CIS101 introduction to computer applications
west virginia university

Supplemental Content
for Microsoft 365

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Supplemental Content

Data Analysis
Microsoft Excel
Microsoft Access
Microsoft Word
Microsoft PowerPoint

CS101 Supplemental Content for Microsoft 365

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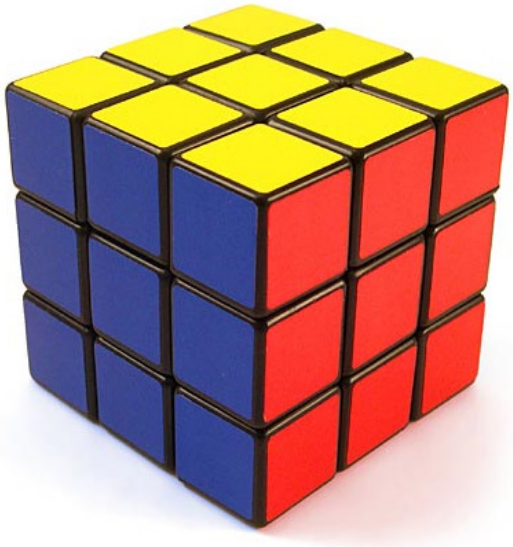


Data Analysis

Data Analysis

Effective Internet searches

With the wide variety of resources available through the Internet, it is now easy to find accurate information that can help in interpreting data and making decisions. Some commonly used online resources include:

- Search engines such as Google and Bing
- Image search engines such as Google Images and Bing Images
- Google Scholar for journal articles and scholarly works
- Google News for news, blogs, and newspaper articles
- Wikipedia for encyclopedia articles
- WVU Libraries databases for access to journal articles, magazines, newspapers, and other resources

Search engines

Search engines are a great tool for locating information, but they're only as effective as your search string. To get good results, you need to be deliberate in your search.

Here are some tips for searching with Google (http://www.google.com) and Bing (http://www.bing.com):

- Be selective about the terms in your search string. Start by using specific terms, and then, if you aren't finding the information you need, generalize your search. For example, if you want information about German shepherd dogs, start by searching for `German shepherd` or `German shepherd dog`. You'll get fewer, better-focused results than searching for a generic term like `dog`.
- Surround phrases with quotation marks. If you want information specifically about Springfield, Illinois, search for the phrase `"Springfield, Illinois"`. Be careful, though, as searching for phrases may exclude alternate representations like Springfield, IL or Springfield, Ill.
- When you enter search terms, Google and Bing assume that you want all of the words to appear in the resulting pages. For example, if you enter `drugstore pharmacy`, you'll get pages that contain both the words drugstore and pharmacy. If your goal is to ensure that at least one of the words appear in the results, such as to list pages that includes the word drugstore or the word pharmacy or both, use the `OR` keyword. For example, search for `drugstore OR pharmacy`.
- Exclude words from your search results by prefixing them with a minus sign (–). For example, if you want information about Springfields not in Illinois, you could search for `Springfield -Illinois`.
- With Google, you can require that a word or phrase must appear in the results by surrounding it with quotation marks. For example, searching for `football "Pittsburgh"` will require that the word `Pittsburgh` appears in the results and will attempt to find pages that also include the word `football`.
- You can restrict your search to a specific website by using the `site` keyword. Bing and Google will only return pages on the specified website or its children (for example, cs101.wvu.edu is a child of wvu.edu). For example, to search for commencement on a wvu.edu website, you would search for `commencement site:wvu.edu`.
- You can restrict your search to certain common file types (such as Acrobat PDF files or Word document) using the `filetype` keyword. For example, to look for a calendar in PDF format, search for `calendar filetype:pdf`. Common file types are `PDF` (Adobe Acrobat), `DOC` (Microsoft Word), `XLS` (Microsoft Excel), and `PPT` (Microsoft PowerPoint).

Image Searching

Google Images (http://images.google.com) and Bing Images (http://www.bing.com/images) are great sources for finding photographs and other clip art. Be careful before using images found online in your documents as they may not be licensed for legal reuse. Both Google Images and Bing Images include search filters that allow you to restrict your search to images that can be freely reused and/or modified.

Google's Search by Image and Bing's Image Match tools allow users to upload an image or specify an image's URL. The search engine will try to locate other copies of that image or similar images.

Google Scholar

Google Scholar (https://scholar.google.com) is a search engine designed specifically for scholarly works such as journal articles and conference proceedings. This tool is especially helpful for graduate students and those conducting research.

In addition to showing publications which include specific search criteria, Google Scholar allows users to view other articles that cite or are cited by a particular article. Users can also search for other articles by the same author or in the same publication.

Google News

Google News (https://news.google.com) is an excellent way to find articles from newspapers, news websites, and blogs. Google News shares Google's extensive search database so if an article is online, it is likely searchable in Google News. Google News also provides access to scanned copies of many older print newspapers including decades-old local publications. If you are looking for a story on a previous event, Google News is an excellent place to begin your search.

Wikipedia

Wikipedia (https://en.wikipedia.org) is a free encyclopedia that anyone can edit. It has a wide variety of articles and is a good way to gain basic understanding of a subject.

Since Wikipedia is open to public edits, the quality of individual articles can vary. Articles with many citations or about popular topics tend to be more accurate. Many faculty do not like students to cite Wikipedia directly, but the references cited in Wikipedia articles can be good sources to use.

WVU Libraries databases

WVU Libraries (https://library.wvu.edu) subscribes to a wide range of research databases which can be helpful for locating articles. A full list of databases arranged by subject is available at https://databases.lib.wvu.edu/. One of the most popular databases is Nexis Uni (formerly LexisNexis Academic), which provides access to the archives of newspapers from around the country and world.

Scientific method

The scientific method is the process by which scientists, collectively over time, endeavor to construct an accurate (that is, reliable, consistent and non-arbitrary) representation of the world. The scientific method consists of iterations and recursions of the following four steps:

1. Observation
2. Hypothesis
3. Prediction
4. Experiment

This model consists of observation of the first and fourth steps. Each step is subject to peer review for possible mistakes. These activities do not describe all that scientists do, however they apply to most experimental sciences such as physics and chemistry.

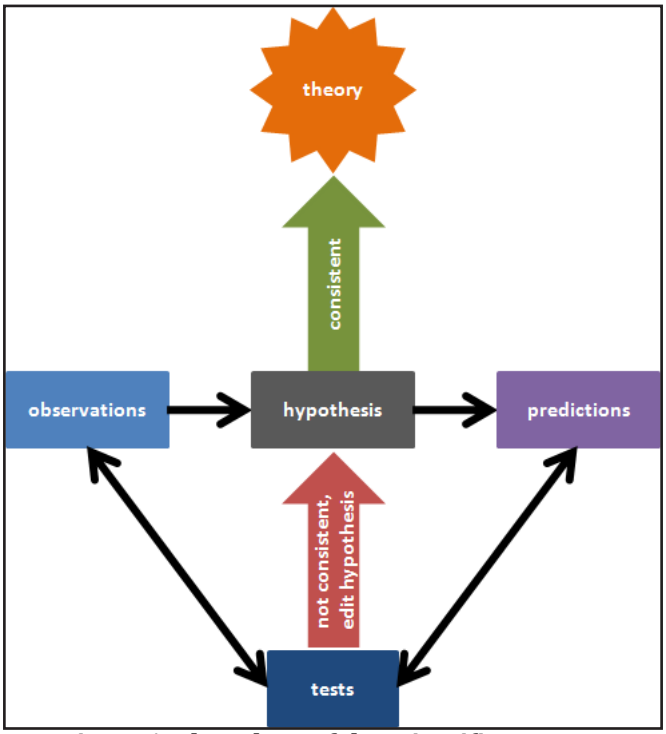


Figure 1: Flow chart of the scientific process.

Observations

Observations are areas of interest in which scientists discover and set out to prove their truth or faults. For example, suppose we have observed that the Earth appears to slowly be warming.

Hypothesis

A hypothesis includes a suggested explanation of the problem or observation. It will generally provide a causal explanation or propose some correlation. Scientists use whatever they can – their own creativity, ideas from other fields, induction, systematic guessing, and the like to imagine the possible explanations for the problem at hand. Hypothesis often consist of an "if this is true, then this will happen" component. For our example, some possible explanations for global warming have been:

1. If humans continue to burn oil and release aerosol pollutants into the atmosphere, then the Earth's temperature will continue to rise.
2. If the ozone hole continues to deplete, then the temperature on Earth will continue to rise.
3. If the solar radiation from the sun continues to increase, then the temperature on Earth will continue to increase.
4. If the percentage of cloud cover on the Earth continues to increase, then the temperature on Earth will continue to increase.

Prediction

The prediction is a formal way to put a hypothesis to a test. If you have carefully designed your hypothesis to be sure that it is testable, then you will know precisely what to predict.

A prediction typically has three parts:

1. If my hypothesis is true,
2. when x is manipulated
3. then y should happen.

The generic variables x and y represent the input and the output for the prediction problem respectively. The input variable (x) is referred to as the independent variable and is one that is adjusted. The output variable (y) is referred to as the dependent variable as its value "depends" on the other variables.

Applying our global warming example, the independent (input) variables include the aerosol index, ozone, erythemal radiation and reflectivity. The temperature is the dependent variable. In our example, we do not have the capability to manipulate the dependent variable. We can analyze our long-term data to see how changes in the input variables have affected the temperature in the past to make predictions about the future. Doing this does not necessary fit into the traditional scientific method; however, it will still work for our situation. Following our example, the predictions will be:

- If hypothesis 1 is true then the mean temperature anomaly will increase in months in which the aerosol index increases.
- If hypothesis 2 is true then the mean temperature anomaly will increase in months in which the ozone level has decreased.
- If hypothesis 3 is true then the mean temperature anomaly will increase in months in which the erythemal level has increased
- If hypothesis 4 is true then the mean temperature anomaly will increase in months in which the reflectivity has increased.

At this stage, if you are having trouble coming up with predictions for your hypothesis then it is probably a good indication that you need to go back and reformulate your hypothesis to ensure that it is testable.

Experiment

This is the part of the scientific method where the actual analysis occurs. This consists of testing the hypothesis in order to either prove it correct or incorrect. During this stage, it is common to realize errors in the predictions or hypothesis and to go back and rework them. Often times, it is impossible to completely prove a hypothesis, so what is often done is that a hypothesis can be assigned a probability that it is true.

Decision

This is the point in the process in which you have enough evidence to either reject or accept the predictions. One important part of the decision making process is to ensure that the experiment is repeatable. Since we cannot manipulate the data in our example, one way to prove or disprove the repeatability is to study different locations in the world. This will help to show whether temperature anomalies are really being experienced the same globally or whether they are just local to a certain region. Knowing this could also help to support our hypothesis.

Critical thinking

Critical thinking is the ability to clearly and rationally consider what to do or what to believe. It is the process of using objective judgments to determine the relative merits or meanings of different options. By studying problems in a thoughtful, consistent manner rather than allowing preconceptions or biases to influence our decision-making process, we can arrive at the best decisions and understandings of issues.

Critical thinking is vital to making sense of large amounts of data and being a successful knowledge worker. Being able to systematically study problems and information can often lead to new insights and understandings that might be missed with a cursory surface-level examination. You might be able to figure out

a better solution to a problem, a more effective strategy, or a cheaper way of doing things by using critical thinking and data analysis.

In college, critical thinking can be helpful to ensure you have a good understanding of the course material and are ready for exam day. For example, if you are reviewing a section of the CS101 textbook about formatting spreadsheets, ask yourself, "How do I format spreadsheets?". Look for answers as you read through the section. At the end of a class lecture, ask yourself what was the most important thing you learned that day and what you did not understand. By giving meaningful thought to these questions, you can identify weaknesses that might cause problems later.

Even in Microsoft Office, critical thinking is essential. Instead of blindly performing tasks a certain way because it's how you've always done it, thinking critically about your task can often help you find faster ways to perform a task. Whether it's using keyboard shortcuts or reorganizing steps to perform them at the same time, thinking critically and carefully understanding your task can save you time and effort.

Analysis questions

Computer Science 101 uses real world problem scenarios and datasets to help build critical thinking and data analysis skills. While a wide array of tools are covered in each assignment, it is in the analysis questions at the end of Homeworks, Exams, and Participation Projects where data analysis skills and critical thinking come together.

Solving analysis questions

To be successful in answering analysis questions, start by reading the background information and problem statement at the beginning of most assignments. It is also helpful to read the analysis questions before starting your work. Knowing what the assignment is about and what you need to answer will help you These pieces of information will help you understand what you should be on the lookout for as you complete the assignment. While some analysis questions on Homeworks and Participation Projects may require outside research, the majority of answers for analysis questions will come from the data you explore in the assignment.

Let's bring our critical thinking and data analysis skills to bear on a sample analysis question. Assume you are working on an assignment analyzing population statistics and are given this analysis question: "West Virginia's population growth hasn't kept pace with the U.S. average. Why might this be the case?" As part of the assignment, you created a chart showing a breakdown of population by age groups as shown in Figure 3 below.

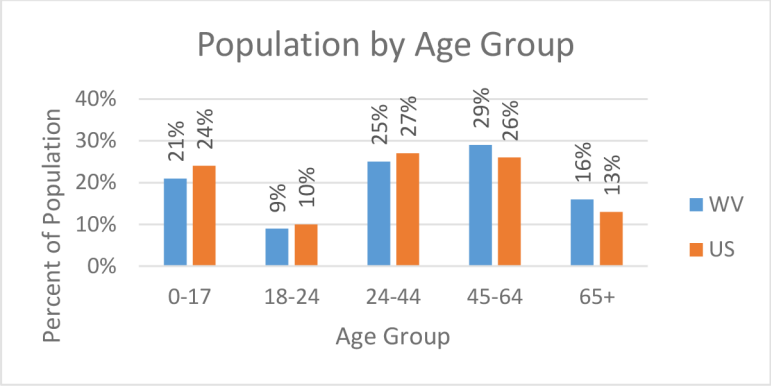


Figure 2: Population by age group for West Virginia and the United States.

Before answering the question, look at the chart to see what information it can provide. Notice that people aged 45+ make up 6% more of West Virginia's population than the national average. It's common knowledge that people in this age group generally don't give birth to children.are mostly out of their childbearing years; it's unusual for someone of this age to give birth. Thus, we can conclude that one reason why West

Virginia's population growth hasn't kept pace with the rest of the U.S. is because it has fewer people who are able have children and add to the population.

Let's take a look at a chart from another hypothetical assignment. This chart plots grades on different assignments for three sections of a course:

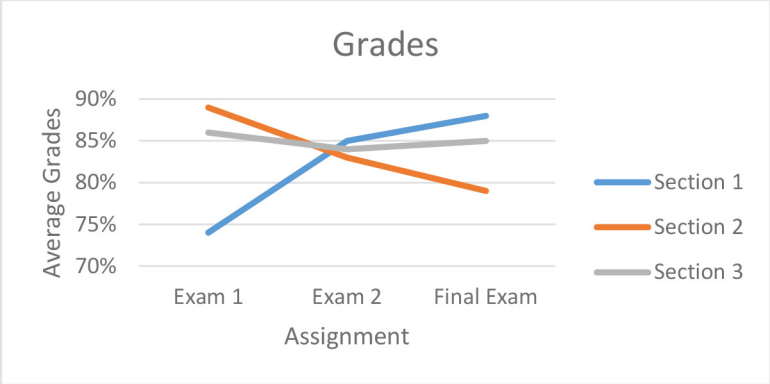


Figure 3: Grade comparison across hypothetical sections.

Some possible analysis questions based on the graph could include "What is this graph telling you about the grades for Section 1?," "What does it mean that Section 2's line is sloping downward?," or "What could this graph tell you about the study habits, the course instructors, or attendance?"

In order to answer these questions, you will have to interpret the graph. Locate the specific area to which each question refers. The first question asks about Section 1, so looking at the lines for Sections 2 and 3 won't tell you much. You could say that initially the grades for Section 1 were low, but gradually they increased.

Charts provide a visual representation of data. Section 2's orange line shows a decrease in exam scores across the semester. The visual results are only part of the answer. It can tell you what happened, but not necessarily why. You can use the Internet, think about possible causes, or draw on personal experience in order to answer the questions.

One possible answer for the third question could be "In the section whose grades increased, study habits could have improved, students might have started attending class after getting a low grade on the first exam, or the instructor could have changed his or her teaching style. The opposite reasons could apply to the section whose grades decreased."

Responding to analysis questions

When responding to analysis questions, you should keep your responses fairly brief. Two to three sentences should be sufficient to clearly make your point.

Be sure that your response clearly indicates your answer to the analysis question prompt. Include supporting justification explaining why you think that's the correct answer. Analysis question responses should never be just "yes" or "no." Even when the question asked is a yes/no question, you still need to justify your answer.

Analysis question responses are evaluated based on these two factors:

1. Was the response factually correct or a reasonable interpretation of the data? In other words, if there was a definitive correct answer, did you give it? If the question is subjective, was your answer something that an education person would consider easonable based on the available information?
2. Was a logical rationale provided to support the answer? You need to explain why you believe your answer is correct based on the available data.

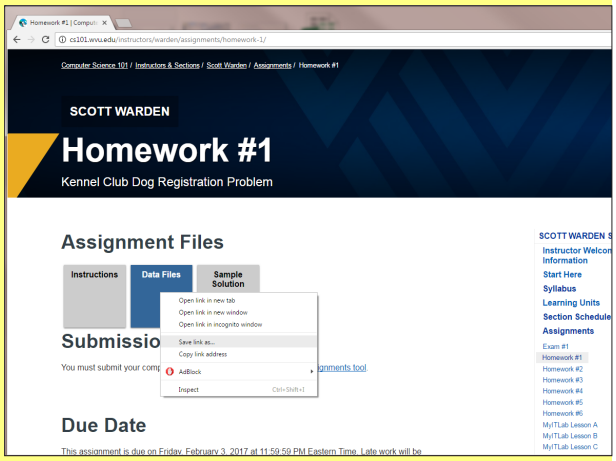
Each of the factors is worth 50% for graded responses. You can give a correct answer but still lose points if you fail to adequately explain your reasoning. Conversely, you can also get partial credit for having a wrong answer if you can give a reasonable explanation of how you arrived at it.

Using data from online sources

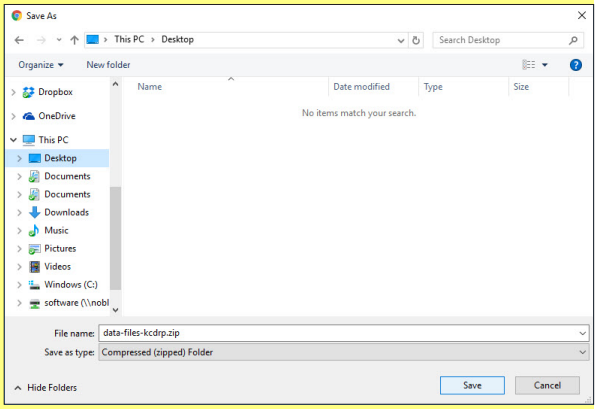
Downloading data

As you work on assignments, you frequently will need to be able to make use of data found online. Different websites provide different means of accessing downloadable information, but one common approach is to make downloads available via links or icons.

1. In your browser, go to the page that contains links to the files you wish to download.
2. Right-click on the link or button for the file to download. Choose the ***Save link as...*** or similar option. (The exact text for the menu option varies by browser.)



3. Choose where to save your file. The Desktop is frequently a convenient location. Click the **SAVE** button to download the file.

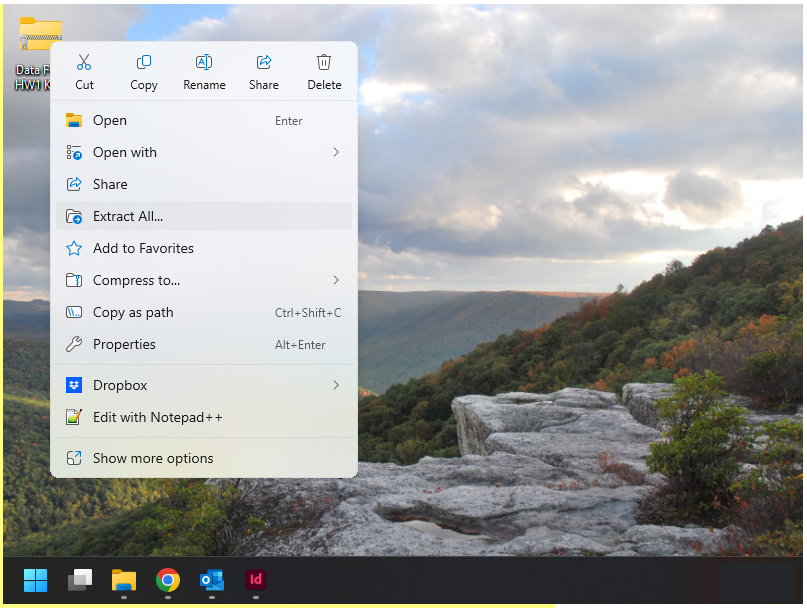


Extracting ZIP files

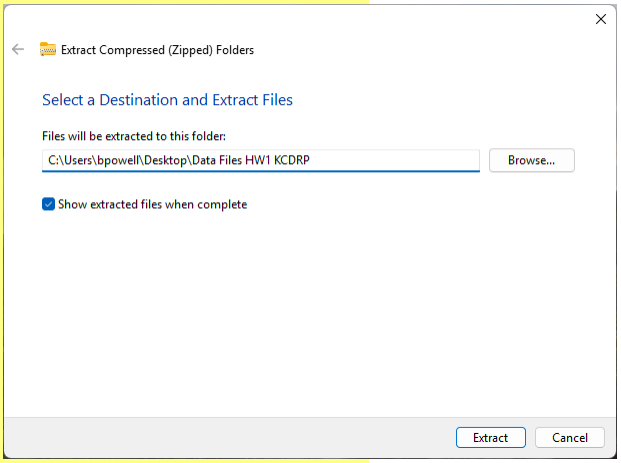
Many downloaded files, including the data files for CS101 assignments, are stored inside of ZIP archives. ZIP archives are compressed and can contain many files inside. Before you can use the files inside of a ZIP archive, you first must extract them.

These instructions assume that you are using Microsoft Windows. On macOS, you can simply double-click on the ZIP file to extract its contents.

Right-click on the ZIP archive file you wish to extract. Choose the ***Extract All...*** option.



Choose where the extract files should go. The default location is generally a good choice. Click the *Extract* button.



View the contents of the extracted ZIP archive. You can close the Explorer window when you are done.

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Supplemental Content

Microsoft Excel

Charts

Using cell contents for horizontal (category) axis labels

When you select a range of cells to use in a new chart, Excel normally does a good job of determining how the data should be shown. Sometimes it guesses incorrectly, though. One common issue is for Excel to plot years on the chart (as data) rather than using them to label the horizontal axis.

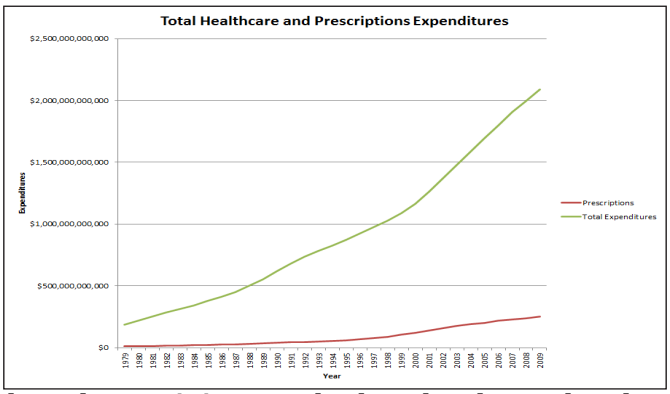
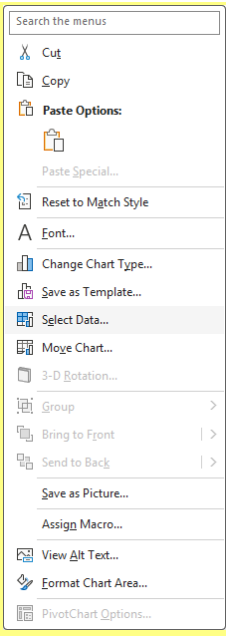


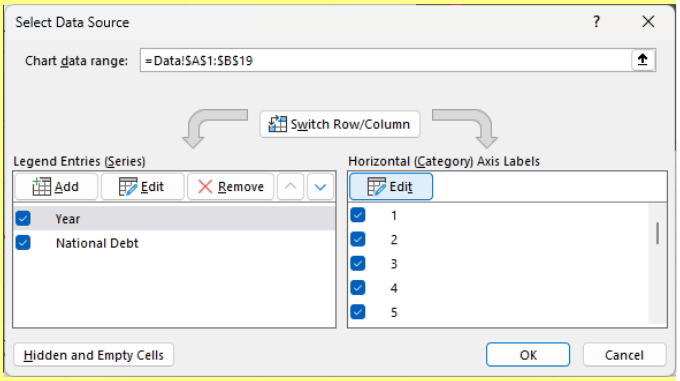
Figure 4: Excel chart where the year is incorrectly plotted as data rather than used to label the axis.

Instructions for changing the data series plotted on a chart are on page 280 of the *Exploring Microsoft 365: Excel 2021* textbook. After deleting incorrect data series, it is still generally necessary to manually specify horizontal axis labels. This can be done by following the instructions below:

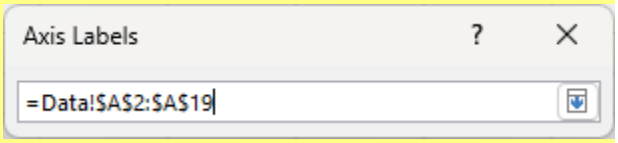
1. Right-click on the chart you wish to edit. Choose the ***Select Data...*** option.



2. In the SELECT DATA SOURCE dialog box, click the **EDIT** button under the ***Horizontal (Category) Axis Labels*** section.



3. The AXIS LABELS dialog box will appear. If you know the range of the cells you want to use for the axis labels, you can type it in here. Otherwise, click the **SELECT RANGE** (icon) button and use the tool to select the cells.



4. Click the **OK** button to exit the AXIS LABELS dialog box.
5. In the SELECT DATA SOURCE dialog box, you should see the new values listed for the horizontal axis labels. Click **OK** to finish the process.

Trendlines

Charts are a great way to display information that we already have gathered, but one feature that many users do not realize is that charts can also be used to predict values into the future or back into the past. We can do this by adding trendlines to extrapolate the lines plotted on the chart.

In most cases, you will plot trendlines on line charts. They can also be added to area, bar, column, stock, XY (scatter), and bubble charts. Trendlines can only be used on 2-D unstacked charts; they cannot be added to 3-D or stacked charts.

See page 581 of the *Exploring Microsoft 365: Excel 2021* textbook for more information on adding trendlines and the types of trendlines available.

Choosing appropriate trendline types

Excel provides several different types of trendlines that can be applied to your chart. How do you know which type to use?

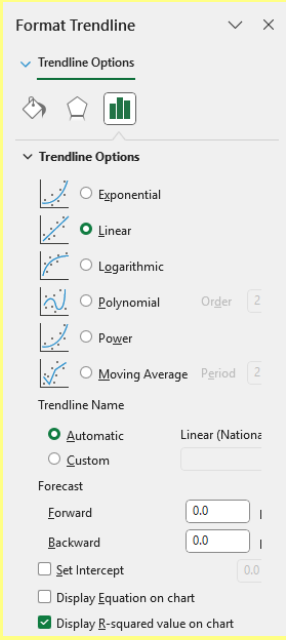
The best type of trendline to use will vary depending on the underlying data. Generally speaking, you should chose the trendline that most closely matches the data already on your chart. Use common sense in your decision, though, especially if you project the trendline forward into the future. If you get a trendline that projects that gasoline will cost -$0.50 per gallon, it's probably not a good a choice.

It's important to note that you cannot use moving average-type trendlines if you are going to project the trendline forward or backwards.

R-squared values

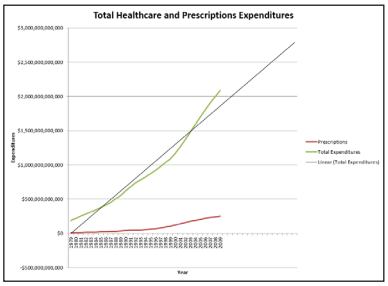
While it is frequently possible to gauge the accuracy of a trendline just by looking at it, there is a formal measure you can use. Called the R-squared value, this number varies between 0 and 1 depending on how closely the trendline fits the underlying data. Higher numbers (those closer to 1) represent a better fit, but be aware that you likely will never get an R-squared value that actually is 1.

1. Right-click on the trendline for which you want to display the R-squared value. Click on the ***Format Trendline*** option.
2. At the bottom of the FORMAT TRENDLINE pane, check the ***Display R-squared value on chart*** box to turn on this option.
3. If you wish, you can change between different trendline types in the FORMAT TRENDLINE pane to see how their R-squared values compare.



Predicting the future with trendlines

One of the major features of trendlines is that you can use them to estimate what values might be in the future (or the past). For example, if you have a chart that shows gasoline prices you can use a trendline to project what gasoline might cost in the future.



1. Right-click on the trendline for which you want to predict the values into the future or past. Click on the ***Format Trendline*** option.
2. In the ***Forecast*** section of the FORMAT TRENDLINE pane, you can specify how many periods the trendline should be projected forwards or backwards.

   One period is equal to one row in the original data. For example, if you have records showing gasoline prices on a yearly basis and you tell Excel to project the trendline forward two periods, it will project the gasoline price two years in the future.

Analysis questions and Excel

When responding to analysis questions for Microsoft Excel assignments, be sure to review the data on your worksheets. Pay special attention to values you calculated using formulas, charted, or used with PivotTables or scenarios as these are likely to be useful in answering the analysis questions.

When facing a question asking if there is a relationship between two values, you can use the `CORREL()` function to see if a correlation exists. Values closer to -1.0 or +1.0 indicate a strong relationship, while values close to 0 indicate little or no relationship exists.

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Supplemental Content

Microsoft Access

Microsoft Access

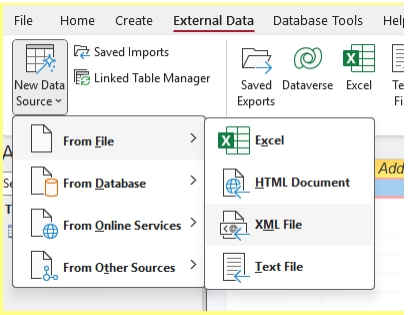
Importing data

Instructions on how to import data from Excel spreadsheets and text (CSV) files are included in Chapter 8 of the *Exploring Microsoft 365: Access 2021* textbook.

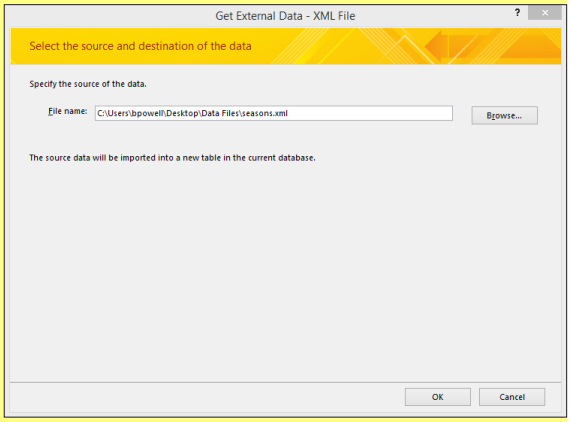
Importing from XML files

Microsoft Access allows users to import data, table structures, or both from XML files. To import data, follow these instructions:

1. View the **External Data** ribbon. In the Import & Link section, click the **New Data Source** menu button, then **From File**, and then **XML File**.

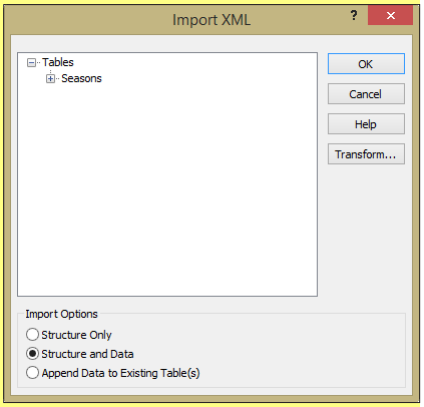


2. Click the **Browse...** button to locate your file. Once you have selected the file to import, click the **Open** button.
3. Click the **OK** button to begin the import process.



4. At the top of the Import XML dialog box, you will see a listing of tables with data contained in the XML file. At the bottom of the dialog box, you can choose to import the table structures only (empty tables), the structure and data (tables with data), or to just append data to existing tables. When appending data, it will import the data into existing tables and fields named identically as in the XML file.

   Once you have made your decision, click the **OK** button.



5. Click the Close button on the resulting Get External Data - XML File dialog box. In most cases, it is not recommended to save the import steps.
6. Any new or updated tables will now be visible on the left navigation pane.

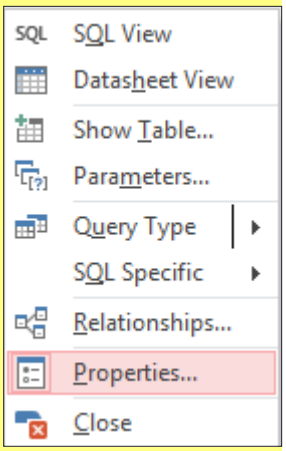
Queries

Displaying unique values

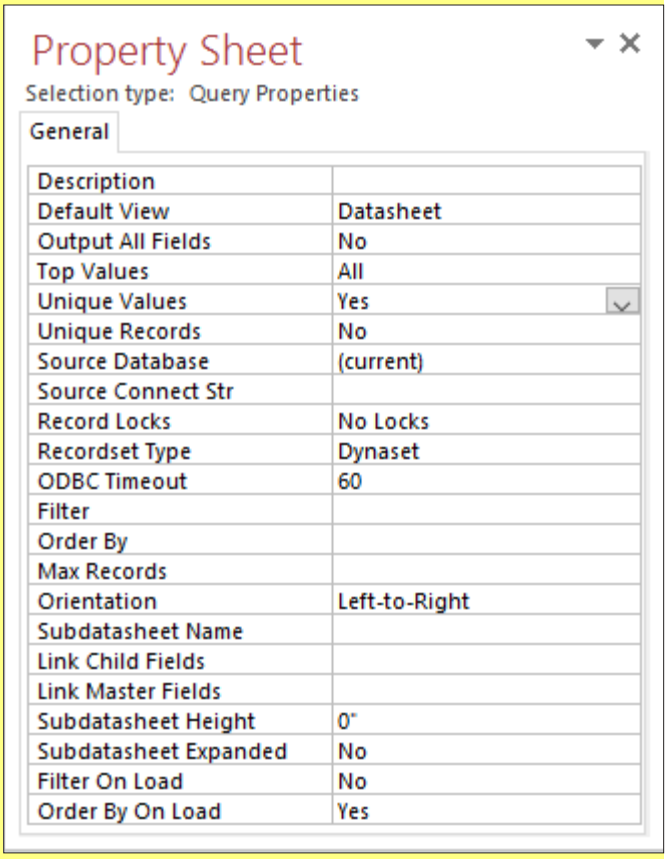
When creating queries, one common requirement is that results should only be displayed once. For example, if you're searching for customers who have made a purchase in the past year so you can send a discount coupon, you probably will want to ensure that each customer only appears on the list once regarless of how many purchases they made.

By turning on the ***Unique Values*** property for your query, Access will only display each set of results values once.

1. With your query open in Design View, right-click on a blank area of the chart. Choose the ***Properties*** option.



2. Change the setting for ***Unique Values*** to *Yes*.

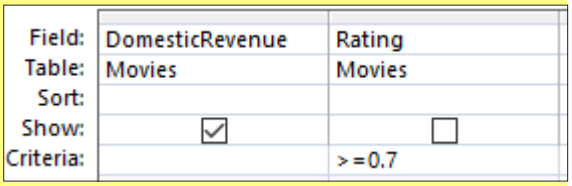


Control if query fields are shown

In a query, you might be required to set criteria to some fields that determine which records will be selected but there fields cannot be shown in the results. In this case, you should know how to control if query fields are shown or not.

For example, assume you are creating a query to view information on movies with a rating of at least 70% but you are not to show the rating in the results. You can set this up by adding the field containing the rating to your query so you can set a criteria but then not showing that field in the results.

3. With your query open in Design View, uncheck the ***Show*** checkbox to turn off display of the field you do not want to have appear in the results.



SQL

Structured Query Language (SQL) is a standardized syntax that can be used to write queries for retrieving and updating most relational databases. In its basic form, it is supported by almost every relational database in use today including Microsoft Access, Microsoft SQL Server, Oracle, MySQL, and others. While some database software uses proprietary extensions to provide additional functionality not included in the SQL standard, common `SELECT`, `DELETE`, `UPDATE`, and `INSERT` queries can generally be run on different platforms without modification.

SELECT queries

`SELECT` queries are the most common form of query. They are used to select and retrieve information from a database.

An example of a basic `SELECT` query is:

```
SELECT Students.FirstName, Students.LastName
FROM Students;
```

Every `SELECT` query contains a `SELECT` clause and a `FROM` clause. The `SELECT` clause specifies which fields should be retrieved; in this case, we want the **FirstName** and **LastName** fields from the *Students* table. The `FROM` clause specifies where the fields are located; here, it is the *Students* table.

ORDER BY clauses

`ORDER BY` clauses indicate how the results of a `SELECT` query should be sorted. If no sort order is specified, the query results will appear in the order in which they are stored in the database. The `ORDER BY` clause comes after any `FROM`, `JOIN`, `WHERE`, or `GROUP BY` clauses.

An example of a `SELECT` query with an `ORDER BY` clause is:

```
SELECT Students.FirstName, Students.LastName
FROM Students
ORDER BY Students.LastName, Students.FirstName;
```

This clause will sort the results by the **LastName** field and then by the **FirstName** field. The results are sorted in ascending order by default. Adding the `DESC` keyword after the field name will sort in descending order instead:

```
ORDER BY Students.LastName DESC, Students.FirstName DESC;
```

DISTINCT keyword

The `DISTINCT` keyword tells the database to only retrieve unique or distinct values. It prevents displaying multiple records with the same information.

For example, if we want to find the last names of students in our database we could write a query like:

```
SELECT DISTINCT Students.LastName
FROM Students
ORDER BY Students.LastName;
```

JOIN clauses

The power of a relational database is that data in multiple tables can be tied together. The `JOIN` clause is used to specify the relationship between the table named in the `FROM` clause and any other tables that contain data to be used in the query.

There are several different types of `JOIN` clauses depending upon how the database should treat cases where one table has a record without a counterpart in the other table. The most common form is the `INNER JOIN`, which will only display results where there are matching records in both joined tables.

For example, if we want combine student names from the *Students* table with address information from the *StudentAddresses* table, we could write a query using an `INNER JOIN` like this:

```
SELECT Students.FirstName, Students.LastName, StudentAddresses.AddressType,
StudentAddresses.Address, StudentAddresses.City,
StudentAddresses.StateAbbrv, StudentAddresses.ZIPCode
FROM Students INNER JOIN StudentAddresses ON
Students.StudentID = StudentAddresses.StudentID ORDER BY Students.LastName,
Students.FirstName, StudentAddresses.AddressType;
```

GROUP BY clauses

The `GROUP BY` clause is used in conjunction with functions such as `COUNT()`, `SUM()`, and `AVERAGE()` to calculate statistics on query results. If any statistical functions are used, al fields that are not calculated must be listed in the `GROUP BY` clause.

As an example, if we want to count the number of addresses listed for each student, we could write a query like:

```
SELECT Students.FirstName, Students.LastName,
Count(StudentAddresses.AddressType) AS CountOfAddressType
FROM Students INNER JOIN StudentAddresses ON
Students.StudentID = StudentAddresses.StudentID
GROUP BY Students.FirstName, Students.LastName, Students.FirstName
ORDER BY Students.LastName, Students.FirstName;
```

WHERE clauses

WHERE clauses are used to restrict the results of a query. The query will only operate on records that match the criteria specified in the WHERE clause.

For example, if we want to display student home addresses, we could write this query which uses a WHERE clause on the **AddressType** field of the *StudentAddresses* table:

```
SELECT Students.FirstName, Students.LastName, StudentAddresses.Address,
StudentAddresses.City, StudentAddresses.StateAbbrv, StudentAddresses.ZIPCode
FROM Students INNER JOIN StudentAddresses ON
Students.StudentID = StudentAddresses.StudentID
WHERE StudentAddresses.AddressType="Home"
ORDER BY Students.LastName, Students.FirstName;
```

Multiple criteria can be specified by using the AND and OR keywords to seperate each criteria. Parentheses can be used to group keywords in cases where the relationship between multiple AND and OR clauses is ambiguous. For example, if we want to display records that are either home addreses or are located in Morgantown, West Virginia, we could write a query like:

```
SELECT Students.FirstName, Students.LastName, StudentAddresses.Address,
StudentAddresses.City, StudentAddresses.StateAbbrv, StudentAddresses.ZIPCode
FROM Students INNER JOIN StudentAddresses ON Students.StudentID =
StudentAddresses.StudentID
WHERE StudentAddresses.AddressType="Home"
OR (StudentAddresses.City = "Morgantown" AND StudentAddresses.StateAbbrv =
"WV")
ORDER BY Students.LastName, Students.FirstName;
```

INSERT queries

INSERT queries are used to add new records to a table. All INSERT queries have two clauses: the INTO clause indicates the table and fields to which the data is being added, and the VALUES clause indicates the data to be added.

For example, if we want to add a record for a student named Bill Smithers we could use this query:

```
INSERT
INTO Students (FirstName, LastName, StudentID)
VALUES ("Bill", "Smithers", "700123456");
```

The INTO clause indicates the record will be added to the *Students* table using fields **FirstName**, **LastName**, and **StudentID**. The VALUES clause indicates the values being added. Each field's value is separated by a comma and they are listed in the same order as the fields in the INTO clause.

UPDATE queries

UPDATE queries are used to modify records already stored in the database. They use three clauses: the UPDATE clause indicates the table containing the records to be modified, the SET clause indicates the specific changes to be made, and the WHERE clause determines which records will be modified.

For example, let's assume Professor Sypolt has retired and been replaced by Professor Gilbert. We want to replace all instances in the *Sections* table that have Sypolt's name with Gilbert's name. We can write this query to do that:

```
UPDATE Sections SET Sections.Instructor = "Gilbert"
WHERE Sections.Instructor="Sypolt";
```

This query specifies that the *Sections* table will be modified by changing the **Instructor** field value to Gilbert for records where the **Instructor** is currently Sypolt.

DELETE queries

`DELETE` queries are used to remove records from a table. They use two clauses: the `FROM` clause specifies the table containing the records to be deleted, and the `WHERE` clause determines which records will be deleted.

For example, let's assume that we no longer want to store parent addresses in the *StudentAddresses* table. We can wite a query to delete records where the **AddressType** is `Parent`:

```
DELETE
FROM StudentAddresses
WHERE StudentAddresses.AddressType="Parent";
```

Analysis questions and Access

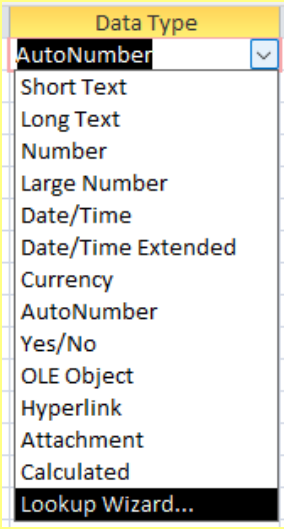
When responding to analysis questions for Microsoft Access assignments, be sure to review the data in your tables. Also closely check the results of queries, since many queries in course assignments exist to provide data for the analysis questions.

Create a lookup field

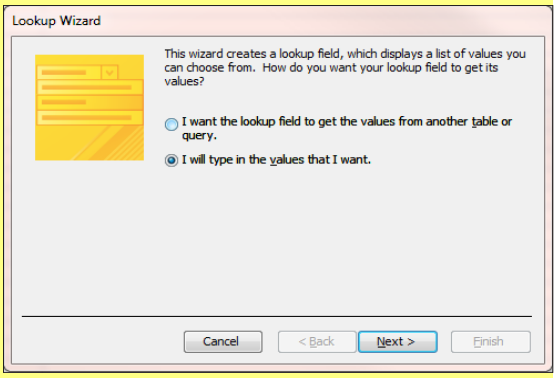
Typing in allowed values for a lookup field

When creating a lookup field, you may want to specify the options the user can choose from rather than having Access use values stored in a table.

1. With your table open in Design View, click on the dropdown list of data type for the field you wish to edit using a lookup field. Choose the ***Lookup Wizard*** option.



2. Choose the ***I will type in the values that I want*** option and click **NEXT**.



3. Enter the number of columns you want in the list, and then type the values you want in each cell. To adjust the width of a column, drag its right edge to the width you want, or double-click the right edge of the column heading to get the best fit. Click **NEXT**.
4. Name the lookup field. You can also choose to check the ***Limit To List*** check box, so users can only select the values from the dropdown list. Click **FINISH**.

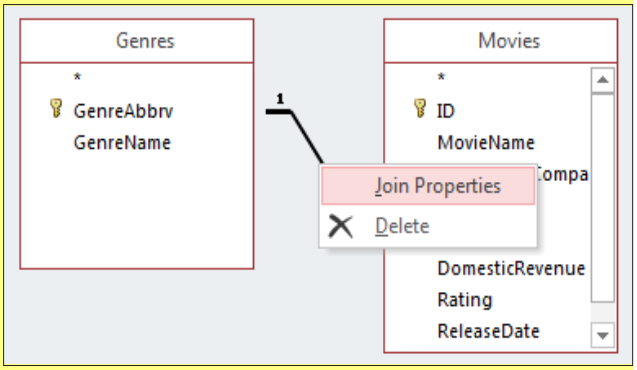
Join tables in a query

When you create a query using multiple tables, you can use joins to limit the records that you want to list, based on how the data sources are related to each other. You can also use joins to combine fields from different tables, so that multiple fileds from the tables become one record in the query result. There are various types of joins between two tables in a query (e.g., inner join, left or right outer join, etc.). When creating a query, the default join is inner join which only includes rows where the joined fields from both tables are equal. Sometimes the requirement tells you that the query should include all of the rows from one table and those rows from the other table that share a common value on both sides of the join, which is called outer join.

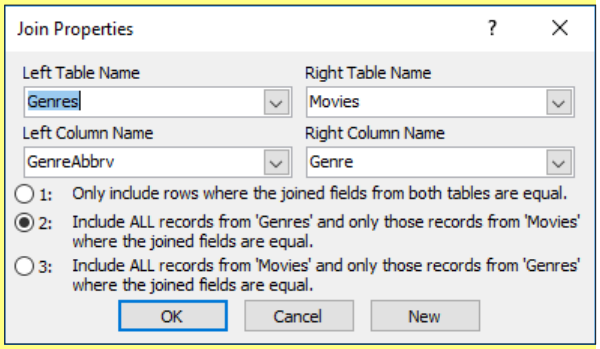
Specifying outer join relationships

Taking tables *Genres* and *Movies* as an example, these two tables are joined through a common field **GenreAbbrv**. You are required to create a query listing for each genre name and its movies, where your results must include all genres even if they have no movies.

1. With your query open in Design View, right-click on the join link between two tables. Choose the ***Join Properties*** option.



2. Change the join type to ***2: Include ALL records from 'Genres' and only thoes records from 'Movies' where the joined fields are equal.*** Click **OK**.



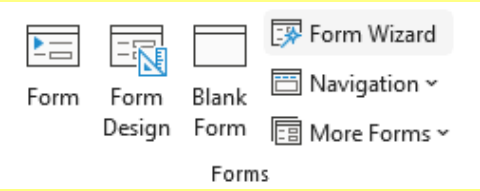
3. Choose ***3: Include ALL records from 'Movies' and only thoes records from 'Genres' where the joined fields are equal.*** when the requirement needs you to include all movies even if they have no genres.

Form Wizard

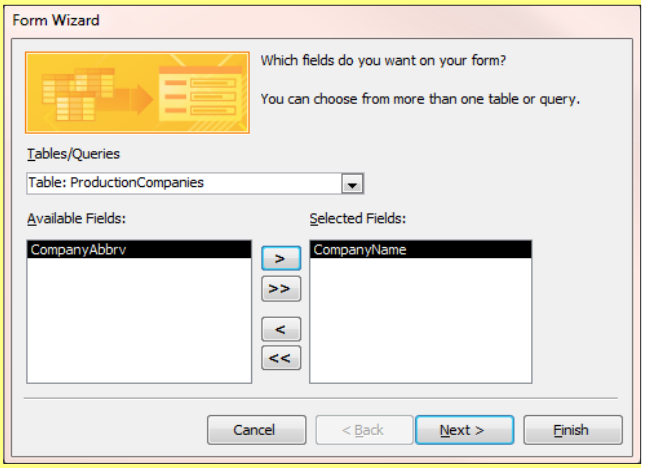
The ***Form Wizard*** promts you for input in a series of steps to generate a customized form. The wizard enables you to make certain customizations quickly and easily without having to be an expert in form design.

Taking tables *ProductionCompanies* and *Movies* as an example, you are required to create a form with subform. The main form should display the full production company name, and the subform must display a datasheet with all *Movies* table fields. To create a form using the ***Form Wizard***, complete the following steps:

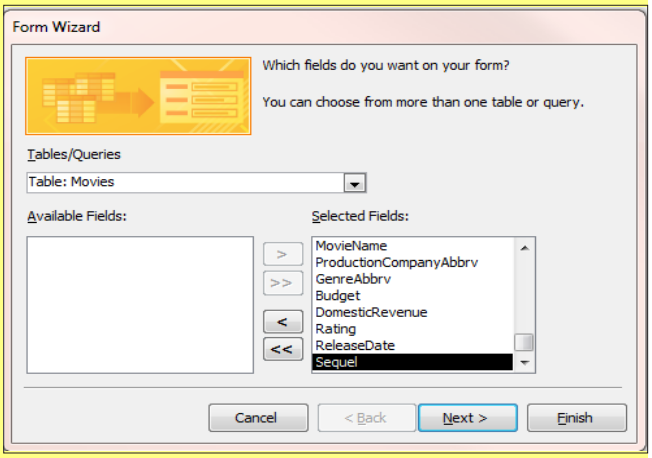
1. View the **CREATE** ribbon. In the FORMS section, click the **FORM WIZARD** button.



2. Click the Tables/Queries list arrow to display a list of available tables or queries. Select the table for the main form (*ProductionCompanies* in this example), and add the fields you want to include in the main form (**CompanyName** in this example).

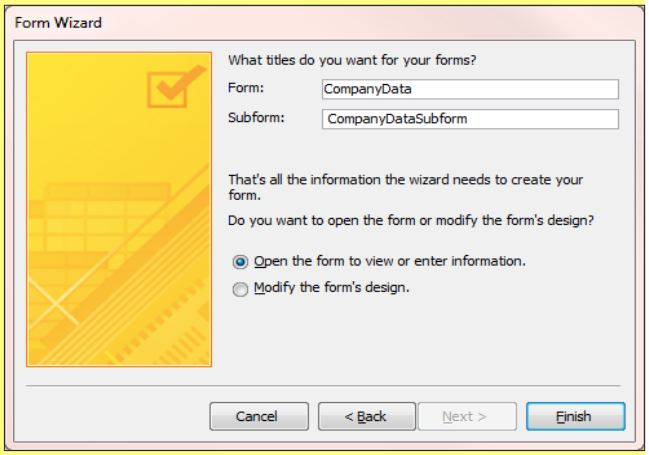


3. Select the table for the subform (*Movies* in this example), and add the fields you want to include in the subsorm (all *Movies* table fields in this example). Click **NEXT**.



4. Click the table for the main form, and choose ***Form with subform(s)*** option. Click **NEXT**.
5. Apply the desired layout (***Datasheet*** in this example) for the subform. Click **NEXT**.

6. Enter a form name and a subform name. Click **FINISH**.



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Supplemental Content

Microsoft Word

Microsoft Word

Equation tools

For many college students and researchers, it is important to be able to share mathematical equations in their reports and assignments. Many users simply type in a basic representation of their equation, like shown here:

x = -b + sqrt(4ab) + c

The problem with this approach is that it does not look professional and it is also difficult to represent complex equations. Luckily, Word includes a better way with its equation tools. Using the equation tools, we can obtain equations like:

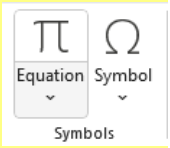
$$x = -b + \sqrt{4ab} + c$$

You can access the Equation tools via the **INSERT** ribbon, in the SYMBOLS section. Your options are to insert a predefined formula (e.g., area of a circle) or make a custom one. The predefined ones are easy to add, but you may need to create your own unique equation, such as the one used in the example above.

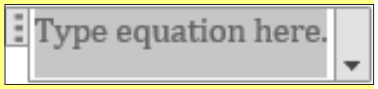
Inserting an equation

Let's work through the creation of the above formula:

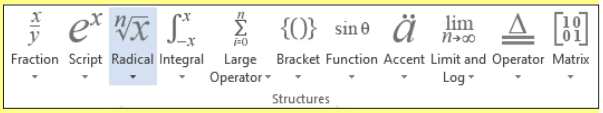
1. View the INSERT ribbon. In the SYMBOLS section, you will find the EQUATIONS button. If you want to use a predefined equation, you can access the list by clicking on the down arrow below the button. In our case, click on the main button to insert a blank equation into the document.



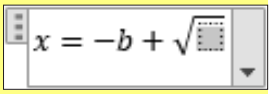
2. Click inside the blank equations area in your document to give it focus. Type in `x = -b +` to get started.



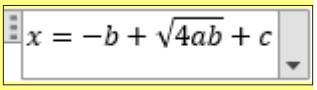
3. We now need to add a radical (the square root bracket). Go the **EQUATION** ribbon. Under the **RADICAL** choice, add a square root radical.



4. Inside the radical is a square box. Anything added in this box is placed beneath the radical. Click the box inside the radical, and type the following: `4ab`



5. To wrap up the equation, place the insertion point after the radical, but not inside it. And finally, type the following: `+ c`



Equation symbols

Also on the **EQUATION** ribbon is a SYMBOLS group, where many different mathematical symbols can be found. You can insert these symbols in your equation by clicking on the appropriate symbol in the ribbon.

References

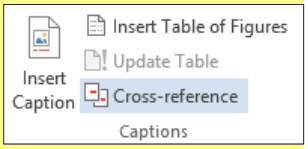
Additional information on Microsoft Word's tools for managing references is available in Chapter 4 of the *Exploring Microsoft 365: Word 2021* textbook.

Cross-references

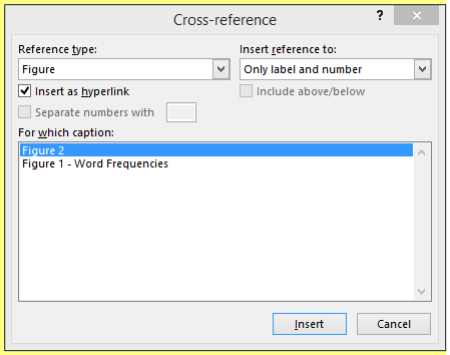
In journal articles and many reports, it is common to refer to figures, equations, or tables from the text (e.g., "Table 6 shows..."). Word's cross-reference feature provides a way to include these references while ensuring the text will always point to the correct item even if its number changes because additional figures are added or removed.

To insert a cross-reference to a figure, table, or equation, do the following:

1. View the **REFERENCES** ribbon. In the CAPTIONS section, click the **CROSS-REFERENCE** button.



2. Choose the type of reference you wish to insert, then pick the specific item's caption. You can choose to include only the item's label and number (e.g., "Figure 1") or its full caption.



3. Once you click the **INSERT** button, the cross-reference will be inserted in your text.

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Supplemental Content

Microsoft PowerPoint

Microsoft PowerPoint

Developing good presentations

How do you design a "good" presentation? Part of the answer depends on the context. Ask yourself what would be appropriate given the purpose of your presentation. A presentation you might design as part of a sales pitch for a company would likely have a completely different feel than one you would make for a history class.

Keeping context in mind, there are a few common guidelines that can help in designing presentations:

Start with the ending.

There's a reason why cooking shows always start by demonstrating what the end result will be - it shows the audience why they should watch. Design your presentation the same way. Begin with a brief teaser highlighting key pieces of your presentation.

Keep it simple.

Presentations generally work best when you focus on general issues rather than detailed minutiae. Keep your slides clear and concise, no more than three bullet points each. Use your accompanying talk to elaborate on any important details.

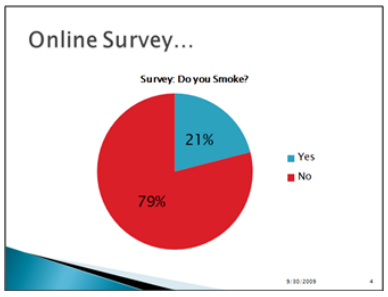
Be brief.

Most people have a fairly short attention span of about 10 minutes. Try to be direct and to-the-point in your presentation. If you have something important to convey, don't leave it for the end when your audience may have tuned out.

Use pictures to emphasize your point.

Research has shown that adding pictures can significantly improve audience understanding of your presentation. Using relevant, high-quality images to illustrate your point can provide a 10% to 65% increase in how much your audience remembers. Avoid confusing your viewers with images that don't add anything useful to your presentation.

Use charts to help tell your story.



Charts can be excellent ways to display information at-a-glance for your audience. Tables can become messy and difficult to read when viewing the presentation on a projector screen.

Stick to the basics with your chart. Include just enough detail so that the audience understands what it is showing without overloading it with labels and unnecessary detail.

Make sure your presentation is legible.

As you design your presentation, remember that your audience is generally going to be sitting some distance from the screen. Keep your presentation design clean to make sure they can easily read your slides.

Use high contrast colors, simple fonts (Arial, Verdana, Calibri, and Cambria are good choices), and large text.

Focus on your content, not special effects.

The existence of animations and slide transitions in PowerPoint doesn't mean they are automatically a good thing to incorporate in your presentation. When properly used, visual effects can draw attention to important parts of your slides. They're easy to misuse, though. Poorly designed transitions and animations can distract your audience from the material you are trying to convey. In general, it's best to focus on your content and use visual effects sparingly.

Be creative, but don't overdo it.

Interesting topics are fun to learn. Ask yourself what you can do to make your topic engaging for your audience. Just be careful - don't stray too far off topic or you'll risk alienating the people viewing your presentation.

Other tips

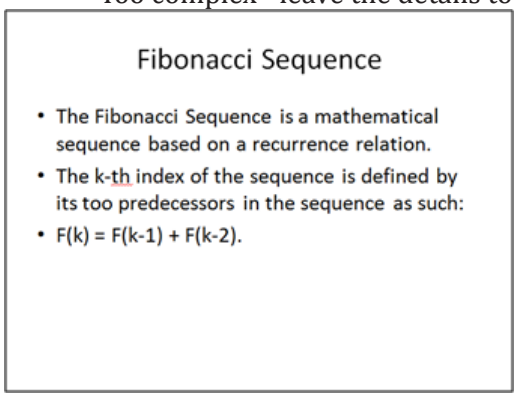
- Spelling is important, but punctuation isn't as critical. It's best to keep your slides to brief statements and ideas. Keep the full sentences for your talk.
- Aim for no more than seven lines to a slide, seven words to a line.

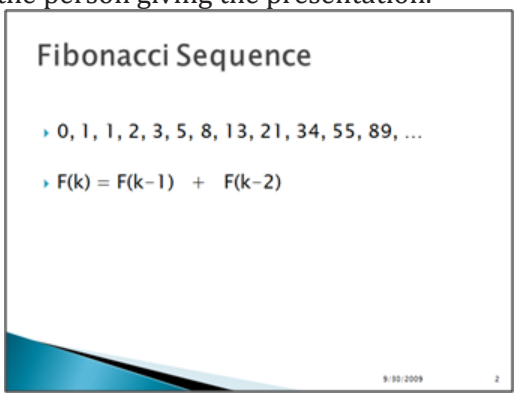
Examples of improving bad presentations

Example #1

The original slide shown here is boring and unexciting, but it can be easily improved by applying some key design principles. Let's identify some issues and how we can fix them:

- Plain white background - isn't very interesting. Apply a theme to dress up your presentation.
- Too much information - the speaker needs to have something to say on their own.
- Too complex - leave the details to the person giving the presentation.

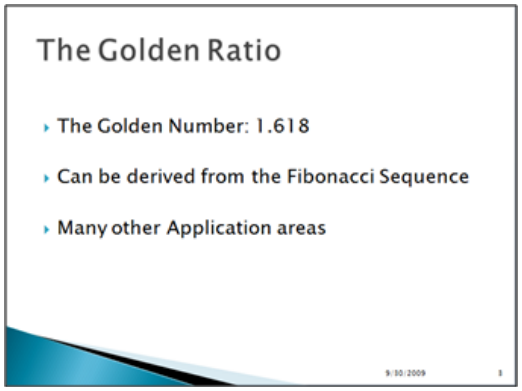


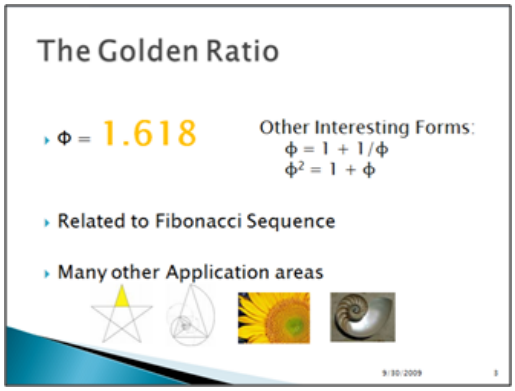


Example #2

The original slide here applies the design principles that we learned earlier, but can we improve it further? We can take the context of our presentation's material into account when we design it.

- Use color to set off text. For example, in our discussion of "The Golden Ratio" it seems obvious to make this text be gold in color.
- Add some supporting details to accompany the topic of your slide. Why is the Golden Ratio so important?
- Add some related images.





Delivering your presentation

Here are some suggestions for when you give your presentation:

- Don't read directly from your slides. That's your audience's job. Instead, use the slides to help pace your talk.
- Practice your timing. Have a rough idea of how long to spend on each slide.
- When you advance to a new slide, give your audience a moment to glance over it before you begin speaking.
- Give your audience print handouts of your presentation so they can follow along and take notes.
- Consider making your presentation file available after the meeting for people who want an electronic copy.

Adding the date and time

It is common in PowerPoint presentations to include the date of the presentation on the title slide and sometimes on slide footers. For presentations that are frequently reused, PowerPoint can automatically display the current date so the text does not need changed every time it the presentation is shown.

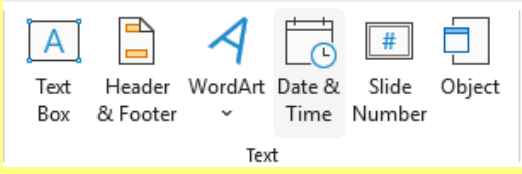
Slide footers

See page P103/P667 of the *Exploring Microsoft 365: PowerPoint 2025* textbook for instructions on displaying dates and times on slide footers.

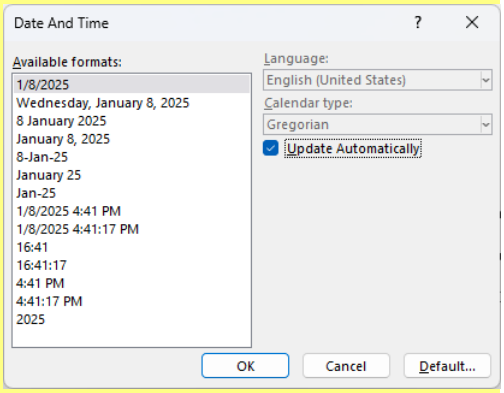
Slide text

To display a date or time in the text of your slide, such as on a title slide, follow these instructions:

1. Click in the content box where the text will go. Position your cursor where the date should appear.
2. Go to the **INSERT** ribbon and click the **DATE & TIME** button in the TEXT section.



3. In the **DATE AND TIME** dialog box, choose which date or time format you wish to use.



4. If you prefer, click the ***Update automatically*** checkbox to always display the current date or time.
5. Click the **OK** button to add the date or time to your presentation.