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BCS Digital Industries Apprenticeship

Software Developer Synoptic Project – Quiz Manager

Version 1.2
November 2018

Change History

Any changes made to the project shall be clearly documented with a change history log. This shall include the latest version number, date of the amendment and changes made. The purpose is to identify quickly what changes have been made.

Version Number and Date	Changes Made
Version 1.0 April 2018	Document created
Version 1.1 July 2018	Submission email address amended
Version 1.2 November 2018	Declaration template removed. To be supplied in a separate document.

Project Overview and Objectives

You work for WebbiSkools Ltd, a software company that provides on-line educational solutions for education establishments and training providers. Your manager would like you to design, build, and test a database-driven website to manage quizzes, each consisting of a set of multiple-choice questions and their associated answers. The website's capabilities will only be accessible to known users. Users with full permissions will be able to view and edit the questions and answers; users with lesser permissions will be able to view them but not edit them; users with minimal permissions will only be able to see the questions.

You will need to:

1. **Review all the key information and create a design for the quiz manager;**
2. **Construct the quiz manager in accordance with the design;**
3. **Test that the quiz manager meets its requirements;**
4. **Document what you built.**

Project Outputs and Deliverables

Once completed, to demonstrate completion of the tasks you will be asked to provide a series of outputs, that should be submitted together with the synoptic project declaration.

Deliverable	Output	Evidence
Design	Create simple design documentation to describe what the quiz manager will do and how it will work. This is likely to include: • Any assumptions made about the requirements or changes made to the requirements; • Sketches of the user interface; • Brief explanations describing what each element of the user interface does; • Use cases and/or user stories and/or sequence diagrams describing the various interactions that users can have with the system; • One or more data models representing the data required to represent users and their permissions, quizzes, questions and answers.	Word or PDF or similar.
Construction	Write a program that implements the quiz manager as a database-driven website. • Your program should be logically structured. • It should follow good design and coding practices. • The website does not need to be deployed on the internet: accessing it locally is sufficient.	Program code, database schemas, configuration data etc.

Test	Create and execute a set of tests that demonstrate that the program meets its requirements. • The tests may be manual or automated. • The tests may be written before, after, or at the same time as the program code. • For each test you should document its expected outcome and the actual result.	Any suitable format e.g. textual documents, spreadsheets, program code.
Document	Document the results of your work. • Discuss any limitations of your design and/or implementation. • Propose future improvements. • Create a user guide.	Word or PDF document or similar. A video might be suitable for a user guide.

Project Information and Equipment

To complete this project, you will need to review all the information in the bullet list below. This can be found in the Appendix, and will enable you to deliver the key outputs and deliverables for this project as detailed in the table above.

- Background information;
- Business requirements.

In addition, you will be provided with access to a virtual platform or alternatively if a virtual platform is not available, your training provider and or employer will provide you with all resources required to complete your project including:

- computer equipment with access to the Internet;
- an appropriate software development environment;
- suitable document preparation software.

Apprenticeships Competencies Covered

Competency Standard
Logic: writes good quality code (logic) with sound syntax in at least one language.
User interface: can develop effective user interfaces for at least one channel.
Data: can effectively link code to the database/data sets.
Test: can test code and analyse results to correct errors found using either V-model manual testing and/or using unit testing.
Design: can create simple data models and software designs to effectively communicate understanding of the program, following best practices and standards.
Analysis: can understand and create basic analysis artefacts, such as user cases and/or user stories.
Can apply good practice approaches according to the relevant paradigm (for example object oriented, event driven or procedural).
Can apply the maths required to be a software developer (e.g. algorithms, logic and data structures).

Appendix – Background Information & Business Requirements

The following additional information has been provided to help you with the completion of the project.

Background information

- WebbiSkools Ltd provides on-line educational solutions to commercial and government clients, such as universities and training departments of large industrial companies.
- This database-driven website enables the creation and management of quizzes consisting of multiple-choice questions.
- The website should be designed and built to production standards and should adhere as far as possible to industry best practices.
- The website should be designed to be straightforward to re-brand, by encapsulating the definition of colour schemes, styles, company logos and so on.
- Any suitable technology stack with which you are familiar may be used to construct the website.
- For this version of the website the set of known users with their passwords and permissions will be pre-configured; the website does not need to provide capabilities for user registration, password reset, or change of permission.

- Related but separate websites will be used to allow students to take quizzes, and will manage their marks and grades. You are not required to consider these.
- You may want to get a simplified viewing-only version of the website working first before moving onto the editing version.

Business requirements

Users and permissions

- The set of users with their usernames, passwords and permissions should be pre-configured. This may be done by manually inputting data into the database, through a separate user-config file (e.g. an XML, JSON or CSV file), or any other mechanism of your choice.
- Stored passwords should be hashed for security, using a suitable hash algorithm.
- Permission levels should be one of {Edit, View, Restricted}, where Edit means the ability to add, delete and change questions and answers, View means the ability to view questions and answers, and Restricted means the ability to view questions only.
- Only known users can login to the website. Once logged in, a user can only carry out the actions allowed by their permission level.
- The website will need to maintain user session state while the user is logged in.
- You may assume that the number of users with edit permissions is small, and the probability of more than one user attempting to edit a quiz simultaneously is negligible.
- A user can logout, which will take them back to the login page.

Quizzes

- A quiz has a title and a numbered sequence of questions.
- Each question is formulated as a text string, e.g. “What is the approximate population of London?”
- Each question is associated with a set of between 3 and 5 answers. Each answer is a text string, shown in the user interface indexed by an uppercase character (‘A’, ‘B’, ‘C’ etc). For example, the answers to the above question might appear like this:
  - A. “250 thousand”
  - B. “1 million”
  - C. “9 million”
  - D. “78 million”

Viewing and Editing

- A user with Restricted permission can select a quiz from all available quizzes. Having selected the quiz, all the questions in that quiz can be viewed on the screen. If the quiz is too large to fit, the user should be able to scroll up and down to see it.

- A user with View permission can select and view a quiz as above. They can also select a question to see the associated answers.
- A user with Edit permission can select a quiz and view questions and answers as above. They can also make and save all the following changes:
    - Create new quizzes and delete existing ones;
    - Add and delete questions at any point in the numerical sequence of a quiz (which may cause the questions to be re-numbered);
    - Edit the text of any questions;
    - Add and delete answers to any question (which may cause the answers to be re-indexed);
    - Edit the text of any answer.

On completion, please upload documentation relating to the project deliverables and a completed project declaration (provided separately) to the relevant folder location as specified by your training provider. Alternatively, please send to epateam@bcs.uk