The University of Nottingham

SCHOOL OF COMPUTER SCIENCE

A LEVEL 4 MODULE, MOCK EXAM AUTUMN SEMESTER 2018-2019

Databases, Interfaces and Software Design Principles

Time allowed ONE Hour THIRTY Minutes

Candidates may complete the front cover of their answer book and sign their desk card but must NOT write anything else until the start of the examination period is announced

Answer All Questions in Section A and Section B.

No Calculators should be necessary in this exam

Dictionaries are not allowed with one exception. Those whose first language is not English may use a standard translation dictionary to translate between that language and English provided that neither language is the subject of this examination. Subject specific translation dictionaries are not permitted.

No electronic devices capable of storing and retrieving text, including electronic dictionaries, may be used.

DO NOT turn examination paper over until instructed to do so

ADDITIONAL MATERIAL: No Additional written material is required for this paper but students will need access to computers, Moodle and the following web material:

http://theselfsufficientliving.com/breeds-of-woolmeat-and-dairy-sheep/

INFORMATION FOR INVIGILATORS: Ensure that all students are able to log on before starting the exam.

In the questions of Section A and Section B you will be following this theme:

You are being asked to design a web site with a back end database on the breeding and rearing of sheep. The process involves you first at looking at a related website. The related site is available at

http://theselfsufficientliving.com/breeds-of-woolmeat-and-dairy-sheep/

The database will store details on sheep' names and characteristics. For the exam the sheep have names, types and facts. The data can be found on the example web page. The types of sheep are: Wool sheep breeds, Meat breeds, dual purpose (meat and wool) hair sheep and dairy breeds. The names of examples of these sheep types are given on the web page with some information about the sheep. (Some other information on the example site has no relationship to the exam and I claim no responsibility for any material on the site.)

The questions is SECTION A will be answered in the answer booklet and those in SECTION B will be answered on the computer. You will need to log on to the Moodle page for the module for this exam as some answers will be uploaded to Moodle.

SECTION A Answer These questions in your answer booklet

1. **Question 1:** All interfaces can be assessed in various ways. One of these is to analyse them using a set of design guidelines. The following are a number of guidelines that were covered in lectures:
   - Think about the appropriateness of controls for the actions to be achieved
   - Avoid ambiguity of representation where this is important
   - Support logical sequencing of activity
   - Separate out functional groupings
   - Give feedback to the user (system state etc.)
   - Think about context of use
   - Prevent accidental activation
   - Exploit perceptual processes
   - Use natural mappings

   [overall 18 marks]

   a. Pick four of the guidelines and describe why they would be good for judging the quality and effectiveness of a user interface.

   [8 Marks]

   b. Using your chosen guidelines look at the example web interface available at: http://theselfsufficientliving.com/breeds-of-woolmeat-and-dairy-sheep/ and evaluate facets of the interface. Make it clear which guideline you are using and why the interface fulfils or fails to fulfil the requirement of that guideline.

   [10 Marks]

Question 2: This question relates to the use of a cognitive walkthrough in assessing an interface. **[overall 18 marks]**

a. Explain what is meant by a "cognitive walk though" as a means of evaluating an interface.

[6 Marks]

b. Choose one aspect of the interface at http://theselfsufficientliving.com/breeds-of-woolmeat-and-dairy-sheep/ and give a description of how you would perform a walkthrough for that aspect.

[6 Marks]

c. Undertake the cognitive walk through you have described in b) and describe your evaluation of the result.

[6 Marks]

Question 3: This section relates to designing normalised databases. **[overall 18 marks]**

a. Databases should be in third normal form. Give 2 reasons why this is important.

[6 Marks]

b. Produce an entity relationship diagram for the sheep database described above. Make sure your entities will conform to the basic rules of third normal form. Describe why you believe they conform to third normal form.

[12 Marks]

SECTION B Answer These Questions On The Computer

Question 4: In this question you will create an example of part of the sheep database. It will have three tables as described below. **[overall 18 marks]**

a. Log on to mersey.cs.nott.ac.uk and create a new database with name: <username>_sheep in your user space where <username> will be your username. Do this using setup_mysql. (You will not have to add your username into the name as this will be done by the system.) Either change the password or make sure to remember it. [2 Marks]

b. Use mysql to create the three tables described below: Table Sheep: Field 1) id an integer as primary key. Field 2) name a string of up to 50 characters. Table Types: Field 1) tid an integer as primary key. Field 2) typeName a string of up to 256 characters. Table Link: Field 1) sheepID an integer as foreign key referencing Sheep.id. Field 2) typeID an integer as foreign key referencing Types.tid. A primary key constraint should be added as a combination of sheepID and typeID and called pKey. [12 Marks]

c. Use mysqldump to save your work to a file called Question4.sql. Upload your result to the Moodle page where it requires you to upload the answer to question 4 of the exam. [4 Marks]

Question 5: Using a text editor of your choice create a PHP page with the following purpose:

The page is to allow a new entry to the sheep' database for the three tables described in question 4. It will not be necessary to actually add data so you should be able to complete this question without having created the database. The page should call itself and check whether data has been added in the correct way. For full marks you will need to ensure that your entry of any data is sanitised (sanitized). You will also need to provide commands to check whether the sheep has been added previously. Upload your finished code to the Moodle page where submission of Question 5 of the exam is required. **[overall 18 marks]**