RUTGERS

Rutgers Business School
Newark and New Brunswick

33:010:458
Accounting Information Systems

Dr. Peter R. Gillett

Associate Professor
Department of Accounting, Business Ethics and Information Systems
Rutgers Business School–Newark and New Brunswick

A.I.S. Class 12: Outline

- Classroom Assessment
- Optionalities & Cardinalities
- Group Work Chapter 9
- Group Projects Stage 2
- Group Projects Stage 3
- Group Projects Stage 4
- Group Work Chapter 10
- Learning Objectives for Chapter 1
- Chapter 1 Overview – Introduction to Microsoft Access
- Chapter 1 Quiz
- Learning Objectives for Chapter 2
- Chapter 2 Quiz
- Chapter 2 Overview – Databases and Accounting Systems

Classroom Assessment

- 8 students declined to complete this exercise or were absent
- 141 responses

Classroom Assessment

- The most important thing I have learned

* REA Diagrams	40
* Flowcharts	37
* Working in groups, relying on others, teamwork	21
* Time management	11
* Importance of organized information & databases for accounting	10
* 9 Steps of REA	9
* Business processes, flow of accounting systems & documents	6
* EER	4
* Importance and use of A.I.S.	4
* Optionalities & cardinalities	4
* How A.I.S. set up & data is stored	4
* UML	3
* Database concepts	3
* SLC & SDLC	2
* Ash Accounting	2
* Advantages of computerizing accounting	2
* Need to stay up to date	2
* Organization	2
* Nothing	1
* *Other items appearing once only*	30

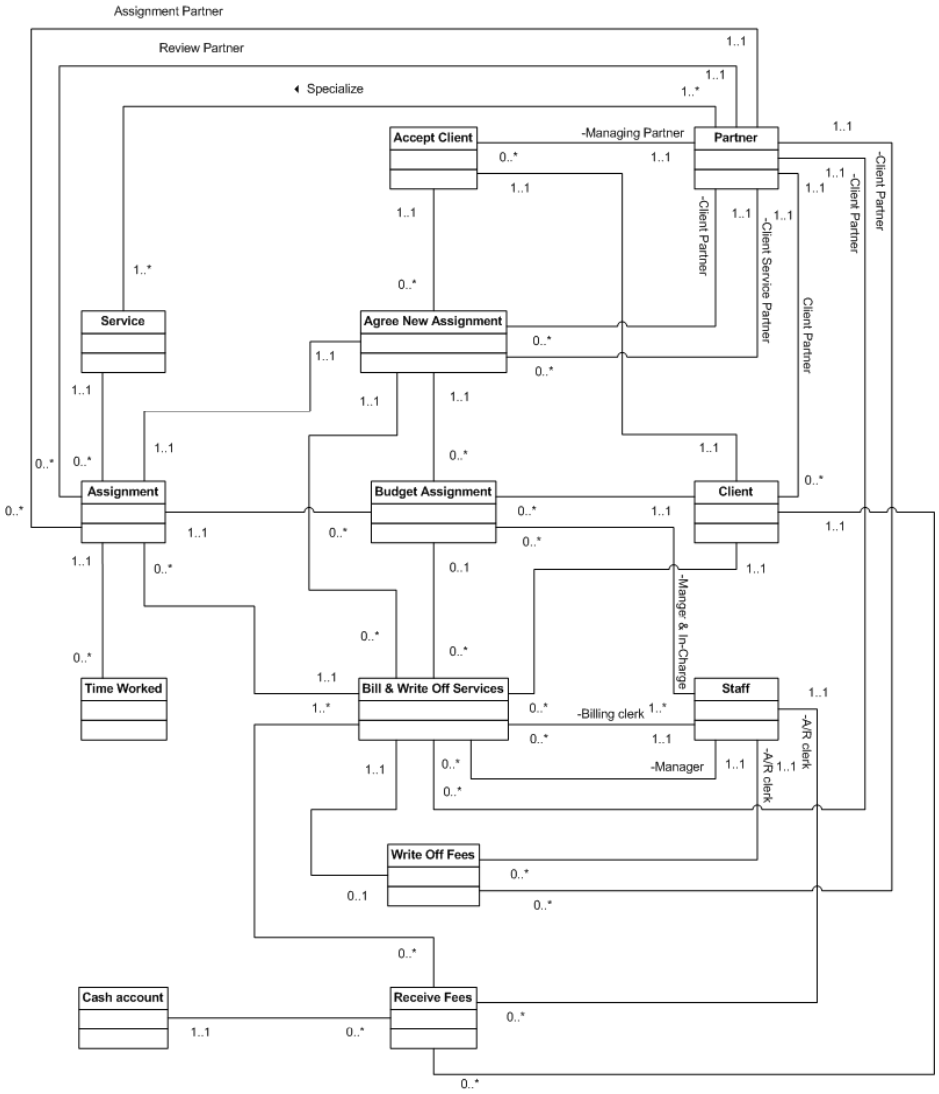
Classroom Assessment

- What is least clear to me

		2008
* DFDs & Context Diagrams & various levels	51	29
* REA	37	25
* Identifying significant events, resources & agents	17	0
* Optionalities & cardinalities	16	16
* UML	10	10
* Flowcharts	10	4
* Primary & foreign keys / composite keys	9	6
* Chapter 9	6	10
* Defining attributes	6	7
* Chapter 10 / Internal Controls	6	6
* Business v. information processes	5	0
* Normalization	4	3
* REA Ontology & associated terminology	4	3
* Tables	4	0
* Chapter 6	4	0
* EER diagrams	3	5
* Chapter 7	3	3
* Chapter 8	3	0
* Steps 7 – 9	2	2
* Chapter 1 Appendix	2	0
* 9 Steps of REA	2	0
* Nothing	1	5
* Identifying Relationships	0	11
* SQL	0	4
* *Items appearing once only, including "Most of it"*	13	11

Optionalities and Cardinalities

Accounting Information Systems



Optionalities and Cardinalities

- In the rules and exception regarding linking database tables, we talk about 1:1, 1:M, M:1 and M:M relationships
- In this context we are talking about CARDINALITIES
- Thus, 1:M does NOT mean 1..*
- It means a relationship in which the maximum participation at one end is 1, and at the other end is *
- A: 0..1 ---------- 1..* is thus 1:M
- B: 0..* ---------- 1..1 is thus M:1
- C: 1..1 ---------- 0..* is thus 1:M
- D: 1..* ---------- 0..* is thus M:M
- E: 1..1 ---------- 0..1 is thus 1:1
- Recall the exception that says if the optionality is 0, the cardinality is treated as * for the purposes of linking tables, regardless of what it actually is:
  - So in A above, the relationship is treated as M:M
  - And in E above, the relationship is treated as 1:M

Group Work Chapter 9

- Chapter 9 Problems 8, 9 &12

Group Projects Stage 2

- It is clear that Stage 3 of the project cannot be successful until Stage 2 is fixed
- There are problems at Stage 2 with identifying the entities, identifying the relationships, determining the optionalities and cardinalities, and specifying attributes
- Every group *needs* to fix their REA diagrams before beginning Stage 3
- Groups should plan to discuss their Stage 2 solutions with me as soon as possible – I provided some extra time today, and will do so again on Friday

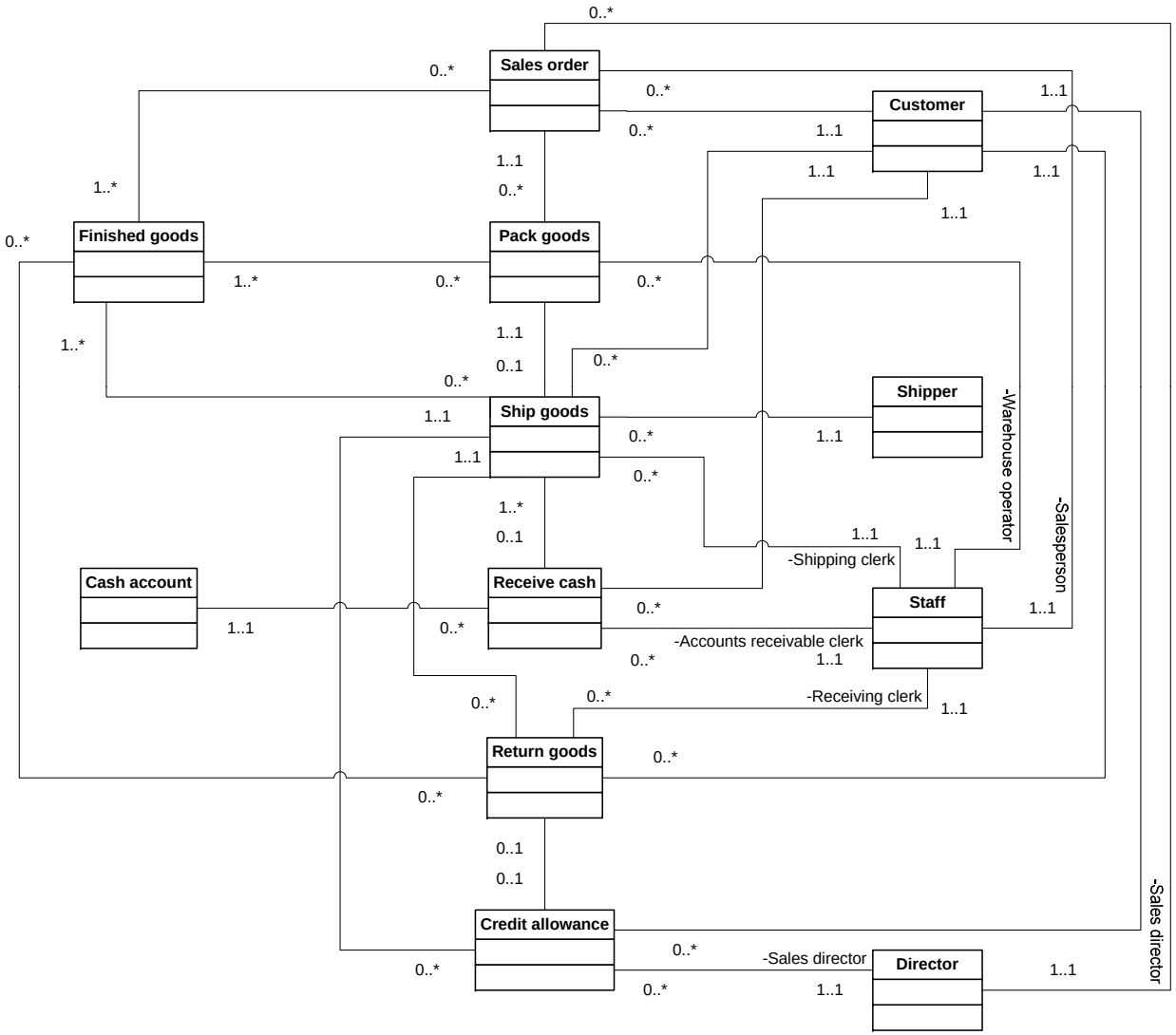
Group Projects Stage 3

- Recall our conventions for keys on tables: underline primary keys, [ ] for foreign keys
- { } are NEEDED for Step 6 but NOT permitted in tables at Step 8
- At Step 8, the Events will form part of your specific cycles – but be aware that the Resources and Agents may also form part of other groups' cycles – and that since in an integrated data repository structure we want to implement each table once only, your tables should contain all the attributes that will be needed in ANY of the cycles – NEGOTIATE!

Group Projects Stage 3

- Camel Code naming conventions for files:
  - SalesOrder
  - TimeWorked
  - RawMaterials
  - Requisitions-RawMaterials
  - E.g.
    - SalesOrder (Order#, Date, [Customer#], [Salesperson#], DeliveryDateRequested)

Accounting Information Systems



Accounting Information Systems

SalesOrder (SalesOrder#, SalesOrderDate, [Staff#], [AuthorizationDirector#], [Customer#], TargetShipmentDate, CustomerPurchaseOrder#)

Packing (Packing#, PackingDate, [SalesOrder#], [Staff#])

Shipping (Shipping#, ShippingDate, [Packing#], [Staff#], [Customer#], [Shipper#], ShippingWeight, ShippingCost, ShippingTracking#)

ReceiveCash (Receipt#, ReceiptDate, [Staff#], [Customer#], [CashAccount#])

ReceiveReturns (Return#, ReturnDate, [Shipping#], [Staff#], [Customer#], Reason, ReturnCondition)

AllowCredit (CreditNote#, CreditNoteDate, [Shipping#], [Director#], [Customer#], AmountAllowed, Explanation)

FinishedGoods (FinishedGoods#, FinishedGoodsDescription, FinishedGoodsFabric, FinishedGoodsFit, FinishedGoodsCollarDesign, FinishedGoodsCollarSize, FinishedGoodsCuffStyle, FinishedGoodsSleeveLength, FinishedGoodsUnits, FinishedGoodsStandardCost, FinishedGoodsSellingPrice, FinishedGoodsBin#)

CashAccount (CashAccount#, CashAccountName, CashAccountDescription, BankName, BankAccount#)

Accounting Information Systems

Customer (Customer#, CustomerName, CustomerAddress, CustomerCity, [CustomerStateCode], CustomerZipCode, CustomerTelephone, CustomerContactName, CustomerCreditLimit)

Shipper (Shipper#, ShipperName, ShipperAddress, ShipperCity, [ShipperStateCode], ShipperZipCode, ShipperTelephone, ShipperContactName)

Director (Director#, DirectorLastName, DirectorFirstName, DirectorMiddleInitial, DirectorSocialSecurity#, DirectorAddress, DirectorCity, [DirectorStateCode], DirectorZipCode, DirectorTelephone#, DirectorJobTitle, DirectorAnnualSalary, [DirectorPayPeriodCode], [DirectorMaritalStatusCode], [DirectorNJRateCode], DirectorTaxExemptions, DirectorNJTaxExemptions)

Staff (Staff#, StaffLastName, StaffFirstName, StaffMiddleInitial, StaffSocialSecurity#, StaffAddress, StaffCity, [StaffStateCode], StaffZipCode, StaffTelephone#, StaffAnnualSalary, [StaffPayPeriodCode], [StaffMaritalStatusCode], [StaffNJRateCode], StaffTaxExemptions, StaffNJTaxExemptions)

Accounting Information Systems

SalesOrder-FinishedGoods ([SalesOrder#], [FinishedGoods#], QuantityOrdered)

Packing-FinishedGoods ([Packing#], [FinishedGoods#], QuantityPacked)

Shipping-FinishedGoods ([Shipping#], [FinishedGoods#], QuantityShipped)

Shipping-ReceiveCash ([Shipping#], [Receipt#], AmountReceived)

ReceiveReturns-FinishedGoods ([Return#], [FinishedGoods#], QuantityReturned)

ReceiveReturns -AllowCredit ([Return#], [CreditNote#])

Staff-JobTitle ([Staff#], [JobTitleCode])

JobTitle (JobTitleCode, JobTitleName)
ValidStateCode (StateCode, State, StateSalesTaxRate)
ValidZipCode (ZipCode)

Group Projects Stage 4

- Use the Internal Control documentation discussed in class last week
- Add additional copies of pages as needed
- The document is downloadable from Blackboard
- Application Controls will be needed this year for *your allotted cycles* only, to save you time
- Complete the documentation for the Internal Control Structure you will design for the *new* system, NOT for the *existing* system

Internal Control Documentation

- Group Project Internal Control Documentation
  - Based on a composite of actual documents used by accounting firms to record client's controls
  - Complete document includes six pages for General Controls which we shall not be using this year
  - In general, these four pages, covering application controls, need to be completed separately for each application, documenting controls over:
    - Input
    - Processing
    - Output
    - User
  - As many copies of each page as needed must be completed

Internal Control Documentation

- Group Project Internal Control Documentation
  - * Each specific control activity must be documented, identifying:
    - The Type of Control (e.g., Range Test)
    - The specific Control Activity (e.g., Attempts to enter Hourly Rates < 0.00 or > 15.000 are rejected with an error message) in enough detail to be able to set them up in Microsoft ACCESS if necessary
    - Whether the control activity is Preventive or Detective
    - Whether the control activity is Manual or Programmed
    - Which Control Objective(s) the activity helps achieve
  - * Good control may help achieve multiple Control Objectives
  - * When the document is completed, it need to be reviewed to ensure that each Control Objective is appropriately covered, and that appropriate mixtures of Preventive and Detective controls, and Manual and Programmed controls, has been achieved

Group Work Chapter 10

- Chapter 10 Problems 6 & 7

Learning Objectives for Chapter 1

- Important topics covered in the chapter include:
  * Understanding the Access work environment
  * Creating and using Access objects including tables, queries, forms and reports
  * Customizing the Access environment
  * Opening and displaying tables
  * Retrieving information with queries
  * Modifying tables' contents with action queries
  * Creating and using forms to display data
  * Designing and using database reports

Introduction to Microsoft ACCESS

- Displaying Help
  - * Important LATER when you want to
    - Find out what new features of ACCESS do and how to use them
      - How do I use DLookup?
    - Discover new functions to resolve specific problems
      - Can I convert Nulls into zeros?

Introduction to Microsoft ACCESS

- ACCESS Ribbon
  - * Ribbon contains Command Tabs
    - Command Tabs contain Command Groups
      - Command Groups contain individual controls
  - * Home Tab
    - Views
    - Clipboard
    - Font
    - Rich Text
    - Records
    - Sort & Filter
    - Find
- Navigation Pane

Introduction to Microsoft ACCESS

- ACCESS Objects
  - Tables
    - Tables are the fundamental storage structures
    - Data is stored *only* in tables
  - Queries
    - Selection queries are most common
      - Design – the structure of a query
      - Dynaset – the results of a query
  - Forms
  - Reports
  - *Macros – not covered in this chapter*
  - *Modules – not covered in this chapter*

Introduction to Microsoft ACCESS

- Object Naming convention for ACCESS
  - Preface object names as follows:
    - Tables – tbl
    - Queries – qry
    - Forms – frm
    - Reports - rpt

Introduction to Microsoft ACCESS

- Viewing Tables in ACCESS – note:
  * Contextual Command Tab: Datasheet
    - Views
    - Fields and Columns
    - Data Type & Formatting
    - Relationships
  * Comment from table column
  * Datasheet navigation buttons
  * Status bar
  * View shortcuts

Introduction to Microsoft ACCESS

- Sorting and filtering Table Rows
  * By default tables are sorted by primary key
  * Sorting and filtering allows us to sort by any single column, and to filter (restrict) the displayed view to certain values
  * Another way to sort is to create an Advanced Filter/Sort
    - Here you can have multiple sort columns
  * Of course, you will most often sort data in Queries!

Introduction to Microsoft ACCESS

- Printing Tables
  * Note that printing data in tables is simple
  * But to print the Table *structure* you will need to:
    - Click the Database Tools command tab
    - Click Database Documenter in the Analyze Group
    - Select the items you want

Introduction to Microsoft ACCESS

- Selection Queries
  - Show, but do not store, data in *dynasets*
  - Created using QBE
  - Query Wizard will help you
  - Query Design (build manually) is simple anyway! . . .
  - Recall # # are used for Dates
  - Queries can sort the dynaset as required
  - Queries can use:
    - < > = <= >= <>
    - AND, OR, NOT
  - Queries can calculate new values using Expressions

Introduction to Microsoft ACCESS

- Action Queries are also important
  - Make Table
  - Update
  - Delete
  - Append
- We will study these later, in Chapter 4
- We will study Tables, Queries, Forms and Reports in greater detail in Chapters 3–6

Chapter 1 Quiz

?

Learning Objectives for Chapter 2

- Important topics covered include:
  * Differences between double-entry bookkeeping and database accounting systems
  * Advantages and disadvantages of database accounting systems
  * Business processes
  * A brief history leading to the development of database management systems
  * Functions of database management systems
  * Theory and application of relational database management systems
  * The structure of database objects that store accounting events
  * The importance of normalizing tables
  * Performing database selections, projections, and joins
  * How accountants use the REA model when designing accounting databases

Chapter 2 Quiz

?

Accounting Databases

- Advantages of Database Accounting Systems
  * Reduce data storage costs
  * Eliminate data redundancy
  * Eliminate data inconsistencies
  * Avoid duplicate processing
  * Facilitate add, delete, and update maintenance tasks
  * Make data independent of applications
  * Centralize data management
  * Centralize data security

Accounting Databases

- Advantages of Database Accounting Systems
  - Make report modifications and updates easier
  - Provide *ad hoc* query capabilities
  - Facilitate cross-functional data analysis
  - Permit multiple users simultaneous data access

Accounting Databases

- Disadvantages of Database Accounting Systems
  * Greater hardware requirements
  * Database software itself
  * Employing a database administrator
  * System operation becomes critical
  * Incorrect data entry corrupts many users' work
  * Territorial disputes over data ownership

Business Processes

- Sales/Collection
  - Events
    - Customer orders
    - Sales
    - Cash receipts

Business Processes

- Sales/Collection
  - Reports
    - Sales orders
    - Invoices
    - Shipping documents
    - Remittance advices
    - Cash receipts summaries
    - Sales analyses
    - Balances owed by customers

Business Processes

- Sales/Collection
  - Tables
    - Cash account
    - Cash receipt
    - Customer
    - Finished goods inventory
    - Sale
    - Sales order
    - Salesperson

Business Processes

- Acquisition/Payment
  - Events
    - Purchase orders
    - Receipt of goods ordered
    - Payments to vendors

Business Processes

- Acquisition/Payment Reports
  - Backorder reports
  - Balances owed to vendors
  - Checks
  - Goods received summaries
  - Purchase orders
  - Purchase summaries
  - Receiving reports

Business Processes

- Acquisition/Payment
  - Tables
    - Cash account
    - Cash disbursement
    - Purchase order
    - Raw materials inventory
    - Raw materials inventory receipt
    - Vendor

Business Processes

- Human Resources
  - Events
    - Employees earn pay
    - Payment to employees
    - Payment of payroll taxes, etc

Business Processes

- Human Resources
  - Reports
    - Checks
    - Employee commission reports
    - Employee earnings records
    - Employee time reports
    - Payroll registers

Business Processes

- Human Resources
  - Tables
    - Cash account
    - Cash disbursement
    - Employee
    - Time worked

Business Processes

- Finance
  - Events
    - Issuance of stock
    - Receipt of cash from stock issues
    - Declaration of dividends
    - Payment of dividends

Business Processes

- Finance
  - * Reports
    - Stock ownership by shareholder
    - Dividends declared and paid
    - Summary of outstanding loans
    - Schedule of loan payments due

Business Processes

- Finance
  - Tables
    - Cash account
    - Loan agreement
    - Stock issue
    - Dividend declaration
    - Cash receipt
    - Cash disbursement
    - Investor
    - Creditor

Business Processes

- Production (not shown in chapter)
  - Events
    - Materials inventory costs flow into production
    - Labor costs flow into production
    - Overhead costs flow into production
    - Total production costs flow into finished goods inventory

Business Processes

- Production (not shown in chapter)
  - Reports
    - Bills of materials
    - Job cost reports

Business Processes

- Production (not shown in chapter)
  - Tables
    - Finished goods inventory
    - Job
    - Raw materials inventory
    - Time worked

Database Foundations

- Functions of a DBMS
  * Efficient data maintenance
  * User-accessible catalog
    - the data dictionary is itself a database file accessible by the user
  * Concurrency control
    - proper lock-out of multiple users
  * Transaction support
    - an entire transaction is processed, or none of it is (in the event of a system failure)
  * Recovery services
  * Security and authorization services
  * Integrity facilities
    - conditions or restrictions on valid data in database

Database Foundations

- Terminology
  * Relation, tuple, attribute
  * Table, row, column
  * File, record, field

Database Foundations

- Other main topics already covered
  * Historical v. modern information systems
  * Advantages and disadvantages of DBMS
  * RDBMS terminology
  * Database normalization
  * Entity-Relationship models
  * Data dictionary

Database Foundations

- Fundamental database operations – SQL
  - Select
    - Determines which rows are included in dyansets
  - Project
    - Determines which columns are included in dynasets
  - Join
    - Combines data from different tables

Database Foundations

- Equijoins (p. 81)
- Outer Joins (p. 81)
- Recursive relations (p. 84)