SOFTWARE DEVELOPMENT

Units 3 & 4 – Written examination

TSSM™
Creating VCE Success

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

SOLUTIONS

SECTION A: Multiple-choice questions (1 mark each)

Question 1

Answer: D

Explanation:
Validation checks for the reasonableness of data being input into a system. Analysis and Development are both stages of the problem solving methodology, not activities. The functional requirements are what the system is meant to do.

Question 2

Answer: B

Explanation:
In a UCD, a rectangle represents the system boundary and an ellipse represents a use case. An external entity is represented by a rectangle on a DFD, a use case is an ellipse and a process is a circle.

Question 3

Answer: C

Explanation:
Authenticity is a characteristic of data that has integrity, not a factor that influences the design of solutions.

Question 4

Answer: A

Explanation:
Option A refers to what is done during the design stage. The rest refer to activities conducted during the design stage.

Question 5

Answer: C

Explanation:
A stack operates on a last in first out (LIFO) format. This is evidenced by the fact that the numbers are read into the program in order and read back in the reverse order.

Question 6

Answer: D

Explanation:

An instruction is a single line of code used to accomplish a task.

Question 7

Answer: B

Explanation:
Robustness is the most important non-functional requirement, as it must still be able to operate with unexpected input. The children are young which means that this may happen a lot. Portability is not a concern as it only needs to operate on one type of operating system. Maintainability is not as important as updating the software is not mentioned, and reliability is not mentioned either.

Question 8

Answer: A

Explanation:
This is straight from the Study Design, p16-18. The benefits for the user is part of the scope of a solution, which also identifies what is within the boundaries of the solution and what is outside the boundary.

Question 9

Answer: D

Explanation:
Checking network log files will discover where the breach occurred, and will assist the IT technician on finding a way to fix it. The other options do not mention how to find out what has occurred during the security breach.

Question 10

Answer: A

Explanation:
The Spam Act 2003 states that all electronic commercial messages must have an option to unsubscribe from future communications.

Question 11

Answer: B

Explanation:
A linear search can work on any list, regardless of data type. It doesn't make a difference whether the list is preordered or not, however as it searches item by item a linear search gets very inefficient on longer lists.

Question 12

Answer: C

Explanation:
Actors should be labeled with the name of the role, not the person. It states that Lisa, the snack bar attendant is responsible for selling the popcorn and drinks, not Hugo.

Question 13

Answer: A

Explanation:
This is an <<extends>> as it is conditional upon the patron also purchasing a drink.

Question 14

Answer: A

Explanation:
Internal documentation is not visible to users of a solution, only programmers, so would be of no use to users of a new solution.

Question 15

Answer: D

Explanation:
250 save files per event x 2MB = 500MB per event

500MB x 180 events = 90,000MB

90,000/1,000 = 90GB

Question 16

Answer: B

Explanation:
This is a key knowledge dot point in the study design. Options A and C refer to project management and option D is part of analysis.

Question 17

Answer: C

Explanation:
Trojans often disguise themselves as useful, if not always legal software and videos, such as TV shows downloaded from internet peer to peer file sharing applications.

Question 18

Answer: A

Explanation:
This algorithm will loop through three times, as follows:

	Begin	**1**	**2**	**3**
A	24	12	6	3
B	1	2	4	8

It then displays B, A which is 8, 3.

Question 19

Answer: B

Explanation:
The algorithm starts in sequence with the assignment statements, and the test and end loop is a form of iteration.

Question 20

Answer: D

Explanation:
A statement is a line of code that modifies a variable's content.

Section B – Short answer

Question 1

Spyware and adware are both forms of malware that are installed on a workstation without the user's consent. However, adware will be obvious as it often displays popup ads for targeted marketing, whereas spyware will discreetly collect data on the user without their knowledge.

2 marks

Question 2

Accidental threats to data and information are done without malicious intent, for example a user accidently deleting a file they meant to keep. Deliberate threats are performed with intent, like a disgruntled employee stealing or deleting important files. Events-based threats include natural disasters, for example a server room flooding after a big storm.

4 marks

Question 3

A record groups together variables for a particular purpose, for example a single user's details. Records hold data for a single entity, but can contain multiple data types. A file is also used for storing data, however can store large amount of data that may be used at a later date.

2 marks

Question 4

   a. One data collection method would be to interview Frank. This would give Ellen a thorough understanding of what functionality they would like to see included in the system, and also allow for them to expand on their thoughts and follow up questions can be asked where required.

       Another data collection method would be to observe the chefs using the current system of receiving orders. This would give Ellen a look at how the chefs use the current system and where any inefficiencies are that may need to be addressed.

4 marks

   b. During analysis, the following will occur.
       Solution requirements: This involves determining what the solution needs to provide, and breaks the requirements into functional and non-functional requirements.

Solution constraints: A constraint is anything that will affect the nature of the solution. This includes time, cost, security and legal requirements, to name a few.
Scope of the solution: The scope defines what the boundaries of the solution are, including what it will do and what it won't do.

3 marks

c. Allow users to enter stock coming in
Allow users to remove completed chairs from the system
Transmit data back to the central computer

3 marks

Question 5

Backing up involves copying files from a workstation to a secondary storage device, such as an external portable hard drive. Archiving also involves copying files to a secondary storage device, but removes the files from their initial location in order to free up space.

2 marks

Section C – Case Study

Question 1

a. User expertise – The solution will be used by any customer that walks in to the restaurant, which will mean that the solution must be easy to use and not contain too much technical jargon.
Cost – Although not specifically mentioned, as a small business cost would be a major factor. This may impact on how much functionality they can afford to put into the solution.

2 marks

b. One non-functional requirement would be robustness. This relates to how well the solution will respond to poor use or input. As the users don't all have high level computer skills, the validation will have to be good to ensure that the solution still works, even when unexpected input is encountered.

Another non-functional requirement would be user-friendliness. The solution will need to be clear, intuitive and logical for the customers to be able to easily interact with it. This is important due to the customers not necessarily being highly skilled users.

4 marks

c. One stakeholder would be Frank. Frank clearly would like the solution in order to save his business money to have greater profits. His view would be in conflict with that of the waiters and waitresses who work for Frank, who are also stakeholders. Their view will be that the solution is not good at all, as it is taking their jobs away, or at best reducing the number of shifts they are offered.

4 marks

d. One constraint on using a mobile device is the battery life. This is because the restaurant may be open for long hours through lunch and dinner and the battery will need to operate for all of this time for the solution to operate.
Another constraint is the screen size. Many mobile devices have small screens and it may be hard for some users to view the menu items to make their selections.

2 marks

Question 2

    a. Designing involves using design tools, such as pseudocode, layout diagrams, object descriptions, data structure diagrams and IPO charts to design the appearance and functionality of a solution. It also involves creating a set of evaluation criteria that will be reported on after the solution has been in operation for a reasonable amount of time to check whether or not it has solved the original problem.

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

    b. A use case diagram is created during the analysis phase. It is used to show the functionality of a solution and the user interactions with the solution. A data flow diagram is also created during the analysis phase, however it is used to show the data flow to and from external entities, and how data is manipulated as it moves throughout an information system.

<div align="right">4 marks</div>

    c. Do the devices last a full day? (Effectiveness)
       Is the ordering process quicker than under the previous system? (Efficiency)

       Note: There are many evaluation criteria that students may use. They need to mention one criterion that measures efficiency and one that measures effectiveness for full marks.

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

Question 3

    a. An advantage for Frank is that he will not have to pay as many waiters and waitresses. An advantage for the customers is that they will not have to wait for a waiter or waitress to come to their table, but will be able to order when they are ready.

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

    b. Storage capacity – Will the device be able to store the orders locally in case of an order going missing?
       Input method – Some people may make mistakes ordering or not be able to work out how to enter data whether it be via a virtual keyboard, a stylus or a touch screen.

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

   c. The mobile device must:
Have wireless capabilities – The devices must be able to wirelessly transmit orders to the central computer so that they can be displayed to chefs.
Be able to connect to peripherals – The devices must be able to take payments via paywave, so the device needs to be able to connect to a peripheral that allows customers to pay and print a receipt for the customers.

<div align="right">4 marks</div>

Question 4

A textbox will allow for an infinite number of possible inputs. This is good if customers need to customise orders etc., however there will be a set number of tables, which will lead to limited inputs. A textbox will lead to poor and unexpected inputs, whereas you can set the options in a dropdown combo box when you are developing the solution. This leads to much better validation, as it ensures that the customer selects a reasonable table number and will be less likely to lead to errors in ordering.

<div align="right">4 marks</div>

Question 5

   a. tableOrders: string
      i: integer

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

   b. The output is:

        Pepper steak
        Chicken parmagiana
        Fettuccine carbonara

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

   c. The line of code is:

```
2.        i ← 1
```

<div align="right">1 mark</div>

d. The line of code should be:

```
2.          i ← 0
```

1 mark

Question 6

```
BEGIN

    Input orderTotal

        IF orderTotal >= 150.00 THEN

            orderTotal ← orderTotal * 0.85

        ELSE IF orderTotal > 100.00 THEN

            orderTotal ← orderTotal * 0.9

        END IF

    DISPLAY orderTotal

END
```

Mark allocation:

- Use of proper indentation (1 mark)
- Has the orderTotal input (1 mark)
- Use of selection (2 marks)
- Correct calculation of discounts (2 marks)

6 marks

Question 7

a. A software requirements specification includes an introduction, a description of the proposed solution, the specific requirements of the software solution and a description of the environment in which the solution will operate.

2 marks

    b. A software requirements specification (SRS) sets out and documents the analysis of an information problem. This includes functional and non-functional requirements, the scope and the constraints upon a solution. A SRS often forms the basis of a legal contract as it is agreed upon by both developer and client, and if this was done correctly at the start then it would have been clear what is expected to be included in the solution.

4 marks

    c. Frank owns a Victorian business in the private sector so is bound by the Privacy and Data Protection Act 2014. One of the national privacy principles is that Frank is required to secure customer data against loss, unauthorised access, unauthorised use or disclosure. The lack of security in the system is not conforming to this law.

3 marks

Question 8

The customers could have an on screen tutorial on how to place an order. This should have a link from the first screen that they are presented with and include step by step instructions on placing an order.

Frank may require a user manual. This will include all of the system's functionality so that any time he needs to interact with the solution he will be able to read up on how to do it.

Students may suggest other forms of documentation as long as it is suitable for the users.

4 marks

Question 9

    a. Are the orders produced by the solution more accurate than the orders taken by waiters?

1 mark

    b. To check this, Frank could look at the number of customer complaints about being served the wrong dish under the old system and then track the number of complaints about being served incorrectly using the new system over the same time period. He would then compare these numbers to see if the number of complaints have decreased.

2 marks

Total 100 marks