Digital Learning and Teaching Victoria

DLTV Resource Kit

For use with the VCE Applied Computing 2020–2024 Study Design

Applied Computing: Software Development

Units 3 and 4 Trial Examination 1 for 2020

Sample solution

Section A – Multiple Choice

Multiple Choice Answers

Question	Answer
1	C
2	D
3	A
4	D
5	C
6	B
7	B
8	C
9	D
10	A
11	B
12	D
13	C
14	C
15	B
16	D
17	A
18	B
19	B
20	A

Section B – Short-answer questions

Solutions provided for this exam are example responses. In some cases, additional responses are given as alternative suggestions. A marking allocation guide has also been suggested for some questions.

Question 1 (4 marks)

a. How do the following measures help to protect the data? **2 marks**

User authentication

Prevents access to data by unauthorised users

Encryption

If drive is stolen, it cannot be read

b. Identify and describe an improvement to the user authentication process that could be implemented to further enhance Beau Forest's data security. **2 marks**

Implement two factor authentication, e.g. by adding mobile phone message or fingerprint.

Three factor authentication is 'Something you know (password), something you have (mobile), something you are (fingerprint, face, retina)'

***1 mark** for identifying improvement*

***1 mark** for description*

Question 2 (6 marks)

The following XML file contains errors. Circle and number up to three errors and explain why each is an error.

xml header should be <?xml version="1.0" encoding="utf-8"?> but adding the "?" would suffice

Second <day> <appointment> has no closing tag

Tag for invitee "Olive Garden" is not closed properly with "/>"

***1 mark** for each error identified*

***1 mark** for each explanation*

Question 3 (8 marks)

a. Select *one* good design feature for each design and justify each selection. **4 marks**

Adam: Dropdown restricts input to known values

Beatrice: Readable title

***1 mark** for each plausible item*

***1 mark** for linking each feature with a specific effect*

b. Choose *one* feature of each design and comment on why it contributes to the effectiveness of the design. **2 marks**

Adam: Good affordance using 'Good night'

***1 mark** for 1 valid comment*

Comment must use the effectiveness words: appearance, readability, affordance, usability, attractiveness, etc.

Beatrice: Good use of space, readable

***1 mark** for 1 valid comment*

Comment must use the effectiveness words: appearance, readability, affordance, usability, attractiveness, etc.

c. Choose *one* feature of each design and comment on why it does not contribute to the effectiveness of the design. **2 marks**

Adam: Poor use of space, small handwritten heading has poor readability

***1 mark** for a valid comment*

Comment must use the effectiveness words: appearance, readability, affordance, usability, attractiveness, etc.

Beatrice: Icons not universal, time-pickers require two clicks so usability and accessibility issues on phone.

***1 mark** for a valid comment*

Comment must use the effectiveness words: appearance, readability, affordance, usability, attractiveness, etc.

Question 4 (9 marks)

a. At which line will a run time error occur? **1 mark**

Line 6: will take the reference beyond the end of the array

b. Rewrite the line of code that caused the crash so that the program will work as expected. **2 marka**

FOR J <- I TO ARRAY LENGTH – 2 since there is a [J + 1] term next

c. Complete the table below to show the state of the array after the corrected program has been run. **2 marks**

12	*13*	*3*	*1*	*20*	*1*

***1 mark** for first four: 12, 13, 3, 1*

***1 mark** for the rest*

d. A new requirement is added, namely, that the array elements that have had their number 'shuffled' out are to be set to zero. Modify and rewrite the pseudocode to meet this requirement in the most elegant way possible. 4 marks

Elegant solution is to add line after line 6: MyNumbers[J + 1] <- 0

***1 mark** for some effective code*

***1 mark** for working*

***1 mark** for including previously corrected line (line 6)*

***1 mark** for most elegant solution*

Question 5 (3 marks)

In the following table, indicate if each statement is a functional requitement (FR) or non-functional requirement (NFR).

The system shall allow the user to enter up to four choices for their preferred holiday destination.	*FR*
The system shall calculate the trajectory of a missile to within 0.2° of accuracy.	*FR*
The system shall be fault tolerant providing an uptime of not less than 99.9%	*NFR*

Section C – Case study

Solutions provided for this exam are example responses. In some cases, additional responses are given as alternative suggestions. A marking allocation has also been suggested for some questions.

Question 1 (6 marks)

Employees are expected to follow all company procedures including the sign-out process, yet at least half the staff are not.

a. What methods could be used to gather information to determine the reasons for this office trend? 2 marks

Possible methods include:

Surveys, focus groups, interviews

1 mark** for each correct method **(2 marks)

b. What ethical dilemma could arise by gathering this information from employees? 2 mark

You will discover those who are not complying with the process and then have a dilemma if management asked you for those names

***1 mark** for the circumstance*

***1 mark** for the consequence or dilemma*

c. How could the information gathered to explain the office trend assist in the development process? 2 marks

By properly understanding the problem, you can create requirements so that the solution addresses them.

***1 mark** for referencing the case study*

***1 mark** for helping to make the process more effective*

Question 2 (4 marks)

Based on the case study, identify *two* functional requirements (FR) and *two* non-functional requirements (NFR).

Possible FRs include:

- *will set the onsite status of an employee upon request from webpage*
- *will present the status of all employees to the receptionist*
- *will provide login facilities for the receptionist, administrator and fire warden.*

***1 mark** for each FR (2 marks)*

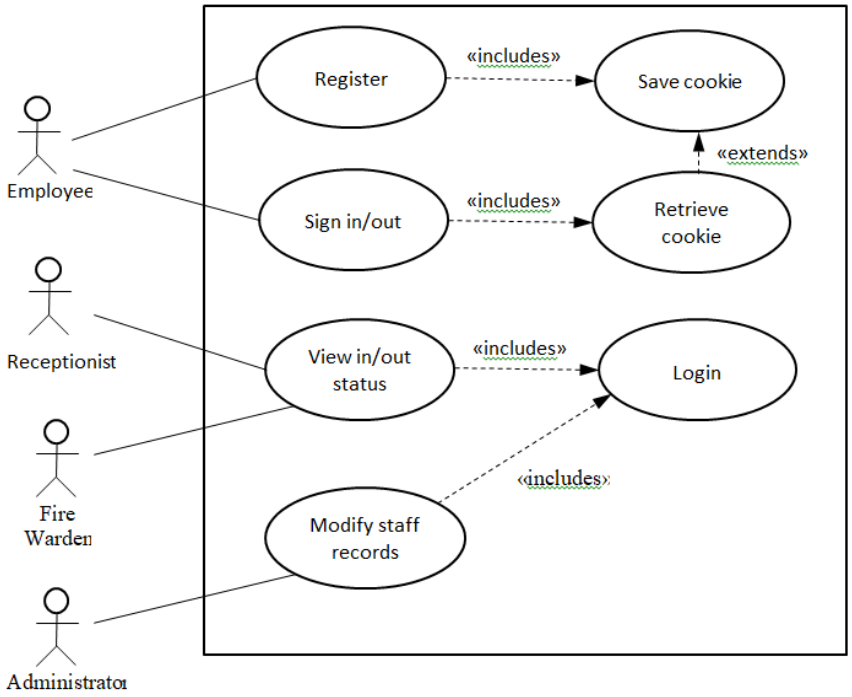
Possible NFRs include:

- *available on various devices*
- *available to fire warden wirelessly on an iPad or similar device.*

***1 mark** for each NFR (2 marks)*

Question 3 (6 marks)

Complete the use following use case diagram to represent the proposed system, using the case study as your guide.



Mark allocation guide:

***1 mark** for use case "Register" named*

***1 mark** for "extends" from Retrieve cookie*

***1 mark** each for "includes" between Modify staff records and Login*

***1 mark** for correct direction for the above arrow*

***1 mark** for "Administrator" named*

***1 mark** for line added from Fire Warden to View in/out status*

Question 4 (6 marks)

Employees connect to the system via their mobile phones. Data is transmitted in plain text across the internet.

a. What security measure could be put in place to protect against malicious attacks? 1 mark

TLS, SSL, https encryption over the internet

b. How could this security measure assist in making the system more secure? 2 marks

The security measure prevents reading of data in transit.

c. Discuss the implications if data transmission is not protected? 3 marks

Adequate, thoughtful discussion related to the case study, which addresses the key areas affected.

Question 5 (4 marks)

State and describe *two* evaluation criteria that could be used to measure the effectiveness of the system.

Mark allocation guide:

1 mark *for each criterion, which must be measurable*

1 mark *for the key characteristics or features of each criterion*

Question 6 (4 marks)

With reference to legislation, explain how this potentially breaches the rights of the employees.

Mark allocation guide:

1 mark *for the Privacy Act*

1 mark *for correct year 1988*

2 marks *for describing that the data was being used for purposes other than solicited*

Question 7 (6 marks)

a. Identify *two* examples of internal documentation. **2 marks**

Possible answers include:

Comments, good variable naming, breaking code into smaller functions

1 mark *for each example*

b. Identify *two* examples of external documentation. **2 marks**

Possible answers include:

SRS, designs, pseudocode, project plan, user guide

1 mark *for each example*

c. Define the term 'coding standard' and state why is it important. **2 marks**

Mark allocation guide:

1 mark *for correct definition (need to include it relates to guidelines or procedures about styles, methods and procedures when using a specific programming language)*

1 mark *for an advantage*

Question 8 (6 marks)

Draw a suitable user interface for the registration screen and the sign in/sign out screen from the elements presented below. Keep in mind the requirements of effective design and annotate your designs with the particular criterion it addresses.

a. Registration screen **3 marks**

Mark allocation guide:

1 mark *for including elements*

1 mark *for annotations of elements*

1 mark *for annotations including effectiveness criterion from this list: accessibility, accuracy, attractiveness, clarity, communication of message, completeness, readability, relevance, timeliness, and usability*

b. Sign-in/sign-out screen **3 marks**

Mark allocation guide:

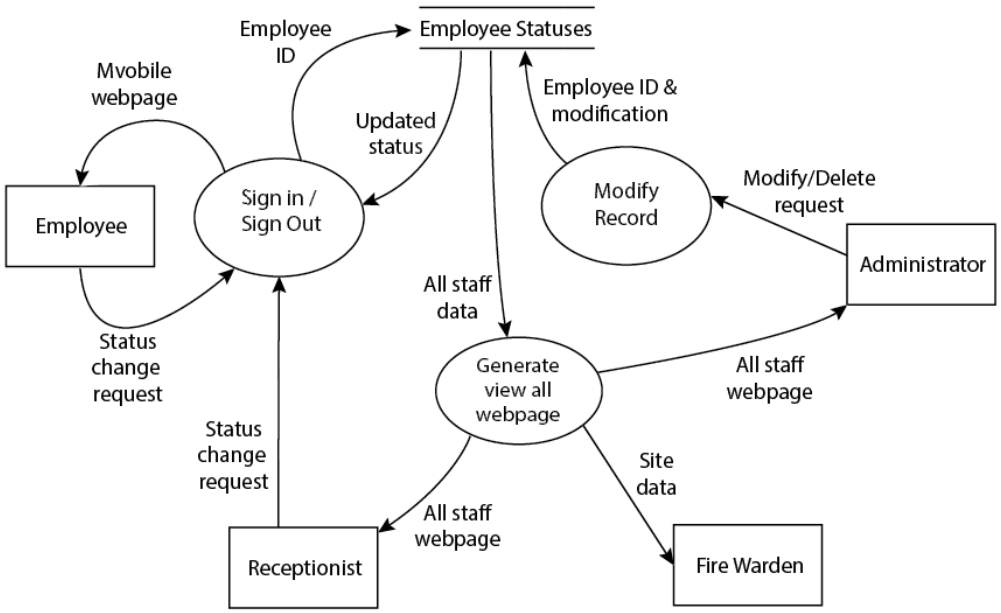
1 mark *for including elements*

1 mark *for annotations of elements*

1 mark *for annotations including effectiveness criterion from this list: accessibility, accuracy, attractiveness, clarity, communication of message, completeness, readability, relevance, timeliness, and usability*

Question 9 (8 marks)

Jake began the data flow diagram at the beginning of the project, however, was distracted before finishing it. Drawing on the case study, complete the data flow diagram below to represent the design.



Mark allocation guide:

1 ***mark*** *for Employee and Receptionist added (must have both)*

1 mark *for Fire warden added with arrowed line*

1 mark *for Status change request from Receptionist added*

1 mark *for Words to the effect of "Modify record" added – must be a verb (process)*

1 mark *for "All staff webpage" (or similar) to Administrator added*

1 mark *for Employee ID and arrowed line added*

1 mark *for all boxes containing entities*

1 mark *for all lines being nouns and representing data*