GMIT
INSTITIÚID TEICNEOLAÍOCHTA NA GAILLIMHE-MAIGH EO
GALWAY-MAYO INSTITUTE OF TECHNOLOGY

SCHOOL OF SCIENCE

GMIT EXAMINATIONS

SESSION: Winter 2015/2016

PROGRAMME:	BSc. Software Development
YEAR/STAGE:	Year 3
MODULE:	Data Representation and Querying
INTERNAL EXAMINER(S):	Dr Ian McLoughlin
EXTERNAL EXAMINER(S):	Dr Michael Schukat Mr Tom Davis

TIME ALLOWED: 2 hours

INSTRUCTIONS TO CANDIDATES:

Attempt any FOUR (4) questions. All questions carry equal marks.

Attachments:	No
Special Requirements:	No
Calculators Permitted:	Yes

Question 1

A company called Spuron has a web application that helps users keep track of their to-do lists. They are now looking to build an Application Programming Interface (API) for the web application. The idea of the API is to allow other developers to control Spuron's users' to-do lists programmatically. They want the API to work solely using the HyperText Transfer Protocol (HTTP).

(a) Explain what a HTTP resource is, giving an example of a resource Spuron's API might provide. (20 marks)

(b) Explain the request-response model in HTTP, and explain how your example resource in part (a) will be provided using it. (20 marks)

(c) Explain what the term stateless means in the context of Representational State Transfer (REST). (10 marks)

Question 2

You're working as an intern at a company called Encryptoco. They are building an Application Programming Interface (API) that allows users to encrypt data. The user can send data to Encryptoco's API and the API will respond with the encrypted form of that data.

(a) Explain the difference between the HyperText Transfer Protocol (HTTP) GET and POST methods. (20 marks)

(b) Suggest whether Encryptoco should use either the GET or the POST method to receive user data, and explain your reasoning. (20 marks)

(c) List and explain two HTTP methods other than GET and POST. (10 marks)

Question 3

An online fashion retailer called Jumpr have created a web application for tracking orders. The system is used by employees to look up orders made through the Jumpr website. The application stores data in a relational database management system.

(a) Explain what is meant by eXtensible Markup Language (XML). (20 marks)

(b) Suppose Jumpr's database has a table called Customer with the following fields: id, name, address, homephone, mobphone, email. These represent a customer's ID number, name, address, home phone number, mobile phone number, and their

email address, respectively. Give an example of how a record in the table might be represented in XML. You can create your own example values for the fields. (20 marks)

(c) Explain what the Document Object Model (DOM) tree is, and how it relates to XML. (10 marks)

Question 4

The Department of Transport, Tourism and Sport (DTTAS) have asked you to make their bus timetables available through an Application Programming Interface (API). They keep the details of all their bus routes in a relational database management system. They have taken a survey of mobile application developers, and their findings suggest that the developers' preference is for the web service to provide them with data in JSON format.

(a) Explain what is meant by JSON, and describe its syntax. (20 marks)

(b) DTTAS's database contains a table called Route, with the following fields: routeno, start, end, active. These represent the route number, the starting location, the ending location and whether or not the route is currently active or not, respectively. An example entry in the table is [16, "Eyre Square", "GMIT", false]. Create valid JSON to represent this example entry. (20 marks)

(c) Explain what the JSON.parse and JSON.stringify functions do in JavaScript. (10 marks)

Question 5

You work for a company called NeMail that offers users an alternative to email services such as GMail and Outlook.com. NeMail's product is a single-page web application that lets users send and receive emails.

(a) Explain what an Asynchronous JavaScript and XML (AJAX) call is, and suggest how NeMail might use one in their application. (20 marks)

(b) Explain what the term *asynchronous* in Asynchronous JavaScript and XML means, and how a call-back function works. (20 marks)

(c) NeMail's web application is hosted at the domain nemail.com. Explain why using an AJAX call, from a script served from nemail.com, to send a HTTP request to NeMail's other domain, nemail.ie, could be troublesome. (10 marks)