**Fall 2011 CSCI 5333 DBMS HW#1 Suggested Solution**

V1.0

**General Notes:**

* It is better to use a CASE tool to construct the diagram. In fact, that will likely be a requirement next semester.
* Difference versions of the document should be kept as the project proceeds. These versions provide a history of the model in various iterations.
* Some sample questions are listed in the use case diagram to provide an idea of what kinds of refinement may be needed in the current phase of modeling.
* You should open the Visio files and look at the documentation.

**Use Case Diagram:**

**Description is included in the Visio file.**

**Actors:**

[1] Requester: a user who makes a work request through the system.

[2] Technician: a person who works and reports on submitted work orders.

[3] Administrator: a person who administers the application and assign works.

Questions to ask:

* It is assumed that there is no need for an actor such as “Manager” to manage the technicians. Instead, the administrator will perform this task. Is it reasonable?

**Use Cases:**

[1] Submit Work Request: A requestor submits a work request by specify the targeted computer of homogeneous computer group and the problem encountered.

[2] Check Work Status: A requestor can check the progress of the work orders he submitted. The technicians and the administrator can check the status of all work orders.

Questions to ask:

* The initial specification does not specify explicitly the need of the requestor to check the progress of the work orders he submitted. It is assumed that this function is implied and thus added to the use case diagram. Is this appropriate?
* The initial specification does not specify explicitly that technicians and administrators can check the progress of all work orders. This may create potential privacy problems, especially for technicians. Is this reasonable?
* The initial specification mentions that the technician can report on the progress on the work order. It does not mention the status of the progress. It is assumed that there can be five states: initial, assigned, started, closed with success, and closed with some problem items unresolved.

[3] Report Work Progress: A technician can report progress on works assigned to him. This includes changing the status of the work.

[4] Assign or Select Work: A technician can select an open work request. An administrator can assign a work to a technician.

Questions to ask:

* **The initial specification states that technicians can select a request to work on. An administrator can also assign works to technicians. It does not specify potential conflicts in work assignment and subsequent changes. Related questions are:**
  + **What happens if a technician selects a work and the administrator wants to assign it to another technician?**
  + **Can an assignment or selection be changed? It is currently assumed that it cannot be changed. This may not be a reasonable assumption as multiple technicians may work on the same request. If not, what happens if a technician assigned to a request becomes sick or quit?**
  + **Is it necessary to add functionality for the administrator to prioritize work requests?**

**[5] Get Work Reports: A technician and administrator can get various kinds of reports on work requests, such as outstanding works, completed works, works sorted by technicians, date, etc.**

Questions to ask:

* Exactly what kinds of reports are needed?
* Do the technicians have the same privileges as administrator in getting reports?

[6] Administer system: An administrator administers the system: manage user accounts and privileges, configure system parameters, etc.

**Class Diagrams**

**General Notes**

* The following stereotypes for database applications are added in Visio: <<PK>>, <<CK>> and <<Nullable>>.
* The model is designed in a minimalistic way to satisfy the initial specification.
* For brevity, the documentation of associations is not provided below.

Classes

[1] Abstract User: An abstract class for all kinds of users of the system.

Notes:

* The stereotype <<Nullable>> is added to SSNum to emphasize that it is optional, not mandatory. Alternatively, we can set the multiplicity of SSNum to 0..1 to achieve the same effect. In this iteration of modeling, we do not set the multiplicity of the attributes, which should be done in later iterations.

[2] Regular user: A regular user can submit a work request a check its progress.

Acronym: user, end user, general user, requestor, requester.

[3] Technician: A technician works on requests, report work progress and get reports.

Acronym: worker.

[4] Administrator: An administrator administers the entire application and assigns workers to works.

Acronym: system manager, system administrator.

[5] Computer: A computer has a unique ID in the inventory of the organization.

[6] Computer Configuration: Hardware and software configuration of a computer or a homogeneous group of computers.

[7] OS: the Operating System, including version.

[8] Supported Software: Software supported by the university.

Acronym: software.

[9] Homogeneous Group: a group of computers with the same configurations.

Acronym: homogeneous computer group, computer group, group.

[10] Heterogeneous Group: a group of computers or groups that may have different configurations.

It is not needed in the current version of the application as a requester cannot submit work order on a heterogeneous group. This is modeled for future expansion and may be skipped in the current implementation of the system.

[11] Work: A work request submitted by a regular user.

Acronym: request, work request.

[12] Problem Item: a problem item identified by the regular user in a work request.

Acronym: problem.

Note: we do not model ‘problem’ (which may contain many problem items) separately as a class. Instead, it is merged with the Work class as they have a 1..1 to 1..1 relationship.

[13] Priority: The priority of a work request.

Acronym: work priority, request priority.

[14] Status: the status of the work.

Acronym: work status, request status.

Current set of values:

1: initial: submitted by a requester but with no work being done yet.

2: assigned: assigned to or selected by a technician.

3: started: in progress

4: closed with success

5: closed with some problem items unresolved.

[15] Work Progress: Progress made on a work.

Acronym: progress, progress report.

Note: The current assumption is a work can only be assigned to a technician once and cannot be changed. As a result, an explicit association between work progress and the technician is not needed. This assumption may not be realistic. If multiple technicians can work on the same work, then such an association will be needed.

Another assumption is that the technician reports on the progress on the entire work request and not individual work item. This may also be not realistic.

[16] Account: account for logging on the system.

[17] Account Types: Type of accounts.

Currently:

1: Regular User

2: Technician

3: Administrator

[18] Unit: business units in the organization.

Acronym: business unit, component

It is assumed that every user works for only one business unit.