IS7030 – Harrison (harri3ar@ucmail.uc.edu)
Assignment 2 Instructions

An ER model is a pictorial representation of business rules, and is one of the first steps in database development. You will be working from the business rules covered in Assignment 1 for creating a presentation layer ER model for an alumni records database.

Recall that in Assignment 1 – Section 1, you identified a series of entities and their attributes. The business rules for assignment 1 are copied below. You will use the entities and attributes you had created in Assignment 1 to expand your ER model. You will need to add to your previous work and may alter your previous entities and attributes. Use assumptions when necessary.

Pay particular attention to the cardinality and participation constraints in your ER model. You do not need to resolve any integrity issues due to deletion constraints or m:n relationships.

**Section 1:** Create a presentation layer ER Model as described above. See page 21, Figure 1.8a, for an example of the ER modeling grammar to use.

**Section 2:** As shown in the example, below your ER diagram, list any integrity constraints that are not explicitly represented in the model.

Please deliver your responses for all three sections before the beginning of the class period it is due. If arranged well, the ERD should all fit on one page.

*Expanded Business Rules:*

The university raises money from alumni, non-alumni, and businesses to support programs on campus. To do so, the university compiles a database filled with potential donors. Alumni from the university graduated with a B.A., B.S., M.A., M.S., or Ph.D. from a department. All alumni have at least one degree; their degrees were granted in a specific year and semester. Alumni, non-alumni, and businesses have ID numbers, names, addresses, phone numbers, and e-mail addresses. While the university knows everyone's names, ID numbers, and scholarship information, it may not have their other contact information. Alumni and non-alumni also have a gender.

Some alumni may have received scholarships when they were in school; they could have received multiple scholarships. Each scholarship has a name, amount awarded, semester, and year. These scholarships are funded by gifts from donors. These gifts can be paid in cash, credit card, a bank transfer, or a check. Cash transactions record the person who paid, the amount, the employee recording the gift, and the date the gift was recorded. Credit card transactions record all of the same fields as cash transactions, but also includes the credit card number, 3-digit security code number, credit card type, and a timestamp. Bank transfers include all the same fields as cash transactions, but also the bank routing number for the paying bank, the account number, and an exact timestamp. Checks record all the same information as a bank transfer except the timestamp, and also add in a check number. These

details are necessary to ensure payment and allow the university to identify fraudulent or unintended transactions.

All gifts are given to a specific department. Each gift has an ID number, date, amount, and type (e.g., “cash”, “credit card”, “check”). Each department belongs to one college. The departments are identified by their names and have different budgets, enrollment counts, and number of faculty members. Faculty members have ID numbers, names, and types (e.g., “adjunct”, “lecturer”, or “tenure track”). All departments offer courses that faculty members teach. Each course has a course id (e.g., “IS7030”), a course name (e.g., “Database Design”), a number of credits, a meeting time, and a location.

Each faculty member, alumnus, non-alumnus, and business has a university ID number. All of these types of prospective donors may be married to one another. A single gift can only be allocated to one scholarship or program. Scholarships can be funded through gifts or by departments. All scholarship amounts are $10,000 or less. Faculty must be assigned to a department and any department with faculty cannot be shut down. Each department is listed within a college. Departments have a unique name, student enrollment, a number of faculty, and a budget. The budget is allocated through several funds. Scholarships are one type of fund. Degrees are awarded by individual departments; there are no interdisciplinary degrees. The faculty can be either lecturers, tenure-track professors, or adjunct professors. College level enrollments, budgets, and numbers of professors are calculated from the departments that the college manages. Any college with departments cannot be shut down. The name of a college can include “Business”, “Liberal Arts”, “Engineering”, or “Design”. Programs, scholarships, colleges, and departments all have unique names.

Degree programs are not entirely funded by gifts; some are funded by departments. All departments have degree programs they administer; all degree programs must be administered by a single department. The degree programs manage funds for a department. Each degree program can manage multiple funds, and every fund is assigned to a specific department. All colleges have at least 4 departments.

Not all alumni, non-alumni, or businesses have given gifts to the university. Some gifts are given anonymously. Business records contain a business name and an owner name. All scholarships have been awarded to alumni. Years are recorded as 4-digit numbers. Semesters include “fall”, “spring” and “summer”. Gifts can be paid outright or given as pledges which are fulfilled later. Pledges are like other gifts, but have a gift date and an expiration date. If a pledge has not been paid before the expiration date the amount of the gift is set to $0.00. The minimum gift amount is $5.00 to dissuade fraudulent payment attempts.

You can add other fields that are necessary (i.e., unique identifiers) or logical (e.g., credit card expiry date) to your model. Remember to list any semantic integrity constraints that don’t make it into the ERD.