Action 2
Next Count
```

Question 8

This section of an algorithm is an example of a:

A. 'test at beginning' type of iteration

B. 'test at end' type of iteration

C. 'fixed loop' type of iteration

D. None of the above

Question 9

Which control structures are present in the algorithm?

A. repetition and selection

B. sequence and selection

C. reiteration

D. iteration and sequence

Question 10

A selection sort will perform a number of comparisons. How can the number of passes and swaps be represented?

A. n^2 passes and n^2 swaps

B. $n\text{-}1$ passes and $n\text{-}1$ swaps

C. n^2 passes and $n\text{-}1$ swaps

D. It cannot be determined

Question 11

How many swaps would be required to sort the following array using selection sort?

{3 – 6 – 2 – 4 - 5 – 7 – 6 – 1}

A. 8 swaps

B. 7 swaps

C. 9 swaps

D. 6 swaps

SECTION A - continued

Question 12

The analysis stage of the PSM must consider:

A. processes, users, digital system and data

B. networks, procedures, information and users

C. hardware, processes and data

D. stakeholders, processes, hardware and data

Question 13

Louise finished a module of code that accepts four numbers and returns the sum as output. This is known as a:

A. Function

B. Procedure

C. Sequence

D. Method

Question 14

Programming languages vary depending on the amount of translation that is required for turning the language to binary code. This process is called:

A. translation

B. coding

C. parsing

D. compiling

Question 15

Which of the following statements is true?

A. A router connects LANS and a bridge connects WANS.

B. Repeaters forward packets of data from one device to another.

C. Networks can be configured as a LAN or WAN.

D. A router connects networks together even if they use different protocols

Question 16

A developer needs to evaluate the efficiency of a new information system. Which of the following criterion measures efficiency?

A. The accuracy of the output has increased.

B. The processing time has decreased by 40%.

C. The number of complaints has reduced.

D. The output produced is clear and relevant to the system.

SECTION A – continued

TURN OVER

Question 17

What does the term 'specification creep' refer to?

A. When tasks take longer than expected to complete.

B. When milestones must be pushed out because the tasks are taking longer.

C. A lack of software integration which may lead to problems occurring.

D. When clients add new features to the requirements during the development stage.

Please refer to the following paragraph to answer questions 18 and 19

A traditional school is in the process of implementing a new learning management system for students, teachers and parents. There has been forward planning, and a timeline to introduce this package in a phased method. The project managers have emphasised the fact that some staff members still have limited skills in the use of technology as they only use their laptops for word processing, research and students' reports.

Question 18

What would the limited skills in the use of technology be known as?

A. A constraint

B. A non-functional requirement

C. A functional requirement

D. The scope of the solution

Question 19

In a software requirements specification (SRS), which section would include details of the staff's IT skill level?

A. The introduction

B. The description of the proposed software solution

C. The specific requirements of the software solution

D. The description of the environment in which the solution will operate

Question 20

'*Enter an even number, enter an odd number, multiply the two numbers and display the output*'. This is an example of:

A. a message

B. a line of code

C. an algorithm

D. selection

END OF SECTION A

SECTION B - Short-answer questions

Instructions for Section B

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

Question 1 (6 marks)

a. What does the agile and waterfall process look like? Draw them. 2 marks

Agile model

Waterfall model

b. Explain the difference between the agile and the linear model 4 marks

_____

_____

_____

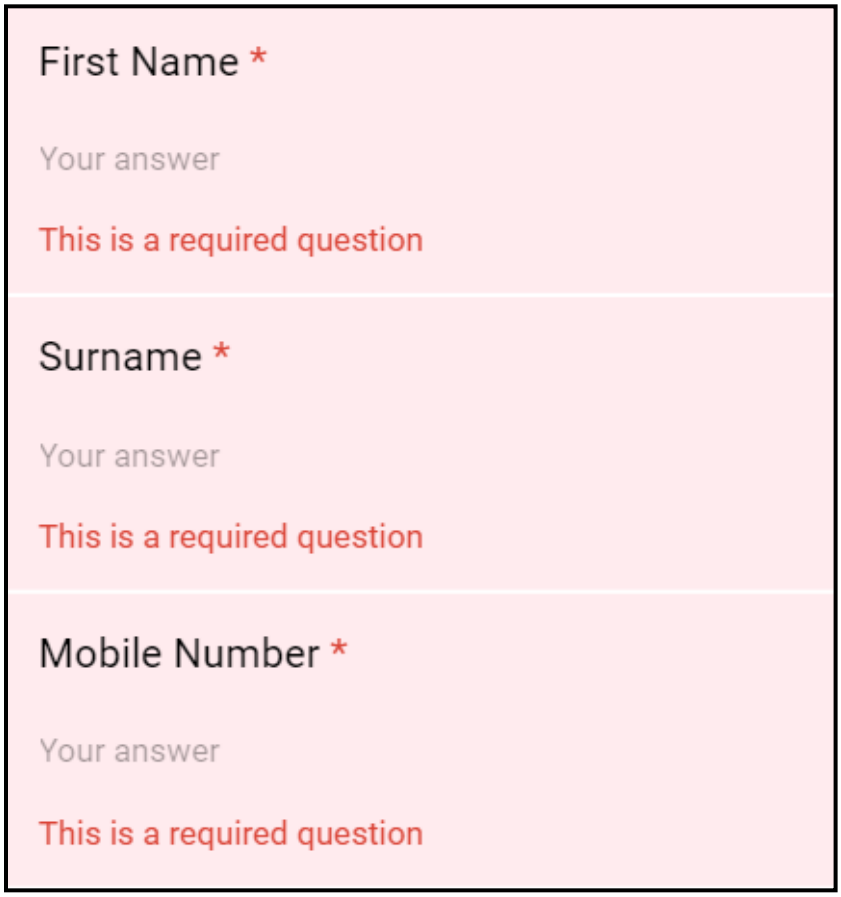
_____

SECTION B – continued

TURN OVER

Question 2 (4 marks)

James has just designed the first screen of a registration form for a training program. The diagram below shows a section of it.



a. What is a validation technique? 1 mark

_____

b. What is the name of the validation technique used according to the diagram? 1 mark

_____

_____

SECTION B – Question 2 - continued

c. What other validation technique could have James applied? 1 mark

_____

_____

d. How does validation differ from testing? 1 mark

_____

_____

Question 3 (3 marks)
Michelle owns a lending institution and she would like to have a multifactor authentification method to provide stronger security and decrease hacking.

a. What is a multifactor authentication method? 1 mark

_____

_____

b. Suggest a multifactor authentication method Michelle could use? 2 marks

_____

_____

SECTION B - continued
TURN OVER

Please refer to the following paragraph to answer questions 4 and 5

Question 4 (4 marks)

```
Start
  i← 1
   While i < 9
      print (i)
      i ← i + 1
   End While
Stop
```

a. Which control structures can be identified? 1 mark

_____

b. How many times does it loop? 1 mark

_____

c. Which is the value of i after the first and last loop? 2 marks

_____

SECTION B - continued

Question 5 (6 marks)
How do viruses hide from anti-virus software? List and explain two techniques.

Technique 1: _____

_____

_____

Technique 2: _____

_____

_____

3 x 2 = 6 marks

Question 6 (7 marks)
Write an algorithm in pseudocode to find the sum of 3 random numbers. This process will loop 3 times and then print the total.

Function: Find the sum of 3 numbers

END OF SECTION B
TURN OVER

SECTION C – Case study

Instructions for Section C
Please remove the insert from the back of this book during reading time.
Use the case study provided in the insert to answer the questions in this section.
Answer all the questions in the spaces provided.

Question 1 (6 marks)
Identify three data collections methods Matt could have used during the analysis of the system? Justify the appropriateness of each collection method for determining the functional and non-functional requirements.

Collection Method 1: _____

_____

_____

Collection Method 2: _____

_____

_____

Collection Method 3: _____

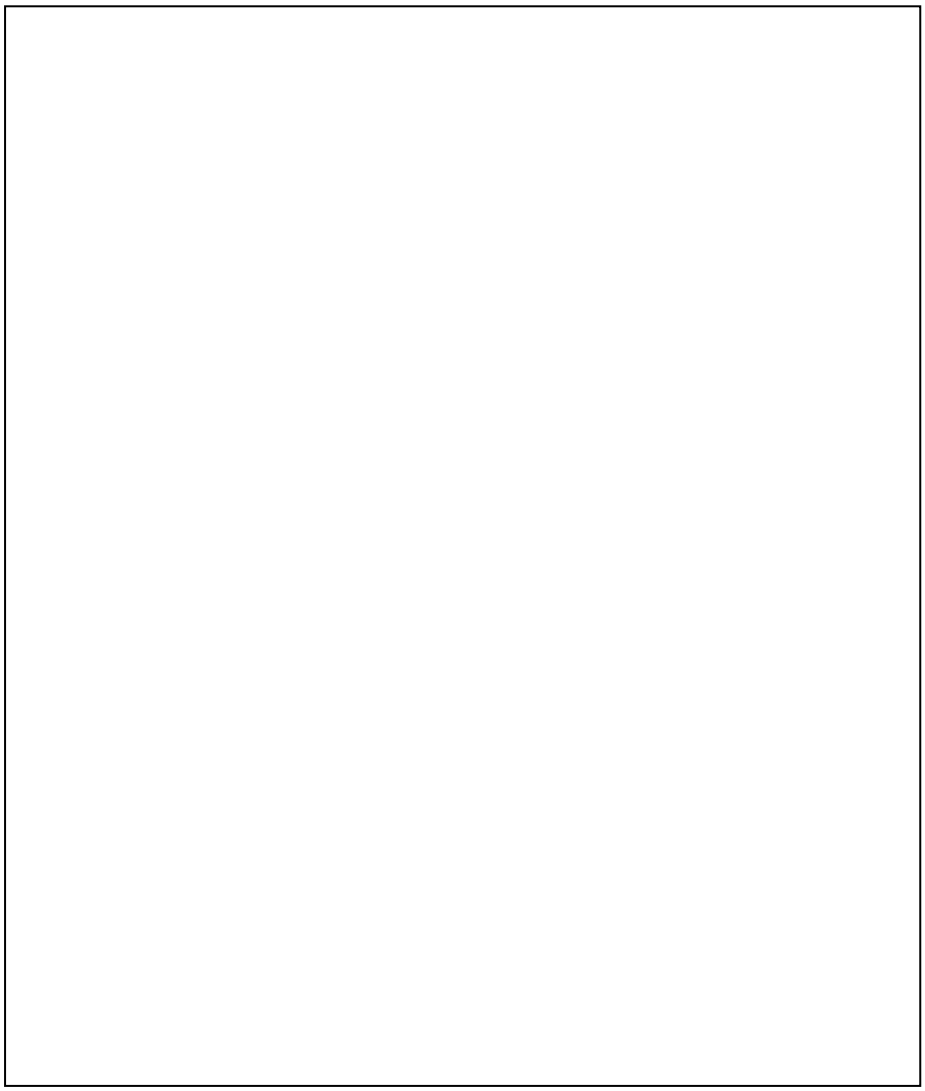
_____

_____

SECTION C - continued

Question 2 (15 marks)
Matt is in the process of preparing a use case diagram for the online booking of an event. Draw a UCD, following the proper conventions and identify:

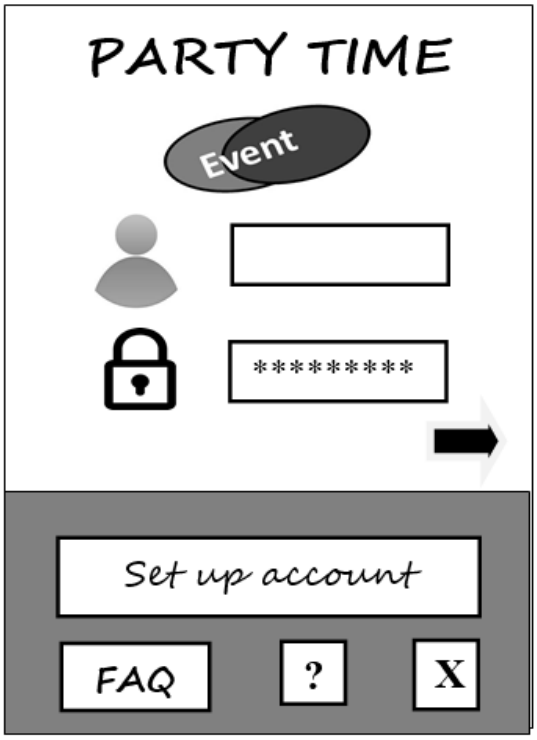
- Five actors
- Four use cases
- Two <<includes>>
- Four associations



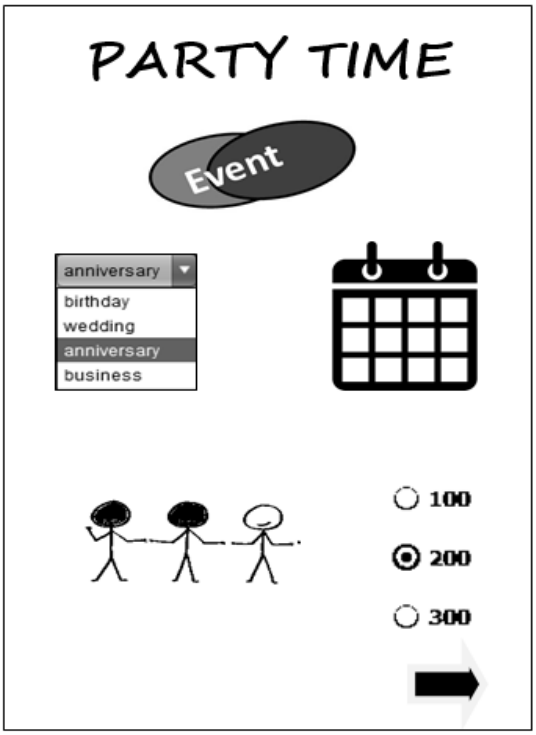
SECTION C – continued
TURN OVER

Question 3 (15 marks)
Matt has designed a login screen and a data entry interface. Matt believes Nicole will love these modern designs.

Login screen



Data entry interface



a. Explain one feature of the design that contributes to the efficiency of the solution.

2 marks

_____

_____

b. Explain one feature that contributes to the effectiveness of the solution.

2 marks

_____

_____

SECTION C – Question 3 - continued

c. Suggest two improvements for these designs. Justify your recommendations.

2 marks

_____

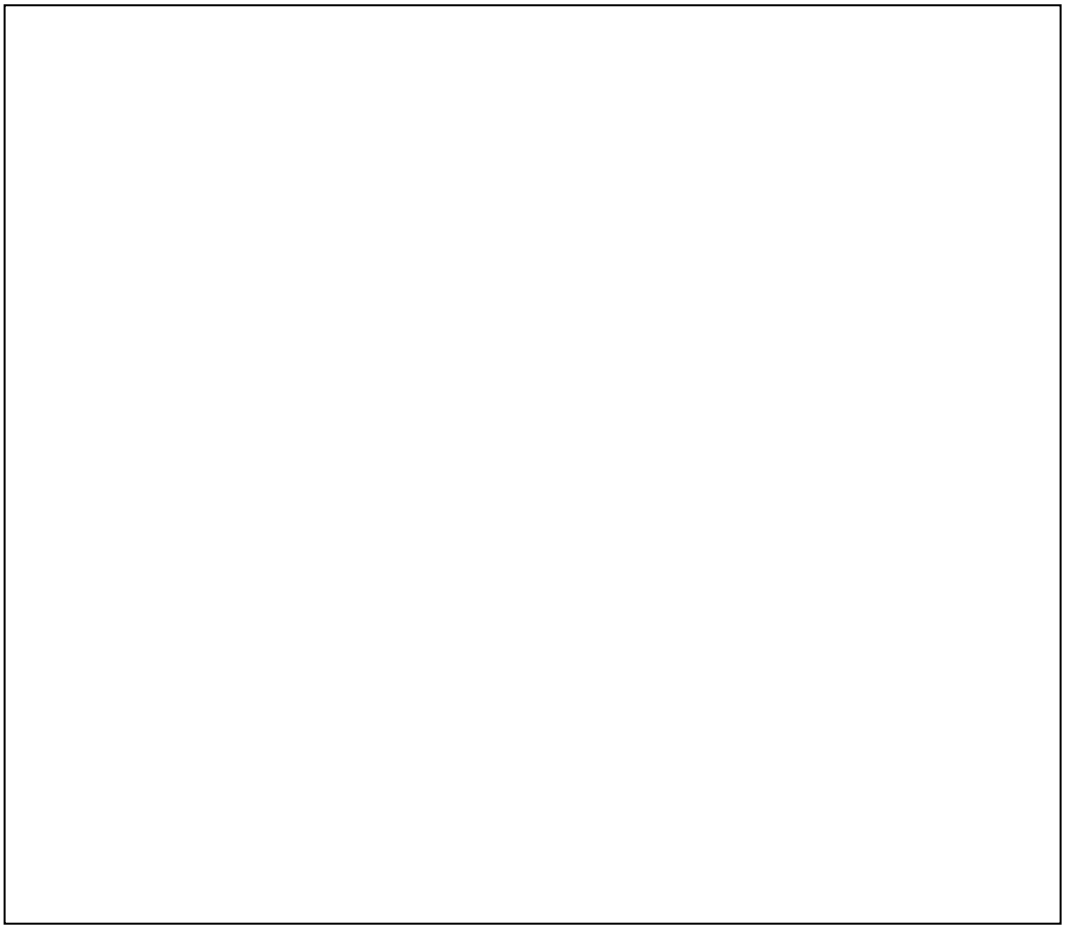
_____

_____

_____

d. Produce an alternative mock-up for the data entry screen. This layout of the proposed screen should convey the look and functionality of the screen. Annotate all the objects used.

5 marks



SECTION C – Question 3 – continued

TURN OVER

e. How would you measure the efficiency and effectiveness of your design? Identify one criterion for efficiency and one for effectiveness. 4 marks

Efficiency criterion: _____

_____

Effectiveness criterion: _____

_____

Question 4 (4 marks)
Discuss two non-functional requirements that Matt will have to pay attention to when developing this portal.
Non-functional Requirement 1: _____

_____

_____

Non-functional Requirement 2: _____

_____

_____

SECTION C - continued

Question 5 (2 marks)

Matt will structure the clients' files in XML files. Name two advantages of doing this.

_____

_____

Question 6 (4 marks)

a. Nicole is aware of the privacy laws in place in Australia and how she must protect her clients' sensitive data. Nicole values data as an asset for her business and she asks Matt about a backup strategy.

Matt has two recommendations for her business:

- Cloud service
- Storage Area Network SAN

Select one of them and explain one advantage and one disadvantage of using this system.

Backup system: _____

Advantage:

_____

_____

1 mark

Disadvantage:

_____

_____

1 mark

SECTION C – Question 6 – continued

TURN OVER

b. As clients will be sending sensitive data over the Internet, Matt will encode the data/information so that is unreadable. Explain the term 'Symmetric key encryption'.

_____

_____

_____

2 marks

Question 7 (2 marks)
Matt has finished the software and he is ready for testing. He will use 'alpha testing' and 'beta testing'. Explain the difference between these two types of tests.

_____

_____

_____

_____

2 marks

Question 8 (2 marks)
The solution is ready for 'acceptance testing'. Explain what this is and who should be involved.

_____

_____

_____

_____

2 marks

END OF QUESTION AND ANSWER BOOK

INSERT FOR SECTION C - CASE STUDY

Please remove from this book during reading time.

'Party Time'

Nicole has always been interested in overseeing and planning parties. She graduated as an event manager in 2014 and worked for the Victoria Market organising the Wednesday night market and other extravagant events for big businesses. After gaining experience in this area, she decided to set up her own business, named 'Party Time'. This business has been running for a whole year now and she is ready to expand. Her main goal is to provide the best service possible for her clients. She wants her clients to remember the event as a fun, unique, memorable, social and a well-organised occasion.

Nicole sees each individual event as a project and allocates a sole point of contact, the supervisor, who deals with the client's requirements in preparation of the event. The supervisor works under Nicole's leadership to plan the budget and deliver an extraordinary time for her clients and guests. The supervisor deals with suppliers that deliver the freshest and tastiest food, designed specifically for the events. She focuses on the client's requirements of design and themes, which includes lighting, furniture, centrepieces, floral displays, video recording and photographs.

Event staff will be responsible for the successful delivery and implementation of various event components under the direction and supervision of the event manager.

So far 'Party Time' hosts a static website which contains information about their business, where prospective clients can read about their services. The site also has a gallery of video clips and photographs of events they have organised. Nicole is aware that her information system is in need of some changes and therefore she asks Matt Weks, who works for 'Technology Solutions', to oversee the revamping of the site.

Nicole is interested in the creation of a portal where clients, supervisors and staff members will be able to log in the system and collaborate in the preparation of the event. The portal will allow clients to log on, upload and submit their requirements with ease and at any time. Afterwards, the supervisor presents the plan to Nicole who approves or updates it if required. The use of this portal will ensure accuracy of documentation and save time for both the clients and the organiser. The camera person and photographer will be able to upload the images and video recording of the event as well. After the event, Nicole's assistant will sort and select the best images and video sections for the clients to view.

Before accessing the portal, clients, duty managers and event manager will create an account to login. Clients will enter all special dietary requirements to ensure the business caters for all guests accordingly. Online registration should be a simple, cost effective and stress-free solution. The registration system should be easy-to-administer and feature a secure credit card payment facility.

END OF INSERT