Our goal for this phase of the iPlanner system is to develop a data model to support the activities that are relevant to the task of project planning. During the first phase, you were provided some basic requirements about this potential system. Furthermore, as the result of your own analysis as well as consultation with experts (department chairs, Deans, Vice Chancellors, and administrative assistants), you gained some additional insight in this problem domain and were able to identify some additional system requirements. Below, you will find a subset of those requirements which define the scope of phase II.

Requirements provided by the Client and your Professor!

- At this point, the system must support 4 categories of users:
  1) Project Manager (PM)
  2) Employees (Project workers)
  3) Administrators (organization admins)
  4) Superuser (System Admin)

- The **Project Manager (PM)** should be able to create her own “new” projects, be assigned an “existing” project, identify some goals / milestones / deliverables for her project, set deadlines for her goals, milestones, etc, and set the deadline for the project as a whole. Additionally, the PM should be able to assign employees with certain skills to various tasks or activities. Often one of those employees may serve as the task or activity leader. The task-leader (TL) works with others to complete the task and has convening and reporting responsibilities. Furthermore, the PM should be able to review the project progress, and identify any potential issues or bottlenecks. A PM is a user of the system and must be authenticated accordingly.

- An **Employee** can have many roles, first she can be an “employee” working on a task, for a given project. Second, she can be the TL on a task or activity which corresponds to a project, and finally, the employee can be a PM. An employee is a user of the system and must be authenticated accordingly.

- **Administrators** are also users of the system and must be authenticated accordingly. Their role is primarily to designate other individuals as PMs, create and define new projects, and assign PMs to a given project. Their next major responsibility is to generate and view reports for their organization.

- The **Superuser (SU)** is typically a single individual who has the role of system administrator and has access to all functionality provided by the system.

In addition to understanding the roles of individuals who may eventually use the system, it is important to analyze and understand the functionality of the system. Earlier, we stated our goal as wanting to design the data model (data infrastructure) for an intelligent project planning system for academic organizations. However, with some care and generalization, the system can be applied to any organization. A typical academic organization (e.g., the sustainability program, the CS dept., the school of business, or the IUSB campus, etc.) undertakes many projects during an academic (or sometimes fiscal) year. These projects have various scope and complexity. The following as series of assumptions about our problem domain.

- An organization may have one or more administrators (Deans, Chairs, directors, etc). These individuals can create new projects and assign them to PMs. Project managers can in turn form a team of employees that work on the project’s tasks and activities. An employee may be designated as the lead individual for a given task or activity.
• Some projects are shared between 2 or more organizations, in which case they may have several administrators, and cross disciplinary team of employees working on them. Employees may be dedicated to a project, but often, they may have other duties, which means that a schedule of availability may be needed. (To show who is generally available when? For example, faculty teaching times, and office hours is known ahead of time and that allows us to remove those time slots from possible project activities)
• Some projects recur several times during the year (scheduling of classes for each semester, hiring of tutors, hiring of adjunct faculty, etc.). Some occur every year (reviewing and selecting the excellence award, and scholarship winners), Some occur once every several years (conducting an external review, proposing and developing a new course, or a new degree program)
• Some projects are terminated due to lack of funding (grant runs out or admin support diminishes), by directive (upper admin stops the project), lack of enthusiastic support (personnel, or funding), etc.
• Some projects have a definite deadline, and others may have flexible deadline.
• Most if not all projects have deliverables that go to a recipient organization or individual.
• Many projects have prerequisite requirements as to the formation or qualification of the team that works on it. For example, diversity in academic discipline (e.g., 2 people from each academic school), faculty rank (tenured / untenured, senior lecturer, lecturer), gender diversity, other prescribed representation such as student representation from SGA, staff representation from the bi-weekly staff, community participation, etc.)
• Virtually all projects have one or more people who manage and/or approve them.
• Projects have priority, but their priority is dynamically adjusted as other projects enter the mix, and as resources change.
• Some projects follow a pre-specified checklist of activity which must be followed precisely. (e.g., creating a new degree program at IU)
• Some projects may require external contractors. In such cases a requisition has to be created and bids have to be obtained and contract must be agreed upon.
• Some projects require special funding (outside the normal budget of the organization), in such cases funding must be acquired which may be viewed as one of the tasks in the project, or as the prerequisite to the project creation.
• Virtually all projects are made up of several tasks or activities.
• These tasks or activities require their own resources (documents, physical space, equipment, budget, etc), and their own set of skills/personnel. (the personnel are referred to her are employees, but the PM is also counted as the project personnel)
• Tasks and activities have their own duration and deadlines (which means they have an implicit start time). Tasks and activities have their own deliverables (which collectively contribute to the deliverable for the project). The tasks or activities may have specific sequential ordering, or may be performed in parallel with other tasks.
• Tasks and activities may trigger other tasks / activities to be performed.

For this phase of the assignment, our goal is to develop the ERD and EAT for the above subset of the iPlanner. This can be a difficult and time-consuming task, so you need to dedicate sufficient resources to this. In addition, you are encouraged to work with a team member to have the benefit of brainstorming the problem with another person.

Your ERD should have a minimum of 20 entities (or associative entities) capturing the data requirements for the system. Make sure your ERD includes the minimum and maximum participation of each entity in the relationship (1 to 1, 1 to many, many to many), and it identifies associative entities. Use Powerpoint, Visio, MySQL-Workbench, Dia, or some other drawing or CASE tool to draw your ERD. Make sure the ERD fits in one page, yet it is readable, and try to avoid crossing lines. Submit your ERD as a PDF or JPG.

In addition to the ERD, you need to provide an Entity Attribute Table (EAT). The EAT provides details such (attribute, keys, foreign key, etc.) about each entity. This information can later be used to develop your relational database. Use Excel to capture your EAT. Clearly designate the attributes as key, foreign key, composite, repeating, derived, etc.
Each team member must upload her/his own version of the assignment separately (everything needed for the assignment). In addition, if you choose to work as a team, you need to provide a **self and peer evaluation** for this assignment. The self and peer evaluation should include the times and dates you met to develop each artifact (ERD, EAT), if some work was completed individually, the responsible party must be clearly identified. In addition, you should provide an estimate of what percentage of work was performed by each member. Ideally, this should be 50-50!

Place all the artifacts for this assignment in a folder (named Assign 2) then compress (zip) the folder before uploading to canvas.

Start Early and Have Fun!!

**What to hand in:**
1) Produce an Entity Relationship Diagram (ERD) for the above requirements. Showing the Entities and their relationships. Identify the cardinality and ordinality of relationships and further identify any associative entities.
2) Produce an Entity Attribute Table (EAT) for the above requirements. Identify the entities and their attributes for the above system. Identify the key attributes, multivalued attributes, composite attributes and derived attributes.
3) If you choose to work as a team you also need to provide a Self and Peer evaluation

**Sample EAT**

<table>
<thead>
<tr>
<th>Entity Name</th>
<th>Building</th>
<th>Car</th>
<th>Colors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attrib 1 (PK)</td>
<td>Build_ID (PK)</td>
<td>VIN (PK)</td>
<td>ColorID (PK)</td>
</tr>
<tr>
<td>Attrib 2</td>
<td>Name</td>
<td>Make</td>
<td>Name</td>
</tr>
<tr>
<td>Attrib 3 (FK)</td>
<td>Address (composite)</td>
<td>Model</td>
<td>Price</td>
</tr>
<tr>
<td></td>
<td>Total SQ FT</td>
<td>Year</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ColorID (FK) to Colors</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Additional Considerations:**
As an organizational administrator, a project manager, a team leader, or an employee, one may need to know the answer to the following questions:

- Q1) What are the set of known projects that occur on a yearly basis?
- Q2) How long does it take to complete each project?
- Q3) Which projects have fallen behind? Why?
- Q4) What resources are needed for each project? (Personnel, equipment, space, skills, etc.)
- Q5) What is the desired outcome of each project (what are the expected artifacts)
- Q6) Who is the recipient of the project outcomes (artifacts)
- Q7) Who oversees the project?
• Q8) What is the predicted cost of the project?
• Q9) What are the constituent parts of the project?
• Q10) Which project cross organizational boundaries? Who are the team members working on those projects?
• Q11) Who is not currently working on a project (or task)?
• Q12) List the projects, their tasks, and the resources needed for each task.
• Q13) Which tasks require external contractors? And what is their status?
• Q14) List of individuals employees who have expertise in performing a task? (have done the task one or more times in the past)
• Q15) List of PMs who have expertise in performing a given type of project? (have done the project one or more times in the past)

So, continue to think about the above questions. What does it take to answer these questions? (what entities are needed? what attributes should be in those entities? How should those entities inter-connect with other entities in order to be able to answer these questions?

Again, please note that we are NOT trying to develop an application to solve this problem or answer these questions. We are in a database course, and our goal is to identify what “data” items should to be available so that a “future application” can answer the above questions? In other words, we are going to build the data model that supports that application.

To further refine your understanding of a typical academic projects, the following table is provided. You may also find it useful to interview one or more administrators during this phase. Although it is not a requirement of this phase.

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Description</th>
<th>Owner Organization</th>
<th>Project Manager</th>
<th>Start Date</th>
<th>Estimated duration</th>
<th>Deadline</th>
<th>Artifact</th>
<th>Recipient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search and Screen</td>
<td>To hire a new faculty member</td>
<td>CS department</td>
<td>Adaikkalavan</td>
<td>Sept 2018</td>
<td>4 months</td>
<td>May 2018</td>
<td>Hiring report</td>
<td>Affirmative action, Dean’s office, VCAA office</td>
</tr>
<tr>
<td>CS Web site</td>
<td>Redesign of the CS web site to accommodate responsive design and mobile devices</td>
<td>CS department</td>
<td>Adaikkalavan</td>
<td></td>
<td></td>
<td></td>
<td>Series of web pages</td>
<td></td>
</tr>
<tr>
<td>CS Fall 2018 Schedule</td>
<td>Creation of the CS and INFO schedule of classes for fall 2018</td>
<td>CS department</td>
<td>Adaikkalavan</td>
<td>Nov 2018</td>
<td>2 months</td>
<td>Jan. 2018</td>
<td>Fall 2018 Schedule</td>
<td>Registrar</td>
</tr>
<tr>
<td>CS Spring 2019 Schedule</td>
<td>Creation of the CS and INFO schedule of class for spring 2019</td>
<td>CS department</td>
<td>Adaikkalavan</td>
<td>March 2018</td>
<td>2 months</td>
<td>May 2018</td>
<td>Spring 2019 Schedule</td>
<td>Registrar</td>
</tr>
<tr>
<td>CS 2018 Assessment</td>
<td></td>
<td>CS department</td>
<td>Adaikkalavan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Campus Assessment committee</td>
</tr>
<tr>
<td>Online Informatics Degree</td>
<td>To create a multi-campus online informatics degree proposal.</td>
<td>Informatics</td>
<td>Adaikkalavan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IU Office of Online Education</td>
</tr>
</tbody>
</table>