

# Chapter 18:

## IT Applications

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### Informatics Practices Class XI

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# Introduction

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The use of modern e-technology changed our lives and affected all the area of application like Banking, Education, Entertainment and Government etc.

In this chapter you will learn about some applications of Web-based e-technologies and their impact on the society.



E-Governance

E-Business

E-Learning

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# E-Governance

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## □ What is E-Governance ?

E-Governance refers to the application of electronic means in governance to fulfill the requirement of common man at minimal cost in faster way.

## □ Objective of E-Governance

- To provide information and knowledge about political process, services to the citizens.
  - To make active participation of citizens by Informing, Representing, Encouraging, Consulting and involving them.
  - To fulfill the public's need by providing simplified online services at front-office side.
  - To facilitate faster, transparent, accountable, efficient and effective process for various administration activities at back-office side.
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# E-Governance

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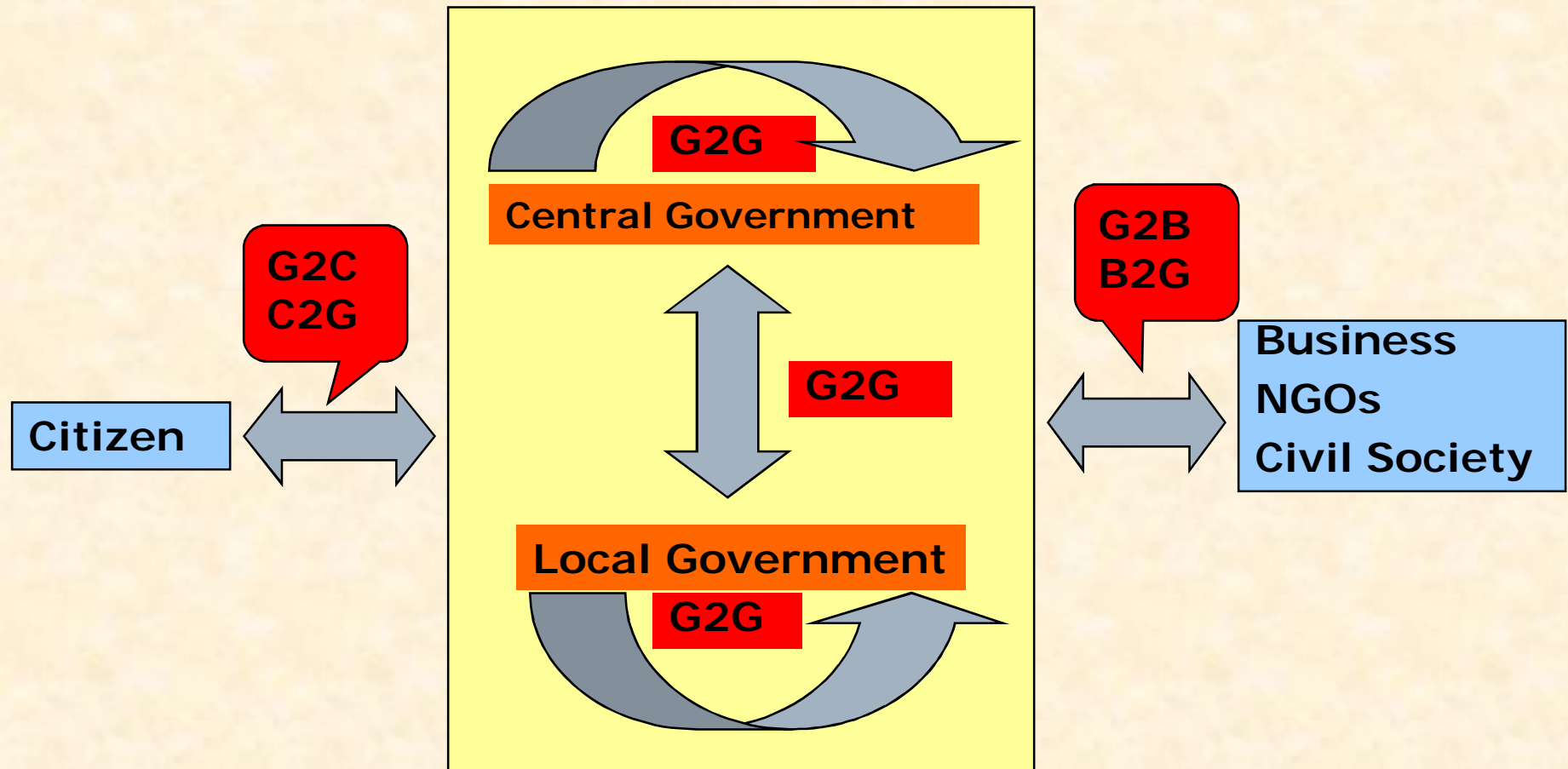
## □ E-Governance Model

E-Governance system is based on the need of the Citizens, Businesses and Government itself. It can be in the following Interaction Model.

- **G2C (Government to Citizens )**
  - **C2G (Citizens to Government)**
  - **G2B (Government to Businesses)**
  - **B2G (Businesses to Government)**
  - **G2G (Government to Government)**
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# E-Governance

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**E-Governance Model**

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# Major E-Governance Projects

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## □ **National Portal of India**

The National Portal of India is a single window to access all the information and services being provided by the various Indian Government entities. This contains information of various Government Ministries and Departments at the Central, State and District level.

This Portal is designed and maintained by the National Informatics Centre (NIC), Deptt. Of Information Technology, Ministry of Communication & Information Technology, Govt. of India.

**URL:** <http://india.gov.in>

## □ **Income Tax Portal**

To meet the demand for efficient system for tax collection, the Income Tax Department launched a centralized website in 2002. Presently this portal offers various services to citizen including PAN/TAN enquiries and Online filling of Income Tax Returns.

**URL:** <http://www.incometaxindia.gov.in>

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# Major E-Governance Projects

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## □ Supreme Court of India

The portal of the Supreme Court of India (highest judicial body) provides information regarding Judgments, Cases, News and e-filing etc.

URL: <http://supremecourtofindia.gov.in>

## □ Indian Courts

The Indian court website is a junction point for Supreme Court and 21 High Courts and their branches in India. This web portal provides information related to Supreme court and High Courts .

URL: <http://www.indiancourts.nic.in>

## □ DRDO

Defence Research & Development Organisation (DRDO) is a network of more than 50 Laboratories which are encased in developing Defence Technologies like Aeronautics, Armaments, Electronics, Instrumentations, Missiles, Special Materials, Life Science, Training and Information Systems etc.

URL: <http://drdo.nic.in>

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# Major E-Governance Projects

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## □ RTI Portal

Right to Information Act 2005 is response to citizen demands for Government Information. The RTI portal is result of initiative taken by Deptt. Of Personnel & Training, Ministry of Personnel, Public Grievances & Pensions .

This portal provides details about Appellate Authorities, PIOs in various Departments, RTI information Disclosures published by the Government etc.

**URL:** <http://rti.gov.in>

## □ Indian Passport Office Portal

The Consular Passport & VISA Division of Ministry of External Affairs, is an executive agency of Government of India for issuing Indian Passports.

The Objective of this portal is to help citizen in Passport related task and queries by providing services and information at their home.

**URL:** <http://passport.gov.in>

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# Major E-Governance Projects

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## □ **Min. of Company Affaires (G2B Project)**

The MCA 21 Project provides convenient and secure online services to corporate bodies, professionals (Chartered Accountants and Company Secretaries), who are authorized signatories or employees of companies.

This offers facilities for downloading various e-Forms, Registration of new companies, payment of fees and penalty, status of payment, investor grievance and certified public records of companies etc.

URL: [www.mca.gov.in](http://www.mca.gov.in)

## □ **Other E-Governance Portals in India**

- <http://indianairforce.nic.in>
  - <http://indiannavy.nic.in>
  - <http://indianarmy.nic.in>
  - <http://goidirectory.nic.in>
  - <http://pensionersportal.gov.in>
  - <http://indiaimage.nic.in>
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# Social Impacts of E-Governance

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## □ Positive Impact

- ❖ E-Governance program have improved the efficiency of Administration and service delivery.
  - ❖ It reduces the Waiting time by providing various Online, secure and faster services at door step.
  - ❖ Peoples are benefited from various E-Governance projects by availing services at reduced cost.
  - ❖ E-Governance has proved as a successful tool to minimize the corruption to some extent.
  - ❖ E-Governance program have resulted in increased public participation.
  - ❖ E-Governance program have resulted in increased transparency and accountability of Government Offices.
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# Social Impacts of E-Governance

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## □ Limitations

- ❖ People in Rural and Remote area could not benefited from these E-Governance projects due to lack of computerization.
  - ❖ Lack of Awareness about these E-Governance programs also prevented people to get benefit.
  - ❖ Incompatibility of Hardware & Software has prevented people to fully benefit from it.
  - ❖ Users find it inconvenient to make payments online due to limited number of certified branches of banks.
  - ❖ Some times Website are slow and performs poor operations. Also some are not maintained regularly.
  - ❖ Not all the services can be computerized and offered by the E-Governance.
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# E-Business (E-Commerce)

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## □ What is E-Governance ?

E-Business or E-Commerce refers to any form of Transaction (Exchange) that uses an electronic medium to facilitate the transaction.

## □ Benefit of E-Business

- Reduces cost of production by reducing overheads like shops or retail outlet at high rent and reducing stock cost.
  - Offers opportunity to access new market on the globe and opportunity to increase sales volume.
  - Provides more accurate information and improved customer services.
  - Allow 24x7 access to market and services.
  - Provides convenience and comfort to the customers.
  - Provides efficient, cost saving, improved customer service and communication, faster response to customer.
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# E-Business

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## □ Types of E-Business

Various forms of E-Business are available, some are-

- **Online Direct Marketing**
  - **Affiliate Marketing (Commission based)**
  - **Viral Marketing (Spreading Brand by Word-of-Mouth)**
  - **Online Auctions**
  - **Value-chain service (Specialized services)**
  - **Membership Marketing**
  - **Deep Discount Marketing**
  - **Electronic Market place (Virtual Market)**
  - **Find-the-best-Price**
  - **Name-your-own-price**
  - **Bartering Online (Point based –repurchase Marketing)**
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# E-Business

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## □ **Types of Business Organizations**

The Business organization can be classified as per their existence in physical world, virtual world or both. The major categories are-

- **Brick-and-Mortar Organizations**

Pure Physical organizations also called Old-economy Business.

- **Virtual Organizations**

Organizations engaged in E-Business only also called Pure-Play organizations.

- **Click-and-Mortar Organizations**

Organization evolved in both type of business ie. Preliminary works as Physical world, but also works as e-commerce. Also called Click-and-Brick.

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# Major E-Business Portals

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## □ IRCTC Portal

The Indian Railway Catering & Tourism Corporation (IRCTC) (subsidiary of Indian Railway) Portal was launched to offer the Online Railway Ticketing in India.

URL: [www.irctc.co.in](http://www.irctc.co.in)

## □ Online Reservation site Yatra.com

Yatra.com provides airline reservation, flight ticket booking services online. You can book flight tickets for domestic and International flights, Hotels and avail Tourist packages etc.

URL: [www.yatra.com](http://www.yatra.com)

## □ Life Insurance Corporation of India

LIC of India is one of the premier insurance company caters various facilities like Online deposit of Premium, Sales of Insurance Policies and enquiry.

URL: [www.licindia.com](http://www.licindia.com)

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# Major E-Business Portals

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## □ **E-Banking Site of State Bank of India**

SBI is the largest government owned bank, has launched e-banking services and offers various services to the customers like Corporate Banking, Personal Banking, Loan Lending and Fund Transfer etc.

URL: [www.statebankofindia.com](http://www.statebankofindia.com)

## □ **Online Store Amazon.com**

It was launched in 1995 as online book store. Later it started selling of VHS, Music CDs and DVDs, Computer Software, Video Games, Furniture, Electronic goods and Toys etc. It maintains various websites for various countries like UK, Germany, France, China etc.

URL: [www.amazon.com](http://www.amazon.com)

## □ **Online Auction Site – eBay India**

eBay.in is India's most popular online shopping mall which provides online auctions for various products like Mobile, Cameras, Computers and others.

URL: [www.ebay.in](http://www.ebay.in)

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# Major E-Business Portals

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## □ Online Stock Trading Site Sharekhan.com

Sharekhan is one of the India's leading financial service e-business company, offering trade in Equities, Commodities, IPO, Mutual Funds, DMAT services.

URL: [www.sharekhan.com](http://www.sharekhan.com)

## □ Western Union Money Transfer

The western Money Transfer e-business company offers Quick collect services to send money online with pay out at world wide through its agents.

URL: [www.westernunion.com](http://www.westernunion.com)

## □ Selling of PCs, Laptops etc – DELL

Dell e-business company is selling its various products like PCs, Laptops and other Accessories through its e-business site online. It offers Customer support and product sales through its web site.

URL: [www.dell.com](http://www.dell.com)

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# Social Impacts of E-Business

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## □ Positive Impact

- ❖ It reduces Transaction and other cost of the products.
- ❖ It increases productivity and efficiency and offers improved customer services.
- ❖ Offers opportunity to increase sales on the globe.
- ❖ It increases the Internet users.
- ❖ It opens the global market for Non-Metro customers and changes the Online shopping habits.
- ❖ Offers easy shopping by Secure and Online payments system.

## □ Limitations

- ❖ Poor Telecommunication Infrastructure for Reliable connectivity.
  - ❖ Multiple issue of trust i.e. product may be faulty, Product received is different as shown on the site.
  - ❖ Lack of legal and Regulatory framework. People are still unaware about legal remedies. High chances for fraud, theft of private information.
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# E-Learning

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## □ What is E-Learning ?

E-Learning describe as a means of teaching through the e-technology like CDROM, Multimedia platform.

## □ Benefit of E-Learning

### ❖ For Trainer

- Reduced Overall Cost.
- Reduced Learning Times.
- Consistent delivery
- Cost effective and fast updation
- Improved Teaching-Learning Resources.
- Easily Manageable.

### ❖ For Learner

- On-demand Availability (Any time-Any Location).
  - Self Paced learning (taken when needed)
  - Self Motivated Interactivity.
  - Confidence (High quality reference Material)
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# Major E-Learning Portals

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## □ Moodle.org

Moodle is an Open Source Course Management System (CMS) also call Virtual Learning Environment (VLM) is a powerful and popular tool to create Online Dynamic Web Sites for the Students. It is Teaching Learning platform that helps to learn various topics online.

URL: [www.moodle.org](http://www.moodle.org)

## □ W3Schools.com

It is free e-learning portal, where you can learn Web site building, and other related topics through online web tutorials.

URL: [www.w3schools.com](http://www.w3schools.com)

## □ eXe Project

The eXe project is a free and Open Source Authoring Application for teachers and academies to publish their contents and lessons without knowing HTML or any other Script languages. It is supported by CORE Education , a non-profit , education research body of New Zealand.

URL: [www.exelearning.org](http://www.exelearning.org)

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# Major E-Learning Portals

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## □ CoFFEE

CoFFEE is a Open Source Software which can be installed on PCs in the computer LAB, to make foster communication without using Internet. This facilities teacher and student to make online conversation for problem solving and discussion i.e virtual class room.

URL: [www.coffee-soft.org](http://www.coffee-soft.org)

## □ Xerte Project

It is Open Source e-learning developer tool, which is used to develop interactive e-learning materials for the students. By using this platform a trainer can develop browser based tutorial without knowing computer programming languages.

URL: [www.nottingham.ac.uk/xerte](http://www.nottingham.ac.uk/xerte)

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# Social Impacts of E-Learning

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## □ Positive Impact

- ❖ Availability of same course to millions
- ❖ Boon for working people.
- ❖ Low Fee structured
- ❖ Ease of availability.

## □ Limitations

- ❖ High Dropout rate.
  - ❖ Cultural Differences among learners.
  - ❖ Technology gap.
  - ❖ High Development Cost
  - ❖ Inappropriate learning contents and Portability
  - ❖ Reduced Interaction between Trainer and Trainee.
  - ❖ Social or Cultural ignorance (non- acceptance)
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# Designing IT Applications

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An IT application refers to a Application software which facilitates customers, users to use major IT application area like e-Governance, e-Commerce or e-Learning.

In General, an IT application comprises two major port-

## □ Front-end

It is an User-Interface which collects input or response from the users.

- ❖ It receives user's queries, requests and passes to the Back-end for further processing.
- ❖ Generally, it includes **Graphical User Interface (GUI)** through which user interacts using Mouse and keyboards.

## □ Back-end

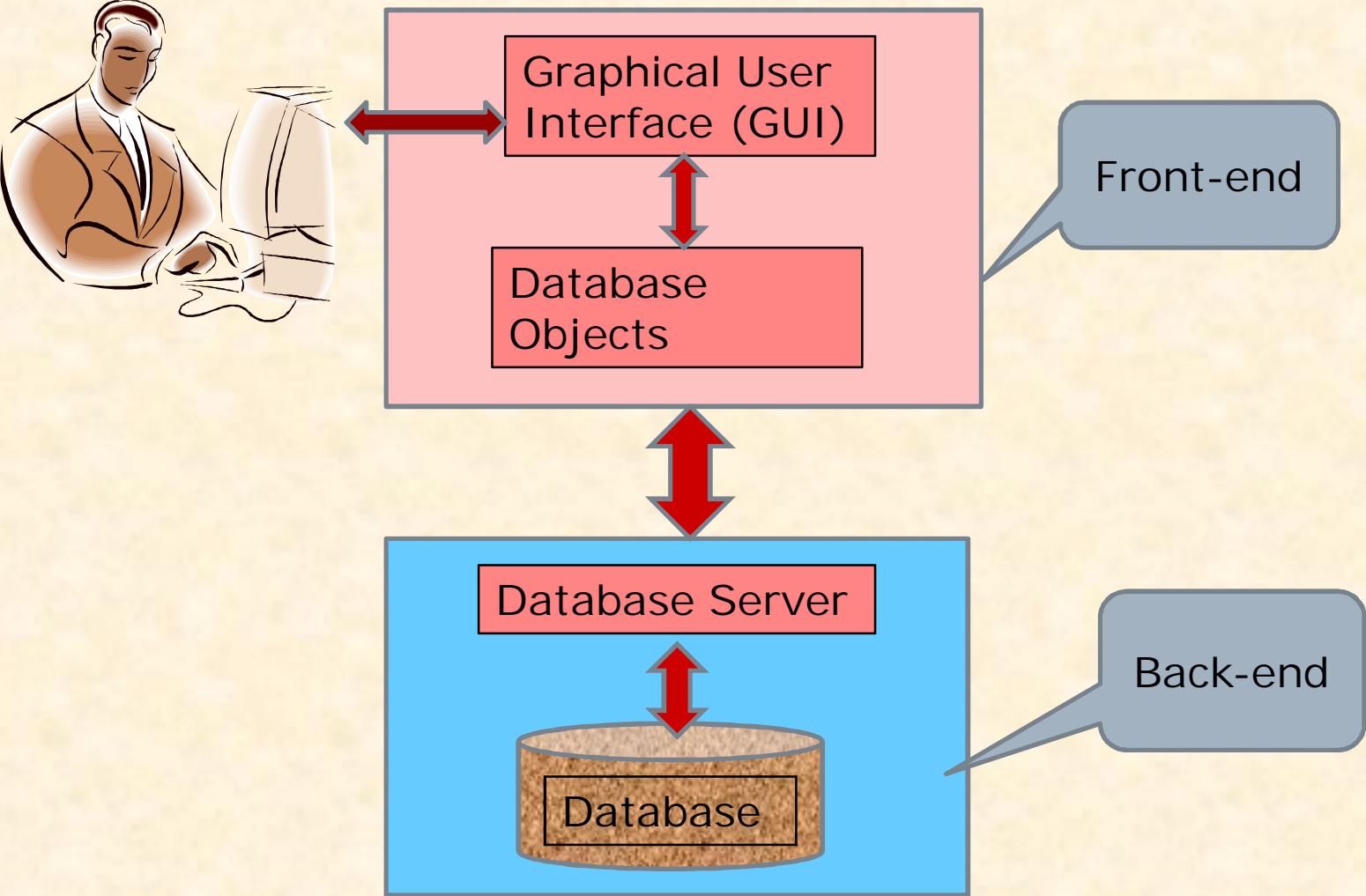
It is invisible component which processes the user-requests as received by the front-end.

- ❖ It handles all the database access received from Front-end and sends results accordingly.
  - ❖ Generally, it contains a **Database** with tables and other objects.
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# Front-end and Back-end

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# Designing Front-End (GUI Interface)

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The front-end deals with users, collects input from users and provide information to users using Graphical components like Text Boxes and Buttons etc.

Goodness of Front-end depends on its Design, contents, features and connectivity to Back-end. A good Interface performs maximum works with minimum information from users.

The following desirable properties (specifications) must be considered while designing of GUI front-end.

- 1. Visibility of System Status**
  - 2. Match between System and Real World.**
  - 3. User Control and Freedom**
  - 4. Consistency and Standard**
  - 5. Error Prevention and Recovery**
  - 6. Flexibility and efficiency of use**
  - 7. Minimalist and Good looking Design**
  - 8. Help Support and Documentation**
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# Properties of a good GUI Design

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## **1. Visibility of System Status**

Always keeps user informed about what is going on.

## **2. Match between System and Real World**

Speak the user's language i.e. avoid technical terms.

## **3. User Control and Freedom**

User must have option to cancel the task and emergency exit.

## **4. Consistency and Standard**

GUI should support OS platform and follows standard.

## **5. Error Prevention and Recovery**

Able to prevent errors and supports recovery in case of failure.

## **6. Flexibility and efficiency of use**

It may serve Expert as well as novice users and supports customization as per user need.

## **7. Minimalist and Good looking Design**

Uses minimum GUI components and contains relevant information.

## **8. Help Support and Documentation**

Provide Help and documentation and explains itself.

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# Content of Front-End (GUI)

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A Front-end (GUI) contains various graphical controls and objects to facilitate user to interact with system.

In Java various types of Swing Controls are used while GUI design.

## ❑ **Component Control:**

A Swing component is a self-contained graphic entity that can be customized and inserted into applications. Ex. `TextField`, `Button` etc.

## ❑ **Container Control:**

A container is special type of component that can hold other components. Ex. `JFrame`, `JPanel`, `JDialog` etc.

Basic Controls (Components used to get input)	<code>Button</code> , <code>CheckBox</code> , <code>List</code> , <code>Menu</code> , <code>RadioButton</code> , <code>Slider</code> , <code>Spinner</code> , <code>TextField</code> , <code>PasswordField</code>
Interactive Display (Displays the information in formatted way)	<code>ColorChooser</code> , <code>EditorPane</code> , <code>TextPane</code> , <code>FileChooser</code> , <code>Table</code> , <code>TextArea</code> , <code>Tree</code>
Un-editable Information Display	<code>Label</code> , <code>ProgressBar</code> , <code>Separator</code> , <code>ToolTip</code>
Top-Level Containers Contains other controls on the Desktop	<code>Applet</code> , <code>Dialog</code> , <code>Frame</code>
General Purpose Containers	<code>JPanel</code> , <code>ScrollPane</code> , <code>SplitPane</code> , <code>ToolBar</code>

# Commonly used SWING Controls for GUI Design

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In JAVA, the following Swing controls or Window Gadget (**Widget**) are commonly used during design of front-end.

- ❑ **jFrame**: Used as a Basic Window or form.
  - ❑ **jLabel**: Allows Non-editable text or icon to displayed.
  - ❑ **jTextField**: allows user input. It is editable through text box.
  - ❑  **jButton**: An action is generated when pushed.
  - ❑ **jCheckBox**: Allow user to select multiple choices.
  - ❑ **jRadioButton**: They are option button which can be turned on or off. These are suitable for single selection.
  - ❑ **jList**: Gives a list of items from which user can select one or more items.
  - ❑ **jComboBox**: gives dropdown list of items or new item can be added. It is combination of jList + jTextField.
  - ❑ **jPanel**: It is container controls which contains other controls using a frame.
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# Features of a good Front-End (GUI)

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An effective Front-end (GUI) facilitates users with certain conventional features so that a user may work easily with previous experiences of GUI.

The features of front-end can be divided into two categories.

## □ **Display features:**

- ✓ Conventional use of Icons
- ✓ Conventional use of reserve words
- ✓ Provides Visual Feedback
- ✓ Use of Audible Feedback
- ✓ Use of correct control in correct way

## □ **Functionality features:**

- ✓ Provide Keyboard support
  - ✓ Effective use of Modal & Modeless Windows
  - ✓ Validation of data
  - ✓ Security feature
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# Display Features of the Front-End

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## ❑ Conventional use of Icons

A good GUI usage conventional icon of symbols like **i**, **!**, **?**, **X** etc. in different informative dialog boxes, so that user can recognize their functions.

## ❑ Conventional use of reserve words

A good GUI usage conventional words and terms for Buttons and Menus with suitable Short-cut keystrokes and tool tips e.g. OK, Cancel, Close, Exit, Cut, Copy and Paste etc.

## ❑ Provides Visual Feedback

A good designed GUI provides visual feedback using Progress bar, hourglass icon or any other animation to exhibit the status of task.

## ❑ Use of Audible Feedback

Sometimes a GUI uses Audible feedback to convey the different signals about the task like critical error, completion etc.

## ❑ Use of correct control in correct way

A good GUI uses correct type of controls for interaction with users. Each control like Text boxes, buttons, list etc. must be places in correct order and at suitable place on the frame.

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# Functionality Features of the Front-End

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## □ Provide Keyboard Support

An effective GUI supports Keyboard to type text, access Menu's items and buttons on the window along with Mouse support.

## □ Effective use of Modal & Modeless Windows

A good GUI supports the proper use of Modal and Modeless Dialog Boxes. A Modal dialog restrict user to access any other task without finishing it. e.g. File Save dialog Box. Whereas Modeless Dialog Box allows user to choose other task with placing it in background.

## □ Validation of data

An effective GUI provide help and supports to minimize errors while entering data. It should validate the correctness of data types, formatting etc.

## □ Security Features

An effective GUI provides means to Authenticate users by providing proper Log-in screen with limited login-trials.

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# Designing Back-End (Database)

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- ✓ The back-end of a system is controlled by a database management system that responds to the request made by the front-end.
  - ✓ A database can be defined as a collection of interrelated data stored together to serve the application. Basically it works as a computer based record keeping system.
  - ✓ A Database Management System (DBMS) is responsible to maintain the database and facilitate users to insert, modify, delete and search (query) information stored in the database.
  - ✓ The Development of Database is very crucial step and key to success of Application. Generally database is developed in a systematic way, which is called Database Development Life Cycle (DDLC).
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# Steps in Database Development Life Cycle (DDLC)

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DDLC is a set of activities that are carried out to develop and implement Database. The DDLC comprises the following steps- (in short **ICLPI**)

## □ **Information Collection:**

Information are gathered about requirements. Entities types, Attributes and their relationships are identified.

## □ **Conceptual Data Modeling**

A database Modeled (represented) as a whole at conceptual level. Entity-Relationship (E-R) Diagram or Unified Modelling Language (UML) tool is used to exhibit the model.

## □ **Logical Data Modeling**

The Conceptual data Model is converted in Relations (Table) and Anomalies are removed. This step is called Normalization.

## □ **Physical Modeling**

A Database is developed and tested against its access, data integrity and performance.

## □ **Installation of Database**

At last, the Database is actually installed on the system to serve the application with real data.

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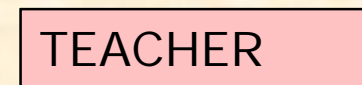
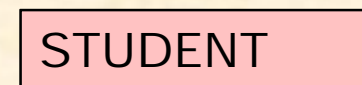
# E-R Diagram – Modeling tool for the Database.

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The Entity-Relationship (E-R) diagram is used to exhibit the model of the database in terms of attributes, entities and their relationships. The following symbols are used in E-R diagram.

## □ Entities

An entity is a distinguishable object which may be place, person or concept e.g. Student, Teacher, Account, Book etc. It is represented by a rectangular Box.



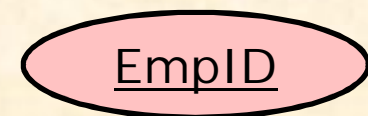
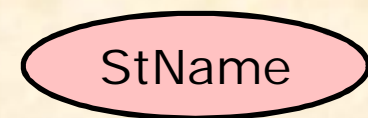
## □ Relationship

It shows the association among Entities and may be One-to-One, One-to Many and Many-to-Many. It is represented by diamond shaped box connecting Entities.



## □ Attribute

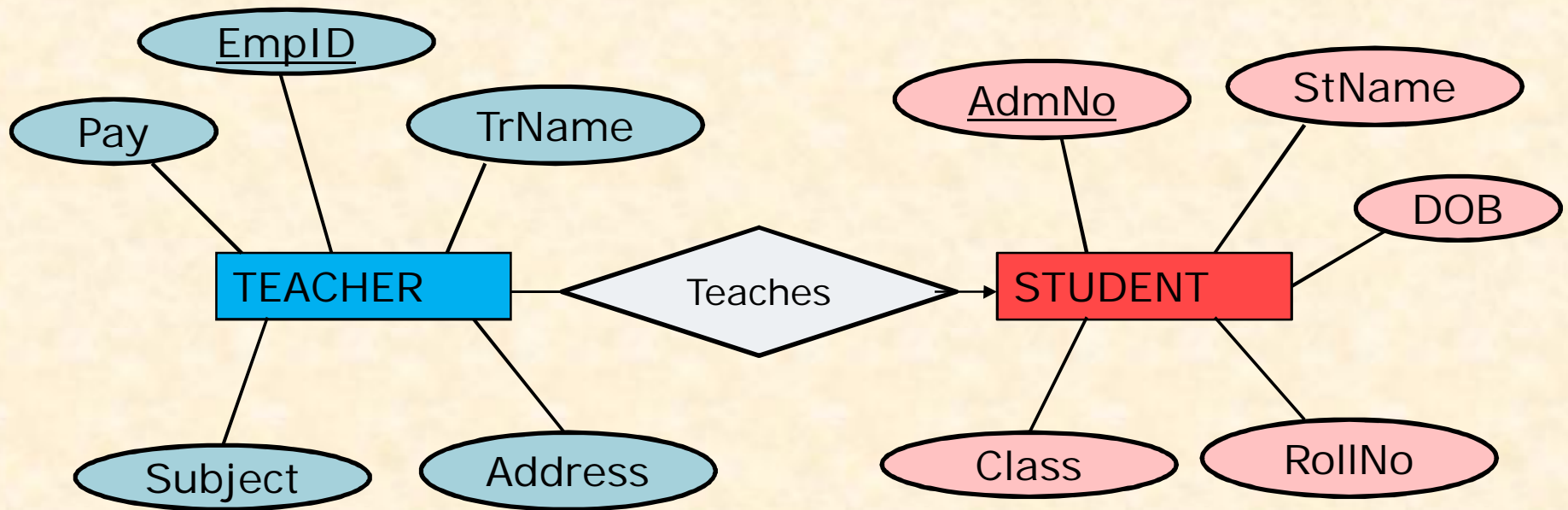
An attribute is a property of a given entity. It is shown by a Oval with the name of attribute. The Primary key attribute is underlined.



# E-R Diagram – Example -1

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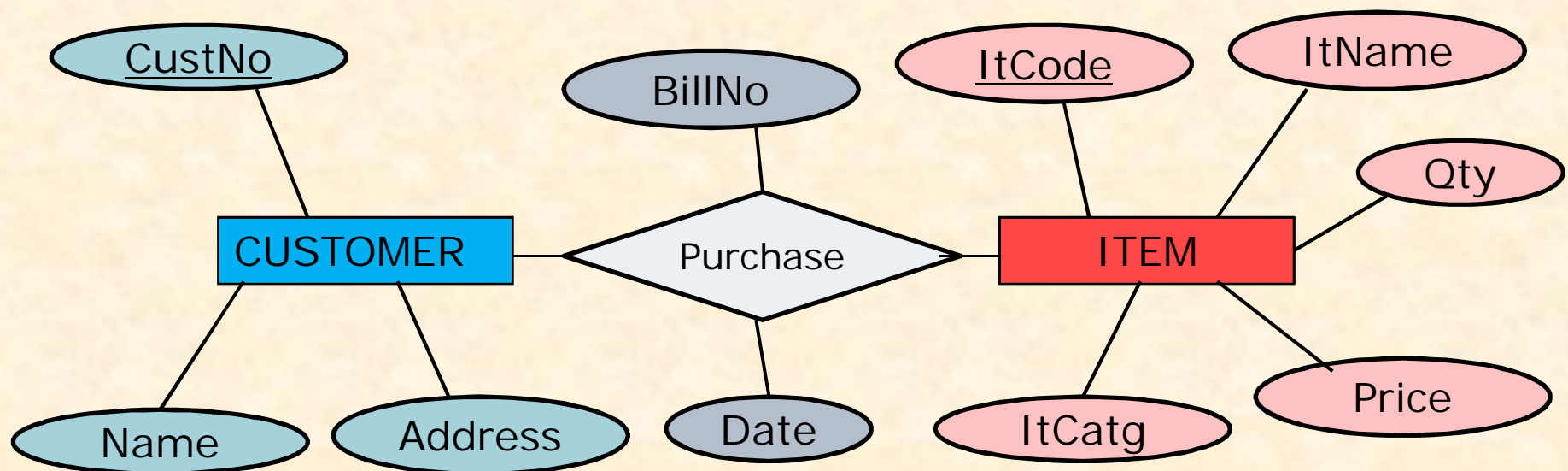
Let us model the simplest database of school. A school contains Teacher, Student Entity type with some properties as shown in the E-R diagram.



## E-R Diagram – Example -2

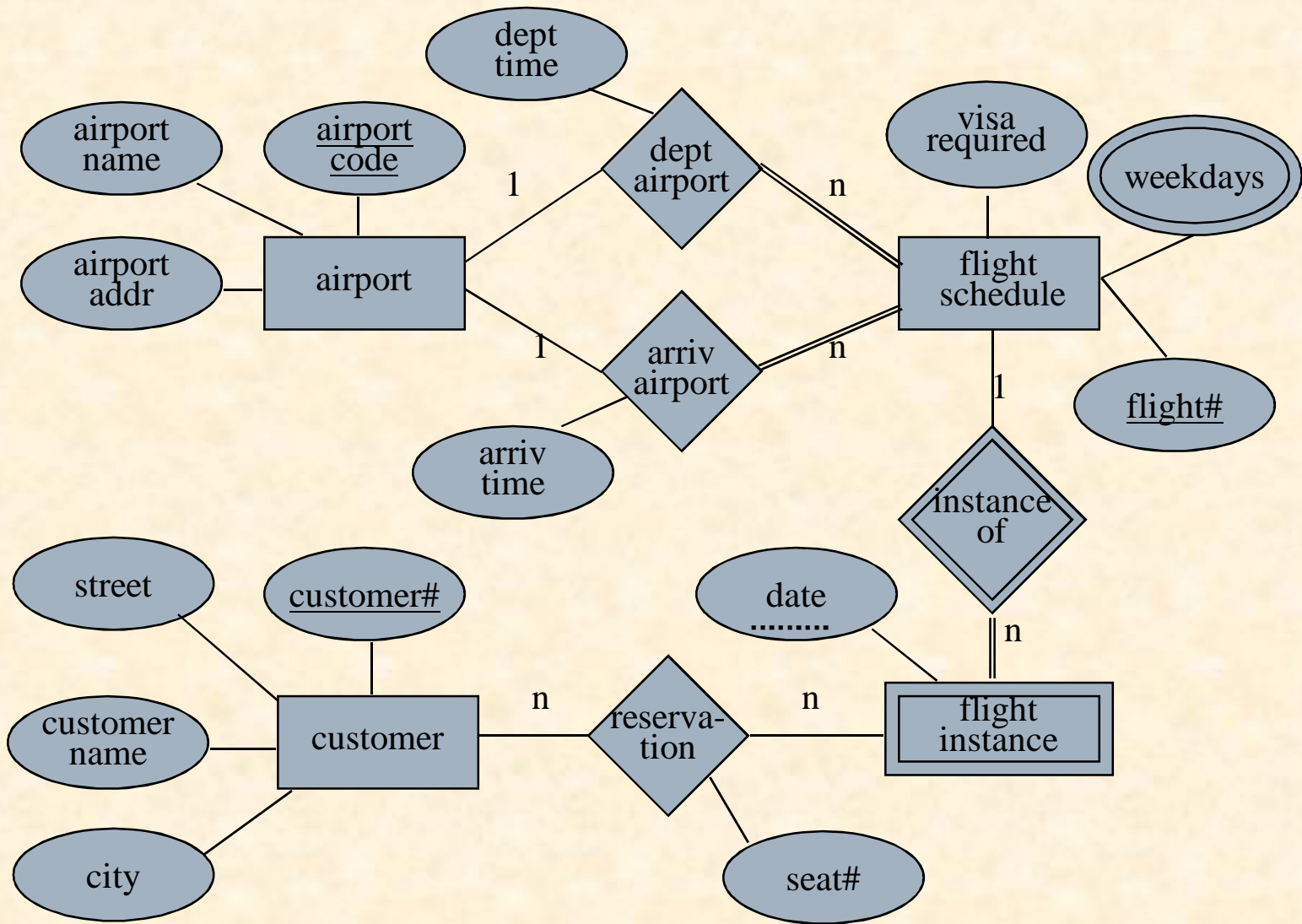
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Let us model the Relationship of Customer and Item Entities.



# ER Model – Example -3

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# Connecting Front-end and Back-end

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The last step of Development of an IT Application is to connect Front-end and Back-end via some means. A database connection requires programming interface called Database Driver, which works as a bridge and facilitates front-end to access information in the database on back-end.

In Java, Database connectivity is implemented by Java Database Connectivity i.e. (JDBC). Once Front-end application is connected to back-end, the following benefits can be realised-

- ✓ A Database can be accessed through Application code using Driver interface (methods).
  - ✓ Database can be handled in safe and secure way.
  - ✓ Application logic can be distributed to balance the load and enhance the performance.
-