Sample Exam 1, 2016: Solutions and Teacher Notes

SECTION A – Multiple choice questions

Question 1
Answer: B

Organisational goals are, by definition, not quantitative in nature.

Question 2
Answer: D

Question 3
Answer: B

Efficiency vs effectiveness. Straight from the glossary definition.

Question 4
Answer: B

Quantitative vs qualitative data. Do you understand the differences between these?

Question 5
Answer: D

Question 6
Answer: B

Question 7
Answer: B

A hash function on its own does not sort data – though it does in a sense! Best response in this case is option B.

Question 8
Answer: A

Though programming languages used across schools vary, the standard data types listed in the study design are the ones that you need to be familiar with.

Question 9
Answer: D

Question 10
Answer: C

Event based threats can be caused by natural disasters (for example).

Question 11
Answer: A

Question 12
Answer: D

XML files are new to the study design this year, so there is highly likely to XML questions on the exam.

Question 13
Answer: C

Must consider the possibility that the item is not contained in the array at all.

Question 14
Answer: B

Question 15
Answer: C

Question 16
Answer: C

Answer to Q15 and Q16 is the same. It takes the same number of comparisons to determine if a number is present or not.

Question 17
Answer: B

The design of a user interface, while it also takes place in the design stage, is a different process to writing an algorithm.

Question 18
Answer: A

Manipulation is something that gets done in an algorithm, but rather this is spelled out using sequence, selection and iteration.

Question 19
Answer: C

Questions such as this are always 'best possible answer'. Option C in this case is quite good as it contains a person's name, a reference to what the file actually is as well as a date.

Question 20
Answer: A

SECTION B – Short-answer questions

Question 1
Answer: Design

Easy mark here – definition directly from the PSM.

Question 2
a. A protocol defines a set of rules for communication.

b. TCP (Transport Control Protocol) divides the data being sent into packets and labels them in such as way as it can be reassembled easily. IP (Internet Protocol) handles the transmission of these packets around a network.

Question 3

Item Description	Process or Data Store
Combine this year's financial figures with those of previous years.	Data store
Retrieve the number of items from the inventory database.	Data store
Archive the month's data for future reference.	Data store
Discard the daily calculations.	Process
Calculate the profit margin for each stock item.	Process

The question itself is possibly ambiguous. All of these descriptions would be contained within a process, however, the question is asking whether they have anything to do with a data store or whether they are simple performing some calculation or other process.

Question 4
A trace table is a way of recording the current values of variables in an algorithm as it is tested. The main purpose of a trace table is in testing – the benefit being that a software developer can see all of the values and how they change line by line.

Question 5
a.   3, 5
b.   Loop will be executed 5 times.

It is not necessary to know what a Fibonacci sequence is – though recognising this makes answering the question easier.

Question 6
a.   The software performs the tasks required of it.

b.   The software is easy to use.

Questions like this provide very little information and it is important to remember that simple answers are often the best. The question also uses says 'list two criteria that MUST' – which means that the focus is on the most important things as opposed to things that are down the list.

Question 7
a. Hungarian convention.
b. i – Makes it easier to debug the program, ii – Makes it easier to see the function of variables (their type, scope and purpose)
c. Anyone doing further development on the program will need to decipher what the variables do and this will take time – leading to an increase in costs.

SECTION C – Case Study

Question 1

Group	Requirements
Presenters	Functional: Sound quality is high. Non-functional: Easy for listeners to find their show and listen to it
Listeners	Functional: Easy to navigate and select shows for their play-list Non-functional: Reliable / doesn't crash or lose where they are up to in their play-list

Functional and non-functional requirements are a common exam question and it is important to not only know the difference between them, but to be able to list things that come under each category.

Question 2
The reason Maxine has left a gap between the end of one task and the start of another is to allow for any unforeseen events or delays in the project. By doing this, the chances that delays during stages of the project will also delay the finish date of the project, are minimised.

Doing this is also known as including 'slack time' – though this is in not a term that is used in the study design.

Question 3
1. Director (actor)
2. Presenters (actor)
3. Producers (actor)
4. Advertising / Marketing person (actor)
5. Organise advertising (use case)
6. Listen to programs (use case)
7. Listener (actor)

Question 4
Rich client: data downloaded to the mobile device which will mean that it will be easy for people to listen off-line. Development time will be much longer and needs to be device specific.
Internet application: Simply need to make the interface compatible with a browser – and then it will work across a wide range of devices with ease. Data will be streamed to the device meaning Internet connection could cause more problems (potentially).

Question 5

a.   A network password will gain you access to a network. Encryption is a method by which the data that is transferred is encoded so that it can't be read (without the correct key).

b.   Reason 1: Anyone could access resources on the network and implant viruses or copy (or delete data).
Reason 2: Data transmitted over a wifi network can be easily read by others if it is not encrypted. This could include banking details and passwords, for example.

Question 6

a. Agile development is the process by which stages in the PDLC can be revisited after feedback by clients.

b. The opposite is Linear development – in which the stages are done one after another with no repeating or cycling back. While linear development is quicker than agile development, it also does not respond to feedback (or give the client as many opportunities to provide this). Agile development is more thorough, but takes longer (and therefore costs more). Clients tend to be much happier with agile development as they are kept 'in the loop' much more.

The question stem 'discuss' means that you should explain the pros and cons of each of the things that have been mentioned. Another clue to the response that the examiners are looking for is the number of marks. As this is a 4 mark question, it is important to ensure that you list 4 distinct points.

Question 7

a.   StartedFlag: Boolean
ListenerID: Integer
Progress: Floating Point
ShowID: Integer

b.
Error 1: Progress > Total Length
This will never be true. As such, the show will not be removed from the listeners play-list and will never be indicated as being 'listened to'.
Error 2: If Progress > 0.8 * TotalLength Then …
This is an 80% calculation rather than the 70% that it should be. This will mean that shows will not be counting the number of people that have listened to them correctly – which will have a flow on effect of losing money through the advertising that the station is promoting.

Both of the errors are logic errors. They would not affect the overall function of the App, though it would not function correctly.

Question 8

    a. The best way to obtain this data legally is to advise listeners downloading the App that this data will be collected and ask for them to agree to this.

    b. Negative 1: the App might not be as responsive as it will be sending additional data back and will also be loading ads to display.
Negative 2: listeners might get annoyed at the presence of the ads and may also feel that their privacy is being infringed upon.

Question 9

It is against the Copyright legislation to play the songs that Dave is playing at the front of his show. Stopping the song just before the end makes no difference. The station may not be selling the song, but they are making revenue from advertising used in the show, so the song is contributing to that (so indirectly – they in fact are selling the song).

Question 10

Clear: The other shows listing would be very difficult to read – and is not given enough screen real estate. This box could be increased in size and the advertising placed elsewhere (or made smaller).
Responsive: There is no way for the listener to know where they are up to listening to the show and how long there is to go. A progress bar along the bottom of the UI would be very useful.
Familiar: Some icons are not obvious as to their function. Use
Consistent: It looks like a trash icon that is next to the stop icon, which is not usual. There is also what looks like a 'close' icon above the stop icon, which is again not the usual place for this. Place potentially destructive icons away from the main icons so that the user can't accidentally press them.

Question 11

a.   Boundary value analysis is when you use test values just before the boundary, at the boundary and then just after the boundary – to ensure that the correct actions are taken in each case.

b.   To see if the 'more than 70%' boundary is being processed correctly, you would use a value just before the boundary (for example, 69.9), on the boundary (70) and then just over the boundary (for example, 70.05).

Question 12

While it is true that the App will be quicker to develop if Maxine ignores internal documentation altogether, it is not in her best interests as she will find it harder to make changes later on (and it will take longer). It is not in the best interests of *SportsCastOz* either – though the reasons are hidden from them. They may be happy with the reduced costs in the short term, but any developer they ask to make changes to the App in the future will need to quote them more just because they will need to add time to work out exactly how the App is working.

2 mark question meaning that the examiners are looking for 2 points.

Question 13

The App will be available to listeners much sooner than if they had to wait for the full release version. As it is a beta, any problems or errors may turn listeners off the shows or the station prior to the full version becoming available. Instead of providing benefit and feedback on the App, it could cause damage to the station's brand.

Question 14

a. SSL encryption is a type of encryption commonly used between servers and web-browsers where the client and server create a 'handshake' in order to transmit secure data.

b. The data that would be being downloaded to the App is not data that needs to be secured. The extra data will also be an additional drain on the mobile data downloads of listeners and this may mean that listeners are less inclined to listen to shows when they don't have access to wifi – which would lead to reduced listeners and advertising revenue.

Question 15

- Prior to the release of the App, gather up to date data on all of the shows and their listenership.
- Each month that the App is available, monitor and collect stats on downloads of the App as well as downloads of shows via the App. Take note of trends in this data – for example, shows that are gaining listeners, shows that are losing listeners.
- Add this data to the data still being gathered to measure listeners who are tuning in using the 'traditional' methods (online), subscribing to the podcasts.

- Ask the presenters to mention the App and invite listeners to 'rate and review' the App in the App store.
- Invite select listeners to come in to the studio for a free tour and then to take part in a focus group to give feedback on the App.

A strategy is a plan with a timeline attached to it. If a question asks you to respond with a strategy, you should ensure that you provide a list that is chronological (you could number the items to help demonstrate this).