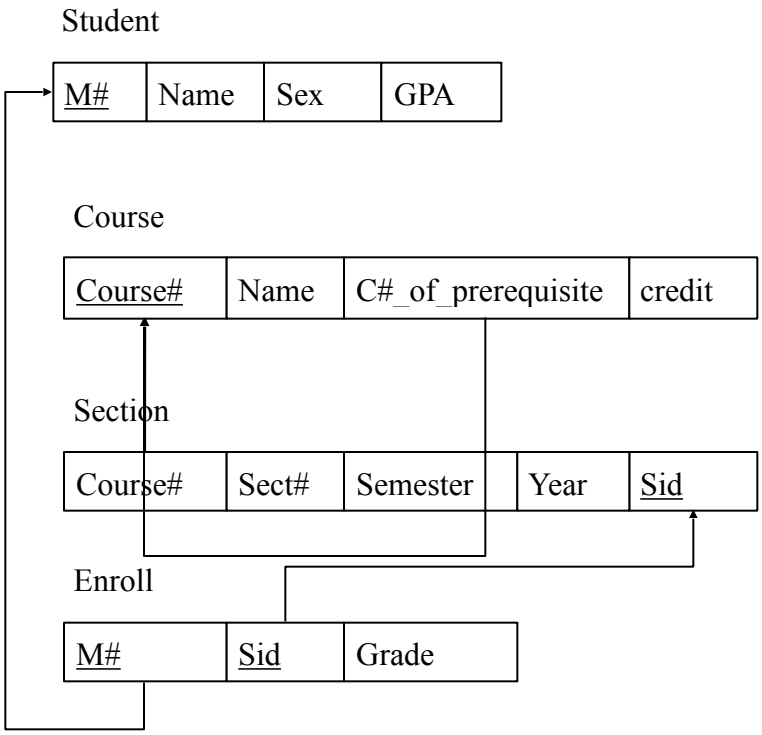
Ben Belden
CSCI 4560
Dr. Z. Dong
Homework 5
November 18, 2014

CSCI 4/5560: Database Management Systems
Assignment #5

Requirement: You **MUST** type your answer. Handwriting is not acceptable.

Database Description: This homework is based on the following schema



Grade can be: A(4.0), B(3.0), C(2.0), D(1.0), and F(0). Your grade point average (GPA) is calculated with the following formula:

SUM(grade of each course*credit hours of the course)/SUM(credit hours of each course)

If a course was taken multiple times, use the one with the highest grade.
The grade point average may range from 0.0 to a 4.0.

In this assignment, you need to

1. Create a function to calculate the GPA of a given student. The function takes the M# of a student as the input, and return the GPA. (60 points)

2. Create a UPDATE trigger on the table Enroll. Within the trigger, for each student whose Grade is updated, recalculate his/her GPA and update it in the table Student. You should call the function defined above. Pay attention, a update statement may update grades of multiple students. (40 points)

3. **Bonus points**: Create a stored procedure to print the transcript of a student, i.e. print all course a student has taken or is taking (including course number, course name, credit, and grade) in the order they are taken. If course are taken at the same semester, order them by course number. The procedure should take M# as the only parameter. (30 points)

#1

```
if (OBJECT_ID('hw5.calcGPA','P') is not null)
   drop proc hw5.calcGPA
go

create procedure hw5.calcGPA
@M# varchar(20),
@gpa decimal(10,2) output
as
declare @grade varchar(2),
       @crdts int,
       @pts decimal(10,2)=0,
       @ttlPts decimal(10,2)=0,
       @ttlCrdtHrs decimal(10,2)=0,
       @ttlPtsXCrdtHrs decimal(10,2)=0

declare gpaCrsr cursor local
for
select hw5.Enroll.grade, hw5.Course.credit
from hw5.Student inner join hw5.Enroll on hw5.Student.M# = hw5.Enroll.M#
inner join hw5.Section on hw5.Enroll.Sid = hw5.Section.Sid
inner join hw5.Course on hw5.Section.Course# = hw5.Course.Course#
where hw5.Student.M# = @M#;

open gpaCrsr;

fetch next from gpaCrsr into @grade, @crdts;

while @@FETCH_STATUS = 0
begin
set @pts = case @grade  when 'A' then 4.0
                                                  when 'B' then 3.0
                                                  when 'C' then 2.0
                                                  when 'D' then 1.0
                                                  when 'F' then 0 end
set @ttlPts += (@pts*@crdts);
set @ttlCrdtHrs += @crdts;

fetch next from gpaCrsr into @grade, @crdts;
end

set @ttlPtsXCrdtHrs = @ttlPts * @ttlCrdtHrs;
set @gpa = @ttlPts / @ttlCrdtHrs;
```

```
return @gpa

close gpaCrsr;
deallocate gpaCrsr;
go
```

#2

```
if (OBJECT_ID('hw5.hwTrigger','TR') is not null)
   drop trigger hw5.hwTrigger
go

create trigger hw5.hwTrigger
on hw5.Enroll
after update
as
begin
   if update (Grade)
   begin
      declare @mnum varchar(10);
      declare @newgpa decimal(10,2);
      declare crsr cursor local
      for
      select M# from hw5.Enroll;
      open crsr;
      fetch next from crsr into @mnum;
      while @@FETCH_STATUS = 0
      begin
         exec calcGPA @mnum, @newgpa output;

         update hw3.Student
         set GPA = @newgpa
         where hw3.Student.M# = @mnum;

         fetch next from crsr into @mnum;
      end
      close crsr;
      deallocate crsr;
   end
end

go
```

#3

```
if (OBJECT_ID('xscript','F') is not null)
   drop func xscript
go

create function hw5.xscript
@M#,
returns @tempTbl table (
   Course# varchar(45),
   Name varchar(45),
   Credits int,
   Grade varchar(45))
as
begin
   select hw5.Course.Course#, hw5.Course.Name, hw5.Course.credit, hw5.Enroll.Grade from
   hw5.Course inner join hw5.Section on hw5.Section.Course# = hw5.Course.C#
   inner join hw5.Enroll on hw5.Section.Sid = hw5.Enroll.Sid
   inner join hw5.Student on hw5.Enroll.M# = hw5.Student.M#
   where hw5.Student.M# = @M#
   order by hw5.Section.Year,case hw5.Section.Semester
                                                    when 'Spring' then 1
                                                    when 'Summer' then 2
                                                    when 'Fall' then 3
                                                    else 4
                                                    end, hw5.Section.Semester
   return
end
go
```

Submission:

1. Hardcopy: print the file and enclosed them within a folder as usual. 10 points will be deducted if no hard copy is submitted.
2. Softcopy: Email the file as attachment to Zhijiang.Dong@mtsu.edu. The subject of the email must be: **CSCI 4560 Homework 5**. 15 points will be deducted if no softcopy is submitted, or subject of the email is different.