2018 VCE Computing: Informatics (NHT) examination report

General comments

The 2018 VCE Computing: Informatics (NHT) examination consisted of three sections: Section A – Multiple-choice questions, Section B – Short answer questions and Section C – Case study.

The multiple-choice questions section of the 2018 examination consisted of mainly separate, individual questions; students had to read data that related to each individual question.

Throughout the examination students were required to answer questions in a variety of ways, including writing short answers, interpreting graphs and diagrams, choosing to answer from selected items, annotating a diagram, drawing, and completing parts of a chart.

Specific information

This report provides sample answers or an indication of what answers may have included. Unless otherwise stated, these are not intended to be exemplary or complete responses.

Section A – Multiple-choice questions

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

Section B – Short-answer questions

Question 1

Students were expected to explain how qualitative data can be coded to support manipulation.

Coding involves using a symbol, word or number to summarise data. Representing qualitative data in these forms makes manipulation easier. For example, 'face-to-face' could be used to summarise the following response to the interview question 'Where do you think you do your best learning?': 'I think I learn better when I am in the classroom with the teacher because I can then ask questions if I am uncertain of something.' This coding allows responses to be quantified and then tallied.

Question 2a.

Students were asked to suggest and describe one software security control.

Any one of the following responses was accepted:

- username and password – a string of characters used to verify the identity of a user during the authentication process
- firewall – a network security system, either hardware- or software-based, that uses rules to control incoming and outgoing network traffic; it acts as a barrier between a trusted network and an untrusted network
- encryption – stored files are made unreadable for unauthorised people; they can be decoded only by a decryption key
- access hierarchy – different users get different levels of access to the data/system
- anti-virus software – a program that is designed to prevent, search for, detect and remove software viruses and other malicious software such as worms, Trojans and adware

Question 2b.

Students were asked to outline two reasons for networking the three computers

Any two of the following responses were accepted:

- file sharing – the three users can easily share data and this can, in turn, increase storage capacity
- resource sharing – networking the three computers will enable them to share software and connected peripheral devices such as printers, scanners and copiers, and this can save money
- sharing a single internet connection – this is cost-efficient
- increased efficiency – the three users can access a common database of clients, which can avoid the same data being keyed multiple times, saving time and preventing errors

Question 3

Students were asked to describe how the table in a relational database management system would be structured to store all the data.

The data could be stored in two tables, one for movies and one for the stars. The movies table would have columns/fields for Movie ID, title, director, and date. The stars table would have columns/fields for actor and title. The Movie ID would provide the link/relationship between the two tables.

Question 4a.

The year that the proportion of females was the greatest was 2009.

Question 4b.

Students were required to select either Chart 1 or Chart 2 to compare the employment trends of males with females for the period 2009–2016 and provide two reasons for their choice.

The following are examples of acceptable responses.

Chart 1

Reasons:

- Placing both the male and female employment rates next to each other makes it easier to compare the two sets of data. (proximity)
- The thickness of the representation of each year's data makes it easier to read. (presentation)

Chart 2

Reasons:

- Line graphs are more suitable for showing trends over a period of time. (trends)
- Being able to focus on two lines rather than eight sets of data (bars) makes it easier to quickly identify trends. (differences)

Question 5

Students were expected to explain the relationship between a prediction and the variables, in relation to framing a reasonable hypothesis.

The following is an example of an acceptable response.

A hypothesis is a statement that predicts the presumed cause-and-effect relationship between at least two variables. The result of the interaction between variables gives rise to the prediction. If one variable changes, then the prediction should change. For example, if there is a 10 per cent increase in the water (independent variable) given to tomatoes in September, then the yield (dependent variable) would increase by 15 per cent in December. The prediction should change if the percentage increase in water is changed.

Students did not need to label the independent or dependent variable to gain full marks.

Question 6a.

Students were asked to explain how a design idea is different from the preferred design of a solution.

Design ideas are broad possibilities for a solution. They are alternative outlines for a solution, usually with detail that is limited but sufficient to gain a general idea of the solution intent. The preferred design of a solution is a detailed one, based on one of the design ideas. It is the design from which the solution will be developed. There are many design ideas but just one design of the preferred solution.

Question 6b.

Students were required to describe two techniques for generating design ideas for a multimodal online solution (MMOS).

Any two of the following responses were accepted:

- brainstorming – generating ideas without making any judgment about the worth of each idea. This could involve working in pairs, discussing alternative ways of solving a problem
- researching – deliberately finding examples of solutions to other problems for comparison, for example, searching for different styles of websites and reading books/articles on design ideas
- graphic organiser – this is a structured approach to considering alternative ideas. An example is a forced analogy organiser where you are required to consider unlikely combinations of

options or the SCAMPER model, which provides prompts to making changes such as modifying or expanding a design element
- mind map – visually organising your ideas or information
- PMI (Plus, Minus, Interesting) – conducting a brainstorming exercise that encourages you to look at the idea from a different viewpoint

Question 7

Students needed to state one criterion that could be used to help evaluate the effectiveness of this MMOS. They also needed to provide a reason for the criterion.

There are many acceptable answers. One accepted answer was: Can the readers accurately name two different types of food that help build muscles in young children?

This allows you to see if the solution has included types of food to help build muscles. The solution can be misleading if incorrect.

To obtain full marks students needed to mention one or more of these terms relating to effectiveness: completeness, readability, attractiveness, clarity, accuracy, accessibility, timeliness, communication of message, relevance and useability.

Question 8

Students were required to annotate the infographic to show where one design principle had been applied, and justify their annotation.

The following are examples of acceptable answers:

- alignment – connecting all elements visually through an invisible line to avoid the appearance of randomly placed items. It provides order and organisation. Alignment of the images and information is from the middle out
- contrast – showing differences using elements such as space, colour, text selection and positioning
- space – appropriate space around each item
- balance – images and text on each side of the page

Question 9a.

Students needed to list the set of actions a member must take to reserve a toy if they land on the website's home page.

The correct actions were click login; successfully login (or enter member number, password), click reserve, click an image, click confirm.

Question 9b.

Students were required to state what data protection should be placed on the 'Join' page and then explain why this protection is needed.

An acceptable answer was: The data entered by the visitor to the web page should be encrypted. The explanation could include specific protocols – for example, SSL and HTTPS – and include what protection the protocol provides.

Encryption is needed because the user is providing private data to the toy library and not to anyone else. When the data goes from the visitor's computer to the toy library's web server/server/computer, there is a danger that it could be intercepted. Encryption prevents unauthorised persons from reading the data.

To obtain full marks, students needed to mention privacy and secure communication of the data.

Section C – Case study

Question 1

Students were asked to discuss ethical dilemmas faced by Indra. To obtain full marks students needed to discuss at least two different dilemmas and there needed to be some form of a conflict.

Some of the following points could have been considered.

Ethical dilemmas occur when a person is presented with choices and the decision may not be clear-cut. Would acceptance of the discount sway the participation rate of customers and influence their answers? Indra could feel responsible for trying to increase the sales of Good Sleep Solutions (GSS) so she may be tempted to accept the medical supplier's offer; however, this could influence how she frames the questions in the survey so that customers might be swayed to provide answers that lead to the medicinal solutions. Also, offering an incentive for customers to participate in the survey might influence their answers, as they may be biased towards what they think GSS might want to hear and what their reward for participation might be.

Question 2

Students were asked to describe a strategy Roberto could use to collect data from existing employees and clients, what data could be collected and how this data could be used to determine the most effective changes to the product descriptions.

The strategy needed to identify:

- the sources of data
- the technique used to collect the data from each source
- what data could be collected from each source and how it could be useful in creating more effective product descriptions.

Students should have noted that the question asks Roberto to consider existing employees and clients. Roberto could:

- interview Cerie to ask which products are the most difficult to explain and/or sell to clients
- select a random sample of medical centres and send them a survey via the current website asking them which descriptions they felt needed more information or contained the most unnecessary technical medical language
- consult with Frank to find out what type of information he currently includes and what he leaves out, and the level of technical medical language in the current descriptions
- directly observe employees and clients.

To obtain full marks students needed to consider the most appropriate data to collect from at least two employees as well as the medical centres. They needed to acknowledge the level of jargon in the current product catalogue is problematic.

Question 3

Students were required to normalise the database into third normal form.

An acceptable approach was:

Users: Username; firstName; lastName

Products: ProductID; productName; unitPrice

Orders: OrderNumber; orderDate; username; productID; quantity

The field 'totalPrice' should not appear anywhere.

Question 4a.

Accepted responses included:

Text or string is the most appropriate data type, as phone numbers contain leading 0s, which would be removed if they were stored numerically.

Field not used for calculations so does not need to be integer.

Question 4b.

Students needed to draw a new entity relationship (ER) diagram that best represents how business and individual data should be stored in the modified database, with minimal redundancy.
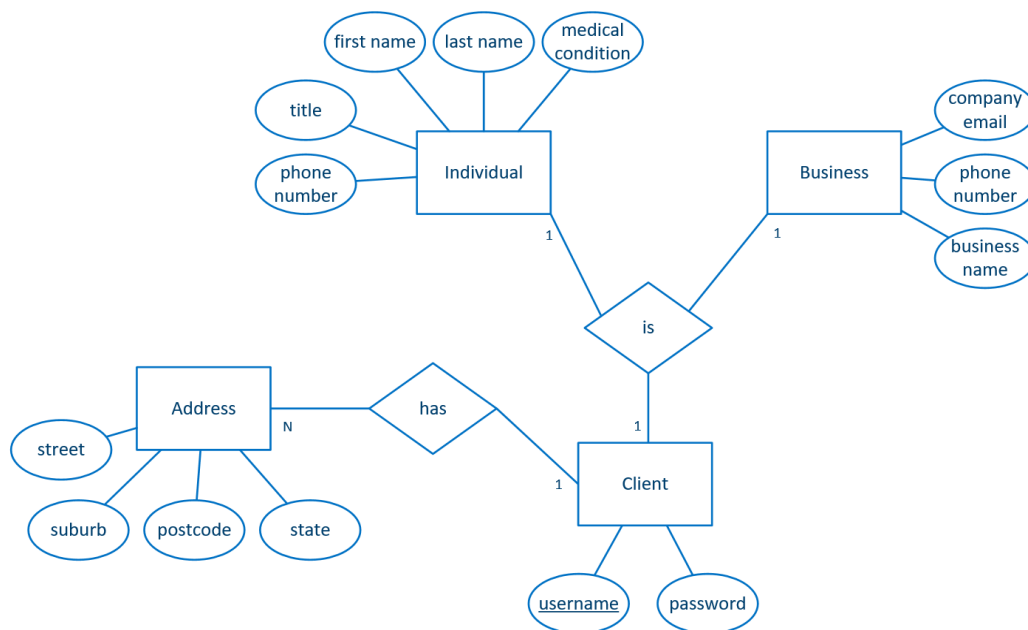
Students needed to:

- show new attributes collected for customer data
- change Address multiplicity to 'N' from 1
- show appropriate separation of individuals and business to limit redundancy of attributes.

Question 5a.

Students were required to complete the mock-up so that it showed the features needed to meet the requirements listed in the question, taking into account the appearance of the page.

The mock-up needed to include the ability to:

- enter their full name and title
- enter their email, their phone number and up to three shipping addresses
- select or enter their medical condition
- submit their information to create an account.

Question 5b.

Students needed to recommend a set of testing techniques that Indra should perform to check that that a customer's phone number has been correctly entered into the database.

Responses that gained full marks included the following:

- create a table with dummy phone numbers of varying lengths and first digits and expected results

- enter the dummy data in the solution and record results
- check that the expected results match the actual results and correct errors if they occur

Question 6

Students were required to explain why Indra does or does not need to comply with each of the following legal Acts when implementing the changes to the GSS system.

The following are examples of acceptable responses:

- *Health Records Act 2001* – This Act does apply because GSS is a Victorian business and Indra will be collecting medical information from her customers (their sleep condition).
- *Privacy and Data Protection Act 2014* – This Act does not apply because while GSS is a Victorian business, it is not an organisation in the public sector, nor is there indication that it is contracted by the public sector.

Question 7

Students were required to identify one characteristic of data integrity and explain why Cerie might be concerned about it in relation to the data received from MedCo.

Answers needed to relate to the integrity of data (timeliness, authenticity and accuracy). For example:

- timeliness – Cerie might be concerned about the timeliness of the data, as the company went out of business a year ago. Customer data can become useless over time, as people move, etc.
- authenticity – A company that hasn't succeeded may not have had good data management practices, so there may be a concern that the data she receives could have been changed by anyone. This might also be discussed in relation to correctness under 'accuracy'
- accuracy – Cerie might have issues with the data being accurate or not.

It is unlikely that Cerie is concerned about relevance.

Students needed to state an appropriate characteristic and give an explanation. To obtain full marks, students needed to explicitly refer to elements of the case study.
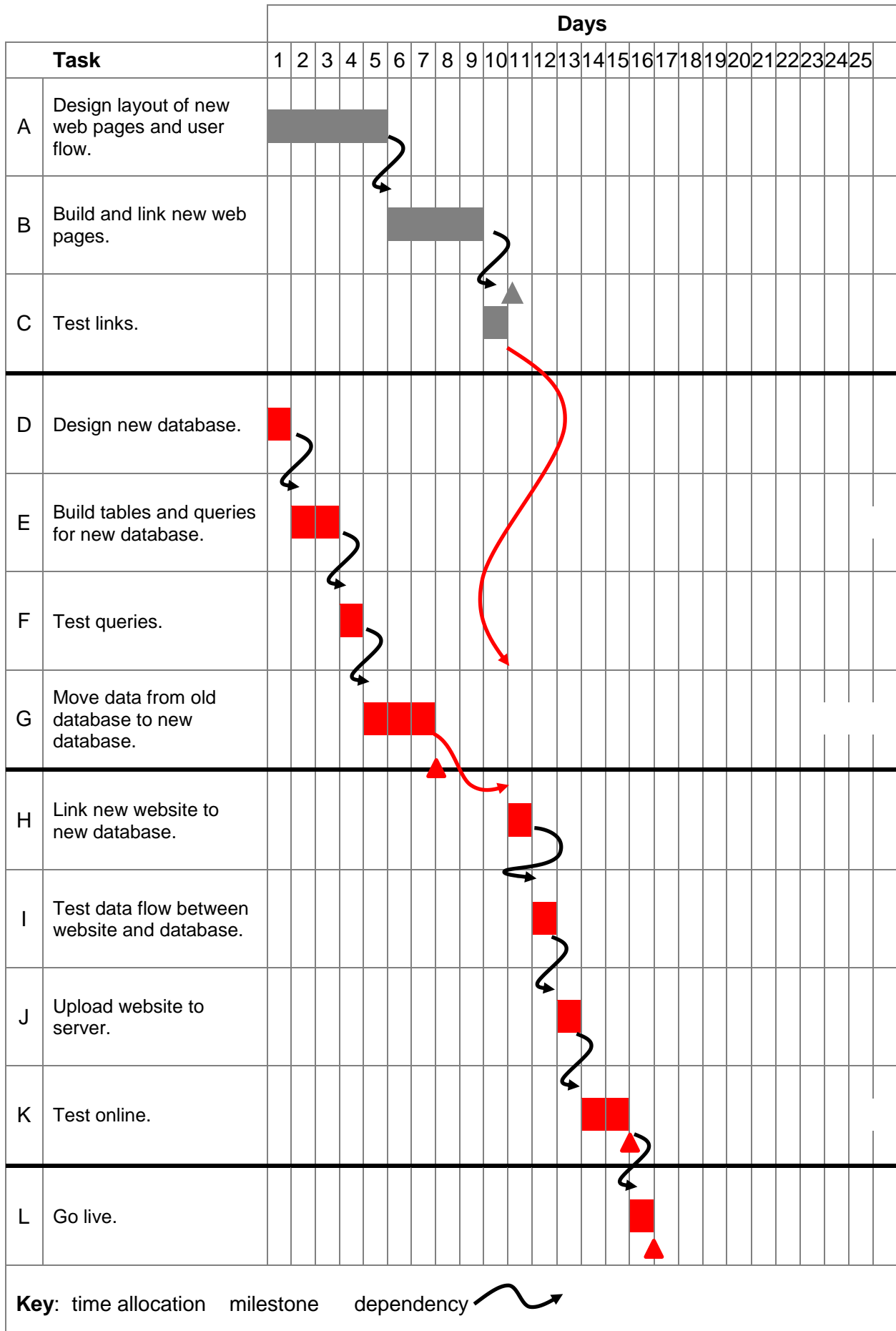
Question 8a.

Students were required to suggest a way to shorten the overall duration of the project.

For example, Indra can run tasks D to G parallel to task A to C as they are not dependent. This shortens the duration of the project. In this case students needed to mention that they need to get someone else in to do the tasks.

Question 8b.

Students were required to fill in the Gantt chart, including allocations, dependencies and milestones.

	Task	Days
		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
A	Design layout of new web pages and user flow.	
B	Build and link new web pages.	
C	Test links.	
D	Design new database.	
E	Build tables and queries for new database.	
F	Test queries.	
G	Move data from old database to new database.	
H	Link new website to new database.	
I	Test data flow between website and database.	
J	Upload website to server.	
K	Test online.	
L	Go live.	

Key: time allocation   milestone   dependency

Question 9

Students needed to outline two components of a disaster recovery plain.

Any two of the following responses were accepted:

- evacuation – In the case of a disaster at the warehouse, Indra will want to retrieve all equipment that she can safely, in particular the web and database server. She should therefore include all equipment and their locations in the plan.
- backups – As she keeps her backups at a separate location, Indra should include where this is in her disaster recovery plan, as well as the location of the key to the locked cupboard.
- restoration (recovery) – Indra should have a fully documented set of steps needed to install her web services and database on a new system. She should also have an itemised list of all equipment that will need to be replaced.
- testing – Indra should schedule a test of the full plan to occur somewhat regularly, for example, once every six or 12 months. In particular, she should test her backups.

Question 10a.

Students needed to outline two weaknesses that currently exist in the information management practices at GSS.

Any two of the following weaknesses were accepted:

- Indra has only one backup (at best) at any given time. While she's completing a backup, she actually has no backups of the system, as she's just deleted the only backup.
- Backups are manual, not automated, and if she doesn't remember to do it, it won't happen.
- Her password policy is non-existent, the warehouse passwords are terrible and Cerie and Frank were given passwords that have not been changed
- While doors are alarmed, windows are just locked. Smashing a window to gain entry may not set off the alarms.
- Data is never actually disposed of (that is, never deleted) if it is stored in the database. Boolean flags will keep the data in the database. Deletion on the file system relies on the operating system's deletion protocol to know if it has been deleted or not (some operating systems don't delete the files; they just assign the blocks to allow for overwriting at some point in the future).
- Virus protection updates are only done once a month; they should be done daily.

Question 10b.

Students were required to outline two possible improvements to the information management practices at GSS.

Improvements on any of the weaknesses outlined in Question 10a. were accepted, but students did not need to explicitly state improvements of the elements that they had discussed – they could discuss completely unrelated improvements.

Question 11

Students needed to explain one advantage or one disadvantage that the action would have for Indra's business in relation to storage and disposal of data and information.

The following advantages and disadvantages were accepted.

Storage

Advantage:

- The data will be available from anywhere and not reliant on a single server protecting against data loss if the server dies.

Disadvantage:

- Storing data will likely be a bit slower if everything is saved in the cloud, as it relies on network speed and connectivity.
- If her internet goes down, Indra will lose access to her ordering system.
- Indra is now trusting her business data with a third party. If they have poor security practices there are risks of data theft.

Disposal

Advantage:

- Data can deleted anywhere and anytime there is internet access.

Disadvantage:

- When Indra deletes files off the cloud system, they may not actually be deleted, depending on third-party processes.
- Indra is storing health information about her customers, so she needs to make sure that disposal practices by the third-party meet her legal obligations in regards to data integrity.

To obtain full marks students needed to explain the advantage or disadvantage – simply stating it (for example, 'higher risk of data loss') did not receive full marks. Students needed to cover both storage and disposal at least once, but did not need to provide advantages and disadvantages for both.