S228/412C

DUBLIN INSTITUTE OF TECHNOLOGY

BSc. (Honours) Degree in Computer Science

Year 4

SUMMER EXAMINATIONS 2014/2015

ENTERPRISE APPLICATION DEVELOPMENT [CMPU4023]

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THURSDAY 14 MAY 2015 9.30 A.M. – 11.30 A.M.

TWO HOURS

ALL THE QUESTIONS ARE COMPULSORY

QUESTION 1 [TOTAL: 33]

a) Describe the REST architecture.
Describe its features.
What is a resource?
What is an action according to REST?
Describe the strength of using resources and actions.

[6+4+2+2 marks]

b) The recommended set of design principles for building correct RESTful applications include addressability, statelessness, connectedness and uniform interfaces. Describe each of them in detail.

[14 marks]

c) Suppose you have a database containing information about the football champions league. This contains information of football teams, football players of those teams, stadiums and matches scheduled between those football teams and stadiums.
Suppose you have to design a RESTful web application that performs the following operations:

- retrieve the list of stadiums
- retrieve the list of teams
- retrieve the list of players
- retrieve the list of players of a given team
- retrieve the list of matches
- retrieve the list of matches in a given stadium
- retrieve the list of matches of a given team
- add a new team
- add a new stadium
- add a new player for a given team
- add a new match (with the 2 teams involved and the date and stadium)
- update the information about a team
- update the information about a stadium
- update the information about a player
- update information about a match
- delete a player
- delete a game
- delete a stadium
- delete a team

Design the APIs entry (URL) for each of the above operations specifying the HTTP method according to the restful approach and guidelines.

[5 MARKS]

Question 2 [total: 17]

A) While developing software, it is a good practice to separate manipulation code and the code in charge of managing the information stored in the database. For this reason DAOs (database access object) can be employed.
Illustrate how DAOs work and their advantages.

[6 marks]

B) Describe the Model/View/Controller (MVC) pattern for software development. What are the advantages of structuring web- applications using MVC? How do the MVC components interact with each other? What is the role of each component?

[3+3+2+3 marks]

Question 3 [total: 27]

A) Describe why server-side scripting is nowadays more appropriate for the development of web applications. Describe the advantages of server-side scripting compared to CGI.

[12 marks]

B) Why are web-applications prone to security problems?
What are the main security guiding principles?

[4+4 marks]

C) What is an SQL injection?
How it is performed?
what are the consequences of such an attack?

[2+3+2 marks]

Question 4 [total: 23 marks]

A) *Test-driven development* (*TDD*) is a software *development* process that is applied while developing software and web-applications. Describe Test Driven Development illustrating how it works, the techniques employed and its advantages for traditional software development.

[11 marks]

B) String Calculator

Suppose you have to create a simple String calculator with a method ADD(inputstring) that takes one string parameter. This is contained in a class CALCULATOR.

The method can take 0, 1, 2 or an an unknown amount of numbers, and will return their sum (for an empty string it will return 0)
The numbers in the input strings can be only separated by commas (,) or semicolons (;) or a combination of both the delimiters.
For example "" or "1" or "1,5" or "5,64,1" or "5;6;1;67" or "88,4;1;55,66" are all valid input strings. Note the delimiter cannot occurs at the end of the input string.

Calling the ADD method with a string containing one or more negative numbers or other alphabetical characters will cause the ADD method itself to return false.

Write all the **tests** for the ADD method of the class CALCU in php (or pseudo-code) including also the SetUP() and TearDown() methods. In other words, you have to test whether the method behaves in the proper way and returns what is expected including extreme cases

[6 marks]

C) Write the **code** (php or pseudo-code) of the ADD method and the class class CALCULATOR.

[6 MARKS]