

UNIVERSITY OF BOLTON

SCHOOL OF CREATIVE TECHNOLOGIES

**BSC (HONS) COMPUTING & WEBSITE
DEVELOPMENT**

SEMESTER TWO EXAMINATION 2018/2019

INTERNET APPLICATIONS & SERVER SYSTEMS

MODULE NO: CPU5005

Date: Monday 20th May 2019

Time: 10:00 – 12:00

INSTRUCTIONS TO CANDIDATES:

There are **SIX** questions on this paper.

Answer **ANY FOUR** questions.

All questions carry equal marks.

Marks for parts of questions are shown in brackets.

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Question 1

a. With reference to the design and development of internet applications in Visual Studio 2017 using ASP.NET and the NET platform, briefly describe each of the following terms:

- i. ADO.NET
- ii. IIS Express
- iii. LocalDB
- iv. NuGet Package Manager
- v. LINQ
- vi. Framework Class Library
- vii. Common Language Runtime

(14 marks, 2 marks each)

b. The .NET platform supports many programming languages, identify 3 of them and explain why a programmer might decide to use one in preference to the others. Highlighting at least 3 differences between them.

(6 marks)

c. .NET has been around for some time but in recent years, .NET Core was released by Microsoft. State when the first .NET Framework version was released to the public. Briefly explain .NET Core is and its similarities and differences to the .NET Framework.

(5 marks)

Total 25 marks

Question 2

An increasingly common trend for SMEs is for their websites to be built and maintained using an “off-the-shelf” CMS (Content Management System).

a. Briefly explain what a CMS is and describe examples of it.

(5 marks)

b. Discuss the *advantages* to a business of having their website constructed in and managed by a CMS and in what circumstances it might be *appropriate* to use one to build or maintain a website.

(8 marks)

Question 2 continues over page...

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Question 2 continued...

- c. Discuss the *disadvantages* to a business of having their website constructed in and managed by a CMS and in what circumstances it might be *inappropriate* to use one to build or maintain a website. **(8 marks)**
- d. Explain two alternative approaches to using an “off-the-shelf” CMS for an SME wanting to build and maintain a website. **(4 marks)**

Total 25 marks

Question 3

ASP.NET is intended to allow developers to be able to create solutions for a number of different kinds of internet applications and, for one of these kinds of applications, it implements a framework and a range of technologies for building applications using the MVC software design pattern.

- a. Identify and briefly describe the 4 key different kinds of applications ASP.NET is primarily designed to help developers create more easily. **(8 marks)**
- b. With reference to ASP.NET, explain the term MVC and the kinds of internet-related applications it facilitates easier development of. **(10 marks)**
- c. Briefly describe 2 other development frameworks that implement the MVC design pattern. **(2 marks)**
- d. List advantages and disadvantages of using the MVC design pattern. **(5 marks)**

Total 25 marks

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Question 4

Data-driven, dynamic websites are now common place and typically the data is stored in a backend database and accessed by programming code. Such database servers are produced by a variety of vendors, both open source and commercial.

- a. Identify 3 relational database products that could be used to drive a data-driven website built for an SME. **(3 marks)**
- b. Explain what an Object Relational Mapper (ORM) is and how it simplifies and eases access to relational databases compared with older data access libraries. **(6 marks)**
- c. State 2 examples of popular ORM frameworks other than Entity Framework. **(2 marks)**
- d. Some ORM frameworks, such as Entity Framework, allow developers to use them in a “code first” or “database first” way. Explain the meaning of both these terms, the advantages and disadvantages of each and why a developer would choose to use each one in preference of the other. **(10 marks)**
- e. When using Entity Framework “code first” migrations in Visual Studio 2017, state the two commands you would execute to migrate class model changes to the database in the Package Manager Console and explain why migration is necessary. **(4 marks)**

Total 25 marks

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Question 5

As a member of a web development team creating a web application for a cattery (cat boarding kennels), you are required to create a model classes to represent details about each cat and then write ASP.NET MVC controller methods to perform selected CRUD operations for the model class whereby the data will be stored in a relational database and the Entity Framework ORM used to read from/write to it.

The cat class should contain the following properties:

ID, Name, DateOfBirth, WeightInKgs, Gender*, Breed*

* denotes that a non-key property cannot be nullable.

Gender is intended to take the value of an enumerated type and can be one of "Male" or "Female".

- a. Write the code for the Gender enumeration in a file named Gender.cs.

(3 marks)

- b. Write the code for the Cat class in a file named Cat.cs, the class should contain any necessary and relevant data property annotations to make properties mandatory, define and enforce foreign keys, define captions for them to display in friendly, human-readable ways etc.

(6 marks)

- c. Write the code for the two CatController CRUD-type methods (one a get and one a post) required to implement an Edit operation for a specific Cat record, taking into consideration that an Entity Framework context which contains a .Cats DbSet property has already been declared in the controller as a private attribute called db.

(14 marks)

- d. Write the code for the CatController CRUD-type method that returns a list of all cats to a view called Index, taking into consideration that an Entity Framework context which contains a .Cats DbSet property has already been declared in the controller as a private attribute called db.

(2 marks)

Total 25 marks

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Question 6

- a. Explain what is meant by the term “3-tier architecture” in the context of internet applications.
(9 marks)
- b. Briefly describe the role of HTTP and web server software and identify two different web server implementations that run on popular server operating systems.
(6 marks)
- c. Over the past few years, web developers have increasingly chosen to develop and deploy websites and web-based applications as Single Page Applications (SPAs). Explain SPAs and how they differ from traditional websites/web applications from both the user and programmer points of view and identify 3 frameworks that can be used to construct SPAs.
(10 marks)

Total 25 marks

END OF QUESTIONS