SOFTWARE DEVELOPMENT
Written examination

TSSM™
Creating VCE Success

2020 - 202**4** Trial Examination

SOLUTIONS

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

Question 1

Answer: D

Explanation:
Spyware is the only answer mentioned that is designed in this way. Although it could come as a Trojan (C) it is the spyware that discreetly collects details about a user.

Question 2

Answer: A

Explanation:
A stick figure in a UCD represents an actor. A process is an ellipse, the system boundary is a rectangle and an external entity is used in DFDs, not UCDs.

Question 3

Answer: C

Explanation:
Creating user documentation is a part of the development stage of the PSM. This is straight from the study design.

Question 4

Answer: B

Explanation:
Processing rate is the only option not listed as a non-functional requirement in the study design. All of the others, response rate (A), user-friendliness (C) and reliability (D) are all recognized non-functional requirements.

Question 5

Answer: B

Explanation:
Both types of diagrams can contain multiple entities (A), neither can have data store to data store communication (and context diagrams cannot include data stores) (C) and entity to entity communication (D) is not allowed in either. A context diagram can only contain one process (that represents the whole system) and a DFD can contain multiple processes.

Question 6

Answer: C

Explanation:
An IF statement is an example of selection.

Question 7

Answer: D

Explanation:
A data dictionary usually contains elements such as the variable name, type, size, scope and a description. A data structure diagram (A) represents the relationships between entities, object descriptions (B) assist with the planning of the structure and content of objects and pseudocode (C) is used for writing algorithms in structured English.

Question 8

Answer: A

Explanation:
The variable "result" is set to 'fail'. This is a sequence of characters, which is known as a string (A). It isn't a single character so (B) is out, a Boolean (C) can only be set to true/false and an integer (D) refers to a whole number.

Question 9

Answer: C

Explanation:
User's details have been given to a third party organisation without the client's consent, which is against the law according to The Privacy Act 1988.

Question 10

Answer: D

Explanation:
Looking at whether the correct results are produced (D) is the only effectiveness measure listed. Ease of use (C) and measurements of the time taken (B) and (A) relate to efficiency.

Question 11

Answer: B

Explanation:
If a section of code accepts parameters, manipulates them and returns a value, it is known as a function (B).

Question 12

Answer: C

Explanation:
(A) is true as it assists future programmers to understand the code, (B) is correct as it makes code quicker to scan for what it's doing and (D) is correct as it assists with debugging. (C) is not true as a compiler does not read internal documentation.

Question 13

Answer: A

Explanation:
The first time through the loop x becomes 6 and y becomes 4. At this stage x is still greater than y, so the loop is executed again. This rules out (B) and (D). In the second iteration, x is halved to 3 and 1 is added to y making it 5. Now that y is greater than x, the loop exits. As it then displays y followed by x, the solution is (A).

Question 14

Answer: B

Explanation:
Repeat…. Until is an example of iteration.

Question 15

Answer: D

Explanation:
Line two of the pseudocode (x ← 12) is an assignment statement (D).

Question 16

Answer: A

Explanation:
As different data types would be used for this data structure, it cannot be an array which rules out (C) and (D). Selection (B) is a control structure, not a data structure which leaves a record, which allows for multiple data types.

Question 17

Answer: C

Explanation:
As this question refers to an actor, which is a role, (B) and (D) are out as they are people's names. Although the appointment is with the doctor (A) the case study clearly states that the booking is made via the receptionist (C).

Question 18

Answer: D

Explanation:
Stick figures are actors, entities (A) are part of DFDs, processes (C) (otherwise known as use cases) (D) are ellipses.

Question 19

Answer: D

Explanation:
A customer will be quite affected by the security of the transaction (A) and the speed of processing transactions (C). They will also be affected by the consistent placement of navigation (B) as otherwise they may not be able to use the site at all. The cost of developing the site (D) is the only option that will not have an effect on the customer.

Question 20

Answer: B

Explanation:
A packet tracer is a simulator, so doesn't actually check the network for unwanted packets (A), malware (C) or for unauthorized access (D). It does simulate packet flow (B).

SECTION B – Short answer

Question 1

Two common searching techniques are a linear search and a binary search. A linear search starts with the first element within a list and continues on sequentially until it finds the value it's searching for. A binary search works only on sorted lists as it picks a value in the middle, and if the value it's picked is lower than the value it's searching for then it discards the lower half of the list. If it's higher, it discards the upper half of the list. It continues on with this "divide and conquer" method until it finds the value that is being searched for. This list is unsorted, so a binary search would be unsuitable. You would have to use a linear search.

4 marks

Question 2

   a. Development

1 mark

   b. Julio would need values that test the boundary, so the numbers 15, 16 and 17 would do. He would also need to test whether it only accepts the correct data type so could type "fifteen" instead of the integer. Lastly Julio should try to run the program without entering any value to see whether an existence check is working.

4 marks

   c.
```
INPUT length
required ← 16
qualified = FALSE

IF length >= required THEN
    qualified ← TRUE
    DISPLAY "Congratulations! You have qualified"
ELSE
    DISPLAY "Better luck next time"
END IF
```

Marks are allocated here for initializing the variables correctly (2), using a selection statement with the correct equation (2) and displaying the appropriate message in each section (2).

6 marks

Question 3

   a. The Health Records Act 2001

1 mark

   b. When archiving records, it involves moving them from your main hard drive to backup media, then deleting them from the original location in order to free up space. The backup media should then be stored in a safe place, preferably offsite or at least in a fireproof safe or the cloud. Proper deletion involves using wiping software to permanently delete the records so that they cannot be recovered in the future. Melissa should ring up patients who haven't been to see the doctor in a certain timeframe (for example, the past 12 months) and ask if they would like their records kept on file or not. If they do, then she can archive them and if they don't then she can delete them.

4 marks

SECTION C – Case Study

Question 1

Mistake 1: Use cases are rectangular.

Correction: Change the shapes around the use cases to ellipses.

Mistake 2: One of the actors is labelled "Julie".

Correction: Actors are roles, not people. This should be "Manager".

Mistake 3: The <<extends>> arrow points the wrong way.

Correction: Point the arrow back to the base case. An <<includes>> would point from the base case, but an <<extends>> must point in the other direction.

6 marks

Question 2

Data collection method 1: Interview Julie. *Programmability* needs as much data on what the system will be required to do, and what functions Julie and her staff will need to use it for. An interview will allow for instantaneous, qualitative feedback.

Data collection method 2: Survey to parents. Parents will be the ones who have used the old system and will now be using the app to book their toys. A survey will reach a far greater audience and take much less time for this large group.

Data collection method 3: Interview Mark. Mark has setup the database and knows how it functions and may be able to offer some insight into what data needs to be retrieved from the database and used by the app. Once again as Mark is only one person and can offer a great deal of information, an interview would be the most appropriate form.

6 marks

Question 3

Julie is breaching the Privacy Act 1988.

In using Medicare numbers, Julie is using a unique identifier for an individual that is used for another purpose. Julie is not allowed to use a unique identifier for a person that has been given to them by another organisation as it could be used to create a profile of the person for identity theft.

Julie is also gathering data on parents that were collected by another organisation. Data collected must not be disclosed by an organisation without the consent of the individual.

4 marks

Question 4

    a. Create a booking
        Calculate overdue fee

2 marks

    b. The app should be reliable, particularly when it is first launched. If an app isn't reliable the users (particularly non-tech savvy parents) may become disillusioned and revert to using the old system again. This would mean that the app would be a failure, as it wouldn't be considered useful.

3 marks

Question 5

    a. Device 1 has wi-fi and 3G, which is a positive as it allows for connectivity almost anywhere. It does weigh the most out of any of the devices listed though, so this may affect its portability.

        Device 2 has the longest battery life out of the three devices; however, it has the slowest processor.

        Device 3 has the most RAM - 4GB, however does not have a camera equipped.

6 marks

b. I would recommend device 1. Although slightly heavier than the other devices, it does have both a front and rear-facing camera, allowing for taking pictures of the toys as they are entered in and is also 3G enabled, so staff can use it even outside of the library.

2 marks

Question 6

a.

Variable	Data type
toyRequired	String
toyAvailable	Boolean
toyNum	Integer

3 marks

b. The iteration sequence always executes until the end of the file, meaning that toyNum is always going to correspond to the final toy in the file. This can be fixed by changing line 11 to:

        UNTIL toyFound = **TRUE OR End of File**

3 marks

Question 7

a.

returnDate	Expected feesOwing	Actual feesOwing	Reason for selecting test data
29/06/2016	0	0	This value tests if a parent has returned the toy before the due date.
30/06/2016	0	0	This value tests if a parent has returned the toy on the due date.
01/07/2016	$0.50	-$0.50	This tests if a parent has returned the toy a day late.
NULL	0	0	This checks to see what happens if a toy has not yet been returned.

8 marks

b. The error is at line 7. It is taking the return date off the due date to calculate how many days late the toy was returned, not the other way around.

2 marks

c. `daysOverdue = returnDate - dueDate`

1 mark

d. A function is similar to a procedure, however returns a value to the code that called it. An event is triggered by a user's interaction with an object, not called by another part of the code.

2 marks

Question 8

User	Documentation	Justification
Library staff	User manual	A user manual is a comprehensive description of how to fully interact with the app. This is used as staff will possibly need to be able to use the app for multiple purposes.
Network technicians	Technical manual	A technical manual uses more jargon and includes how to manage the backend of the app. The network technician needs to be able to interact with the backend.
Parents	Quick start guide	Parents want to be able to easily download and interact with the app. They just want to cover the basics of things like booking a toy or checking availability.

6 marks

Question 9

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. If this was done correctly at the start then it would have been clear what is expected to be included in the solution.

3 marks

Question 10

    a. The purpose of user acceptance testing is to ensure that the software solution works and performs the functions that the user expects from it.

1 mark

b. To see whether the app is easy to use the toy library staff could select a group of parents who have yet to install it. They could then be asked to install it and book a toy and report back on whether they were able to install the app, book a toy and even check the availability of the toy without referring to the user manual or requesting assistance.

2 marks