A201 Object Oriented Programming with Visual Basic .Net

By:

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What do we need to learn in order to write computer programs?

- Fundamental programming constructs:
  - Variables,
  - Arithmetic operators,
  - Input and output
  - Conditionals,
  - Loops,
  - Procedures and functions,
  - Arrays (Multi-Dimensional Arrays),
  - Structures, classes and objects,
  - Files
  - Databases
What is a Database?

- A database is a logically coherent collection of data with inherent meaning.

- A database is an integrated, shared repository of operational data of interest to an enterprise.
What is a Database Management System (DBMS)?

- A collection of programs that enable the user to create and maintain a database.

- A general purpose software system that facilitates the following:
  
  - Defining the database (schema, define the attributes, their types, size, constraints, range, etc.)
  
  - Populate the database (Add data to the database)
  
  - Manipulate the database (Querying, updating, generating reports, creating views, joining information)
What is a Database Management System (DBMS)?
Relational Data Structures and Concepts:

- **Database:**
  - A collection of tables, file or relations.

- **Table:**
  - Same as a file, relation or entity. Consists of many records.

- **Record:**
  - A record or a row in a table. Each row represents a set of facts about one instance of the table. Each fact is stored in a field.

- **Field:**
  - Also known as an **Attribute.** A column name in a table. A field name. All values of the same column are of the same type. A single fact.
What is a Key?

- **KEY:**
  - One or more attributes which will uniquely represent a record within a table.

- **Primary Key:**
  - One of the candidate keys designated as primary. (usually used for look up of a given record.)

- **Foreign Key:**
  - Attributes in one table, whose values are required to match those of the primary key of some other (not necessarily different) table.
What is Metadata?

- Metadata is non-user data which contains the descriptive information of the data and database organization.

- Data about data!
Microsoft Access: A Relational DBMS

Basic Elements in MS-ACCESS

- **Table**
  - Creating and populating the tables ‘Base Tables’ in the database.

- **Query**
  - Extracting data from the database
  - Methods:
    - Query by Example (QBE)
    - Structured Query Language (SQL)
  - The result of a query is typically a ‘Virtual Table’. A virtual table is constructed every time the query is executed.

- **Forms**
  - Electronic forms, used to build interfaces to the tables in the database.

- **Reports**
  - Electronic or Printed reports, which can be built from underlying base tables or virtual tables.
  - Reports also have Header and Footer information as well as formatting, aggregation and grouping features.
Microsoft Access:
Microsoft Access:
Creating a Table:
Creating a Table:
Creating a Table:
Creating the Fields:

The data type determines the kind of values that users can store in the field. Press F1 for help on data types.
Creating the Fields:

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LastName</td>
<td>Text</td>
<td></td>
</tr>
<tr>
<td>FirstName</td>
<td>Text</td>
<td></td>
</tr>
<tr>
<td>Telephone</td>
<td>Text</td>
<td></td>
</tr>
<tr>
<td>Email</td>
<td>Text</td>
<td></td>
</tr>
</tbody>
</table>

The field description is optional. It helps you describe the field and is also displayed in the status bar when you select this field on a form. Press F1 for help on descriptions.
Saving the table, and giving it a name:

![Image of Save As dialog box with name Friends]

![Image of Microsoft Office Access dialog box warning about primary key]

Although a primary key isn't required, it's highly recommended. A table must have a primary key for you to define a relationship between this table and other tables in the database. Do you want to create a primary key now?

[Yes] [No] [Cancel]
A new table is created:
Populating the table:

<table>
<thead>
<tr>
<th>LastName</th>
<th>FirstName</th>
<th>Telephone</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith</td>
<td>John</td>
<td>574-333-5555</td>
<td><a href="mailto:jsmith@iusb.edu">jsmith@iusb.edu</a></td>
</tr>
<tr>
<td>Thomas</td>
<td>Mary</td>
<td>666-777-8888</td>
<td><a href="mailto:mthomas@iusb.edu">mthomas@iusb.edu</a></td>
</tr>
</tbody>
</table>
Creating a Query using the Wizard:
Select the fields to appear in the query:
Select more fields...

![Simple Query Wizard]

Which fields do you want in your query?
You can choose from more than one table or query.

Tables/Queries
Table: Friends

Available Fields:
FirstName
Telephone
Email

Selected Fields:
LastName
After fields are selected, go to the next step:
Finish the Query:

Give it a name

Modify the query

Finish
Microsoft Access:

Modify the query
Specify the Query Criteria:

LastName = "Smith"
Close the Query Window:
Save the query:
A Query is Created:
Query Results:

LastName = "Smith"
Creating Forms:
Creating Reports:
Creating Reports: