GIC #1 solution

The following is provided as a potential solution. Below list reasoning for the design, as well as, query solutions given the design. The design is listed the third page. The last page shows the design that incorporates the dimensional history.

Design Reasoning:

- 3 roleplay dimension are employed. This represents the following:
  - Two link are necessary to reflect the professor and student. Thus two links between persondim and coursefact
  - Two links are necessary between personjunkdim and coursefact. This reflects that we have gender and ethnicity information on both professor and student.
  - Two links are necessary between departmentdim and coursefact. This reflects that we have department information on professor and course.
- Studentdim is created to hold the act, sat, and gmat scores. Rnumber is included as there is no other natural key available. These 3 values cannot be put on the persondim as persondim contains both student and professor information.
- Locationdim is employed to handle the hierarchy. There are two items of interest:
  - Currently year built is listed on this table. In a full design, you could make use of an outrigger dimension (not covered in class) and put a link between a datedim and this table. Note, this makes this a snowflake design and our current datedim could not be used, as it goes to the month level. i.e. we do not have month built information on the building.
  - Seatingcapacity is listed on this table. This could have been moved to the fact able and treated as a measure. In this case, I have decided to keep it on the location table.
- Schedulecode is treated as a degenerate dimension
- GradeDim was created as lettergrade is categorical in nature. This is a measure, but cannot have aggregates used on it. This could have been listed on the fact table, but having a separate dimension is more correct of an answer.
- Semestercode has been included in the datedim, as it can easily be reflected and is time based.

Dimensional Histories

- Type 0
  - DateDim
- Type 1
  - PersonJunkDim
  - ProfessorJunkDim
  - LocationDim
  - StudentDim – Assumption, you only need to keep the latest (best) score
  - GradeDim
- Type 2
  - PersonDim
  - DepartmentDim
  - CourseDim

Granularity: Course Participation by Month (could be semester)

SQL Statements - Note, for all roleplay dimensions, there is an assumption that a view exists for aliasing. I will use the following naming scheme. vw[roletype][dimension]. Example: vwProfessorPersonDim

1. List which students are professors.

   1.
      ```
      Select vppd.Lastname, vppd.FirstName, vppd.Rnumber FROM coursefact cf inner join
      vwProfessorPersonDim vppd on cf.ProfessorPersonDimKey =
      vppd.ProfessorPersonDimKey inner join vwStudentPersonDim vspd on
      cf.StudentPersonDimKey = vspd.StudentPersonDimKey
      WHERE vppd.ProfessorPersonDimKey = vspd.StudentPersonDimKey
      Order by vppd.LastName, vppd.FirstName
      ```

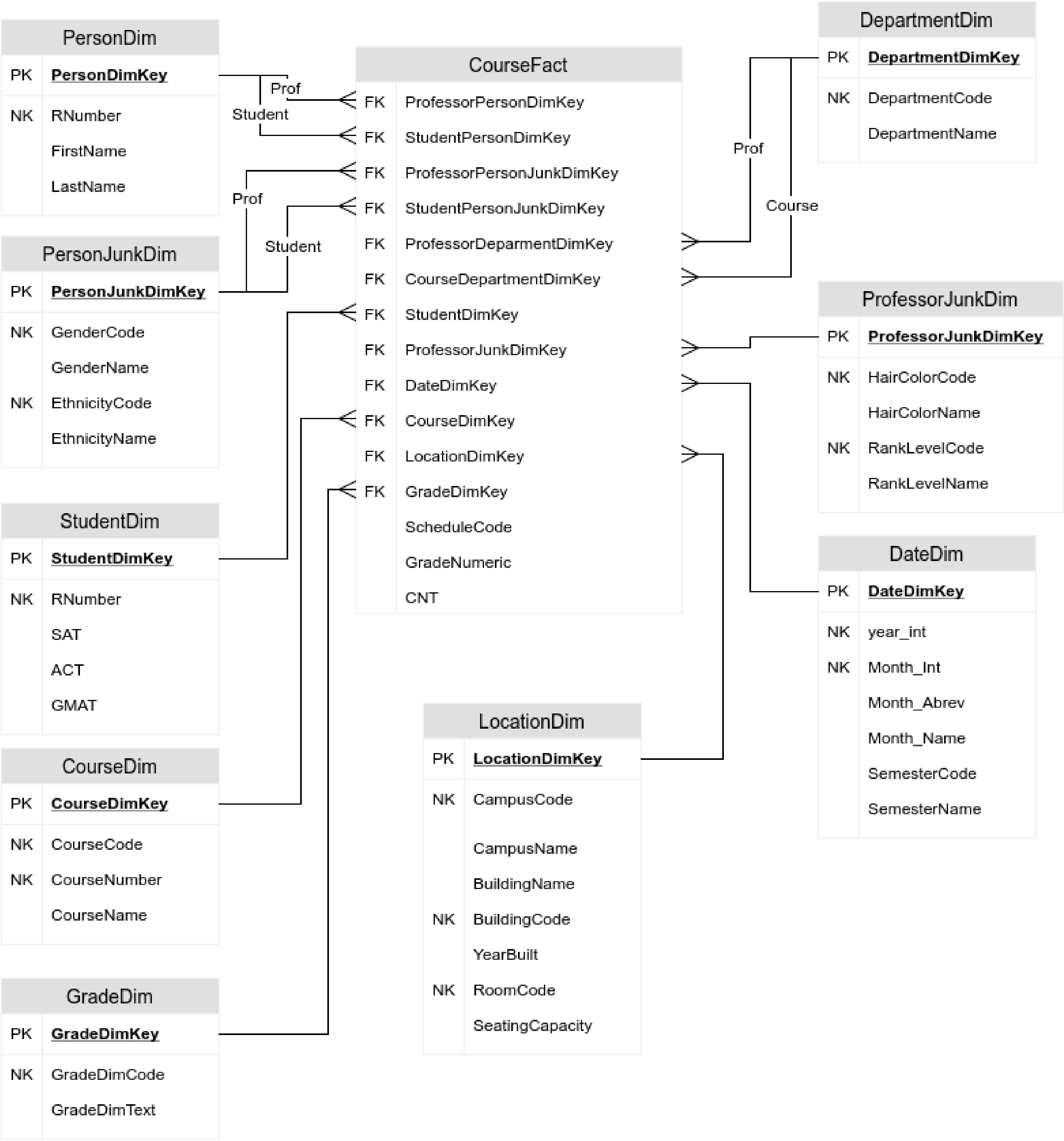
2. Average # of classes taken by students each semester.

   1.
      ```
      SELECT SemesterCode, average(total_courses_by_student) as avg_student_course_load
      FROM (
      SELECT SemesterCode, cf.StudentPersonDimKey, sum(CNT) as total_courses_by_student
      FROM CourseFact cf
      INNER JOIN DateDim dd on cf.DateDimKey = dd.DateDimKey
      GROUP BY SemesterCode, cf.StudentPersonDimKey
      ) GROUP BY SemesterCode
      ```

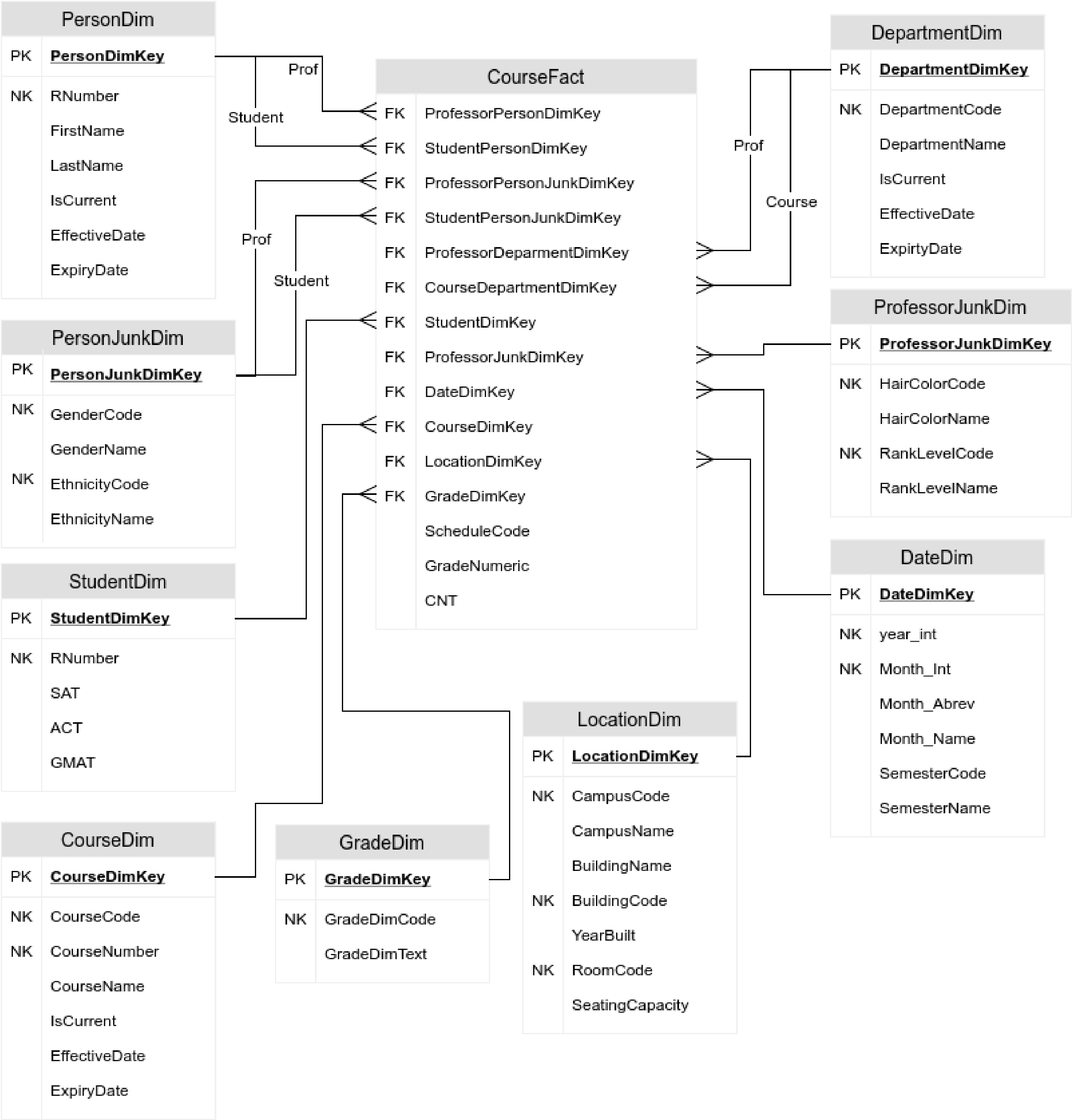
3. Room utilization report by semester.

   1.
      ```
      SELECT dd.SemesterCode, l.CampusName, l.BuildingName, l.RoomCode,
      (SUM(cf.CNT) / l.SeatCapacity) as room_utilization
      FROM CourseFact cf
      inner join location l on cf.locationdimkey = l.locationdimkey
      inner join DateDim dd on cf.DateDimKey = dd.DateDimKey
      GROUP BY dd.SemesterCode, l.CampusName, l.BuildingName, l.RoomCode
      ORDER BY  dd.SemesterCode, l.CampusName, l.BuildingName, l.RoomCode
      ```

Basic Design



Design with Dimensional History



	PersonDim
PK	**PersonDimKey**
NK	RNumber
	FirstName
	LastName
	IsCurrent
	EffectiveDate
	ExpiryDate

	CourseFact
FK	ProfessorPersonDimKey
FK	StudentPersonDimKey
FK	ProfessorPersonJunkDimKey
FK	StudentPersonJunkDimKey
FK	ProfessorDeparmentDimKey
FK	CourseDepartmentDimKey
FK	StudentDimKey
FK	ProfessorJunkDimKey
FK	DateDimKey
FK	CourseDimKey
FK	LocationDimKey
FK	GradeDimKey
	ScheduleCode
	GradeNumeric
	CNT

	DepartmentDim
PK	**DepartmentDimKey**
NK	DepartmentCode
	DepartmentName
	IsCurrent
	EffectiveDate
	ExpirtyDate

	PersonJunkDim
PK	**PersonJunkDimKey**
NK	GenderCode
	GenderName
NK	EthnicityCode
	EthnicityName

	ProfessorJunkDim
PK	**ProfessorJunkDimKey**
NK	HairColorCode
	HairColorName
NK	RankLevelCode
	RankLevelName

	StudentDim
PK	**StudentDimKey**
NK	RNumber
	SAT
	ACT
	GMAT

	DateDim
PK	**DateDimKey**
NK	year_int
NK	Month_Int
	Month_Abrev
	Month_Name
	SemesterCode
	SemesterName

	LocationDim
PK	**LocationDimKey**
NK	CampusCode
	CampusName
	BuildingName
NK	BuildingCode
	YearBuilt
NK	RoomCode
	SeatingCapacity

	CourseDim
PK	**CourseDimKey**
NK	CourseCode
NK	CourseNumber
	CourseName
	IsCurrent
	EffectiveDate
	ExpiryDate

	GradeDim
PK	**GradeDimKey**
NK	GradeDimCode
	GradeDimText