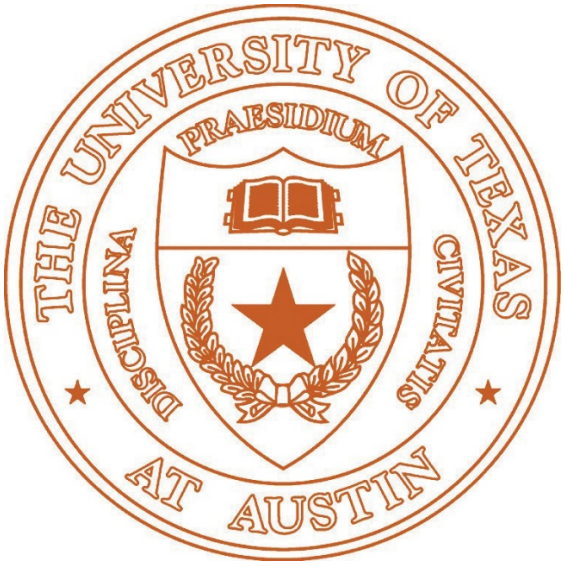
University of Texas at Austin, Cockrell School of Engineering
Requirements Engineering – EE 382C.11



Assignment # 3

Graphical-based Requirements Specifications

November 07, 2015

Gabrielson Eapen
EID: EAPENGP

1. Identify three Installation Requirements and for each describe how stakeholder expectations have changed over time.

   - Servers with 2 GHz processors and 2 GB memory
     Although this processor specification is low by today's standards, I assume that they are a significant upgrade to any existing server hardware. From the stake holder perspective, this hardware is an **investment** and intended to serve the system even when additional services are added in the future.

   - Support for gigabit (GB) networks
     Again, 10 GB networking is ubiquitous in the modern datacenter today. So when the requirement is specified as get servers with support for gigabit networks, the implication is that they are currently running 10 MB or 100 MB networks. The 1 GB network with the norm expected for server class hardware described above and probably the prevailing standard about 5 – 10 years ago.

   - Oracle Database
     Again the stake holder expectation is to have best of breed when it comes to the database platform especially when the desire is to build a core base that can be expanded to support additional servers in the future. By today's standards, Microsoft SQL Server 2014/2016 can compete head on with Oracle[1] but the general consensus is that Oracle is the established leader. An enterprise database will support faster read/write access and offer tuning capabilities if needed.

2. Identify three Non-Functional Requirements (NFRs) and for each suggest scope and evaluation criteria.

   - Responsiveness and fast transactions
     Scope: The registration system is very responsive and users should experience no lag during peak system usage.
     Evaluation criteria: Every user request must complete in less than two seconds.

   - Payment Data Encryption
     Scope: Federal regulation requires that payment data be encrypted at rest and in flight
     Evaluation criteria: Local storage of payment data must be encrypted and all access to payment input screens must be over SSL

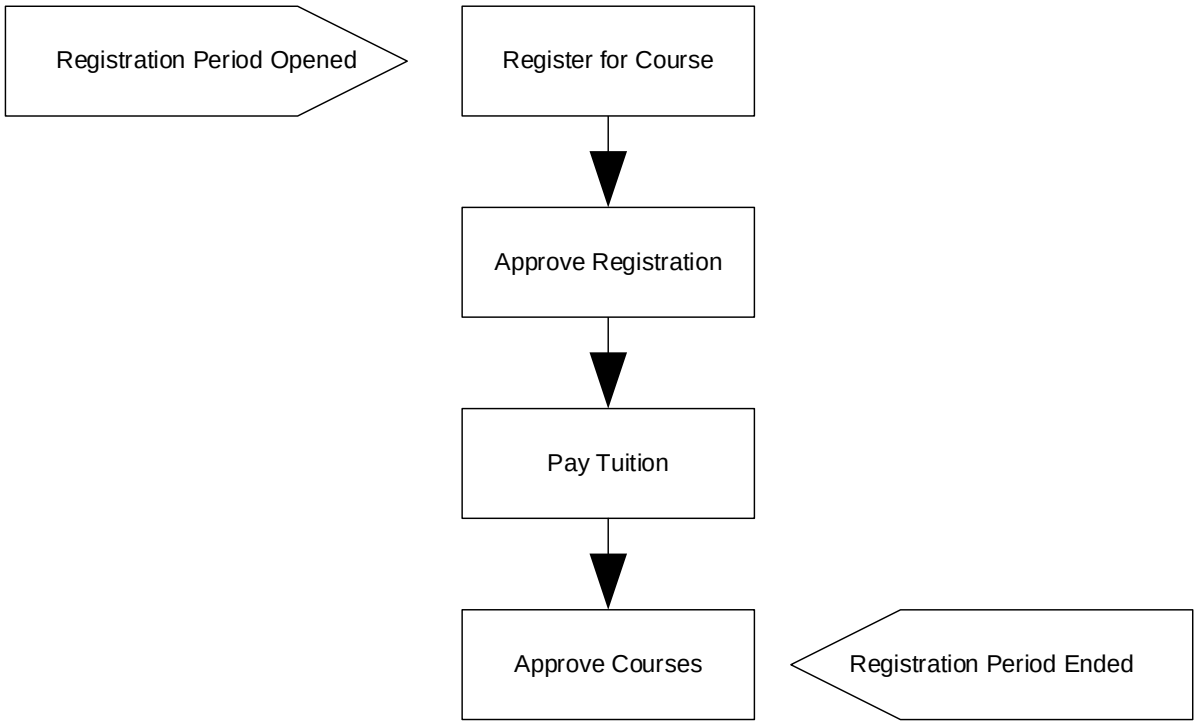
   - System Extensibility
     Scope: Due to insufficient departmental funds, only a minimal feature set will be implemented today. The system must be expandable to accommodate new services in the future.
     Evaluation criteria: When additional services are added, existing system functionality should not be changed.

[1] Stansfield, J. (March, 2014) *Microsoft SQL Server vs. Oracle: The Same, But Different?* Retrieved from http://www.seguetech.com/blog/2014/03/13/Microsoft-SQL-Server-versus-oracle

3. Draw one Operational Reference Model (ORM) for the process occurring during the registration period.

Operational Reference Model

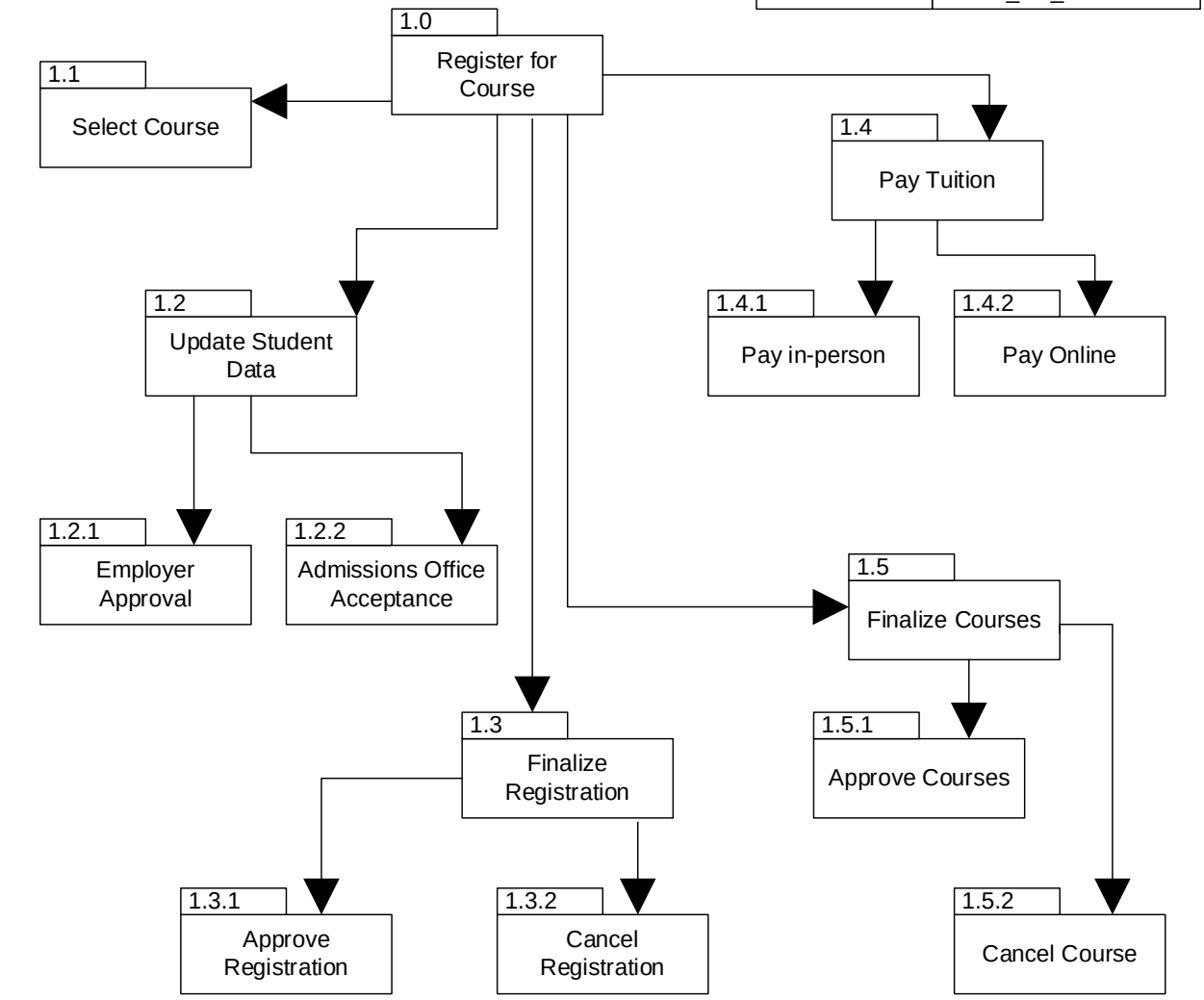
RM Number	Admin_OR_001
RA Source	Admin_Overview_001
RE	Gabrielson Eapen
Perspective	Admin
Date	November 07, 2015
Date Revised	
Date Revised	
Date Stakeholder Approval	
RM Reference	Admin_TD_001
RM Reference	Admin_TH_002
RM Reference	Admin_TH_002



4. Draw a Task Decomposition (TD) diagram for each task in your ORM and any additional tasks that can be decomposed that are not represented in your ORM.

Task Decomposition

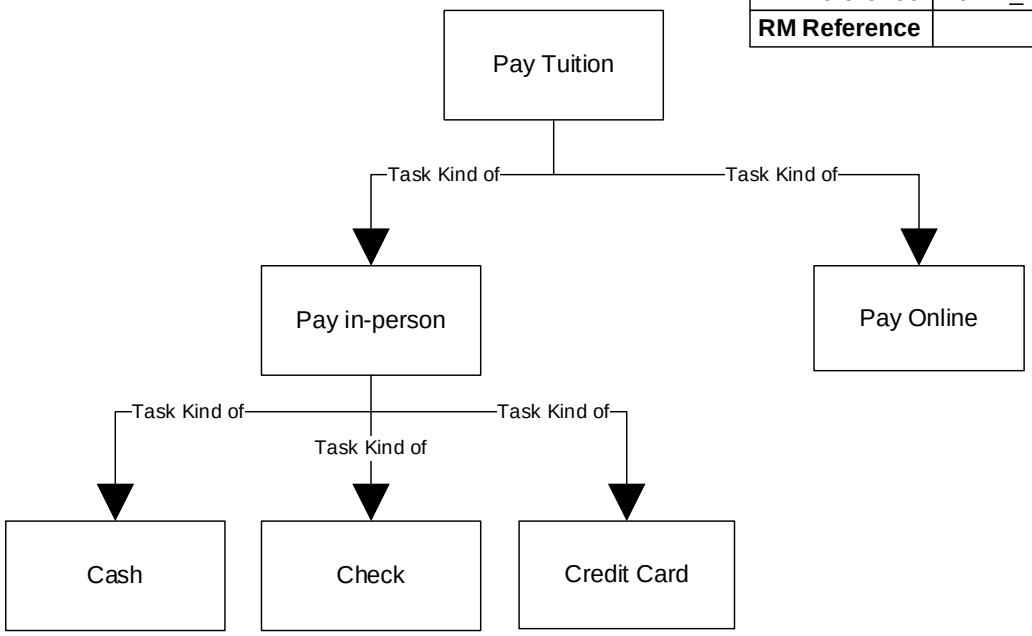
RM Number	Admin_TD_001
RA Source	Admin_Overview_001
RE	Gabrielson Eapen
Perspective	Admin
Date	November 07, 2015
Date Revised	
Date Revised	
Date Stakeholder Approval	
RM Reference	Admin_OR_001
RM Reference	Admin_TH_001
RM Reference	Admin_TH_002



5. Create at least one Task Hierarchy (TH) to describe how a task can be performed more than one way.

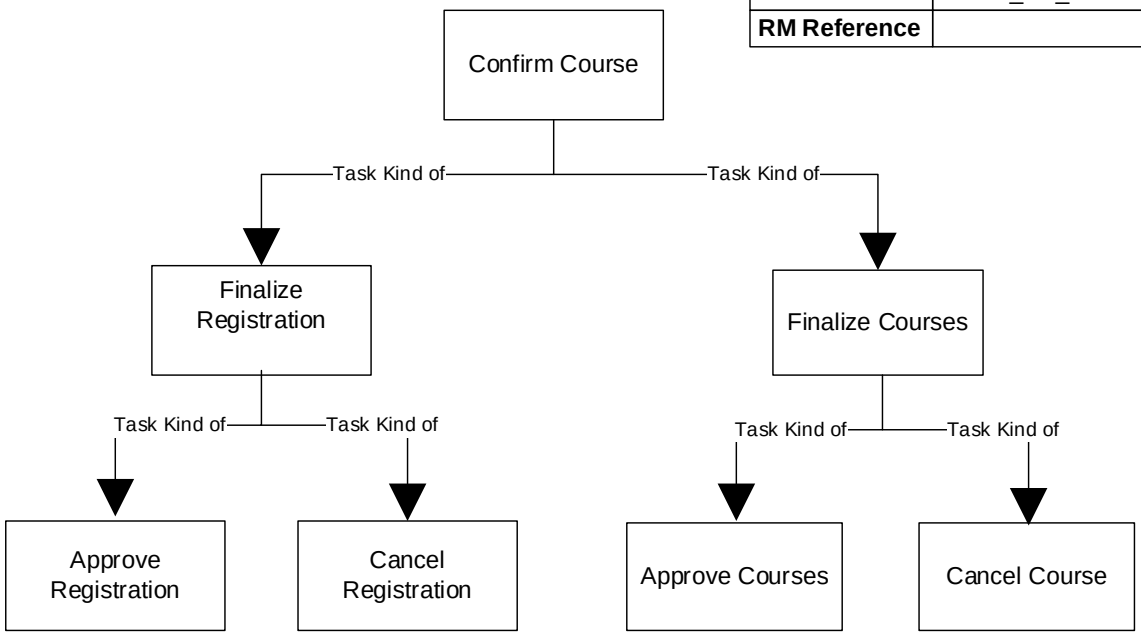
Task Hierarchy

RM Number	Admin_TH_001
RA Source	Admin_Overview_001
RE	Gabrielson Eapen
Perspective	Admin
Date	November 07, 2015
Date Revised	
Date Revised	
Date Stakeholder Approval	
RM Reference	Admin_OR_001
RM Reference	Admin_TD_001
RM Reference	



Task Hierarchy

RM Number	Admin_TH_002
RA Source	Admin_Overview_001
RE	Gabrielson Eapen
Perspective	Admin
Date	November 07, 2015
Date Revised	
Date Revised	
Date Stakeholder Approval	
RM Reference	Admin_OR_001
RM Reference	Admin_TD_001
RM Reference	



6. Select two leaf tasks in the Task Decomposition models to specify in a Task Template (TT).

Task Name: Approve Courses

RM Number:	Admin_TT_001
RA/RM Source:	Admin_Overview_001
RE:	Gabrielson Eapen
Perspective:	Admin
Date:	November 06, 2015
Date Revised:	November 07, 2015

Basic Task Information

Decomposition Reference	*Duration*	*Frequency*	*Location*
1.5.1	1 hour	Once per semester	Customer Site

Performers

Department Personnel

Pre/Post Conditions

Pre Conditions

Input Data

Input Data Name	*Cardinality*	*Data Condition*	*Sending Task*	*Sending Performer*
Course Identifiers	ManyToOne	Available at Task Start	Last day of enrollment	System
Total Income	One	Available at Task Start	Last day of enrollment	System
Total Costs	One	Available at Task Start	Last day of enrollment	System

Resource Constraints

Resource Name	*Resource Condition*
System	System is online and accessible

Post Conditions

Output Data

Output Data Name	*Cardinality*	*Receiving Task*	*Receiving Performer*
Approval	One	N/A	System

Output Event

Output Event Name	*Receiving Task*	*Receiving Performer*
All Courses Approved	Cancel Course	System

Task Name: Cancel Course

RM Number:	Admin_TT_002
RA/RM Source:	Admin_Overview_001
RE:	Gabrielson Eapen
Perspective:	Admin
Date:	November 06, 2015
Date Revised:	November 07, 2015

Basic Task Information

Decomposition Reference	*Duration*	*Frequency*	*Location*
1.5.1	1 hour	Once per course per semester	Customer Site

Performers

Department Personnel

Pre/Post Conditions

Pre Conditions

Input Data

Input Data Name	*Cardinality*	*Data Condition*	*Sending Task*	*Sending Performer*
Course Identifier	One	Available at Task Start	Last day of enrollment	System
Course Income	One	Available at Task Start	Last day of enrollment	System
Course Cost	One	Available at Task Start	Last day of enrollment	N/A
Total Income	One	Available at Task Start	Last day of enrollment	System
All Courses Approved	One	Available at Task Start	Approve All Courses	Departmental Personnel

Resource Constraints

Resource Name	*Resource Condition*
System	System is online and accessible

Post Conditions

Output Data

Output Data Name	*Cardinality*	*Receiving Task*	*Receiving Performer*
Course Cancellation	One	N/A	System

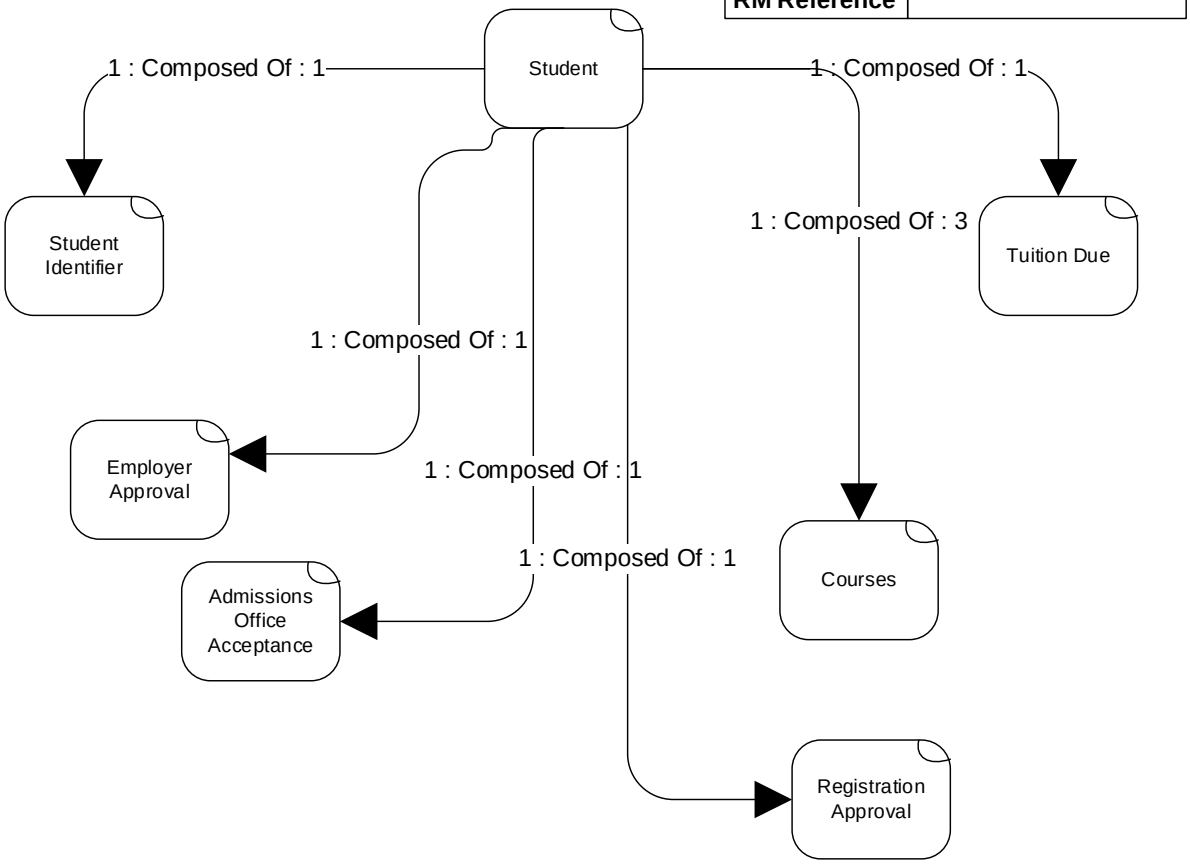
Output Event

Output Event Name	*Receiving Task*	*Receiving Performer*
Course Canceled	N/A	Student

7. Draw Entity-Relationship Diagrams (ERDs) for two records, describing all concepts and relationships related to those records. Include aggregation, inheritance, and domain-specific relationships.

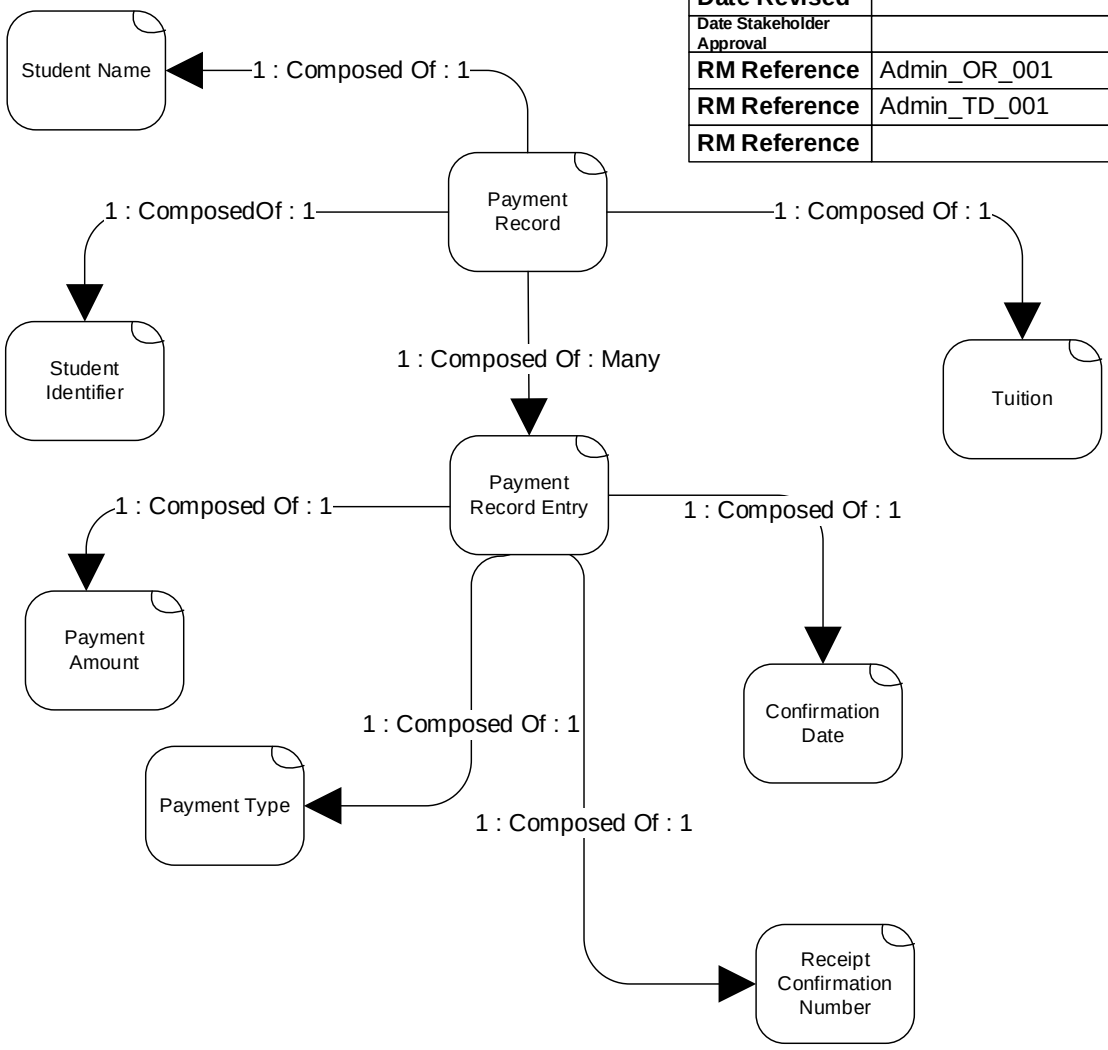
Entity Relationship Diagram

RM Number	Admin_ER_001
RA Source	Admin_Overview_001
RE	Gabrielson Eapen
Perspective	Admin
Date	November 07, 2015
Date Revised	
Date Revised	
Date Stakeholder Approval	
RM Reference	Admin_OR_001
RM Reference	Admin_TD_001
RM Reference	



Entity Relationship Diagram

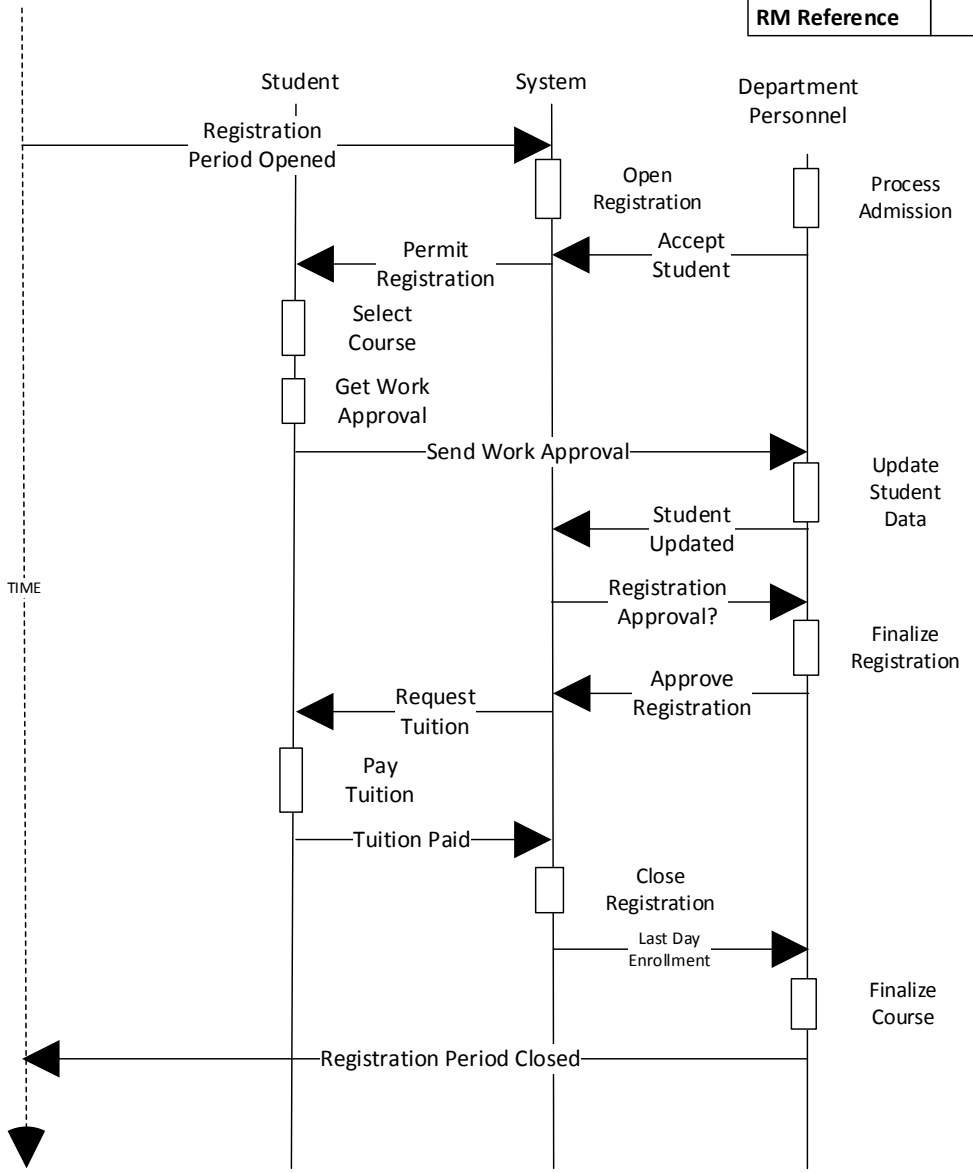
RM Number	Admin_ER_002
RA Source	Admin_Overview_001
RE	Gabrielson Eapen
Perspective	Admin
Date	November 07, 2015
Date Revised	
Date Revised	
Date Stakeholder Approval	
RM Reference	Admin_OR_001
RM Reference	Admin_TD_001
RM Reference	



8. Create one Temporal Sequence (TS) reflecting the process to register for a class with no less than three swim lanes

Temporal Sequence Diagram

RM Number	Admin_TS_001
RA Source	Admin_Overview_001
RE	Gabrielson Eapen
Perspective	Admin
Date	November 05, 2015
Date Revised	November 07, 2015
Date Revised	
Date Stakeholder Approval	
RM Reference	Admin_OR_001
RM Reference	
RM Reference	



9. Identify one inconsistency using a Task Hierarchy and an ER Diagram (i.e., evaluate for consistency)

   Pay Tuition (Admin_TH_001, Admin_ER_001, and Admin_ER_002)
   The task hierarchy model (Admin_TH_001) shows that the 'Pay Tuition" task can be accomplished in at least two ways. Other permutations of accomplishing this task also exist. In my ER diagram for "Student" (Admin_ER_001) and "Payment Record" (Admin_ER_002), there are two data item called "Tuition Due" and "Tuition" respectively. The system can obviously make the initial calculation based on courses approved for registration multiplied by the $1000 per course tuition. While Payments can be processed online, it is unclear if the "Tuition Due" field is dynamic and reduces by the amount of each payment (full or partial) made. It is also unclear how payments made in person are processed by the Account Receivable department. Does that department personnel update the Payment record in the System only which then updates tuition due amount on the Student record or does the personnel directly update the tuition due field on the Student record?
   The next inconsistent item based on the Payment Record ER diagram is whether partial payments (other than the full amount due) is permitted. My ER model allows for it but the task hierarchy makes no mention of its possibility.

10. Identify additional information that you would like to acquire based on missing content in two different type of models (i.e., evaluate for completeness)

    Update Student Data (Admin_TD_001, Admin_TS_001)
    There is a presumption that student information initially "magically" appears in the system. Is there a task responsible for this? Is it an ancillary activity of Admissions or Registration? Does "Process Admission" also include the creation of the student record? This is unclear. Next, should "Accept Student" event only happen after registration opens? Both of my models imply this is the case but that is not very clear from the requirements provided. This point needs to be clarified further.

    The second item I want to clarify is the subtle distinction of all courses approved versus some courses cancelled. If total income exceeds all costs, then **all** courses are approved. This is straightforward. The individual course cancellation criteria is not so obvious. Is it based purely on the profitability of each course? I don't think that is the case as one course can be very profitable and cover some courses that are still not individually profitable. This is implied by looking at only Total income when deciding if all courses are to be approved. So I would like to acquire more information about the course cancellation criteria.