Database Development Assessment

RHD Applicants Database

Every week members of academic staff at CSEM receive either emails or applications through the admissions office from Research Higher Degree applicants wanting to undertake a degree here. There is an urgent need to administer these applications in an organised, central way. There is actually no typical application method so the DBMS must be able to handle a variety of documents and data. The requirements identified so far are:

- When an application is received, a member of staff must be able to access the database and key in the name of the applicant. If an entry for this person has already been stored, a summary record is displayed and if there is additional information, the system should allow this to be added to the current record(s). If the stored record is for a different person with the same name a new entry must be added and of course if there is no current record a new one should be added. (Some applicants email one member of staff while others email everyone in the school).
- Information about the applicant includes their full name, address, contact details, citizenship, sex, degrees completed, area of research, funding, and GPA.
- All documents that the applicant has provided should be uploaded to the DBMS. There may be none or many. These documents may include a CV, a proposal, a scholarship offer, transcripts of undergraduate and master's degrees, financial guarantee declaration, TOEFL results, academic references, a thesis, journal or conference papers, passport photographs and so on.
- The name of the member of staff who entered the record should be stored along with the date and time.
- An acknowledgement of receipt of application should be able to be generated to send to the applicant along with an indication of the status of the application, ie more information is required, their GPA is not high enough for entry to the degree, or an agreement of a member of staff to supervise them and what the next step in an application should be. There should be standard replies or proformas set up for this.
- Information should be recorded about decisions made or outcomes reached.
- Members of staff will need to be able to receive a report of potential candidates showing a summary of the application, this should be able to be filtered to their research area.Reports should be generated for summaries of applicants, showing new applications since a specified date, applications that are pending, applications waiting for supervisors, and information about any decisions or outcomes that have occurred.
- A checklist should be displayed to ensure that we have recorded or received all the information we need.
- All correspondence with the applicant should be recorded.
- Members of staff should be able to record their willingness to be Principal or Associate supervisors.
- Notifications should be sent to staff members of new applicants in their area of research.

All diagrams and documents should be produced using Visual Paradigm for UML. It is installed in both Windows and Unix labs and you may install it on your own computers. The Windows version for VP-UML 10.2 (build 20131205) and the activation code can be downloaded from /opt/teaching/comp3771/software.
A first draft of a conceptual design is included at the end of this document.

1.1 Fact Finding

1. Describe the fact-finding techniques you would use to identify the important facts required to develop the database.
2. What does the application do?
3. Create an appropriate mission statement for the database system.
4. Create a diagram to represent the scope and boundaries of the database system.
5. Who are the target users and audience?
6. Define the user views required.

1.2 Requirements Collection and Analysis

1. Find out more about the requirements. For example, what type of decisions will be made? What are some of the outcomes? Should these be able to be added or is there an already known finite number? What format will all these data have? Ensure that *ALL* the requirements are included in the specification.

1.3 Database Design

At each step of Database design, produce the appropriate documentation.

1.3.1 Conceptual Design - update the conceptual design

1. Identify entity types
2. Identify relationship types
3. Identify and associate attributes with entity or relationship types
4. Determine attribute domains
5. Determine candidate, primary, and alternate key attributes
6. Use enhanced modelling concepts
7. Check model for errors and redundancy
8. Validate conceptual model against user transactions
9. Develop draft test plan
10. Review conceptual data model

1.3.2 Logical Design

1. Derive relations for logical data model
2. Validate relations using normalization
3. Validate relations against user transactions
4. Check integrity constraints
5. Review logical data model
6. Check for future growth
7. Develop test plan

1.3.3 Physical Design

1. Translate logical data model for target DBMS
   (a) Select target DBMS
   (b) Design base relations
   (c) Design representation of derived data
   (d) Design general constraints
2. Design file organisations and indices
   (a) Analyse transactions
   (b) Select file organisations
   (c) Select indices
   (d) Estimate disk space requirements
3. Design user views
4. Design security mechanisms
5. Introduce controlled redundancy if necessary
6. Create SQL scripts for data definition
7. Create SQL scripts to populate all tables with data
8. Create SQL scripts for required queries
9. Monitor and tune the operational system
10. Update test plan
11. Create SQL scripts to test system
12. Test operational system

2 Submission Dates

Section Documentation	**Due in Practical of Week**
Requirements Specification	4
Conceptual Design	6
Logical Design	8
Physical Design - *SQL Scripts	12
Operational System **Complete documentation of all sections, SQL, scripts, test plans	**Due** Friday 5pm week 13

*Your SQL scripts for creating, populating and querying the database will be marked in the computer laboratory sessions in week 12.
**Your entire project, ie all documents and scripts, must be in a single PDF file and uploaded to the FLO assignment box.

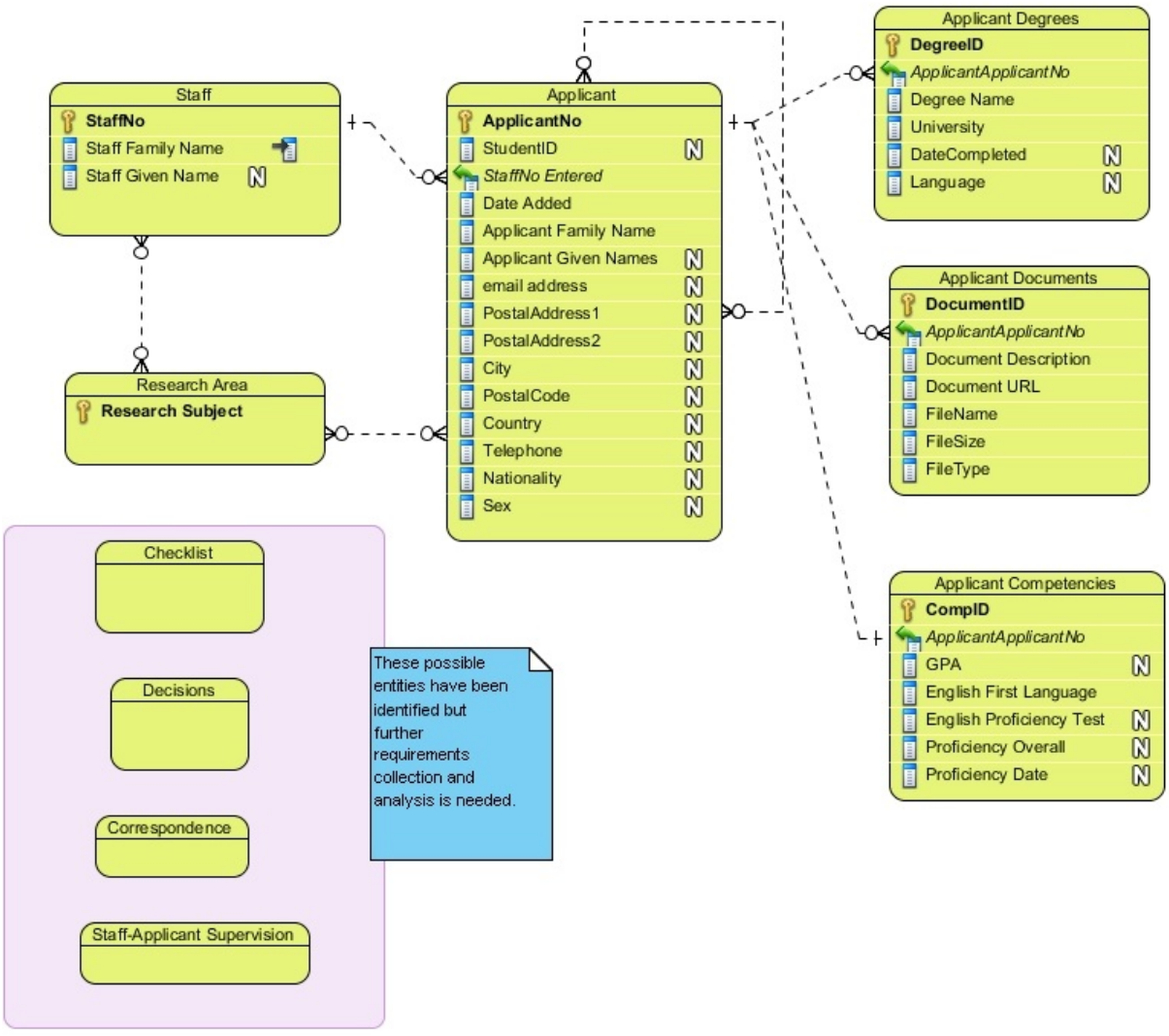

Figure 1: First Draft Conceptual Diagram