University of Michigan – Dearborn
Department of Computer and Information Science
CIS 425 – Fall 2012

Term Project

The aim of this project is to design **and** implement a computerized system to automate the work done by the "B. S. T. Smart Scholarship" committee. The committee is composed of three members and receives hundreds of applications from students at the end of each semester. The committee awards one scholarship at the end of each semester to reimburse tuition paid by the awardee at the beginning of that semester.

Students apply to the smart scholarship by filling out and submitting an application form. The form includes Student Number, First Name, Last Name, Phone Number, Email Address, Gender, Date of Birth, Status (Freshman, Sophomore, Junior, Senior), Cumulative GPA, Number of credit hours taken during the semester. Such information is saved in the "Applicants Data Store" The first tasks of the committee are:

- Double-check the information submitted by the applicant with the **Registrar Office**. In particular, the following is obtained from the **Registrar Office**: Status (Freshman, Sophomore, Junior, Senior), Cumulative GPA, and Number of credit hours taken during the semester. Other information (e.g., Data of Birth, etc.) may also be needed.
- Check the eligibility of the applicant. Applicants must have a 3.2 minimum cumulative GPA, should have taken at least 12 credit hours during the semester, and must be at most 23 year-old at the application date. Each applicant is marked as "eligible" or "non eligible" in the "Applicants Data Store". E-mails are sent to non-eligible applicants.

The next task of the committee is to award the scholarship to one of the applicants. The decision making process is described below:

> The student with the highest cumulative GPA will get the scholarship. If two or more students have the same highest cumulative GPA, then the committee selects the student with the highest GPA in the current semester. If two or more students have the same highest GPA in the current semester, then the committee selects a junior among those students. If there are more than two junior students or no junior is among the selected students, then the committee gives the award to a female student. If there are more than two female students or no female student is in the selected students, then the committee selects the two youngest students and conducts an interview with them. Each committee member elects one of the two students. The student with the highest number of votes will be awarded. The student ID and Full Name of the awarded student is stored in the "Awarded Data Store".

Once a decision is made, the committee sends a congratulation email to the awardee. Emails are also sent to the other eligible applicants informing them about the outcome. The committee also requests the bill amount paid by the student at the beginning of the semester from the **Registrar Office**. The awarded amount (i.e., balance of the bill) will be stored in the "Awarded Data Store". The committee will finally send a request to the **Accounting Department** to reimburse the awardee.

Part 1 – 50 Points (Due: 10/16/2012)

No implementation is required in the first part.

1. Give the DFDs (at all levels – context, diagram 0, and child diagrams). Use **EDrawSoft** (Trial version) to design the data flow diagram for Perfect Pizza (URL: http://www.edrawsoft.com/Data-Flow-Diagrams.php). **(20 points)**

2. Give the decision tables for the following two processes (described in page 1): (i) the process that checks applicant's eligibility **(5 points)** and (ii) the process that selects the awardee **(10 points).**

3. Give the design of the different screens needed to interact with the "B.S.T Smart Scholarship System". You are required to discuss all the techniques used to improve computer-to-human interaction. All screens should be designed in **MS Visio** or any other similar software you are familiar with **(15 points)**.

Part 2 – 40 Points (Due 11/27/2012)

Implementation could be done in the programming language/environment of your choice. You are also allowed to use any database system you are most familiar with to implement your data stores (SQL Server, MySQL, MS Access, Oracle, etc.)

1. Implement the part of the system that allows students to submit their applications to the "B. S. T. Smart Scholarship System". **(10 points)**

Interactions between the "B. S. T. Smart Scholarship System" and **Registrar Office** are done via the exchange of XML documents. Please note that there are two types of interactions between the system and the **Registrar Office**: (1) Double checking students information and (2) requesting the bill amount for the awarded student.

2. Give the XML schemas of the documents sent from the "B. S. T. Smart Scholarship System" to the **Registrar Office** and the documents returned by the **Registrar Office** to the "B. S. T. Smart Scholarship System". **(10 points)**

3. Implement the part of the system that enables interactions with the **Registrar Office. (10 points)**

4. Implement the part of the system that decides about awarding the scholarship. **(10 points)**

Part 3 – 10 Points (Due 12/11/2012)

We would like to implement a simple Accounting functionality (external entity to our system) as a Web service. The Web service should only implement a Web method that receives a reimbursement request from the "B. S. T. Smart Scholarship System" and processes it by simply returning the string "request processed" to the "B. S. T. Smart Scholarship System".

1. Implement the **Accounting** Web service and the interaction between "B. S. T. Smart Scholarship System" and **Accounting** Web service. **(10 points)**