Report of the coursework2 for COMP23111

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Username: m33394mr

Module code: Directory(php)

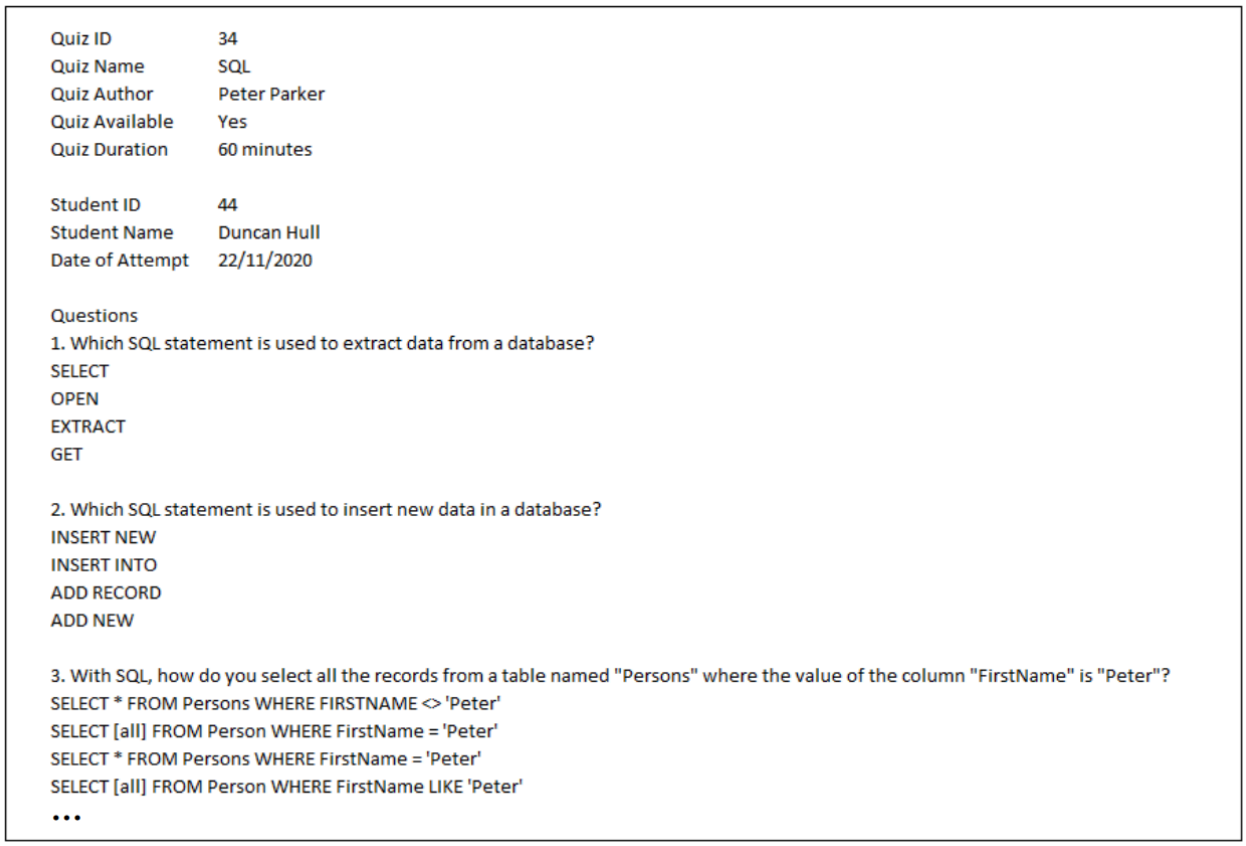
Date: 27/11/2021

Contents:

Part A: Normalisation

A.1 Introduction to section

In this apart, normalization will be applied for a given information source from UNF to 3NF. And here is the image of the given information:



Quiz ID 34
Quiz Name SQL
Quiz Author Peter Parker
Quiz Available Yes
Quiz Duration 60 minutes

Student ID 44
Student Name Duncan Hull
Date of Attempt 22/11/2020

Questions
1. Which SQL statement is used to extract data from a database?
SELECT
OPEN
EXTRACT
GET

2. Which SQL statement is used to insert new data in a database?
INSERT NEW
INSERT INTO
ADD RECORD
ADD NEW

3. With SQL, how do you select all the records from a table named "Persons" where the value of the column "FirstName" is "Peter"?
SELECT * FROM Persons WHERE FIRSTNAME <> 'Peter'
SELECT [all] FROM Person WHERE FirstName = 'Peter'
SELECT * FROM Persons WHERE FirstName = 'Peter'
SELECT [all] FROM Person WHERE FirstName LIKE 'Peter'
...

A.2 UNF

By looking through the information given, it shows some sub-information for the quiz like its ID and Name etc. And some information of student. The last important things given is the question including the specific question and the options. Therefore, some fields and sample data will be identified. Besides, key will be identified and underlined.

1>

	record1	Record2	record3
Quiz ID	34	34	34
Quiz Name	SQL	SQL	SQL
Quiz Author	Peter Parker	Peter Parker	Peter Parker

Quiz Available	Yes	Yes	Yes
Quiz Duration	60 minutes	60 minutes	60 minutes
Student ID	44	44	44
Student Forename	Duncan	Duncan	Duncan
Student Surname	Hull	Hull	Hull
Data of Attempt	22/11/2020	22/11/2020	22/11/2020
Question	Which SQL statement is used to extract data from a database?	Which SQL statement is used to insert new data in a database?	With SQL, how do you select all the records from a table named “Persons” where the value of the column “FirstName” is “Peter”
Option1	SELECT	INSERT NEW	SELECT * FROM…
Option2	OPEN	INSERT INTO	SELECT [all] FROM…
Option3	EXTRACT	ADD RECORD	SELECT * FROM…
Option4	GET	ADD NEW	SELECT [all] FROM…

A.3 1NF

As there are some repeating attributes (question) in the UNF, a new table with bound key will be created and it will remove repeating attribute.

1>

Quiz ID	34
Quiz Name	SQL
Quiz Author	Peter Parker
Quiz Available	Yes
Quiz Duration	60 minutes
Student ID	44

Student Forename	Duncan
Student Surname	Hull
Data of Attempt	22/11/2020

2>

Quiz ID	34
Question	Which SQL statement is used to extract data from a database?
Option1	SELECT
Option2	OPEN
Option3	EXTRACT
Option4	GET

A.4 2NF

By check partial independencies, it seems like that the name of the student is not dependent on the quiz ID, but which student takes which quiz is related to the quiz id and the student id. Then remove any to new table with copy of determinant.

1>

Quiz ID	34
Quiz Name	SQL
Quiz Author	Peter Parker
Quiz Available	Yes
Quiz Duration	60 minutes

2>

Quiz ID	34
Student ID	44

Data of Attempt	22/11/2020

3>

Student ID	44
Student Forename	Duncan
Student Surname	Hull

4>

Quiz ID	34
Question	Which SQL statement is used to extract data from a database?
Option1	SELECT
Option2	OPEN
Option3	EXTRACT
Option4	GET

A.5 3NF

By checking transitive dependencies, the 3NF should be same as the 2NF.

1>

Quiz ID	34
Quiz Name	SQL
Quiz Author	Peter Parker
Quiz Available	Yes
Quiz Duration	60 minutes

2>

Quiz ID	34
Student ID	44
Data of Attempt	22/11/2020

3>

Student ID	44
Student Forename	Duncan
Student Surname	Hull

4>

Quiz ID	34
Question	Which SQL statement is used to extract data from a database?
Option1	SELECT
Option2	OPEN
Option3	EXTRACT
Option4	GET

Part B: Relational Schema

B.1 Introduction to section

Before doing the relational schema, make some assumptions:

1. For the quiz author which also the staff, they have username, password, email and unique ID.
2. Assume that there is a Take No. which records which student did which quiz and the date or other things
3. For student, assume that they also have username, password, email
4. However, both the user information stuff like username, email or password from students and staff will be put together with an entity called user, and the user status state whether the user is a student or a staff. This helps to make the database easier to look for.
5. Also, ID is assumed to exist as the content of the question will be too long if it is used as a primary key.

B.2 Schema

Then the relational schema should looks like:

Quiz(Quiz ID, Quiz name, Author ID, Quiz Available, Quiz Duration)

FK Author ID —> Author(Author ID)

FK Quiz ID —> Question(Quiz ID)

FK Quiz ID —> Answer(Quiz ID)

Author(Author ID, Author name, Username)

Takes(Take No, Quiz ID, Student ID, Date of Attempt, Grade)
FK Quiz ID —> Quiz(Quiz ID)
FK Student ID —> Student(Student ID)

Student(Student ID, Student Forename, Student Surname, Username)

User(Username, Password, Email, Status)
FK Username —> Student(Username)
FK Username —> Author(Username)

Question(ID, Question ID, Quiz ID, Question, Option1, Option2, Option3, Option4)
FK Question ID —> Answer(Question ID)

Answer(ID, Question ID, Quiz_ID, Answer)

Part C: Implementation

C.1 Introduction to section

With the assumption given in the part B, the schema is created with MySQL on phpMyAdmin and the table name is called “m33394mr”.

C.2 MySQL Statements

```
USE `m33394mr`;

CREATE TABLE IF NOT EXISTS `Answer` (
    `ID` MEDIUMINT NOT NULL AUTO_INCREMENT,
    `Question_ID` int NOT NULL,
    `Quiz_ID` int NOT NULL,
     `Answer` varchar(80) NOT NULL,
     PRIMARY KEY (`Question_ID`, `Quiz_ID`)
) DEFAULT CHARSET=utf8;

CREATE TABLE IF NOT EXISTS `Question` (
    `ID` MEDIUMINT NOT NULL AUTO_INCREMENT,
    `Question_ID` int NOT NULL,
    `Quiz_ID` int NOT NULL,
```

```
    `Question` varchar(80),
    `Option_1` varchar(80),
    `Option_2` varchar(80),
    `Option_3` varchar(80),
    `Option_4` varchar(80),
    PRIMARY KEY (`Question_ID`, `Quiz_ID`),
    UNIQUE (`Question_ID`, `Quiz_ID`),
    INDEX (`ID`),
    FOREIGN KEY (`Question_ID`) REFERENCES Answer(`Question_ID`)
) DEFAULT CHARSET=utf8;


CREATE TABLE IF NOT EXISTS `Student` (
    `Student_ID` int NOT NULL,
    `Student_Forename` varchar(20) NOT NULL,
    `Student_Surname` varchar(20) NOT NULL,
    `Username` varchar(15) NOT NULL,
    PRIMARY KEY (`Student_ID`, `Username`),
    INDEX (`Username`),
    UNIQUE(`Student_ID`, `Username`)
) DEFAULT CHARSET=utf8;

CREATE TABLE IF NOT EXISTS `Author` (
    `Author_ID` int NOT NULL,
    `Author_name` varchar(30) NOT NULL,
    `Username` varchar(15) NOT NULL,
    PRIMARY KEY (`Author_ID`, `Username`),
    INDEX (`Username`),
    UNIQUE (`Author_ID`, `Username`)
) DEFAULT CHARSET=utf8;

CREATE TABLE IF NOT EXISTS `User` (
    `Username` varchar(15) NOT NULL,
    `Password` int unsigned NOT NULL,
    `Email` varchar(30) NOT NULL,
    `Status` varchar(10) NOT NULL,
    PRIMARY KEY (`Username`),
    UNIQUE (`Username`, `Email`),
    FOREIGN KEY (`Username`) REFERENCES Student(`Username`),
    FOREIGN KEY (`Username`) REFERENCES Author(`Username`)
) DEFAULT CHARSET=utf8;

CREATE TABLE IF NOT EXISTS `Quiz` (
    `Quiz_ID` int NOT NULL,
    `Quiz_name` varchar(20),
```

```
    `Author_ID` int NOT NULL,
    `Quiz_Available` varchar(10) NOT NULL,
    `Quiz_Duration` varchar(20),
    PRIMARY KEY (`Quiz_ID`),
    FOREIGN KEY (`Quiz_ID`) REFERENCES Question(`Quiz_ID`),
    FOREIGN KEY (`Quiz_ID`) REFERENCES Answer(`Quiz_ID`),
    FOREIGN KEY (`Author_ID`) REFERENCES Author(`Author_ID`)
) DEFAULT CHARSET=utf8;

CREATE TABLE IF NOT EXISTS `Takes` (
    `Take_No` MEDIUMINT NOT NULL AUTO_INCREMENT,
    `Quiz_ID` int NOT NULL,
    `Student_ID` int NOT NULL,
    `Date_of_Attempt` varchar(20),
    `Grade` int NOT NULL,
    PRIMARY KEY (`Take_No`),
    UNIQUE (`Take_No`, `Quiz_ID`, `Student_ID`),
    FOREIGN KEY (`Quiz_ID`) REFERENCES Quiz(`Quiz_ID`),
    FOREIGN KEY (`Student_ID`) REFERENCES Student(`Student_ID`)
) DEFAULT CHARSET=utf8;
```

Part D: The Application

D.1 Introduction to the section

In this section, an application created by PHP and MySQL was made to implement a quiz system. In this system, a database named “m33394” was created to store data from the users, quizzes and questions. Firstly, user can register and login. And users can be divided by staff and student. A staff can add quizzes, delete quizzes and update quizzes while student can view all quizzes and pick one available quiz to do and get final mark. Student can also view the history for doing quizzes. Next is the guide to show how to use the quiz system.
Remind: As the password of the root database is limited, in the code, password: <Ren010218…> is used to connect to the localhost database.

D.2 Guide

D.2.1 For staff

D.2.1.1 Start
The application is started in the index page where users can choose sign in or sign up (figure D.2.1.1). Now assume that users have not created an account as a staff so choose sign up.

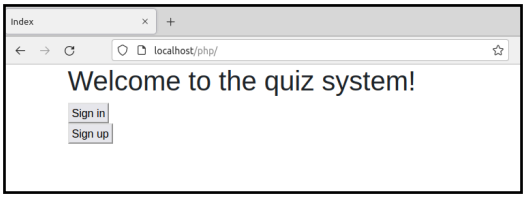


Figure D.2.1.1 Index page

D.2.1.2 Register

Once choose sign up, users will go to the register page where users can input the username, email, password (with confirmation) and identify whether they are a staff or a student (figure D.2.1.2).

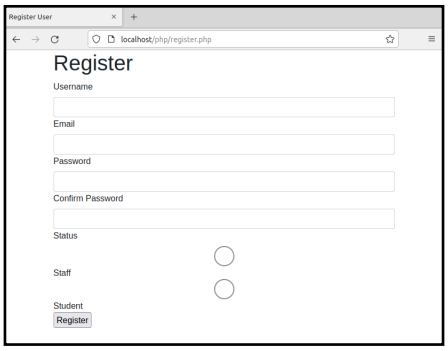


Figure D.2.1.2 Register page

However, for one of the cases where username has been user, confirm password does not match to the password and password used does not satisfy the requirement (numeric and longer than 3), the application will tell users try again when users click the Register button (figure D.2.1.2.2).

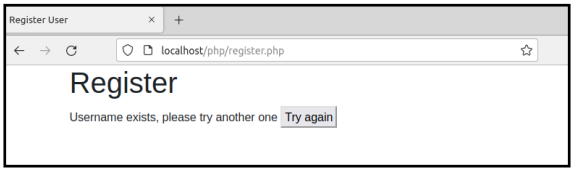


Figure D.2.1.2.2 Notice when register failed

D.2.1.3 Complete information

Once users have been registered successfully, the user will see the website showing the state “staff” and the username, telling them to finish their personal information. (Figure D.2.1.3)

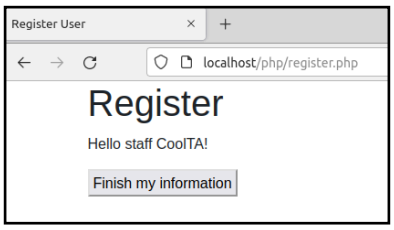


Figure D.2.1.3 Finish personal information

After click the button, the page will go to the completing information page for staff where the staff ID and staff real name are needed (figure D.2.1.3.2).

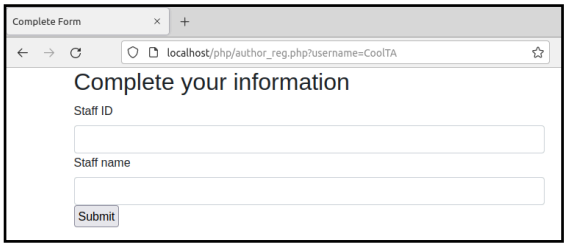


Figure D.2.1.3.2 complete information

D.2.1.4 Login

After submit the staff information and click the “go to Login” button, the page will become the Login Page where users input the username and password (figure D.2.1.4).

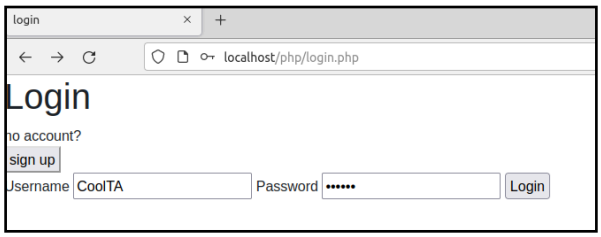


Figure D.2.1.4 complete information

If the username input does not exist, or the password input is not correct, the application will tell the user to try again, or users can just register a new account as well.

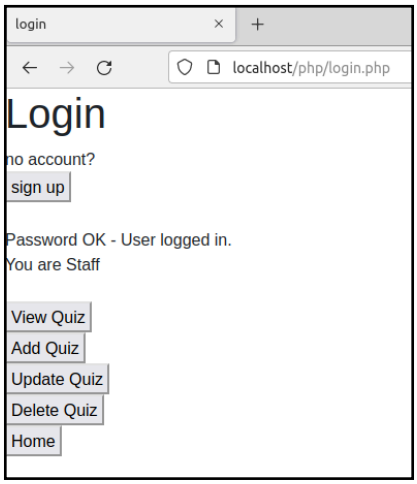


Figure D.2.1.4.2 Successfully login

Once user successfully logged in ,there will have some button go to different pages and do the related functionality. Let the user go to Home page first.

D.2.1.5 Home

In the Home page, there are just some buttons which will lead user to each page (figure D.2.1.5).

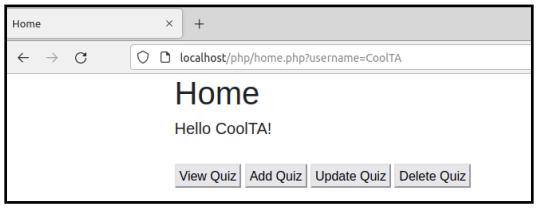


Figure D.2.1.5 Home page

D.2.1.6 Add Quiz

In the Add Quiz page, a staff need to input the Quiz Name, Available Status and Estimate Duration and submit them (figure D.2.1.6)

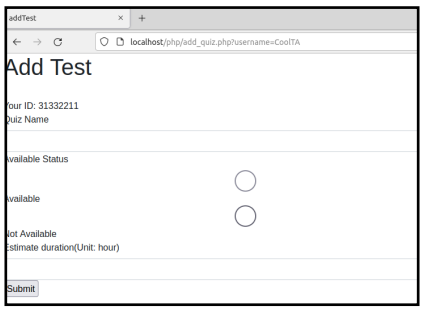


Figure D.2.1.6 Add Quiz Info

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Then the staff will add questions in this quiz and also input the correct answer (figure D.2.1.6.2)

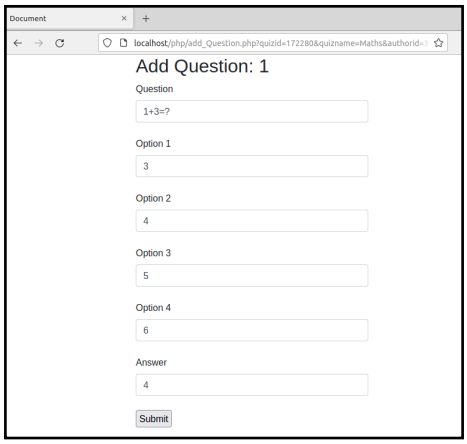


Figure D.2.1.6.2 Add Question for Quiz

After add one question, the page will ask staff whether stop adding or continue adding questions (figure D.2.1.6.3).

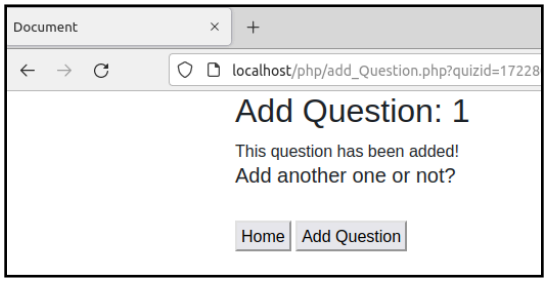


Figure D.2.1.6.3 Ask

D.2.1.7 Update Quiz

When clicking the Update Quiz button on the Home page, the page will show the quizzes created by the current using staff and show the quiz id and other information of the quiz (figure D.2.1.7).

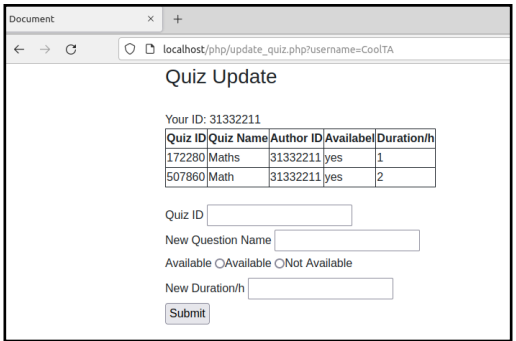


Figure D.2.1.7 Update Quiz

The staff can update the quiz name, available status and duration of the quiz by inputing the id of the quiz. Once updated, a new table of the quiz will appear and lead the user to home page again.

D.2.1.8 Delete Quiz

When clicking the Delete Quiz button on the Home page, the page will show the quizzes created by the current using staff and the information of the quiz. The staff can just input the quiz id to delete the target quiz (figure D.2.1.8).

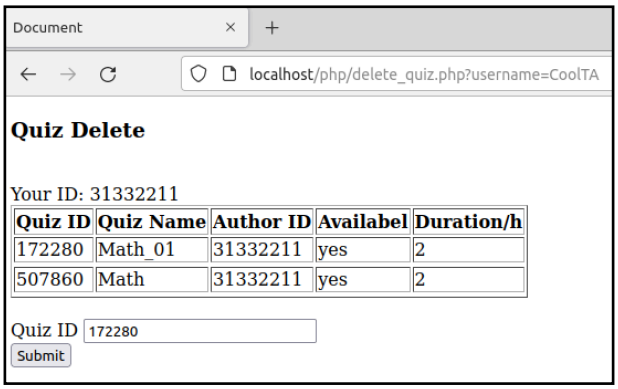


Figure D.2.1.8 Delete Quiz

D.2.1.9 View Quiz

When clicking the View Quiz button on the Home page, the page will just show the quizzes created by the current using staff and a button leading to the home page.

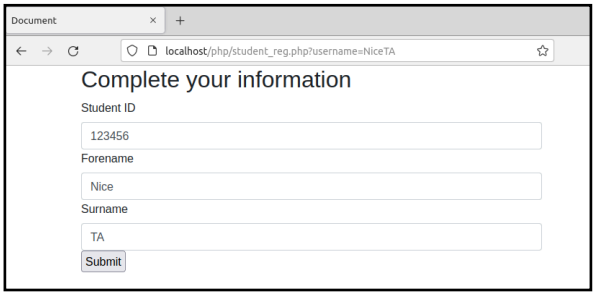
D.2.2 For Student

D.2.2.1 Register

Some steps are similar to the registration as a staff, but by identifying student on register page, the complete information session will be different.

D.2.2.2 Complete Information

When registering as a student, the completing information page will show a different form to collect the user information (figure D.2.2.2).



D.2.2.3 Login

Same steps as login as a staff, but the differences are the view after login(figure D.2.2.3).

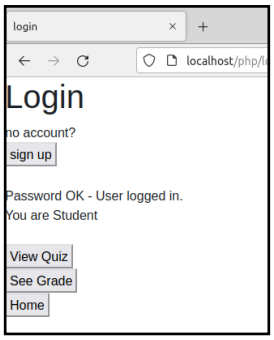


Figure D.2.2.3 After Login

D.2.2.4 Home

Similar to the home page for staff but with different buttons.

D.2.2.5 View Quiz

This page looks same as the view quiz page for staff, but for student, it will show all of the quiz created and student can click the Quiz Name to do the quiz (figure D.2.2.5).

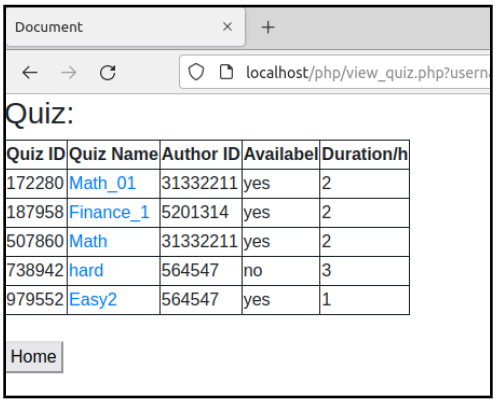


Figure D.2.2.5 View Quiz

However, if the student choose an unavailable quiz, it will tell the student that is unavailable and choose another one.

D.2.2.6 Do Quiz

Once student enter one quiz and start to do the quiz, the page will show all the questions in this quiz. Student just need to input all the answers and submit(figure D.2.2.6).

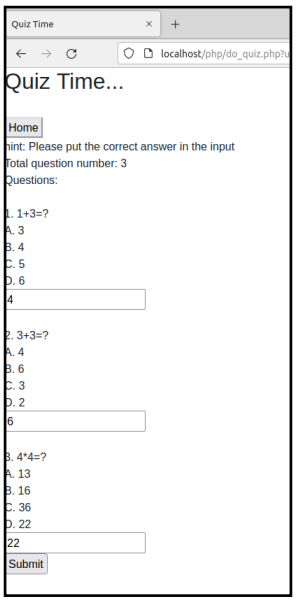


Figure D.2.2.6 Quiz time

Once submit, it will show the grade the student just done on this quiz (figure D.2.2.6.2).

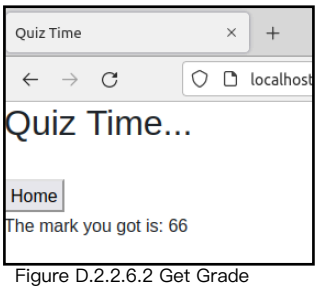


Figure D.2.2.6.2 Get Grade

D.2.2.7 View Grade

When clicking the Grade button on the home page, it will show all of the taken history of the student, including the quiz id, attempt date and the grade got on that quiz (figure D.2.2.7)

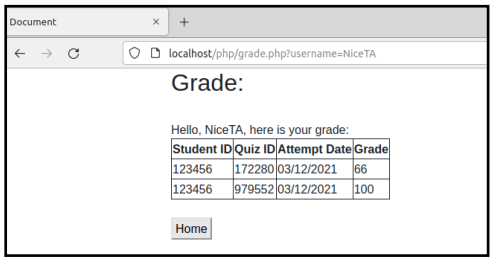


Figure D.2.2.7 View Grade

Part E. Stored Procedures and Triggers

E.1 Introduction to the section

In this section, a stored procedure will be created to store the student name and the grade which is less than 40. Also a trigger will be created to log the staff id, quiz id and current date and time.

E.2 Stored Procedure

As there is a table named “Takes” will record all the students who takes a quiz and their grade, this procedure can be created easily. Here is the SQL:

```
DELIMITER ^
CREATE PROCEDURE lowGrade ()
        BEGIN
        SELECT Student_ID,
                Student_Forename,
            Student_Surname,
            Grade
       FROM Takes
       WHERE Grade < 40;
   END ^
DELIMITER ;
```

E.3 Trigger

A new table called “Delete_Quiz” will be created to store the data when a quiz is deleted.

```
CREATE TABLE IF NOT EXISTS `Delete_Quiz` (
        `Quiz_ID` int NOT NULL,
    `Author_ID` int NOT NULL,
    `Delete_Date` DATE NOT NULL,
    `Delete_Time` TIME NOT NULL,
    PRIMARY KEY (`Quiz_ID`)
) DEFAULT CHARSET=utf8;

DELIMITER ^
CREATE TRIGGER after_delete_quiz
        AFTER DELETE
    ON Quiz FOR EACH ROW
    BEGIN
        INSERT INTO Delete_Quiz(
          Quiz_ID,
          Author_ID,
          Delete_Date,
          Delete_Time)
       VALUES(OLD.Quiz_ID,
            OLD.Author_ID,
            curdate(),
            curtime());
```

```
    END ^
DELIMITER;
```