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Department of Computing

Bachelor of Information and Communication Technologies

Graduate Diploma in Information and Communication Technologies

Database Management Systems

BCPR203

Assignment One

Semester Two, 2018

Due date: 27 August 2018

Time: 5.00pm

Instructions:

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TOTAL MARKS: 100

Student Name/ID

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Submissions received late will be subject to a penalty of 10% of the student's mark per working day.

This assignment is worth **20%** of the total marks for this course.

This paper has *four* (4) pages including the cover sheet.

Instructions

- There will be time set aside during normal class time during which students will be asked to demonstrate some aspects of their assignment.
- Microsoft Visio may be used to create the Entity Relationship diagram. The Visio file or scanned image, report, data dictionary and the MySQL database file need to be **submitted via Moodle** before the due date.

Project Background and Description

Computing for Free (CFF) has been in operation since 2001. Between 2001 and February 22nd 2011 students attending CFF had been tracked in a student management system called Jasper. In September 2011 Christchurch was struck by a major earthquake that meant the temporary closure of the institute for a number of months. The earthquake caused considerable disruption and displaced many students. Because of this the staff of CFF switched to a paper based system for taking and recording student bookings. Around the same time the student management system was changed to the current Tribal system. Tribal was unable to cater for the self-paced flexible learning system that CFF uses so the paper based system was continued. When Jasper was used it required a full time staff member to administer the recording of student bookings. Several proposals were put forward to either develop a purpose built system or purchase an off the shelf one that could be adapted to our needs. No suitable off the shelf system could be found and the proposed options for building a system were rejected on the grounds of cost and not wanting to support another system outside the current suite.

In early 2017, we decided that we had to have some way to electronically record student tracking in order to meet our funding requirements so we created a set of spreadsheets for each site (eight sites at the time). The spreadsheets have been evolving over this time and while they do enable us to achieve our aims it is starting to become difficult to maintain their integrity and we need a more robust system to allow us to continue.

Project Scope

The scope for the project will encompass the creation of a database for all CFF staff to use to track and monitor students across all eight locations. This will require a front end interface and a back end database that will be hosted on a server. The expected outcome is a single interface for staff to be able to input and monitor student attendance. Out of scope is a potential student web interface so that they can make their own bookings online. Staff will require reports to flag students for following, monitor overall attendance patterns and forms to input data. Exporting data from the Tribal student management system into the database can also be investigated as part of this project (load data from external systems in CSV or other compatible formats).

Project Product

We have been shown the possibility of using RFID (Radio frequency Identity) tags to allow students to “attend” by swiping an RFID tag or their student ID card over a reader which then attends them in a database. We have approximately 1500 to 2000 individual students enrolled in any one year.

Initial Product (Scope of BCPR203)

A simple database system that would record the sessions that a student is attending, to run alongside our paper based booking system.

Stage Two

Integrated into a computer based booking system that the students could access to make their own bookings.

Stage Three

Student attendance system integrated with an online student booking system.

High-Level Requirements

The new system must include the following:

- Comply with Ara business rules
- Have no visibility to sensitive data
- Have reports for specific purposes and the ability to export raw data reports for further analysis in Excel
- Include all the relevant data fields for monitoring student engagement and attendance
- Reduction in time spent using the tool compared with spreadsheets

Deliverables and Query Generation

CFF staff will be able to easily enter and access data on their students simultaneously across a number of sites. This will require a front end with forms for data entry, reports and the ability to export data (e.g. to Excel) for further analysis.

Five high level queries are required for the Team Leaders and Manager:

1. Students that have not been engaged in the last week (or other time period)
2. Students that are near the end of their course duration
3. How many times have students attended their course
4. Bookings for a day/time/session
5. Students that have not attended past the last withdrawal date

Front end interface (Forms), Reports and back end database to record and view student attendance.

Front end functions – needs to be able to:

See the following student details:

- ID
- Name
- Course
- Start date
- End date
- Number of sessions attended

- Number of sessions in course
- Branch(s) they have attended
- Date of each attendance (?)
- Number of days since last attended
- Number of forfeits – how many times they did not attend a session they had booked in

The details above will need to come from the database itself. It is likely that this table will need to be updated on a daily basis. For the purpose of this project, fake data can be created for testing purposes.

Possible options:

Course data (what course the student is enrolled in) could come from a drop down list. For example if a student had finished their CFCB206 course and then starting their CFWP205 course on the next class a staff member could then search for that student and pick the CFWP205 course from the drop down list. That would then change the start/end dates and the number of weeks for that course.

Branch data (which branch a student is attending) could come from the reader at the branch. For example a student attending at Bishopdale would have that recorded alongside their name and then if say the next day they attended at Hornby, that would be recorded alongside their name. Branch data is required to be stored in the database.

Get a warning when a student has:

- not attended for X number of days/weeks
- Has attended their final class
- has attended more than the number of allow classes (e.g. 21 times in a 20 class course)
- has used 75% of classes (e.g. 15/20) so that we can ensure they are ready to sit their assessment

Staff need to be able to enter the following:

- Attend a student (if they did not bring their RFID tag)
- Un-attend a student if are not staying for the class
- Add notes (e.g. student has not attended due to illness)
- Add/remove students from the system

Staff need to be able to search for:

- Individual students
- Students in courses
- Students at a branch
- Students attending on a day/session

Staff need to get reports on:

- Non-attending students
- Number of sessions attended per course
- A report for a particular student that would show the number of classes they attended for each course, the length of time it took them to do their course and at which branches they attended.

Needs to be accessible to staff across five branches via the ARA network.

Project Objective

“Easy-as” system for students and staff. The previous Jasper system was very labor intensive. Each student that booked in needed to be attended by a staff member, and there could be as many as 80 “attended” students per day per branch.

Assumptions/ Business Rules

Students should be attending a minimum of two sessions per week, but they can attend as often as they can.

Students cannot attend more than the allocated number of classes – unless by arrangement with the Team Leader. Provision needs to be made for Team Leaders to over-ride the maximum number of allocated sessions.

Students need to complete their course within the allocated number of weeks – unless by arrangement with the Team Leader. Provision needs to be made for Team Leaders to over-ride the maximum number of allocated sessions.

Students can attend more than one branch. E.g. student X may attend Bishopdale on a Tuesday and Hornby on a Friday.

Each class is two hours long and starts on the hour e.g. 10am to 12pm. If a student turns up late or leaves early this is still counted as one class.

Students can attend more than one session on one day.

Students do turn up early to classes. Anyone attending 10 minutes before a class needs to be counted in the *next class*.

CFF students currently do not have Ara ID cards. In the ideal case they would be able to use their ID card. In the short term, they may need to be provided with an RFID tag/card that does not have their student ID number as the code number for the card.

The vision

“Easy as bookings, cancelations and attendance system...”

Scenarios:

Brenda

Walks into Bishopdale branch, swipes her card on the reader grabs her book and finds a seat in class and gets on with her learning. An alert/warning is triggered in the system to alert the staff that Brenda is at 75% of her course hours and should be looking to sit her assessment. Jo sees the alert and walks over to Brenda and asks her how she is progressing and when she will be ready to sit her assessment and Brenda replies “I’m just doing some revision today...can I book the assessment in tomorrow?” Jo books Brenda’s assessment for the next day.

Dave

Dave is at home planning his week out around his part time work. He decides to come to (CFF) class on Tuesday night, Thursday morning and Friday afternoon. He logs into the CFF student booking system, enters his log in details and then books in the classes. He wants to do his assessment on the Friday afternoon so he ticks a check box/adds a note to this effect. When he comes in to class he swipes his card and is attended. Because he booked in the assessment on Friday the staff have it all ready for him when he walks in the door.

Fred

Fred has not attended a CFF class for two weeks. An alert is triggered and the branch Team Leader sees this and gives Fred a call. Fred tells the Team Leader that he has been unwell, but is better now and intends to return to class in the next few days.

Course	No. of Sessions	Number of weeks
CFCB206	30	9
CFCF106	20	6
CFCS206	20	6
CFDB206	30	9
CFDB306	50	13
CFDC201	20	6
CFDK206	30	9
CFDK306	20	6
CFHM301	40	11
CFIG205	20	6
CFPP206	20	6
CFSP206	30	9
CFSP306	40	11
CFTP205	40	11
CFWB301	40	11
CFWP205	40	11
CFWP306	40	11
CFWP407	60	16

Course	No. of Sessions	Number of weeks
CFCB110	20	10
CFWP110	20	10
CFSP110	20	10
CFKY110	12	7
CFPP110	10	5
CFDK110	20	10
CFDB110	15	8
CFDB310	17	8
CFWP310	24	12
CFSP310	16	8
CFWB110	20	10
CFDC110	10	5
CFPS110	20	10
CFDT110	25	13

Supplementary Data

Campus Connect has five branches:

- Bishopdale
- Hornby
- Madras
- New Brighton
- Rangiora

Affected Parties

- CFF staff
- Department of Computing Administration support staff
- Contact Centre staff

Affected Business Processes or Systems

This project will be expected to improve processes around student tracking in two areas - attendance and engagement. Attendance relates to how often a student attends a session and engagement is how the student is engaging with the course content (whether or not they are attending). This information is used to support the continued enrolment of a student or the withdrawal process if the student is not attending or engaged in their course.

Specific Exclusions from Scope

This project will relate to the tool (likely a database) used to capture and provide similar information to our current set of spreadsheets but in a more robust way. It will be limited to the staff supported aspects – student driven bookings, access or online interaction will not be included in this projected but need to be considered for future integration.

Implementation Plan

Step one is to complete this project scope. Then this will be reviewed by the teaching staff of the student teams and refined as required. Students will be introduced to the project and the writer of the scope and project owner (Manager of Computing for Free) will act as the industry representative for the duration of the project. Students will consider the project and develop plans to implement the requirements. The project will develop over the second semester of 2018 (July to November) with a product (tool) as an outcome at the end of the project.

The tasks

Produce:

1. a relational Schema (an extended ERD), using Visio, that includes entities, relationships, cardinality, attributes and the PK indicated.
2. a data dictionary of normalised tables (fields, data type, size, constraints)
3. a report on the design process and the design issues encountered and how you chose to resolve these e.g. choice of entities, relationships, choice of keys, extent of normalisation, multi-valued or composite attributes etc. Comment on any optional, mandatory, recursive, weak, subtype/supertype and composite entities.
4. tables and relationships created in MySQL – with at least 15 rows of sample data entered.

Marking**Combined ERD and Relational Schema (40 marks)**

Deduct marks (-1 for each occurrence) for:

- Attributes in wrong tables
- Incorrect PKs
- Incorrect FKs
- Incorrect cardinalities
- Incorrect entities
- Relationships not shown
- Not enough entities (i.e. fewer than 10)

Data Dictionary (20 marks)

Deduct marks (-1 for each occurrence) for:

- Poor/non-standard naming system
- Incorrect/poor choice of data type
- Incorrect/poor choice of size
- Appropriate constraints not shown
- PK/FK not indicated

Report on Design Issues (20 marks)

Comments expected on: (3 marks each)

- Choice of entities
- Choice of attributes (simple, composite, multi-valued etc)
- Choice of keys
- Connectivity/Relationships
- Use of composite/bridging entities
- Extent of normalisation
- Other “interesting” aspects of the design (supertype/subtype, cardinality – optional or mandatory, weak entity, recursive entity etc.) (2 marks)

MySQL database (20 marks)

Deduct marks(-1 each occurrence) for

- Lack of representative data
- Database doesn't match data dictionary/ERD
- Queries are not sensible