



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Examination Answer Books

12 Pages

Instructions to Candidates

1. Please give the information requested in the boxes below.
2. Enter your name in the space provided to the right, fold over and seal down (using the label provided) to hide your name.
3. The answers must be legibly written. The Examiners can either ignore illegible script or have it typed and the expense of typing charged to the candidate.
4. Write your answers in ink.
5. Begin each answer on a fresh page. Do all rough work in the answer book and cross it through.
6. No part of this book is to be torn out; it must be handed in complete.
7. If more books than one are used, fasten them together using the tags available from the invigilator(s).
8. Every book must be handed in. In no circumstances may answer books, used or unused, be taken out of the examination venue.

Complete, fold and seal
(see note 2 below)

SURNAME: ELLIS

FORENAME(S): Jamie

1	Student Number	1101941
2	Title of Examination Paper	web services
3	Module Code	ACCA 7005
4	Date and Time of Examination	May 13 th 2019 9.00 am
5	Examination Venue	310 IQ
6	Seat Number	6001
7	Number of Answer Books handed in	1

List the numbers of the questions you have attempted	Office Use
1a	2
~~1b~~	
2a	6 1/2
~~2b~~	
~~3a~~	
3a	12
~~3b~~	
4a	11
~~4b~~	
~~4c~~	
Total	31.5

(Gweler yr ochr arall am y fersiwn Cymraeg)

✓ GT 31/5/19

Q1a) When a web browser is used to navigate to a working web address such as Google, the TCP/IP and HTTP protocols need to be considered. TCP/IP is the most common language of the internet. It follows the process of taking data from one computer, packing up the data and sending it to the other ~~com~~ it's destination, before sending it back as new data to be respond to the client's request. There is an alternative method in the OSI model which would be easier to develop but is less credible than the TCP/IP model. HTTP is the standards for web when it's comes to how actions should be messaged etc. HTTP uses TCP/IP to send the data. When the request gets sent, the DNS gets split into IP addresses - these help the connection from one network to another. ~~With~~ with a WAN ~~likely~~ to have be used for this request, a router would have been used to send the IP addresses. The DNS is split up into chunks where it is sent into the data packet and returned where it is then converted back into ~~the~~ a DNS for the user to understand better. The DNS would be `https://google.com`.

1b) An URL is the whole hyperlink ~~ref~~ at the top of a web page to help users to navigate to easily. An URI is such a section of the URL with the HTTP and the domain name. An URN is ~~the~~ the last part of the URL where it includes the query of the link.

2a) CRUD has 4 operations to it.

* Creating

* Replacing X

* Updating

* Deleting

To create a new request to the server the ~~PUT~~ operation is used. This will create a new request to the server and respond back with either a success message or error.

Replacing data from a server requires the POST operation. Data gets sent to the server to update existing data and the server will respond if successful or not.

Updating data from a server is more tricky and usually requires data to be cleared first and then reposted as new data.

Deleting data from a server can be done by using the DELETE operation. ~~Data gets sent~~ A request is made to the server to delete certain data and the server will respond if successful or not.

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2b)

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c) 200 - This code means that the request has been Successful with no problems, ~~Data is~~ with body. 1 1/2

401 - This code means there is something wrong suspected from the client side. Data ~~cannot~~ be understood.

403 - This is a client side error that comes from not understanding ~~the data~~ how to translate ~~the data~~ back.

404 - This code means there is something wrong client side. The data ~~is~~ not found is usually ~~the~~ ^{the} problem. 2

500 - This code refers ~~to~~ a problem with the server side. There would be a connectivity problem somewhere in your service. 1
not usually connectivity - a general server error

d) With a 401 error the data sent to it is not being sent in the format it requires so it cannot understand the data. An 403 error occurs when data has been sent, ~~understood~~ but the server does not what it has to format it back to. Normally JSON is used to format the data and the data needs to be told to convert to JSON to get sent. —

3a) RESTFUL web services are the implementation of a web service following the REST standards. Roy Fielding came up with the idea of REST in 2000 in his PhD. He came up with a standard for developing web services and his six constraints that are important to developing a web service are client-server architecture, statelessness, cacheability, code-on-demand (optional), layered system and uniform interface. These constraints provide many benefits in the implementation of a web service. Statelessness allow the service to be loosely coupled and easy to maintain due to the components

being managed ~~independently~~ Independently. A layered system allows the system to talk to each other when necessary while keeping it loosely coupled. Cacheability puts less demand on a server as requests by clients are stored to allow quicker actions on requests. Uniform interface is beneficial to the client side as it simplifies the experience for the client by implementing logical ways for the client to understand. Client - Server architecture balances out the responsibilities on the server and client side to ease strain or confusion.

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3b) A JPA can access a database through a web service in many ways. It can use different formats like JSON to transport data. Hibernate has tools which work with JPA to ease the process of ~~enter~~ designing the repositories. ORM - object relational mapping works with JPA by helping design the mapping areas for requests. It creates an in-between for the server and the database as JSON format can be stored to the mapping location and read from to the database.

JPA is the implementation of data management in Java and can be utilised in the development of a web service to connect it to a database.

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4a) Cloud Computing platforms can be useful when implementing on a web service. Servers are expensive and using cloud computing platform would save a company a lot of money as they would ^{not} be required to ~~look~~ invest in servers. There is a lot of framework built for them already, allowing developers to focus on their service more ~~and~~ less about other areas of the architecture. It does then save company time to focus on other areas as infrastructure can be built in a very fast space of time. Cloud computing platforms have the ability to maintain and manage your service for you, making it easier to notice when there is an issue with your service. When an issue is found, infrastructure can be torn down and rebuilt within minutes without affecting your service.

However there are limitations to the cloud platforms. From a company point of view, staff would need to be trained or new staff brought in to be able to work with a cloud platform, your service's infrastructure would need to work with the way that the cloud platform is designed and some circumstances this would not be possible. From a service point of view, you are relying on a platform to manage the service for you and changes would need to be carefully considered so no issues with the infrastructure occur.

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4b) A developer must consider the architecture of the web service when developing a web service. Roy Fielding the designer of REST believes that a web service should be stateless. To ensure the service is easy to maintain and problem solve, then the service should have independent components that keep it loosely coupled. A web service should be designed to give responsibilities to the server-side (Backend) and client-side (Frontend). Security would need to be considered as well. Authentication would need to be used to log in clients into the service and data would need to be encrypted and stored away following GDPR. The web service must be easy for the client to use. ~~There~~ Your service should guide the client through the processes they need to do and interact with them with feedback. From a client view too, the service should be a quick, smooth operation as much as possible and things like caching can be used to temporarily store data to fasten requests. This can be useful to put less strain on your server with demand.

4C) Automation tools with the creation of a web service are beneficial in many ways. The obvious benefit is that it simplifies the amount of work required to build a web service. It does not require a lot of code to build up a web service infrastructure in Spring. Testing would be a benefit too. In most automation tools, basic tests are automatically done to make sure that some of the ~~web~~ service works correctly. While it is not a big benefit, it is a bit of a time saver. Documentation is automated in tools like Swagger and this is considered to be a big benefit of using it. These build reports that would take a long time to do yourself in a matter of seconds. Tools like hibernate allow the connection to a database to be simplified even more.

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