**Introduction to data types and field properties** **in Access**

As you should know already, a **database table** is a collection of rows and columns that are used to organize information about a single topic. Each row within the table corresponds to a single **record** and contains several pieces of information pertaining to that record. Each piece of information in a record is referred to as a **field**. The below table contains employee records. Each record (row) contains information about one employee. Each field (column) contains a specific piece of information about that employee. In this table there are 5 employee records and each record contains the following fields: EmployeeID, LastName, FirstName, Title, DateOfHire and Salary.



Every field in a table has properties. These properties define the field's characteristics and behavior. The most important property for a field is its **data type**. A field's data type determines what kind of data it can store. For example, a field whose data type is *Text* can store data that consists of either text or numerical characters, but a field whose data type is *Number* can store only numerical data. A field’s data type is defined at the time the field is created.

Commonly used Data Types available in Microsoft Access are:

|  |  |
| --- | --- |
| **Data Type** | USE |
| **Text** | Text or combinations of text and numbers in the field, such as addresses, names, etc. Numbers that do not require calculations, such as phone numbers, part numbers, or postal codes can be defined as a text field. Input masks can be used on fields like phone numbers to ensure data follows a certain pattern.  |
| **Number**  | Numeric values, such as quantity on hand, distance travelled, etc.. Note that there is a separate data type for currency. |
| **Currency** | Monetary values such as purchase price, salary, etc. |
| **Yes/No** | Yes and No values and fields that contain only one of two values. Used to store data that can be answered with a yes/no, on/off or true/false answer.  |
| **Date/Time** | Date and Time values, such as Date of Hire of Date of Birth.  |
| **Rich Text** | Text or combinations of text and numbers that can be formatted using color and font controls.  |
| **Calculated Field** | Results of a calculation. The calculation must refer to other fields in the same table. You would use the Expression Builder to create the calculation. |
| **Attachment** | Attached images, spreadsheet files, documents, charts, and other types of supported files to the records in your database, similar to attaching files to e-mail messages. |
| **Hyperlink** | Text or combinations of text and numbers stored as text and used as a hyperlink address.  |
| **Memo** | Long blocks of text. A typical use of a Memo field would be a detailed product description.  |
| **Lookup** | Displays either a list of values that is retrieved from a table or query, or a set of values that you specified when you created the field. The Lookup Wizard starts and you can create a Lookup field. The data type of a Lookup field is either Text or Number, depending on the choices that you make in the wizard. |
| **AutoNumber** | Use for generating unique values that can be used as a primary key, which Access inserts when a record is added. Note that AutoNumber fields can be incremented sequentially or by a specified increment, or assigned randomly. |
| **OLE Object** | Objects (such as Microsoft Word documents, Microsoft Excel spreadsheets, pictures, sounds, or other binary data) that are created in other programs can be linked to or embedded in an Access table.  |

A field has many other properties, some examples include:

* A field’s **name** is used as a column heading when viewing the table. It is also used when querying the database from the graphical interface and when using structured query language SQL. Some guidelines you should follow when naming a field:
	+ A field name should be meaningful. Do not name your fields - Field1, Field2, Field3, etc., but choose names that identify what kind of information will be stored in the field.
	+ Even though Access allows spaces in your field names, you should consider using either Initial caps or the underscore character ("\_") instead of a space (i.e., A field that contains a person’s first name should *not* be named *First Name*. Instead you should use FirstName or First\_Name, or FName). This will make it easier when querying the database. It will also make it easier to port your tables to a different database.
	+ Aside from the Underscore character you should consider using only alphanumeric characters (numbers and letters) in your field names. Don’t use special characters like colons, semi-colons, brackets, etc.
* A field’s **size** identifies the maximum size for data stored in the field. For example, a State field might be used to store a two character state abbreviation therefore it might be configured with a size of 2. When determining a field’s size you should consider all the possible data values that will be stored in that field; pick a size that will support the largest value. (i.e., If the field will store a department’s name, find the department in your company with the longest name and use, at a minimum, that as the field’s size. )
* A field’s **format** identifies how the field will appear by default when it’s displayed or when it’s printed. For example, a date field might be formatted to display as short date (1/18/2014) or as a long date (Saturday, January 14, 2014).
* A field’s **default value** could be used to populate the field with a frequently used value. For example, if you have a state field in an employee database and most of your employees live in Massachusetts, you could include a default value of MA for the state field. This would cause the value MA to be stored in the state field automatically and will save time when populating the record.
* Setting a field’s **input max** allows you to provide a set format for data entry in a field by using characters and symbols. When you apply an input mask to a field, anyone who inputs data in that field must follow the specific pattern defined by the input max. For example, if you set a phone number field to a data type of text you could then set a mask of (\_\_\_) \_\_\_-\_\_\_\_ . Input masks provide a large amount of data validation and prevent users from entering invalid data. Input masks can also help ensure that users enter data in a consistent way. That consistency can make data easier to find and make it easier to maintain your database.

There are many more field properties available; some of which will be covered as we create databases in this course, others are beyond the scope of this course. If you’d like to read more about data types and field properties, refer to the following article: [data types and field properties](http://office.microsoft.com/en-us/access-help/field-properties-quick-reference-HA010231953.aspx)

**Decide what data type to use for the field in a table**

Before creating a table you need to decide the data type that you will use for each field. You also need to decide the field’s name, size, format and any additional properties that you wish to apply to the field. The data type that you select must be based on the following considerations:

* What kind of value do you want to permit in the field?

You cannot store text in a field that has a Number data type.

* How much storage space do you want to use for the value that is in the field?

Some data types require more storage space than others.Regarding text fields: Access stores only the characters that are entered in the field. Access does not store space characters for unused positions in a Text field. To control the maximum number of characters that can be entered in the field, set the Field Size property to the value that you want.

* Do you need to perform operations on the value that is in the field?
Access can sum values in a Number field or in a Currency field. Access cannot sum values in a Text field.
* Do you want to sort the field or to index the field?
You cannot sort or index OLE Object fields.
* Do you want to use the field to group records in queries or in reports?
You cannot use OLE Object fields to group records.
* How do you want to sort values in the field?
If you put numbers in a Text field, the numbers are sorted as strings of characters (1, 10, 100, 2, 20, 200), not as numeric values. Use a Number field or a Currency field to sort numbers as numeric values. Also, many date formats cannot be sorted correctly if they are entered in a Text field. Use a Date/Time field to make sure that dates are sorted correctly.

Referring back to the employee table displayed on page 1 of this document, the below table identifies each field’s name, type, size and format that could be used when creating the fields.

| **Field Name** | **Field Type** | **Size** | **Format/Input Mask(if any)** |
| --- | --- | --- | --- |
| EmployeeID | Text –You might initially think that this should be a numeric field, but it’s unlikely that any calculations will be done with this field therefore it should be defined as a text field. | 4 |  |
| LastName | Text | 20This size for this field needs to be as long as the longer last name that will need to be stored in the field. 20 is a reasonable size. |  |
| FirstName | Text | 20 |  |
| DateOfHire | Date | When defining a field as a Date, you don’t need to define the size. The user will only be allowed to enter a valid date.  | Short date format was used for this date. |
| Salary | Currency | When defining a field as Currency, you don’t need to define the size. It will automatically allow up to 8 bytes and will store the numeric value accurately up to 15 digits to the left of the decimal point and 4 digits to the right of the decimal point. | CurrencyThe currency format will include a dollar sign, commas in the thousands positions a decimal point and 2 decimal positions. |
| NumOfDep | Number | Integer |  |
| Phone | Text | 10 This will not be used in calculations therefore text is appropriate.  | Phone Input Mask is used. This forces a specific pattern to be used on the data. |