

SOLUTIONS and TEACHER NOTES
SECTION A – Multiple choice questions

Question 1

In designing a new software product, a company was able to cut the time it took to compile a sales brochure. This could best be described as an improvement in:

- A. Wages
- B. Cost
- C. Efficiency
- D. Effectiveness

Measures of time, cost or effort are always efficiency. Effectiveness relates to correctness of the information or how well as solution works. Make yourself familiar with the glossary definitions of these terms in the Study Design.

Question 2

‘City Tech aims to provide up time of 99.5%’ is a statement that could be best described as:

- A. An organisational goal
- B. A mission statement
- C. A banner heading for the web-site
- D. An information system objective

While goals and objectives of information systems are not a big focus of this study, they are mentioned in the Study Design, so make sure you are familiar with the definitions.

Question 3

Which of the following is **not** a benefit that writing an algorithm provides?

- A. Find errors in logic
- B. Easier to divide a program up amongst a team for coding
- C. Test the user interface
- D. Make the code as efficient as possible

Question 4

The network device shown at position A in the diagram is most likely a:

- A. Router
- B. Switch
- C. Hub
- D. Firewall

Question 5

The scanner shown at position B is poorly placed as:

- A. Will not work in this position.
- B. It will only be able to be used when the computer it is connected to is on.
- C. It should be connected to the server.
- D. Other users will not be able to locate it.

Question 6

The printer shown has an IP address of 192.168.1.112. The IP address of the gateway is most likely to be:

- A. 1.0.0.1
- B. 192.168.0.1
- C. 192.1.1.1
- D. 192.168.1.1

Response B is close, but 192.168.0 is a different subnet to 192.168.1. The most likely scenario is that the gateway will be on the same subnet as the printer which is 192.168.1.x

Question 7

An interface that is 'forgiving' is one that:

- A. Works reliably all of the time
- B. Is easy to understand
- C. Allows the user to undo transactions
- D. Works on a variety of platforms

Question 8

The presence of the logic error would most likely mean that:

- A. The program would not run at all
- B. The program would run for a time and then crash
- C. The program would not compile
- D. The program would most likely give incorrect results in response to supplied input

Question 9

The validation technique known as existence checking is when the code:

- A. Checks to see that a value is within a specified range
- B. Prompts the user to click 'next'
- C. Checks to see that a value has been entered
- D. Checks to see that a value is of the correct type

Question 10

The data structure Length[Index] is most likely to be:

- A. A one-dimensional array
- B. A two-dimensional array
- C. A reference to a hash table
- D. An integer

Question 11

The first number that the algorithm will display is:

- A. -1
- B. 6
- C. 562
- D. 104

Question 12

After reading the last line of the data set, the algorithm does not finish as it should. This is because:

- A. Height[Index] will equal 88 and not -1
- B. Index will not equal -1
- C. Height[Index] will equal -1
- D. TSA will be greater than 0

Question 13

Which of the following could not be used to gather data from potential users of an App that is being developed regarding their requirements?

- A. An online survey
- B. A focus group
- C. Observation**
- D. Interviews

Observation is usually done to see how users interact with an existing software solution. In this case, the App is yet to be developed and data is sought on the requirements of users, so observation will not achieve this.

Question 14

An element of a DFD which transforms the data coming into it is known as a:

- A. Data flow
- B. Data store
- C. Process**
- D. Entity

Question 15

True/False choices in a questionnaire would best be stored in which data type?

- A. Integer
- B. Character
- C. String
- D. Boolean**

Key word is 'best'. A true/false response could be stored in any of these types but a boolean would be the most efficient.

Question 16

Which of the following could be legal?

- A. A company sells the details of its clients to a marketing firm without permission
- B. A company requests medical information from customers**
- C. Trying to guess someone's password so that you can access their social media accounts
- D. Inspecting the code of a competitor's software product so that it can be used in your own

Option B could be legal if the company has a legitimate reason for requesting medical information.

Question 17

A set of test data that would test the boundaries of an age range that can be from 18 to 80 years old, would be?

- A. 17, 18, 80, 81**
- B. 18, 80
- C. 18, 19, 79, 80
- D. 16, 17, 19, 78, 79, 81

18 and 80 are valid, so the test data needs to include these values as well as ones just outside these.

Question 18

Data that is collected that is descriptive in nature can be categorised as:

- A. Associative
- B. Quantitative
- C. Qualitative
- D. Strings

Question 19

The use of a naming convention such as the Hungarian Convention ensures:

- A. Variable names will be kept to the smallest size possible
- B. Consistency of the naming of program elements
- C. Code will be easy to read for other programmers
- D. Descriptive names will not be used

Technically, Hungarian Convention ensures consistency of the naming of program elements. Whether they will make any sense to other programmers is another question!

Question 20

Which of the following should not be used as an actor in a Use Case diagram?

- A. Maxwell Smith
- B. System Administrator
- C. Accounting Department
- D. Time sheet software

Actors in Use Case diagrams represent roles, organisations or systems but should not represent individuals. The reason for this is that individuals change roles or come and go from the organisation.

SECTION B – Short-answer questions**Question 1**

development

1 mark

Question 2

a. At the completion of each phase in an agile development, the client is consulted and changes made, which may result in phases being revisited. The client is able to check and make adjustments while the development is occurring which results in a better product being created.

1 mark

b. An agile development can result in a project taking a lot longer than planned with phases being revisited. It can be prevented with a strong project management plan in place that caps the amount of time that is spent at each stage and prevents scope creep.

2 marks

Question 3

- a. A point in time at which an event in the project (completion of stage or whole of the project) needs to be completed to a specific point or an event occurs. 1 mark
- b.
1. Ensure that tasks have enough time built in to allow them to be completed allowing for delays.
 2. Allocate enough resources to critical tasks so that they can be completed on time.
- 2 marks

Question 4

- a. 0 1 mark
- b. Value 1: 11, Value 2: 7 2 marks

Question 5

- a. It maps a value to an index based on a rule. 1 mark
- b. It is quicker to locate values or determine if they are present. 1 mark

Question 6

- d. 'up': 0, 'down': 9 2 marks

e.

Index	0	1	2	3	4	5	6	7	8	9
Value	14	16	5	2	1	12	25	26	32	34

1 mark

- f. 'pivot': 25 1 mark

A variation of this question could have the sort already mid way through and ask you to perform a few comparisons or a complete pass from that point.

Question 7

Logical measures

- Usernames and passwords so that only those that are authorised can gain access to the information system.
- Levels of access which only allow those with the correct clearance in an organisation to access important / critical files.

Physical measures

- Security cameras which monitor critical areas such as the server room.
- Swipe cards on doors so that only those with clearance can gain physical access to certain areas.

4 marks

Other possible answers include the use of logs / audit trails and biometric devices such as fingerprint scanners / locks.

END OF SECTION B**SECTION C – Case Study****Question 1**

Requirements of the software solution	Description
Functional	1. Order food and drinks from the supplied menus 2. Display and order with local menus using the Ooba Eats API 3. Correctly link the order to the client's account 4. Locate the destination of the order correctly using the QR codes.

4 marks

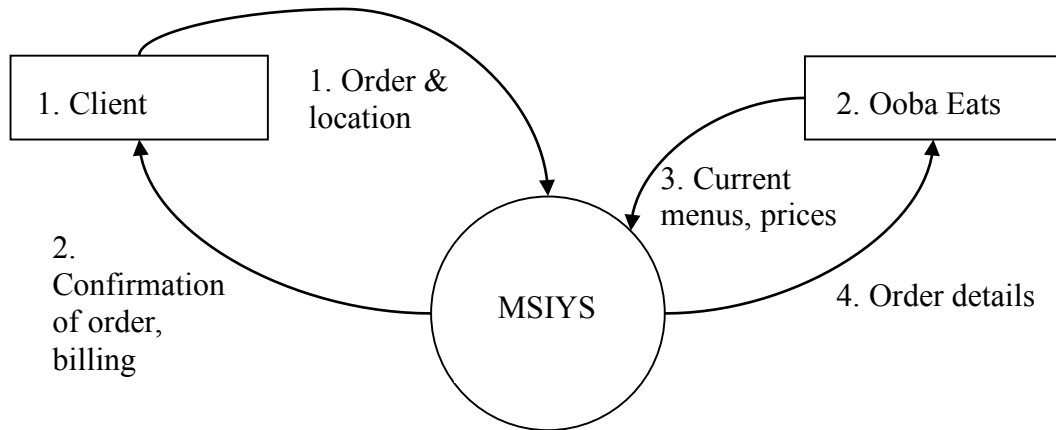
Question 2

- | | | |
|--|-------|------------|
| • No technical staff on site | Scope | Constraint |
| • Place orders with (effectively) zero wait time _____ | Scope | Constraint |
| • App to work with iOS, Android and Windows | Scope | Constraint |
| • Orders to be tracked with feedback to the user _____ | Scope | Constraint |
| • App to include accessibility features _____ | Scope | Constraint |
| • \$5,000 budget to develop the App _____ | Scope | Constraint |

6 marks

Constraints are things that need to be taken into account that may limit what the software solution will be able to do or need to be built into it as a specific requirement. Cost, compatibility of equipment and the operating environment are common constraints on solutions. Scope describes what the solution will (or won't) do.

Question 3



6 marks

Question 4

a.

1: If anyone in the business can place food orders, there may be duplication or orders placed that have not been approved by the owner of the business.

2: A mobile phone could be used to quickly order food to a vacant location in the office area (by scanning a QR code) and billed to a company, by someone else.

2 marks

b.

The App could have a number of senior people registered that will receive a notification of a pending order (via SMS, email, or via the App). That person then needs to approve the order before it will proceed.

2 marks

Question 5

1: a person with a swipe card could let their friends (who are non-members) enter the space and use the facilities for free.

2: Staff who work in the office (such as café staff, cleaning staff, etc) would be able to use the Internet connection for free.

3: The signal may be strong enough for people outside or on different floors to access, if they know the password.

Proposal: Users could be granted access via a secure authentication server that checks to see that they are a registered employee of a currently subscribed client.

4 marks

Question 6

1: The client cannot see any details about the dishes being ordered, such as price or description.

2: The interface is not intuitive. The heading 'MSIYS Eats' takes up too much screen real estate.

2 marks

Question 7

a. Data associated with each menu item is kept together. A collection of 1D arrays could easily become out of sync (that is – index 100 in one array may not match the data at index 100 in another array).

1 mark

b.

Variable Name	Type	Justification
msiys-breakfast(1).name	String	Name of the dish – multiple word description.
msiys-breakfast(1).price	String	Price includes a \$ sign and a . point, so must be a string.
msiys-lunch(5).description	String	Description of the dish – several words (or a sentence or two).
msiys-dinner(10).id	Integer	Id is composed of a whole number.

8 marks

Question 8

a.

Error: The index variable is not reset to 0 each time a new while loop is started.

Correction: Before each while loop, insert the line 'index $\leftarrow$ 0'.

2 marks

b.

Instead of adding \$0.10 to each menu item, add up the total number of menu items that have been ordered, and multiply this by \$0.10. If the total is greater than \$0.50, set the surcharge variable to \$0.50.

2 marks

c.

If surcharge $>$ 0.50 then surcharge $\leftarrow$ 0.50

1 mark

Question 9

a.

For this feature to be included in the App, it is necessary to ask the permission of users under the Privacy Act 1988. The App would need to be designed so that if users 'opted out', the App will still work normally. Collecting the data without the permission of individual users would be illegal.

b.

On install, the App could inform users that this was a 'feature' that was included and ask their permission to install it or whether they wanted to 'opt out'. It would also be a good idea to include this as an option in the App's settings so that users who changed their mind would not have to uninstall and reinstall the App to change the setting.

2 marks

Question 10

- a. A thin client application has the bulk of its data stored on a server whereas a rich client application stores most of its data on the device.
- 2 marks
- b. As every client would be accessing the menus (some on a daily basis), it would be preferable to have these stored centrally rather than have each App download the data separately. If clients were using their mobile Internet connections, the amount of data downloaded would potentially have an impact on their monthly data allowances.
- 2 marks

To be fair, the amount of data would not be great and mobile plans are generally quite generous with data, but having the data in a central place makes much more sense in this scenario.

Question 11

By including this line, it appears that Kelly is promoting her own work instead of that of OHOOM Technologies. Given that she works for OHOOM Technologies, her work product belongs to them and not to her. Phillip is also not getting the whole product that he has contracted OHOOM Technologies to produce, but as the omission is in the internal documentation, he may not be aware of this until changes need to be made to the App. When this occurs, it puts him in the position of having to contact OHOOM Technologies again or, if OHOOM is no longer in existence, paying a lot of money for a new programmer to effectively start from scratch.

2 marks

Question 12

1: OHOOM may not have the opportunity to ensure that all of the requirements outlined in the SRS have been addressed.

2: OHOOM may not have the opportunity to test compatibility with different devices and how the App performs in terms of robustness and stability.

2 marks

Question 13

Type of threat	Possible threat to data	How the loss could be prevented
Accidental	Phillip deletes the data off the server.	Maintain frequent backups of the server data that are stored in an off-site location or the cloud.
Event-based	Fire in the building destroys the server.	Maintain backups in the cloud.
Deliberate	The system is hacked from outside.	Ensure that firewalls, virus checkers and security protocols are in place. The database could also be encrypted.

6 marks

Many other threats could be mentioned here. Examiners will have a list of valid responses from which they will check your response. While this does mean that there are several ways in which you can achieve full marks in the question, you should always put down the most obvious answers first to make sure your response is on the examiner's list.

Question 14

1: Include a facility inside the App that logs all of the transactions, including aspects such as order frequency and time to place an order.

2: After each order is completed, have the App ask the client if they wish to submit feedback – either as a star rating (how happy they are with their order and the process) or allowing them to write a comment.

2 marks