Object Oriented Programming

* Visual basic, java, c++
* An object (me, car, computer, etc) has two parts
  + Properties – year, brand, make, color
    - static
  + Methods – Activities (for a cor: drive forward, reverse, turn left/right
    - They are dynamic
      * Programmable

3 control blocks

* Sequence
  + An action or event leads to the next ordered action in a certain order
  + Base🡪tomato sauce🡪cheese🡪bake
* Selection
  + A question is asked and depending on the answer, the program can take one of two courses of action
  + Base🡪tomato sauce🡪toppings? (If yes, add pepperoni. If not, skip)🡪cheese🡪bake
* Iteration
  + Loop that goes through a group of instructions
  + Base🡪tomato sauce🡪topping? (If yes, add pepperoni and go back to topping? If not, skip)🡪cheese🡪bake

Repetition Structure

* Do while loop

Select Case show

Case >93 “A”

Case >89 “A-“

Generations

* 4
  + ABAP, SQL
* 3
  + VB, Java
  + A compiler converts to machine
* 2
  + Assembly Language
  + Assembler converts the language statements to machine
* 1
  + Machine
  + ‘0’ and ‘1’

Database:

* Organized collection of related data
* Flat files
* Hierarchical
  + Each child can have only one parent. Data is repeated
* Network
  + Child can have more than one parent.
* Relational
  + Flexible, just need a common field in tables
* Object-oriented
* Functional dependency
  + One attribute determines another attribute
  + StudentID 🡪 Student Name
  + StudentID 🡪 (dorm name, dorm room, fee)
    - Attribute on left of the arrow is determinant
* Keys
  + A column or combo of columns that uniquely identifies the rows in a relation
  + A composite key
    - consists of two or more columns
  + Candidate key
    - Determines all of the other columns in a relation
  + Primary
    - Primary means of identifying rows in a relation
  + Surrogate
    - Artificial column added to serve as a primary key
    - RentalProperty without surrogate
      * RentalProperty(street, city, state, zip, country, rate)
    - RentalProperty with
      * RentalProperty(PropertyID, street, city, state, zip, country, rate)
  + Foreign
    - Primary key of one relation placed in another relation to create a link
* Normal Forms
* 1nf
  + A table that qualifies as a relation
* 2nf
  + Table in 1nf and all partial dependencies have been removed
  + Partial dependencies
    - One or more non key attributes are functionally dependencies on part but not all of the primary key
* 3nf
  + In 2nf and all transitive functional dependencies have been removed
  + Transitive
    - Functional dep between two or more non key attributes
* Entities
  + Person, place, object, event
  + Class – a collection of a given type (ID, Street, City…)
  + Instance – the occurrence of a particular entity (24, denhertog, Wyoming)
  + Identifiers
    - An attribute that uniquely distinguishes individual instances of class
      * Tables have keys, entities have identifiers
  + Naming conventions
    - Entity
      * Singular nouns
    - Attribute
      * Singular nouns or noun phrases
    - Relationship
      * Verb phrase
  + Associative
    - Creates a link between entities. Can’t have many to many without a associative
  + Specialization
    - 2 lines if a the top entity must be one of the bottom (employee must be salary or hourly)
    - 1 line if can be one or neither (vehicle can be car or truck and also neither)
  + Disjointness
    - ‘d’ in the circle if the top entity must be one of the bottom, but not both
      * An employee must be hourly or salaried, but not both
      * Top employee entity would be EmployeeType
    - ‘o’ in the circle if the top entity can be in both of the bottom
      * A part may be both manufactured in house and purchased
      * In part entity, Manufactured(Y/N), Purchase(Y/N)

Analysis and Design

* DFDs
  + Shows data movement but not logic or processing
  + Process
    - Rounded rectangle
    - Must have incoming and outgoing data flow(spontaneous generation, black holes), and can’t have spontaneous info gathered (gray hole)
  + Data flow
    - arrow
  + Data store
    - Long short box with open end
    - Cannot be connected to another data store, must have incoming and outgoing data
  + External entity
    - Square
    - Must be connected by a data flow to a process, and not directly to a data store or another external entity
* Data dictionary
  + Storage of information about the systems data
    - Analysts use to collect, document, and organize specific facts about the system
* Development strategies
  + Traditional
    - Design influenced by compatibility issues
    - Run on local and wide area networks
    - Internet links and resources
    - Three main paths
      * In house
      * Purchase of software package
      * Outside consultants
    - Scalability affected by network limits and constraints
    - Needs a lot of power
    - Security issues less complex than web-based
  + Web-based
    - Developed on .NET or WebSphere
    - Web as a platform, not a channel
    - Scalable, multiple environments
    - CRM, order processing and materials management
    - Limits in-house involvement to a min as vendors install, configure and maintain the system
    - Requires addition layers, called middleware, to communicate with existing software and legacy systems