SOFTWARE DEVELOPMENT
Unit 3 & 4

TSSM™
Creating VCE Success

2021 Trial Examination

SOLUTIONS

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

Question 1

Answer: D

Explanation:
It is a document that contains the scope, constraint and requirements. It is the outcome of the analysis stage.

Question 2

Answer: D

Explanation:
num1 = "-20", num2 = "-40"

-20 x -40 = "800" The product of two negative numbers is a positive number.

Question 3

Answer: A

Explanation:
TCP/IP These two protocols allow devices to communicate over long distance networks. While the TCP part has to do with verifying the delivery of the packets, The IP has to do with moving of data packets between nodes

Question 4

Answer: B

Explanation:
The bubble sort is a simple comparison. If the first value is greater than the second, swap the elements. If not move to the next element. This process is repeated passing through each element in the array until there are no more swaps.

Question 5

Answer: D

Explanation:
There are three passes and 12 comparisons as it is a repetitive process until no more swaps are required.

Question 6

Answer: C

Explanation:
A firewall is a network security device that monitors incoming and outgoing traffic. Based on a defined set of rules it decides whether to allow or block specific traffic.

Question 7

Answer: C

Explanation:
The Health Records Act 2001 applies to both private and public sectors in Victoria. This law was created to provide guidance about the collection and handling of data.

Question 8

Answer: A

Explanation:
The fact that she requires more team members to assist in the completion of the system means that the budget is not enough.

Question 9

Answer: C

Explanation:
Interviews are ideal for in depth questions and clarification. This type of data collection would provide thorough data about the current system

Question 10

Answer: D

Explanation:
character is a single letter. It is not *Boolean* as this data type only holds true and false values. *Text* and *string* are the same data type and these contain more than one character.

Question 11

Answer: A

Explanation:
A record is a data structure used for the collection of variables of different data types related to a single element. In this case, each dancer has set of data.

Question 12

Answer: A

Explanation:
In the Snake case the words within the name are joined by an underscore. This makes it easier to read the variable, event, method and function names.

Question 13

Answer: B

Explanation:
Effectiveness refers to how well a software solution achieves its intended output. A and C refer to efficiency, while D is functional requirement.

Question 14

Answer: A

Explanation:
Option B refers to a data flow diagram (DFD), while option C refers to a context diagram (CD). Option D is a use case within the use case diagram (UCD).

Question 15

Answer: D

Explanation:
Options A and C refer to non-functional requirements while B is a legal constraint.

Question 16

Answer: C

Explanation:
Comparing the performance of the current system against the old system is a method to evaluate how *effective* the solution is. The other options relate to *efficiency*.

Question 17

Answer: B

Explanation:
A dropbox restricts the user's selection to only one mobile device.

Question 18

Answer: B

Explanation:
All the other options refer to testing the solution. B is the only criterion that can be considered in the evaluation stage.

Question 19

Answer: D

Explanation:
The purpose of the table is to run through an algorithm to simulate what a device would do if the software solution were to execute. The trace table shows how the variables change, what the conditions would resolve to, and what outputs would be displayed.

Question 20

Answer: C

Explanation:
A data dictionary is used to plan storage structure: variables, arrays and UI objects. It lists the variable name, type, size, scope and function. It may include format and example for the variable.

SECTION B: Short-answer questions

Question 1 (7 marks)

a. Linear search

1 mark

b. Seven (7) times, as it will check each element till found or end of array.

1 mark

c. It is simple. It involves checking every element in the array, from the start of the list. It uses a **FOR** loop which checks the first index value and compares it with the search input. If this returns false, the **FOR** loop will repeat until the value is found.

2 marks

d. Binary search.
If the elements of the array are sorted then it is much faster than the linear search. This search algorithm works on the principle of divide and conquer. It looks for a particular item by comparing the middle most item of the collection. If a match occurs, then the index of item is returned. If the middle item is greater than the item, then the item is searched in the sub-array to the left of the middle item. Otherwise, the item is searched for in the sub-array to the right of the middle item. This process continues until the element is found or there are not more elements left..

1 + 2 = 3 marks

Question 2 (4 marks)

Wireless network:

Mobility: The mobile users can roam around his office space without getting disconnected from the network.

Installation: It reduces cables, which are hard to setup at times and can pose a safety risk, as people could trip over them. It is quicker and easier to install than wired networks.

2 marks

Wired network:

Data transfer: higher data rate, which means faster transfer of information than wireless

Security: more secure than wireless unless someone breaks the connection to tap the signal.

2 marks

Question 3 (4 marks)

Technique 1
The spider diagram gives an overview of a central idea. The body of the spider is the main idea and the legs branch out to related ideas.

2 marks

Technique 2

Mind-mapping is used to generate and link ideas. The designer can add, link, organise and modify ideas.

2 marks

Question 4 (3 marks)

a. A mock-up is a sketch designed to show how the user interface will look like.

1 mark

The answers will vary. Sample answer:

- Colour scheme
- Position and relative size of controls

2 marks

Question 5 (2 marks)

Syntax errors refer to the grammar rules of a programming language which have not been followed, while logic errors refer to the expected output of an algorithm which does not match the actual output.

SECTION C – CASE STUDY

Question 1 (2 marks)

a. *Answers will vary.* These are two sample answers:
- To prevent unauthorised access to the house.

b. *Answers will vary.* These are two sample answers:
- To provide the high-quality service.
- To provide clients with quality services.

Question 2 (4 marks)

a. A survey is an efficient method to collect data. These can be given to many participants and can be processed quickly.

2 marks

b. Ismael will be able to see the technical features of the current security systems Yolande has been selling. He will also be able to see customers' complaints.

2 marks

Question 3 (6 marks)

a. The clients are retirees who travel and want to be able to monitor their homes.

1 mark

b. Requirements:
- Functional: Monitor the zones with security cameras.
- Non-Functional: User friendly, robust

2 marks

c. Constraints:
- Legal: Protect their clients' right to privacy as they will be holding details about them including home address.
- Usability: It has to be easy to use as these people are older and might not be comfortable using an app.

2 marks

d. Scope: an apps that will allow users to monitor their homes.

1 mark

Question 4 (5 marks)

a. Labels:
1. login
2. <<extend>>
3. <<include>>
4. retiree

1 + 1 + 1 +1 = 4 marks

b. Draw a box around the use cases (actors must be outside the boundary)

1 mark

Question 5 (4 marks)

a. The count-controlled loop can be described as a **FOR** loop. The program repeats the action, asking for a user name and password that matches to the database credentials, three times.

1 mark

b. **WHILE count < 3** to **END WHILE**

1 mark

c. Three times, since count starts from 0 (0, 1, 2 makes 3 iterations). 3 cannot be included as it is not *below* 3.

2 marks

Question 6 (6 marks)
Answers will vary. The recommendation must be justified.

The **Waterfall Model** is recommended for these clients as they know exactly what they want. It is a linear model and is easy to manage. This model is perfect for the scope of this project.

The **Agile Model** is suitable when there are frequent changes required during the development of the software. It is flexible and allows changes to be made at any stage. The project requirements can change frequently depending on the input from the client. The clients (retirees) know what they want from the security system, so this is not optimal.

Finally, the **Spiral Model** does not follow the sequential stages. It iterates through processes and eliminates of risk, thus requiring more time for development.

2 + 2 + 2 = 6 marks

Question 7 (4 marks)

a. Multifactor authentication involves the use of two or more pieces of evidence to prove that the user is who they say they are. It involves something you know, something you have and something you are e.g.: hardware/software tokens and biometric authentication.

b. Single factor authentication is no longer adequate in terms of online cyber security. It is weak and easier for hacker to access details, and there are numerous tools available to hack into passwords.

Question 8 (6 marks)

Answers will vary. They have to refer to the UI.

Clarity

The UI does not communicate the functions accordingly. The purpose of the UI is not clear and therefore is harder for the retirees to interact with.

Space

There are areas around and between the controls on the UI which is not cluttered. The title, text and on-off buttons have been distributed well. It is pleasant to look at.

Formatting

The size of the elements is proportional according to their importance within the UI. Numerous elements have been formatted:

- the centering of the title.
- the arrow with the text 'next'.
- the icons that represent **Home** and **Help**
- Exit at the top of the screen.

Question 9 (3 marks)

a. It is an XML file.

b. Features:
   - Design to store and transport data.
   - It does not have predefined tags.

Question 10 (4 marks)

a. Many apps are monetised with in-app advertising. Retirees would become frustrated at having their mobile app experience interrupted. This would not a positive association.

b. This is unethical as the app belongs to Ismael's company. They cannot just make a copy without consultation. Furthermore, they will submit a software solution that was not created by them.

Question 11 (4 marks)

Answers will vary.

Students can discuss two of the threats in the list or other reasonable options.

- Hacking
- Virus
- Phishing
- Mobile device loss
- Device malfunction

Question 12 (6 marks)

a. A risk management strategy refers to the steps put in place to provide a structured approach for identifying, assessing, and managing risk. This will assist in minimising security breaches.

b. Two risks
   - A software security audit may be conducted, carried out by someone outside the developer team or by the developer team itself. The software audit may use analysis tools to gather data on the security of the software or its functionality.
   - Risk tolerance is determined by balancing the expense in terms of financial resources and usability of information assets against financial liability, loss of information assets and reputational damage if the risk is exploited.

c. HTTPS (Hypertext Transfer Protocol Secure) is a secure version of the HTTP protocol that uses the *Secure Sockets Layer/Transport Level Security* (SSL/TLS) protocol to encrypt data sent between devices. Nowadays, it is the standard protocol.

Question 13 (6 marks)

a. Evaluation method:
   - This should take place between 6 and 12 months.
   - The data collection method could be a questionnaire in an email.
   - The retirees would complete the questionnaire.
   - The questions would relate to the questions created in the design stage.

b. Criteria:
   - Efficiency: Are the modified settings for cameras processed quickly?
   - Effectiveness: Is the user interface attractive?