

**COMP.** **6108 Database Design and Development Semester 2 2013**

## Assignment

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| **Learning outcomes assessed:** | |
| Part 1 | 1. Explain the role of a DBMS within a business. 2. Produce a conceptual data model for a given set of requirements. 3. Develop a logical database design for a given set of requirements. |
| Part 2 | 1. Implement a physical design from a given logical design. 2. Demonstrate understanding of usability issues in Database Management. |

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| Assessment Parts | Due Date | Marks | Weighting |
| Part 1 | September 18, 2013 (4.00 pm) | 100 | 30% |
| Part 2 | October 23, 2013 (4.00 pm) | 100 | 30% |

Assignment given: Wednesday, 28 August 2013

**Instructions**:

All the parts of the assignment are to be completed individually.

* In Part 1 you will plan and design a relational database based on the attached case study “St Michaels College Job Search”.
* Your lecturer will act as the client – any questions in regards to the business must be communicated to the lecturer by email.
* In Part 2 you will take the logical design and convert it into a physical design and implementation.

Sending questions to the client:

* Each email to the ‘client’ should include an attachment that contains the questions.
* No more than eight questions per attachment.
* No more than 2 sets of questions for the each part of the assignment.
* Wait until you have received the answers to a set of questions before sending another set.
* Ask ‘closed’ questions where possible.
* Make sure your questions are free of technical jargon.
* Make sure that the information you require is not already in the requirements.
* Questions for Part 1 must be sent before 4:00 p.m. on Wednesday September 4th 2013.
* Questions for Part 2 must be sent before 4:00 p.m. on Wednesday Sept 25th 2013.

Assignment Hand-in

Electronic submission of a copy of the paper version is required for ALL assignments. This copy will only be used as a backup for the paper version and must be uploaded to the Assignment Upload Link of the eCampus prior to 4:30 p.m. on the same due date as the paper version.

Special Assessment Circumstances

All assessments are to be completed by the due date specified in course outlines. Work not submitted by the due date will be given a fail grade unless an extension has been granted. Extensions will only be granted in exceptional circumstances.

Students who anticipate difficulty in submitting assessments by the due date may request an extension in accordance with the following conditions:

* Students must apply for extension in writing to the Head of Department and negotiate a new submission date with the Course Coordinator;
* Unless there are extraordinary or unforeseeable circumstances, requests for an extension must be made at least three (3) days prior to the due date;
* Students must provide acceptable documentary evidence to support their application for extension.

Assistance to other Students

Students themselves can be an excellent resource to assist the learning of fellow students, but there are issues that arise in assessments that relate to the type and amount of assistance given by students to other students. It is important to recognise what types of assistance are beneficial to another’s learning and also what types of assistance are unacceptable in an assessment.

Beneficial Assistance

* Study Groups.
* Discussion.
* Sharing reading material.

Unacceptable Assistance

* Working together on one copy of the assessment and submitting it as own work.
* Giving another student your work.
* Copying someone else’s work. This includes work done by someone not on the course.
* Changing or correcting another student’s work.
* Copying from books, Internet etc. and submitting it as own work. Anything taken directly from another source must be acknowledged correctly: show the source alongside the quotation.

**PART 1**

**Delivery**

Areport submitted in a folder with the assignment cover sheet that is available on at the reception. An electronic copy of your report must also be uploaded to the Assignment Part1 Upload Link of the eCampus. The report should contain the following:

1 A TITLE PAGE identifying the report title, the name and ID number of the student, date completed and the total number of hours taken to complete Part 1 of the assignment.

2 A TABLE OF CONTENTS identifying sections of the report as well as the corresponding page numbers.

3 An INTRODUCTION to the report.

4 A section on PLANNING containing the following:

* 1. Strategic planning factors.
  2. A functional decomposition diagram outlining the core processes (functions) of the application.
  3. An initial list of entity types with definitions.
  4. A conceptual level business function (process) to data entity planning matrix.

5 A section on the LOGICAL DESIGN containing the following:

* 1. Three detailed normalised entity-relationship diagrams, for the following processes.
     1. All current unfilled vacancies.
     2. All students interested in one particular vacancy.
     3. All Students and matching vacancies.
  2. An integrated normalised entity-relationship diagram showing primary keys, foreign keys and attributes.
  3. A list of operational business rules and referential integrity constraints categorised by process – **exclude** structural business rules and cardinality rules.

6 An appendix that lists any additional information that you gathered from the client.

**PART 2**

**Delivery**

Areport submitted in a folder with the assignment cover sheet that is available at the reception. An electronic copy of your report and SQL script file must also be uploaded to the Assignment Part-2 Upload Link of the eCampus. The report should contain the following:

1. A TITLE PAGE identifying the report title, the name and ID number of the student, date completed and the total number of hours taken to complete Part 2 of the assignment.
2. A TABLE OF CONTENTS identifying sections of the report as well as the corresponding page numbers.
3. An INTRODUCTION to the report.
4. A section on the LOGICAL DESIGN that contains:
   1. The integrated normalised entity-relationship diagram (from Part 1).
5. A section on the PHYSICAL DESIGN that contains:
   1. A set of relations (tables) derived directly from the integrated E-R diagram. Present the relations (tables) in the standard relational notations. If a relation has a foreign key, state the appropriate on-delete action in the child relation (table).
   2. Data volume map.
   3. Two data usage maps – one for each of the two most important processes:
      1. All Students and matching vacancies. This process is run, on average, 200 times a day
      2. All students interested in one particular vacancy. This process is run, on average, 150 times a day
   4. Considerations for de-normalisation (including duplication), indexing and partitioning to improve the performance of the two important processes listed in 5.3. For each of the two processes, discuss how de-normalisation can be used, discuss whether or not you will use it and, finally, discuss the disadvantages of using it.

* 1. Final ERD.
  2. Create an SQL script file containing create table commands, Primary key referential integrity constraints. It must have 10 insert commands for each table (relation) to populate with data. The script file should run in SQL server 2008 R2 on a computer in N224 or on CTC-MSSQL server.
  3. A data dictionary, containing details about each table (relation) for the case (e.g. field name, field description, data type, size, domain, range, example, required, indexed, primary key, foreign key, format and default value), organised for easy reference. The data dictionary must reflect the Final ERD.

**Marking Schedule**

### Part 1 Logical Design Marking Schedule

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| --- | --- | --- |
|  | **Expected Outcome** | **Marks Allocated** |
| 1 | Introduction | 5 |
| 2 | Strategic planning factors | 5 |
| 3 | Functional decomposition diagram | 5 |
| 4 | An initial list of entity types with definitions. | 5 |
| 5 | Business function (process) to data entity planning matrix | 5 |
| 6 | All current unfilled vacancies. |  |
|  | 1. Identification of Entities | 2 |
|  | 1. Using cardinalities according to business rules | 3 |
|  | 1. Specifying PKs and FK | 3 |
|  | 1. Use of meaningful labels | 2 |
| 7 | All students interested in one particular vacancy. |  |
|  | a. Identification of Entities | 2 |
|  | b. Using cardinalities according to business rules | 3 |
|  | c. Specifying PKs and FK | 3 |
|  | d. Use of meaningful labels | 2 |
| 8 | All Students and matching vacancies. |  |
|  | a. Identification of Entities | 2 |
|  | b. Using cardinalities according to business rules | 3 |
|  | c. Specifying PKs and FK | 3 |
|  | d. Use of meaningful labels | 2 |
| 9 | Integrated ER diagram |  |
|  | 1. Identification of Entities | 5 |
| 1. Using cardinalities according to business rules | 10 |
| 1. Specifying PKs and FK | 10 |
| 1. Use of meaningful labels | 5 |
| 10 | A list of operational business rules and referential integrity constraints |  |
|  | operational business rules | 5 |
|  | referential integrity constraints | 5 |
| 11 | Appendix | 5 |

### Total 100

### Part 2 Physical Design & Implementation

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|  | **Expected Outcome** | **Marks Allocated** |
| 1 | Introduction | 5 |
| 2 | Set of relations (tables) and on delete action | 10 |
| 3 | Data volume map |  |
|  | 1. All the entities involved and relationships are shown | 4 |
|  | 1. The data volumes of each entity shown | 3 |
| 4 | Data usage map-1 |  |
|  | All the entities involved and relationships are shown | 3 |
|  | The access frequency of each table (relation) are shown | 3 |
|  | Assumptions used for access frequency calculation are given | 3 |
| 5 | Data usage map-2 |  |
|  | All the entities involved and relationships are shown | 3 |
|  | The access frequency of each table (relation) are shown | 3 |
|  | Assumptions used for access frequency calculation are given | 3 |
| 6 | Considerations for de-normalisation |  |
|  | 1. Consideration of Indexing | 3 |
|  | 1. Discussion on the use of indexing | 5 |
|  | 1. Consideration of Partitioning | 3 |
|  | 1. Discussion on the use of Partitioning | 5 |
|  | 1. Advantages of using it | 4 |
| 7 | Final ERD | 10 |
| 8 | Physical Database - SQL script file |  |
|  | 1. Creation of Tables | 5 |
|  | 1. Specifying Primary keys | 5 |
|  | 1. Specifying referential integrity constraints on the script file | 5 |
|  | 1. Populating data ( 10 records for each table) | 5 |
| 9 | Data Dictionary | 10 |

### Total 100

### Part 1 - Report Checklist

(*Tick boxes of requirements met*)

* Cover Sheet
* Title page
* Table of contents
* Planning factors
* Functional decomposition
* List of entity types
* Conceptual level Business Function (process) to Data Entity planning matrix
* Detailed normalised entity-relationship diagram for each of the 3 main processes
* Normalised integrated E-R diagram
* Business rules by process
* Additional information gathered from the client

### Part 2 - Report Checklist

(*Tick boxes of requirements met*)

* Cover sheet
* Title page
* Table of contents
* Logical ERD (from Part 1 – this can be the one given to you by the lecturer)
* Relations (tables) and on-delete action where appropriate
* One data volume map
* Two data usage maps
* Physical design considerations
* Final relations (tables) and ERD
* SQL script file.
* Data dictionary