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TECHNOLOGICAL UNIVERSITY DUBLIN
KEVIN STREET CAMPUS

BSc. (Honours) Degree in Computer Science (Infrastructure)

BSc. (Honours) Degree in Computer Science

BSc. (Honours) Degree in Computer Science (International)

Year 4

SEMESTER 1 EXAMINATIONS 2019/20

Rich Web Application Technology

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Two Hours

Instructions to Candidates
Question 1 is **compulsory.** Answer question 1 **and** any two of the other three questions.
Question s is worth 40 marks, all other questions are worth 30 marks

1 (a) Define the term rich web application. Briefly describe the typical technologies used and their roles in the construction of a rich web app.

(8 Marks)

(b) Describe what pseudo selectors are in CSS and what problem they solve. Consider the following code fragment:

```
<div id="pseudo-style">
   <p>My first paragraph</p>
   <p>My second paragraph</p>
</div>
<div>
   <p>My third paragraph</p>

   <p>My nth.. paragraph</p>
</div>
```

Make the first paragraph text colour red, the second paragraph text colour 'blue'. All other text within all other paragraphs should be black. Outline the css for this problem.

(8 Marks)

(c) What are higher order functions in Javascript? What is meant by a function closure? Give an example of declaring and using a closure.

(8 Marks)

(d) What is a stateful function component is in React JS? Illustrate your answer with an example declaration and component usage.

(8 Marks)

(e) Why use Elm? What problems is it trying to address with web development? What is meant by type inference?

(8 Marks)

2 (a) With the aid of a diagram <u>and</u> example code, describe the Cascading Style Sheets (CSS) Box Model and show how it can be used to space DOM elements.

(12 Marks)

(b) An asset bundler (like Webpack) allows CSS and Javascript to be shared across a large project using the ES6 export and import semantics. Explain what an asset bundler does and what problems it solves. Also, describe how an asset loader can work with third-party loaders (like Babel) to allow access to future technologies beyond the currently-supported W3C and standards and vendor features.

(18 Marks)

3 (a) What is the Document Object Model (DOM)? Show, using example code of your choice, how a developer can interact with DOM API to capture an input event using the following approaches

- A Callback Function
- An Observable Stream

(12 Marks)

(b) Describe the Promise API in Javascript, briefly illustrating, using code, how a function can return a promise and how a consumer uses a returned promise object. Describe, with an example, how promises can help to improve network throughput between a rich web application and the server

(18 Marks)

4 (a) Describe in detail JSX (from React JS) using code fragments to illustrate your answer. Also, explain in detail the Virtual DOM in React JS.

(12 Marks)

(b) Javascript and Elm support a functional programming paradigm. Explain what is meant by functional programming, mentioning the important features that a language must support in order to be considered functional. In your opinion, why do you think this style has become so popular in rich web application development in recent years?

(18 Marks)