Expressions are calculations in Access. Expressions use field values, constants, and operators (or some combination of these items) to perform mathematical calculations. Expressions can also be defined using built-in functions to produce specified data. Expressions can be defined in queries, forms, or reports.

An *unbound text box* is a control added to a form or report. Unbound text boxes are used to enter expressions that calculate information from data stored in the database or display system data such as the current date. Unbound text boxes can further be used to prompt for data from the user that is not stored in the underlying table.

**Concatenated Expressions**

A *concatenated expression* is an expression that joins two or more fields and/or text together.

Below is a typical field layout to display first and last name fields in a report.

![Field Layout](image)

When displayed in Print Preview, the data looks as follows:

<table>
<thead>
<tr>
<th>Name:</th>
<th>Barry</th>
<th>Hassan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td>Deborah</td>
<td>Ward</td>
</tr>
<tr>
<td>Name:</td>
<td>Ed</td>
<td>Curran</td>
</tr>
<tr>
<td>Name:</td>
<td>Michelle</td>
<td>Kim</td>
</tr>
<tr>
<td>Name:</td>
<td>Alexander</td>
<td>Decosta</td>
</tr>
<tr>
<td>Name:</td>
<td>Paul</td>
<td>Novick</td>
</tr>
<tr>
<td>Name:</td>
<td>Liz</td>
<td>Sorrento</td>
</tr>
<tr>
<td>Name:</td>
<td>Carmen</td>
<td>Sanchez</td>
</tr>
<tr>
<td>Name:</td>
<td>Kelly</td>
<td>Smith</td>
</tr>
<tr>
<td>Name:</td>
<td>Jessica</td>
<td>Picard</td>
</tr>
</tbody>
</table>

Notice that the spacing for Alexander DeCosta appears appropriate, but there is a large amount of space between the first and last names of Ed Curran. If you adjust the field layout in design view so that the spacing for Ed Curran is appropriate, you will cut off the first names of many records. This problem can be solved by defining a *concatenated expression*. 
As with any expression, concatenated expressions are entered in unbound text boxes. Start the expression with the equal sign. Field names must be enclosed in brackets [ ]. Text strings must be enclosed in quotation marks. Ampersands & are used to connect fields and literal text strings in concatenated expressions. Spaces are considered to be text.

Example: You have a field called [Customer] that contains a customer’s name and you want that name to appear immediately following the word “Dear” in a report (a letter). To accomplish this, enter the following in an unbound text box:

```
=“Dear ”&[Customer]
```

The expression begins with the equal sign. Note the space after the word “dear” in the text string. Also note that Customer is a bound field and the field name is enclosed in brackets.

**IIF Expressions**

The **IIF function** (two “I”s) returns one of two specified results based on the evaluation of data as “true” or “false”. The IIF statement in Access works almost identically to the IF statement in Excel. IF statements are written in an “IF, Then, Else” format. Build IIF expressions as follows:

- Determine the parameters of the expression in terms of what you want displayed in the field under each condition.
- Add an unbound textbox to your form or report:
- Begin the expression with an equal sign: =
- Enter the function name: IIF
- Insert an opening parenthesis:
- Enter the IF condition criteria
- Separate the IF condition from the “Then” desired results with a comma: ,
- Separate the “Then” and “Else” results with a comma: ,
- Place a closing parenthesis at the end of the expression: )

**Additional Operators**

- Enter field names in brackets: [field name]
- Enter text in quotes: “text string”
- Use appropriate comparison operators in determining whether the stated criteria meet the defined requirement: > < <> =
- Use appropriate mathematical operators in defining calculations: * / + -
Example:
You want to calculate a raise for all full-time (entered as FT in the database) employees. The raise will be calculated as 5% of the current salary. For part-time (entered as PT in the database) employees, the raise field should display Not Eligible.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Description</th>
<th>Entered As</th>
<th>Data Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary</td>
<td>Current Salary</td>
<td>Amount</td>
<td>Currency</td>
</tr>
<tr>
<td>Employment Status</td>
<td>Full/Part Time</td>
<td>FT or PT</td>
<td>Text</td>
</tr>
</tbody>
</table>

Define the IIF expression as follows:

=IIF([Employment Status]=”FT”,[Salary]*0.05,”Not Eligible”)

Read this expression as follows: If the employment status is full time, then multiply the current salary amount by 5%, otherwise, enter the text “Not Eligible”.

Compare this expression to the steps above:
• The desired results are that a 5% raise value will be calculated for full-time employees while the text “Not Eligible” will display for part-time employees.
• The expression begins with the equals sign followed by the IIF function and an opening parenthesis.
• [Employment Status] is a bound field on the table underlying the form/report and is therefore enclosed in brackets.
• [Employment Status] must equal full time (FT) in order for a raise to be calculated. The equals comparison operator is used to define this relationship and the “FT” criteria is entered in quotes since this is a text entry in the table.
• The IIF criteria and desired results (the computation of a new salary) are separated by a comma.
• The “Then” (matches FT criteria) and “Else” (does not match FT criteria) results are separated by a comma.
• Since the result of the “Else” condition is a text entry, the text string is enclosed in quotation marks.
• A closing parenthesis is placed at the end of the expression (unlike Excel, Access requires the designer to enter the closing parenthesis. Otherwise, you will get an error.)
**Parameter Fields**

A **parameter field** is an unbound field which prompts the user for input. Parameter fields can be used in queries, forms, or reports. In reports, parameter fields can be used for applications ranging from simply entering the user’s name on a report to entering date or value criteria used in expressions. The information entered by the user at the prompt displays as a field on the report or is used as part of an expression.

To create a parameter field on a report, first add an unbound text box to the report. In the unbound text box, enter instructions that prompt the user for the desired information in brackets. The example below prompts the user to enter his/her name. Notice that the instructions [Enter your name] are enclosed in brackets.

![Unbound Text Box](image)

When the report is opened in Report View or Print Preview, the following dialog appears before the report will display:

![Instructions](image)

Note that the instructions entered in the unbound text box appear above the data entry text box. The user then enters the requested information and presses OK. The report will display with the data the user supplied.

![Parameter Field](image)
Calculating Running Sums

A running sum is a cumulative total from record to record within a group. Running sums can be used anywhere you have multiple values stored in a field and you want an updated total each time a new record is added.

Create running sums by adding the bound field containing the amount you want to add to your report in Design view. For this field, set the Running Sum property on the Data tab to Over Group. Note that the value field may be added twice to your report – once to display the current record value; a second time to display the running sum. See the example below where a running sum is applied to the Contract Amount field.

For the running sum field, labeled as Overall Customer Total on the report, the first total is the value of the first record, $1,500. The second total is the value of the first two records summed ($1,500 + $2,250 = $3,750); and the third total is the total of all three records.