



# Homework #4

## Nielsen Television Ratings Problem

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### Background Information

Over the course of a given week, the vast majority of Americans watch at least some amount of television. Since most television shows are paid for by the sales of advertising, broadcasters and advertisers have a vested interest in knowing who is watching each television show.



Nielsen Media Research conducts surveys on a weekly basis to calculate the ratings for television shows. The ratings are used for a variety of purposes including deciding which shows to air and when to schedule them, how much advertising costs, and when to buy advertising.

Despite the shift to streaming media, a large portion of American households still watch television with Nielsen estimating there were 123.8 million households using television during the 2022-2023 season [1].

### Problem Statement

In this assignment, we wish to create a database to store and analyze television show ratings data for the 18-49 age demographic's top-20 most-watched shows.

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### Instructions

**IMPORTANT:** This assignment requires the Windows version of Microsoft 365. macOS users can access a ready-to-use version through Windows Virtual Desktop by following the instructions at <https://cs101.wvu.edu/wvd>.

**IMPORTANT:** Complete the steps below in the order they are given. Completing the steps out of order may complicate the assignment or result in an incorrect result.

1. Create a new Microsoft Access database named **hw4\_lastname\_firstname\_ntrp.accdb**.
2. We would like to begin by making a table to store the television networks.
  - a. Create a table named *Networks* to store the names of the television networks and their abbreviations. Designate the abbreviation as primary key.



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- b. Enter records for all networks below.

**HINT:** The *Networks* table will contain 6 records.

Network Abbreviation	Network Name
NBC	National Broadcasting Company
ABC	American Broadcasting Company
CBS	Columbia Broadcasting System
FOX	Fox Broadcasting Company
CW	CW Television Network
PBS	Public Broadcasting Service

3. We need to store information on various television genres.
- a. Create a table named *Genres* to store the names of the genres and their abbreviations. Designate the genre abbreviation as primary key.
- b. Enter records for all genres below.

**HINT:** The *Genres* table will contain 6 records.

Genre Abbreviation	Genre Name
COM	Comedy
DRM	Drama
SPT	Sports
REA	Reality
ACT	Action
NWS	News

4. To finish adding our dataset, we must store information about the shows.
- a. Create a table named *Shows* to store information on each of our shows (listed below under Step 4b). Some requirements for this table appear below.

**IMPORTANT:** Completely define the *Shows* table before entering records.

- i. For the primary key, use an AutoNumber-type field to store an ID number.
- ii. Provide a field to store the network. Using a lookup field referencing the *Networks* table, allow the user to select the network abbreviation and name (e.g., "ABC | American Broadcasting Company") from a dropdown list.

Do not hide the key column. Store the value of the network abbreviation field. Enable data integrity, restricting deletes, on the relationship created by the Lookup Wizard.

- iii. Provide a field to store the name of the television show.



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- iv. Using a lookup field referencing the *Genres* table, allow the user to specify the genre. The user should be able to select the genre abbreviation and name (e.g., "DRM | Drama") from the lookup field dropdown list.

Do not hide the key column. Store the value of the genre abbreviation field. Enable data integrity, restricting deletes, on the relationship created by the Lookup Wizard.

- v. Provide a fixed-type number field with 2 decimal places to store the show's rating. Use the *Double* field size.
- vi. Include a standard-type number field with no decimal places to store the number of viewers.
- vii. Provide a field to store the day the show aired. Using a lookup field, allow the user to select the day from a dropdown list. Permit the user to choose only from these values:
- ◇ Sunday
  - ◇ Monday
  - ◇ Tuesday
  - ◇ Wednesday
  - ◇ Thursday
  - ◇ Friday
  - ◇ Saturday



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- b. Enter the show data below into your *Shows* table as appropriate. The below information is from the 2022-2023 television season [2], [3].

**HINT:** The *Shows* table will contain 20 records.

Network	Show	Genre	Rating	Viewers	Day
National	Sunday Night Football	Sports	4.90	6,398,000	Sun
American	Monday Night Football	Sports	2.46	3,214,000	Mon
Columbia	Survivor	Reality	1.04	1,360,000	Wed
Fox	911	Drama	1.00	1,306,500	Mon
National	Chicago PD	Drama	1.00	1,304,000	Wed
National	Chicago Fire	Drama	0.99	1,295,000	Wed
National	Law & Order: SVU	Drama	0.95	1,243,000	Thu
American	Saturday Night College Football	Sports	0.94	1,228,000	Sat
Columbia	Ghosts	Comedy	0.94	1,225,750	Thu
American	American Idol - Sunday	Reality	0.92	1,202,000	Sun
Fox	The Masked Singer	Reality	0.92	1,199,750	Wed
Columbia	Young Sheldon	Comedy	0.88	1,151,750	Thu
Columbia	60 Minutes	News	0.87	1,137,000	Sun
Fox	Next Level Chef	Reality	0.87	1,134,000	Thu
National	Chicago Med	Drama	0.84	1,099,000	Wed
American	Grey's Anatomy	Drama	0.83	1,086,000	Thu
Columbia	Fire Country	Drama	0.81	1,060,000	Fri
American	Abbott Elementary	Comedy	0.80	1,045,750	Wed
National	The Voice - Monday	Reality	0.80	1,043,000	Mon
Fox	Fox College Football	Sports	0.79	1,031,000	Sat

5. Create separate queries to provide the information requested below. Name each query after the step in which it appears (e.g., name the query in Step 5a as *Query5A*).

**HINT:** Run your queries to test them. Make sure that they display all and only the records that you would expect to appear.

- a. Create a query to display information on each show. List the show name, network name, genre name, ratings, number of viewers, and air day.

Sort by ratings and then by the number of viewers, both in descending order.

**HINT:** This query will show 20 records and 6 fields.



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- b. We wish to determine the number of households watching each show. Create a query listing the show name, ratings, and number of viewers. Also, include a field to calculate the number of households.

You can calculate the number of households using the formula:

$$([Shows.Rating] * 1238000)$$

Format the calculated field as a standard-type number with no decimal places. Sort by the number of viewers and then by the number of households, both in descending order.

**HINT:** This query will show 20 records and 5 fields.

- c. Create a query to display information on shows with high ratings. List the show name, network name, and number of viewers.

Only display shows with a rating of at least 1.0 ( $\geq 1.0$ ). Do not show the rating in the results.

**HINT:** This query will show 5 records and 3 fields.

- d. We wish to calculate the average rating for each network. Create a query listing, for each network name, the average of its ratings.

Format the average as a fixed-type number with 2 decimal places.

**HINT:** This query will show 4 records and 2 fields.

- e. Create a query to determine statistics for each genre. List, for each genre name, the count of its shows, and the sum of viewers.

Your results must include all genres, even if they have no shows.

Format the count and the sum as standard-type numbers with no decimal places.

**HINT:** This query will show 6 records and 3 fields.

6. Using the Form Wizard, create a form with subform. The main form should display the network name. The subform must display a datasheet with all *Shows* table fields.

Name the main form *NetworkData* and the subform *NetworkDataSubform*.



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7. Using the Report Wizard, create a report to show the results of the *Query5A* query. Display all fields from the query.

View by genre and sort by show name in ascending order. Use a stepped layout and landscape page orientation. Name the report *ShowSummary*.

Ensure the full widths of all columns are visible on the report.

8. We need to create a new table to store analysis questions responses.
- Create a table named *AnalysisQuestions* with the fields below. Use appropriate field types and designate a good primary key.

Table: <i>AnalysisQuestions</i>	
Field Name	Description
<b>QuestionNumber</b>	Question being answered.
<b>Response</b>	Response to the analysis question prompt.

9. In the *AnalysisQuestions* table, answer three of the five analysis questions below. Respond to one question per record.
- How does Nielsen select the participants who track their viewing so that the ratings can be generated? Do you think the method used gives accurate results for the number of viewers for the shows?
  - In looking at the top 20 shows listed, only one of the shows aired on Friday. Why do you think this might be the case?
  - In addition to overall viewer figures, Nielsen tracks viewers by various demographics including age and gender. Why might one want to use this demographic information? For example, why might it matter if a show has many female teenage viewers but few male viewers in their forties?
  - During the "sweeps" months of February, May, July, and November, Nielsen collects over 2 million paper diaries from households across the country [4]. Do you think that measuring viewers only at certain times of the year like this gives accurate overall results? Why or why not?
  - Average television show ratings have been decreasing over time. What are some possible causes for this?
10. Run the Compact and Repair Database utility on your database. Ignore any errors you receive when running the utility.



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### Grading Rubric

This assignment is worth 60 points. It will be graded by your instructor using this rubric, with partial credit awarded as appropriate:

Steps 2a-b	5 points total	Step 6	4 points
Steps 3a-b	5 points total	Step 7	4 points
Step 4a	6 points	Step 8a	3 points
Step 4b	4 points	Steps 9a-e (pick 3 of 5)	3 points each
Steps 5a-e	4 points each		

The analysis questions in Steps 9a-e will be evaluated using this rubric:

Standard	Meets Requirements (1.5 points)	Does Not Meet Requirements (0 points)
Answer is reasonable.	Answer addresses the question prompt and is factually correct or a reasonable interpretation of available data.	Answer does not address the question prompt, is factually incorrect, or is an unreasonable interpretation of available data.
Answer is supported.	Logical rationale is provided to support the given answer.	Logical rationale is not provided to support the given answer.

### References

- [1] "Nielsen Universe Estimates," 2023. Available:  
<http://www.ratingsryan.com/p/universe-estimates.html>.
- [2] "18-49 Ratings to Viewership Converter," 2023. Available:  
<http://www.ratingsryan.com/p/18-49-ratings-to-viewership-converter.html>.
- [3] R. Porter, "TV Ratings 2022-23: Final Seven-Day Averages for Every Network Series," *The Hollywood Reporter*, Jun. 07, 2023. Available:  
<https://www.hollywoodreporter.com/tv/tv-news/tv-ratings-2022-23-every-prime-time-network-show-ranked-1235508593/>.
- [4] "Nielsen ratings," *Wikipedia*, Dec. 27, 2016. Available:  
[https://en.wikipedia.org/w/index.php?title=Nielsen\\_ratings&oldid=756869407](https://en.wikipedia.org/w/index.php?title=Nielsen_ratings&oldid=756869407).