

8/1/2019

09.30 - 11.30am

Basement 1, Kevin Street



DUBLIN INSTITUTE OF TECHNOLOGY

**DT211C/4 BSc. (Honours) Degree in Computer Science
(Infrastructure)**

DT228/4 BSc. (Honours) Degree in Computer Science

**DT282/4 BSc. (Honours) Degree in Computer Science
(International)**

WINTER EXAMINATIONS 2018/201

RICH WEB APPLICATION TECHNOLOGY [CMPU4043]

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DR. DEIRDRE LILLIS

DR. DAVID MALONE – DT211

MR. PATRICK CLARKE – DT228/DT282

TUESDAY 8TH JANUARY

9.30 A.M. – 11.30 A.M.

TWO HOURS

INSTRUCTIONS TO CANDIDATES

Question 1 is **compulsory**. Answer question 1 **and** any two of the other three questions.

Question 1 is worth 40 marks, all other questions are worth 30 marks

- 1 (a) What is the web component abstraction? Explain its relationship to ordinary native DOM elements. How does a web component facilitate the separation-of-concerns principle in web development?

(8 Marks)

- (b) Briefly describe the process that takes place when a page is loaded into a browser. In your answer, deal with each of the asset types, namely HTML, CSS and JavaScript. When is it safe to start executing JavaScript on a page and why? How do you control when your JS starts executing?

(8 Marks)

- (c) In functional programming, a functor type is a type that can have a map operation applied to it. Explain the semantics of the map operation and give an example of a functor's use in JavaScript.

(8 Marks)

- (d) Describe the relationship between the JavaScript Object Notation (JSON) standard and native JavaScript data structures. In your answer, mention the key differences. Show in code, how to convert between JSON and native JavaScript data structures

(8 Marks)

- (e) Explain how the fetch API is used in browser networking. Illustrate your answer with example code in JavaScript showing the happy path and the error path cases

(8 Marks)

- 2 (a) Modern rich web development makes use of a large number of build-time tools for packaging code and assets into an application bundle. Briefly describe what each of the following tools does and what problem each attempts to solve:

- Bundler (e.g. Webpack)
- Loader (e.g. Babel)
- Minimiser (e.g. Uglify)

(15 Marks)

- (b) Describe in detail, with code examples, how code reuse across a complex rich web application can be achieved.

(15 Marks)

- 3 (a) Briefly describe, with examples, each of the following concepts in asynchronous program execution in Javascript.

- Callback functions
- Concurrent request processing with promises
- Event streams

(18 Marks)

- (b) The **try-catch-finally** statement in JavaScript is of little use in asynchronous programming. Explain why this is the case, illustrating your answer with a failing example. Suggest a way that error handling can be achieved in asynchronous programming.

(12 Marks)

- 4 (a) Describe, in detail, each the following rich web technologies using code fragments to illustrate each of your answers.

- JSX (from React JS)
- The Elm Architecture
- The CSS flex-box model

(30 Marks)