

SOFTWARE DEVELOPMENT

Units 3 & 4 – Written examination



(TSSM's 2017 trial exam updated for the current study design)

SOLUTIONS

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

Question 1

Answer: A

Explanation:

She requires a simple interface and functionality, as she is not confident with the use of technology. Response rate is important, as it must count each step accurately to calculate the number of calories burnt and kilometres walked/jogged.

Question 2

Answer: D

Explanation:

Number of steps are whole numbers. While calories and km could be decimal values.

Question 3

Answer: A

Explanation:

Popular languages start indexing an array from 0 while the last index is the array length minus 1. While this is usual to most developers, not all programming languages follow this convention. In Fortran the array index starts at one. However, the array index should start at zero because it relates to computer science concepts and it has a strong relation to language design. Most programming languages have been designed this way, so indexing from 0 is pretty much inherent to the language.

Question 4

Answer: A

Explanation:

Option B is floating point data type while options C and D are string data type.

Question 5

Answer: A

Explanation:

Power failure is external to the organisation and is beyond the immediate control or influence of security planning to prevent and hence is classified as an event-based threat.

Question 6

Answer: A

Explanation:

This is the aim of the analysis phase. Options B and C are isolated parts of this stage. Analysis must be the first stage to fully understand the current information system.

Question 7

Answer: B

Explanation:

Option A has a selection and iteration structure. Option C is a sequence and option D is repetition and selection.

Question 8

Answer: C

Explanation:

Stacks are described using the analogy of a stack of plates or a stack of books. For an item to enter the stack, it needs to be 'pushed' and to remove an item it needs to be 'popped'.

Question 9

Answer: D

Explanation:

'For Count, Next Count' indicates the presence of repetition while *Action 1* and *Action 2* shows a sequence of steps.

Question 10

Answer: B

Explanation:

'n' is the number of array elements being sorted. It is the number of passes less the total number of array elements. This applies for both passes and swaps. The number of array elements minus one.

Question 11

Answer: B

Explanation:

Total number of array elements minus 1. This set contains 8 elements.

n-1 swaps

8-1 = 7 passes

Question 12

Answer: A

Explanation:

The analysis stage must consider the whole information system to produce a detailed SRS

Question 13

Answer: A

Explanation:

If a section of code accepts parameters, manipulates them and returns a value it is known as a function.

Question 14

Answer: D

Explanation:

It is a program that processes source code and turns it into machine language that a computer's processor uses.

Question 15

Answer: B

Explanation:

DFS's are drawn to levels, where each level gives more information depicting detailed processes and flow of data from entities to/from data stores. Context Diagrams have the least number of processes shown and hence is often class the level 0 DFD.

Question 16

Answer: B

Explanation:

Option A, C and D refer to effectiveness measures of the solution.

Question 17

Answer: D

Explanation:

When developer and client have agreed on the design of a new solution but later the client decides to add extra features to the program while it is in the development stage. This delays the whole process as the design stage would have to be revisited.

Question 18

Answer: A

Explanation:

This constrain would be identified in the analysis stage. Therefore, during the design process, the developer will need to consider the staff members' skills as some of the teachers have limited skills.

Question 19

Answer: B

Explanation:

An SRS contains four sections:

- An introduction
- A description of the proposed software solution, which contains the constraints
- Specific requirement of the software solution
- A description of the environment within which the solution will operate

Question 20

Answer: C

Explanation:

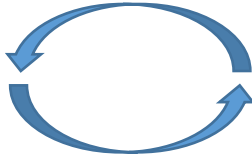
There a finite number of steps to follow to achieve a solution. In this case, it will be the product of an even and odd number.

SECTION B: Short-answer questions

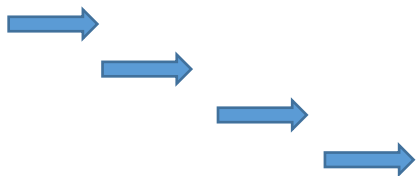
Question 1 (4 marks)

a. Sample answer. Students may provide a different graphic to demonstrate the difference.

Agile model



Linear model



2 marks

b. Models:

In the agile model, the developer will only move to the next stage if the previous one has been completed to a satisfactory standard. This may involve the client's feedback which could also include revisiting previous stages. On the other hand, the waterfall model follows a specific order from stage one to stage four. It does not revisit previous stages.

2 marks

Question 2

a. It is a technique used to minimise the entry of inaccurate data. It is a check to ensure that the data entered is reasonable.

b. It is existence check. The asterisk denotes required field (compulsory). The red text reinforces the fact that the user has not entered data and therefore they have to fill it in.

c. Type Check

d. Validation techniques are used to minimize user input errors while testing is checking that the solution is free from errors.

4 x 1 = 4 marks

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Question 3

- a. Iteration 1 mark
- b. 8 times 1 mark
- c. The first value is 2 and the last one is 8 2 marks

Question 4 (6 marks)

Students may discuss any of these features such as

- Self-modification:
Some viruses have the ability to change their identity, look and feel.
- Self-Encryption
Viruses encrypt themselves to avoid signature detection.
- Polymorphic virus
These viruses contain what is known as a polymorphic or mutating engine. This engine functions like a unique re-coding agent that modifies the virus on every infection or when certain criteria are met.
- Metamorphic viruses
A metamorphic virus rewrites itself each time it infects a new device or if it fits some defined criteria.

SECTION C: Case Study

Question 1 (6 marks)

Collection Method	Justification
Interview	Interview Nicole to obtain qualitative data on the deficiencies of the current system and clarify functional and non-functional requirements of the solution
Survey	To gather data from staff members and clients and ask them about satisfaction levels i.e. the efficiency and effectiveness of the booking process. This can be in a multiple choice or scaled responses format.
Observation	To see how the assistant operates the system and interactions that take place. Matt can take notes about his observations.

3 x 2 = 6 marks

Question 2 (15 marks)

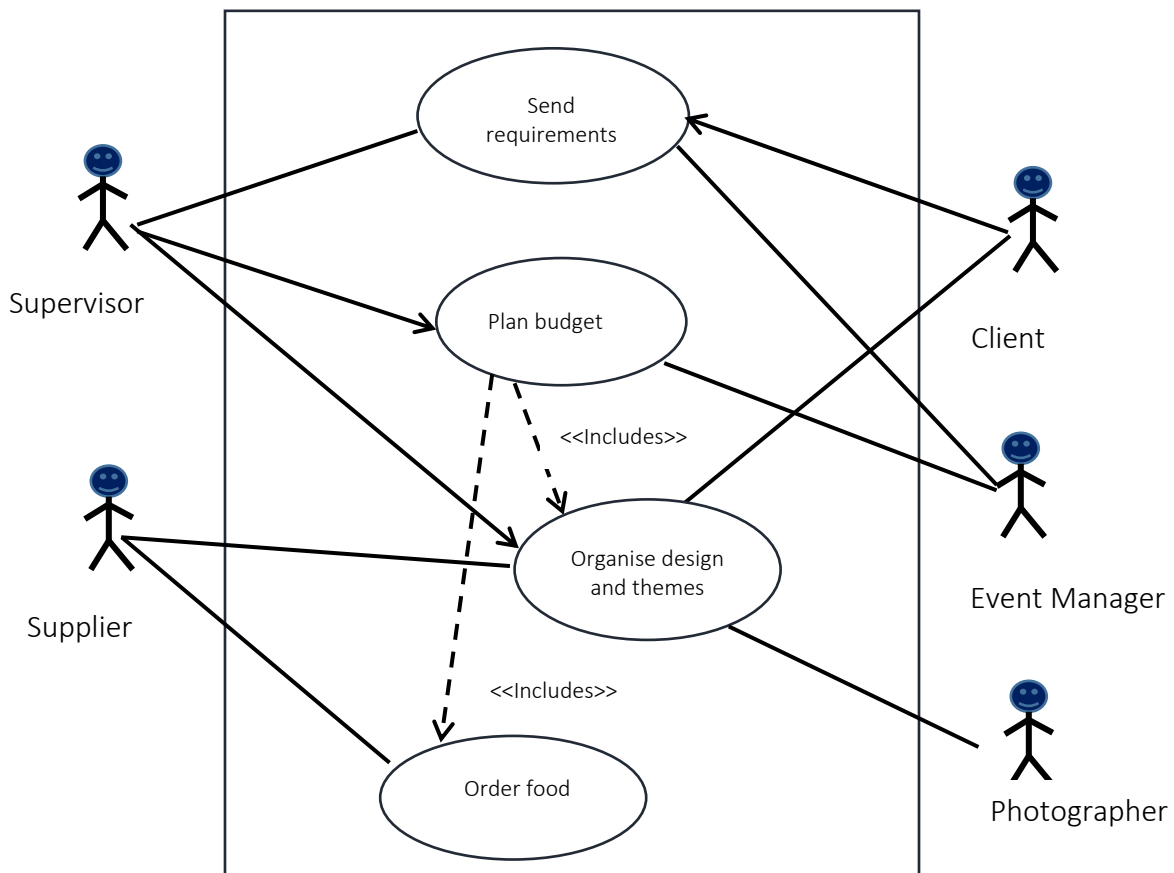
- Five actors
- Four use cases
- Two <<includes>>
- Four associations

5 x 1 = 5 marks

4 x 1 = 4 marks

2 marks

4 marks



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Question 3 (15 marks)

- a. The use of a combo box to select the event, the use of a calendar to select the date, the use of radio buttons to estimate number of guests. This is a quick method to enter data 2 marks
- b. The use of standard icons for the login and entry data screen. This makes it clear to use. 2 marks
- c. Improvements: The use of labels to aid the use of icons to enter data as some users may not be quite familiar with technology icons. 2 marks
- d. The design should contain:
- Heading
 - Event type
 - Event date
 - number of people

Each object should have annotations indicating the purpose of each object on the screen 5 marks

- e. Answers may vary. Sample Criteria
Efficiency:

- Are clients able to complete a booking quickly?
- Can the client move from one screen to the other quickly?
- Are steps within the booking form easy to follow?
- Do staff have more time to prepare for the event rather than handling bookings?

Effectiveness:

- Is the information produced complete or does the user need to access more information to complete a task?
- Is the output easy to read?
- Is the UI design appealing?
- Is the solution output accurate?
- Are features of the UI easy to find?
- Is the output produced in a timely manner?
- Is the output relevant to the task?
- Is the information produced easy to interpret?

4 marks

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Question 4 (4 marks)

- Usability
- Reliability
- Robustness
- Maintainability

Students may select two of them. The discussion must be in reference to the case study.

Question 5 (2 marks)

Students may identify other advantages. These are sample answers.

- XML lets you separate form (appearance) from content.
- Stores and transports data between different types of software.

Question 6 (2 marks)

To provide a professional event organising and delivery service.

Question 7

Agile Model

As Matt will be working on-site, it will be easy for him to deliver each module after getting feedback from Nicole. He can implement changes on the go to meet the need of the business.

Question 8 (10 marks)

Usability testing will be undertaken with real users to ascertain how easy the software solution is to use. (2 marks)

Steps: (1 mark for each step)

1. Approach a user to conduct the usability testing.
2. Explain the use of the equipment and functionality of the software.
3. Introduce each module of the solution in detail to the user, emphasizing what the software solution is meant to do.
4. Let the user, use the system.
5. Matt should document any ambiguity or confusion the user is facing.
6. Matt should have pre-prepared questions that he could ask the user to gain better understanding of the ease of use of the system.
7. At the completion of the task, Matt should thank the user for their time and invite any extra comments or observations about the system.
8. Matt may now implement changes to the required modules of the solution to enhance the use of the software solution before delivering it to Nicole.

Question 9 (4 marks)

While backing up, all your copies should be stored in different locations. If the primary copy and the backup copy are both stored on the same drive there is a possibility that both copies will be lost. Cloud storage is now considered a different storage location that is off-site and hence will always be available if the physical drives on-site crash or fail. Hence, it is safest to have at least one copy of the data backed up to the cloud to make sure the data is available at all times.