TSSM
Creating VCE Success

2020 Examination Package -
Trial Examination 3 of 7

STUDENT NUMBER

Letter

Figures										
Words										

SOFTWARE DEVELOPMENT
Units 3 & 4 – Written examination

(TSSM's 2015 trial exam updated for the current study design)

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	5	5	20
C	9	9	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.
- 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 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

Luke is currently developing a program and has created a rule that checks whether or not the data that a user enters is within a certain range. Which activity in the problem-solving methodology is this known as?

A. Analysis

B. A functional requirement

C. Development

D. Validation

Question 2

In a use case diagram, what does a rectangle represent?

A. An external entity

B. The system boundary

C. A use case

D. A process

Question 3

Which of the following is not a factor that influences the design of solutions?

A. Useability

B. Affordability

C. Authenticity

D. Marketability

Question 4

Which of the following is not involved in the development of a solution?

A. Identifying how the data will be named, structured, validated and manipulated.

B. Creating internal documentation to assist future programmers with updating the solution.

C. Checking that the results produced by the solution match the expected results.

D. Creating a tutorial on how to use certain functions of the solution.

Question 5

A user enters the numbers 7, 18, 3, 9, 21 into a program. When the values are read back to the user they are in the order 21, 9, 3, 18, 7. The data structure used would be:

A. a serial file.

B. a linked list.

C. a stack.

D. a queue.

Question 6

A line of code is used to calculate the sum of two variables. This is known as:

A. a procedure.

B. a function.

C. a method.

D. an instruction.

Question 7

An app has been created for young children aged 3-7 years old to use on their parents' smartphones. It is designed to run only on the myOS operating system and will assist students to learn spelling and grammar.

Which of the following is the most important non-functional requirement for this app?

A. Maintainability

B. Robustness

C. Portability

D. Reliability

Question 8

Features to be included within the solution are identified in which stage of the problem solving methodology?

A. Analysis

B. Design

C. Development

D. Evaluation

Question 9

There have been some breaches of an organisation's network and personal and sensitive data may have been accessed. The manager has asked the IT technician to review how secure the network is, and the best way to do this would be to:

A. back-up all files.

B. update anti-virus software.

C. install a firewall.

D. check the network log files.

Question 10

Karyn is writing software to keep track of volunteers for her local community group. The software solution will store the personal details of each volunteer, such as their name, street name and number, postcode, state, phone number and email address.

The most appropriate data structure to store these personal details is a

A. two-dimensional array.

B. record.

C. string.

D. file.

Question 11

Which has the biggest effect on the efficiency of a linear search?

A. The list contains all string data types.

B. The list contains more than 1000 items.

C. The initial list is completely unsorted.

D. A bubble sort has already been performed on the list.

The following information applies to questions 12-13

Hugo is the owner of a local movie theatre. When patrons arrive, they often want snacks to go with their tickets. There is a discount for those patrons who order both popcorn and a drink from Lisa, the snack bar attendant. Currently Hugo's system does not handle this discount, so he has asked you to create him a new module for calculating the costs. Below is a small part of the UCD for the proposed system.

Patron

Purchase popcorn

2

Calculate discount

1
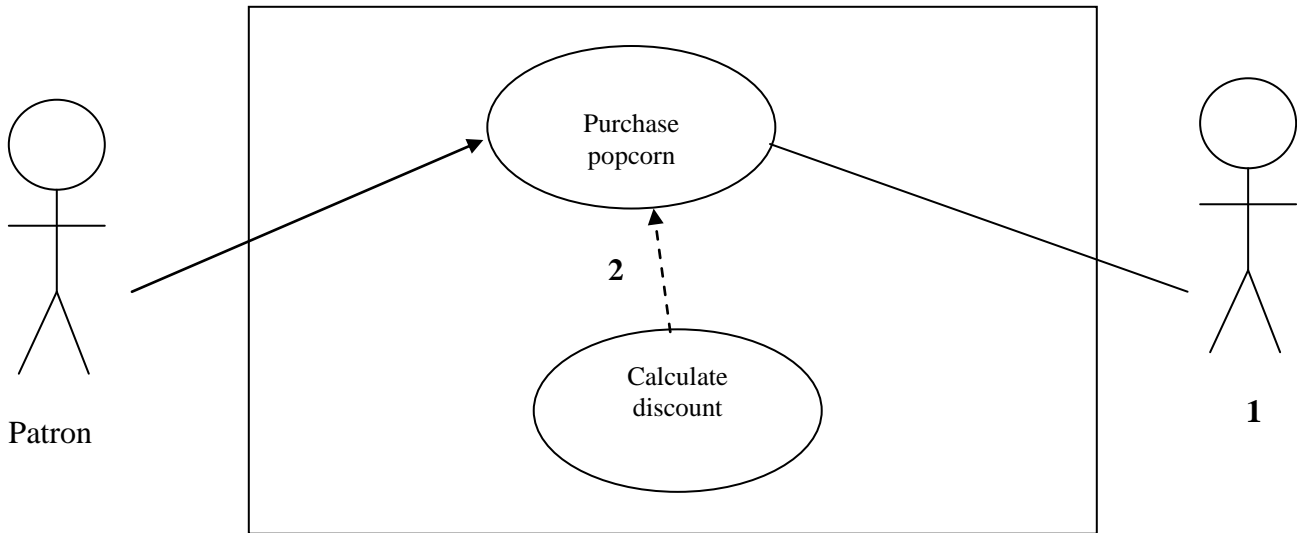
Question 12

What should the stick figure at position 1 be labelled as?

A. Owner

B. Hugo

C. Snack bar attendant

D. Lisa

Question 13

What kind of association does position 2 represent?

A. <<extends>>

B. <<includes>>

C. a data flow

D. a transaction occurring

TURN OVER

Question 14

Which of the following forms of documentation is the least likely to assist users of a new solution to understand how to operate it efficiently and effectively?

A. Internal documentation

B. A user manual

C. A tutorial

D. A quick start guide

Question 15

Enrique is a professional photographer for sporting events such as the football, cricket and motor racing. He attends on average 180 sporting events per year and takes 250 photos at each event, which are 2MB each in size. He is looking at buying a new external hard drive to archive his photos from 2020. How much space will these images take up?

A. 9000 megabytes

B. 900 megabytes

C. 90 megabytes

D. 90 gigabytes

Question 16

When planning a project, you should:

A. set a budget and ensure that your team sticks to it.

B. identify and schedule tasks, resources and people.

C. ensure that you have allocated the correct human and physical resources to tasks.

D. correctly identify any constraints that will affect the nature of your solution.

Question 17

James has received a call from his bank informing him that there have been some unusual transactions occurring on his credit card from multiple countries around the world, and have asked him if he is aware of this. He is not and has to cancel his card. James has been downloading the hugely popular *Game of Kings and Queens* TV series from an internet peer to peer file sharing application over the past few months and thinks that this may have something to do with his problem. What is the likely cause of his problems?

A. James has clicked on a popup and had adware installed.

B. A virus has come onto his computer from an incorrectly ejected USB flash drive.

C. A Trojan downloaded from the file sharing application.

D. A worm has been installed when he opened an email.

The following algorithm applies to questions 18-20

```
1.    BEGIN
2.    A ← 24
3.    B ← 1
4.    REPEAT
5.        A ← A / 2
6.        B ← B * 2
7.    UNTIL B > A
8.    DISPLAY B, A
9.    END
```

Question 18

What is the final output of the algorithm?

A. 8, 3

B. 3, 8

C. 6, 4

D. 4, 6

Question 19

Which two control structures are demonstrated within the algorithm?

A. Sequence and selection

B. Sequence and iteration

C. Selection and iteration

D. Selection and recursion

Question 20

What is line 6 of the algorithm known as?

A. A variable declaration

B. A data structure

C. A control structure

D. A statement

END OF SECTION A
TURN OVER

SOFTWARE DEVELOPMENT EXAM

SECTION B - Short-answer questions

Instructions for Section B

Answer **all** questions in the spaces provided

Question 1 (2 marks)

Outline one similarity and one difference between waterfall model and agile model.

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Question 2 (4 marks)

Using examples, distinguish between accidental, deliberate and events-based threats to the security of data and information shared between information systems.

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Question 3 (2 marks)

In reference to the storage of data, what is the difference between a record and a file?

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Question 4 (10 marks)

Vincent is planning a solution that will be used to track stock movements within a chair manufacturing business. It will need to be able to have inputs entered as they arrive, chair details added when they are completed, and chair details removed when the chairs leave the warehouse. This will be done via mobile devices as staff walk around the warehouse and sent back to the central database located in the manager's office.

    a. Discuss two data collection methods that would be used during analysis. Ensure that you include the stakeholders and the data that will be collected.

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SECTION B – **Question 4** - continued

TURN OVER

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b. Briefly describe three activities that will occur during the analysis phase.

3 marks

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c. Identify three functional requirements of the solution.

3 marks

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Question 5 (2 marks)

Compare and contrast backing up and archiving.

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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 (12 marks)

    a. Describe two constraints that will impact upon the proposed solution for Frank's Foods.

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    b. Define and explain two non-functional requirements that would be important considerations during the development of the solution for Frank's Foods.

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<div align="right">SECTION C – Question 1 - continued
TURN OVER</div>

c. Identify two stakeholders in the proposed solution for Frank's Foods and explain how their views would conflict with one another.

4 marks

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d. Outline two constraints on using a mobile device for the solution being proposed for Frank's Foods.

2 marks

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Question 2 (8 marks)

Now that a thorough analysis has been completed, the solution must be designed.

    a. Describe the activities that are involved in designing a solution.

<div align="right">2 marks</div>

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    b. Ellen has started to create a data flow diagram. Frank feels that it is just another graphical representation of the solution and she is wasting her time as he has already had a use case diagram created. Explain to Frank the difference between a data flow diagram and a use case diagram, and why both are required.

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SECTION C – Question 2 - continued
TURN OVER

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c. Identify two criteria that could be used to evaluate the efficiency and the effectiveness of the mobile devices.

2 marks

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Question 3 (8 marks)

a. Describe one advantage for the customers and one advantage for Frank in deciding to use mobile devices to take orders.

2 marks

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b. Apart from security concerns, outline two disadvantages of using a mobile device to take orders.

2 marks

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c. Explain two features that the mobile device must have to be able to operate according to Frank's instructions.

4 marks

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Question 4 (4 marks)

When developing the solution, Ellen initially uses a textbox for customers to enter their table number. She then changes this to a dropdown combo box. Explain why this is the case.

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SECTION C - continued
TURN OVER

Question 5 (6 marks)

Ellen has now created the module for sending orders to central computer in the kitchen. She has rolled this out to customers, and there have been some complaints about the food that they have received.

Upon ordering, the table's order is read into a 1D array called `currOrder[]` from the text file orders.txt. An example of an order:

0	Fish and chips
1	Pepper steak
2	Chicken parmagiana
3	Fettuccine carbonara

The algorithm that Ellen used is below:

```
1.    BEGIN
2.         i ← 1
3.              tableOrders ← ""
4.              DO WHILE tableOrders[i] <> -1
5.                   tableOrders ← tableOrders & currOrder[i] & _
                     newLine
6.                   i ← i + 1
7.              LOOP
8.              DISPLAY tableOrders
9.    END
```

    a. Identify the most appropriate data type for the following variables:

2 marks

       `tableOrders`:_____

       `i`:_____

b. The output on the screen is expected to be the following:

Fish and chips
Pepper steak
Chicken parmagiana
Fettuccine carbonara

What is the actual output of the algorithm?

2 marks

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c. Identify the line(s) of code that has caused the error that you have identified.

1 mark

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d. Write down what the line(s) of code should be changed to.

1 mark

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SECTION C - continued
TURN OVER

Question 6 (6 marks)

After fixing the problem with the orders, Frank has asked Ellen to create an algorithm that will request the current total of the order (`orderTotal`) and give a 10% discount on all orders over $100 and 15% discount on all orders $150 and over. It will display the total at the end.

Write the algorithm in the space below:

```
BEGIN
```

```
END
```

Question 7 (9 marks)

Frank has decided that it has taken long enough to create the solution and has advertised that it will be launched at the start of next week. It has taken longer than planned because he is constantly asking Ellen to incorporate new features that weren't agreed upon initially.

a. List four sections that make up a software requirements specification.

2 marks

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b. Explain how this problem wouldn't have occurred if a software requirements specification was created initially.

4 marks

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c. Identify a law that pertains to *Frank's Foods* holding credit card details for their customers and explain specifically how it applies.

3 marks

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Question 8 (4 marks)

Recommend and justify different forms of user documentation for two types of users of the solution.

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Question 9 (3 marks)

   a. List one criteria that could be used to evaluate the effectiveness of the solution.

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   b. Describe a technique that you could use to evaluate how well the solution meets the criteria listed above.

<div align="right">2 marks</div>

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END OF QUESTION AND ANSWER BOOK

CASE STUDY INSERT FOR SECTION C
Please remove from during reading time.

Case Study

Frank's Food

Frank manages a small but thriving restaurant on Flinders Street in Melbourne's CBD called *Frank's Food*. It is open for lunch and dinner from Wednesday to Sunday and is generally very busy.

Despite being busy, Frank is finding that his profit margins are quite low. He has looked through his records and discovered that his biggest cost is paying his staff wages, particularly as he has to pay staff time and a half on Saturdays and double time on Sundays. He would like to have a solution created that allows customers to directly enter their orders via a mobile device that they will be given upon arrival.

Customers will be able to use the mobile device to first view the menu and then place their orders. The orders will be sent to a central computer and appear on a screen in the kitchen for the chefs to view and cook the requested meals.

Frank will not be able to do away with his staff altogether, as he still needs chefs to cook the food and waiters to serve the food. However, he figures that he will be able to have far fewer waiters, as instead of taking orders they will only be required to deliver food to tables.

Frank has also looked at placing an attachment on the mobile devices for each table that allows them to scan credit cards so that customers can pay via paywave. This will mean that he won't need anyone extra at the reception desk to take payments. The building already has a wireless network in place, so he figures that he will not have to purchase any additional infrastructure for this to be able to occur.

A sample use case diagram of the proposed system is on the following page.
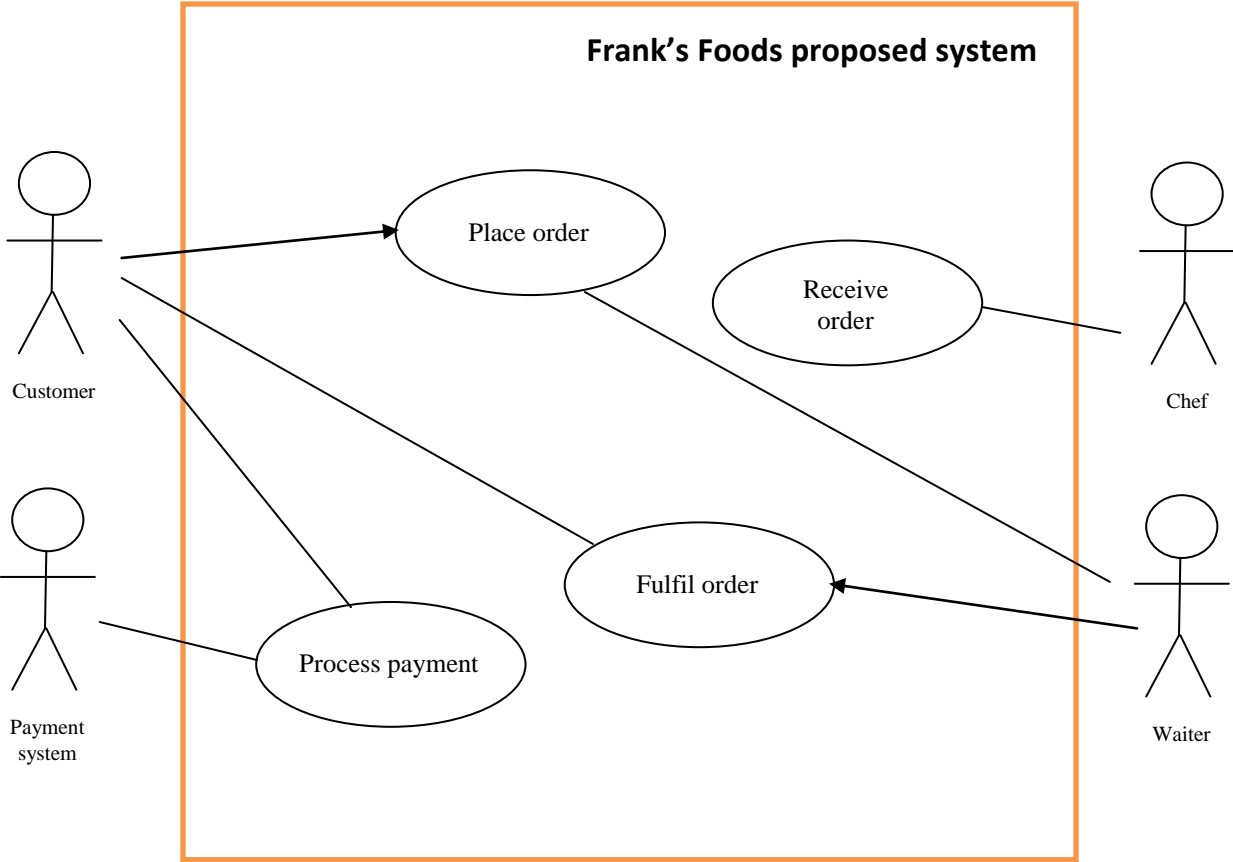
Frank has asked Ellen to review his current system and look at his proposal so that she can create a solution that would fulfill his needs.

END OF CASE STUDY INSERT FOR SECTION C