Programme Code(s): DT211C; DT228; DT282

Module Code(s): CMPU 4023

CRN(s): 22423 & 31093

**TECHNOLOGICAL UNIVERSITY DUBLIN**

**KEVIN STREET CAMPUS**

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

BSc. (Honours) Degree in Computer Science

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

**Year 4**

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SEMESTER 2 OPEN BOOK EXAMINATIONS 2020/21

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**Enterprise Application Development**

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Ms. Pauline Martin

Ms. Sanita Tifentale

Duration

3 hrs

Exam script available 2 pm on date of the exam.

All exams submissions should be uploaded before 5pm on the date of the exam

Answer ALL questions.

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| **1.** | **(a)** |  | Explain in the process of a typical interaction between a browser and a server using AJAX shown in the picture and highlight the main advantage of this process. Use some basic code instructions to illustrate the example a little bit clearer.    (8 marks) |
| **(b)** |  | Imagine you were hired to create an API (Application Programming Interface) for an application where transmitted information must be kept confidential. Describe and contrast how the REST and SOAP technologies could be used to build an API with this security constraint. Of these, which is more suitable in your opinion?  (10 marks) |
| **(c)** |  | Given the following incomplete JavaScript code fragment. Provide code to complete the functionality.. The program asks the user for three parameters: the size of the array, the lower index and the higher index number. First, generate an array of the SIZE given by the user. Then, fill it with integers with random values from 1 to 100. Then, Display the result of summing all the elements between the two numbers representing the positions in the index (where the first is the lower and the second is the higher).  (15 marks)     |  | | --- | | Code:  <!DOCTYPE html>  <html>  <head>   <title>Array summation</title>  </head>  <body>   <h1>Summation of the elements of the array</h1>   <p>The following exercise calculates the summation of the numbers in a given range.</p>   <p>First number: </p>   <input type="number" id= "lower" value = "1">   <p>Second number: </p>    **//Complete here (4 pts)**     <button onclick="CalculateSummation()">Calculate</button>   <p id = "interval">The solutions: </p>   <script type="text/javascript">     function CalculateSummation()     {         const ARRAY\_LENGTH = document.getElementById("lower").size;         const randomArray = []         for(let i = 0; i<ARRAY\_LENGTH; i++)         {             randomArray.push(Math.floor(Math.random()\*10))             console.log(randomArray[i])         }         var low = document.getElementById("lower").value;  **//Complete here (3 pts)**         solutions = solutions + arraySummation(randomArray, low, upp);  **//Complete here (3 pts)**       }     function arraySummation(arraySummation, lower, upper)     {  **//Complete here (5 pts)**     }   </script>  </body>  </html> | |

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| **2** | **(a)** |  | A company that has implemented a server based on Node.js is thinking about using MongoDB rather than SQL for their future projects. The projects will be globally distributed and will be expected to support a high level of transactions. The company is concerned about the relatively high memory consumption of MongoDB due to its internal architecture. Discuss and contrast the main advantages and disadvantages of MongoDB over SQL.  (8 marks) |
| **(b)** |  | Discuss the main reasons that explain why the increase in the sales of mobile phones worldwide has boosted the popularity of the Bootstrap styling and component framework.  (10 marks) |
| **(c)** |  | Suppose you are a company in charge of managing an art gallery exhibition offered by different museums in different years where there are different items such as pictures or sculptures.   1. Explain and give examples of how the interface should be. Give examples for the GET method to retrieve information. And also for the POST, PUT, DELETE methods for new items (10 pts). 2. Give an example of a request to obtain a list of all the items exposed in the national museum in the year 2020 from this API (3 pts). 3. Update a picture called “Yellow Landscape” from the author “Roderic O’Conor” in the museum called “National Gallery” with the identifier 5014. (3 pts).   (16 marks) |

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| **3.** | **(a)** |  | Describe the process of routing in the context of a Web API using the Express framework. Support your answer with examples or code snippets.  (8 marks) |
| **(b)** |  | Discuss the difference between the concepts of user authentication and user authorisation in the context of enterprise API security. Give two examples of both of them.  (10 marks) |
| **(c)** |  | Discuss how HTTP Cookies can be used to facilitate the implementation of server-side sessions in enterprise web applications, and how that would differ from their possible use in stateless authorization solutions such as JWT.  (15 marks) |