Exam #2 Review

Baseball Payroll Problem

Background Information

In Major League Baseball today, there is a significant disparity in relative wealth amongst the 30 teams that make up the American and National Leagues. While some teams, such as the New York Yankees and Boston Red Sox, come from large markets and have large revenue streams, others, like the Kansas City Royals, come from small areas and are relatively poor.

Major League Baseball has implemented a revenue sharing plan that is designed to support poorer teams, but there are still substantial differences in how much money each team spends on player salaries, known as its payroll. In 2024, the New York Yankees spent $316 million on payroll but the Pittsburgh Pirates only spent $85 million [1]. As a result, the Yankees have a roster stocked with well-known stars while many of the Pirates players are straight out of the minor leagues.

Problem Statement

In this assignment, students will analyze baseball win/loss statistics see what impact a team's payroll size has on its on-field performance.

Instructions

IMPORTANT: This is not the actual Exam for your section. You will not receive any credit for completing this project.

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

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. Download and extract the provided Data Files ZIP file. It contains the following files for use in this assignment:
    a. **batter.png** – Image of a baseball for use in PowerPoint [2].
    b. **chart.xlsx** – Microsoft Excel workbook with the forest area chart for use in PowerPoint.

c. **teams.xml** – Information on Major League Baseball teams [3].

Table: *Teams*		
Field Name	**Type**	**Description**
TeamAbbrv	Short Text	Primary key. Abbreviation for team.
TeamName	Short Text	Name of team.
DivisionAbbrv	Short Text	Abbreviation of division to which this team belongs.

d. **teamstatistics.xml** – Information on win/loss records and payroll for the 2011 to 2024 seasons [1], [3].

Table: *TeamStatistics*		
Field Name	**Type**	**Description**
Season	Number	Part of composite key. Baseball season.
TeamAbbrv	Short Text	Part of composite key. Team abbreviation.
Payroll	Currency	Total of all player salaries.
Wins	Number	Number of games won by this team in this year.
Losses	Number	Number of games lost by this team in this year.
AvgPlayerAge	Number	Average age of players.

Microsoft Access Portion

2. Create a new Microsoft Access database named **examreview2_bpp_*lastname_firstname*.accdb**.
3. Import the following items into the database:
   a. **teams.xml** file – Import structure and data into a new table.
   b. **teamstatistics.xml** file – Import structure and data into a new table.
4. We need to create a new table to store information about each Major League Baseball division.
   a. Create a table named *Divisions* with the fields below. Use appropriate field types and designate a good primary key.

Table: *Divisions*	
Field Name	**Description**
DivisionAbbrv	Abbreviation of the division.
DivisionName	Full name of the division.
League	Full name of the league associated with the division.

b. Enter records for all divisions below.

HINT: The *Leagues* table will contain 10 records.

DivisionAbbrv	DivisionName	League
ALC	AL Central	American League
ALE	AL East	American League
ALW	AL West	American League
NLC	NL Central	National League
NLE	NL East	National League
NLW	NL West	National League
FLE	Frontier East	Frontier League
FLN	Frontier North	Frontier League
FLC	Frontier Central	Frontier League
FLW	Frontier West	Frontier League

5. Create the appropriate relationships for the following tables. Enforce referential integrity, but do not enable cascade updates or cascade deletes.
   a. *Teams* and *TeamStatistics*
   b. *Divisions* and *Teams*
6. Create separate queries to provide the information requested below. Name each query after the step in which it appears (i.e., name the query in Step 6a as *Query6a*).

   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 calculate each time's win percentage. List the season, team name, payroll, number of wins, and number of losses. Also, include a field to calculate the percentage of games the team won.

      You can calculate the percentage of games the team won using the formula:

$$\frac{[TeamStatistics.Wins]}{([TeamStatistics.Wins]+[TeamStatistics.Losses])}$$

      Format the calculated field as a fixed-type number with 3 decimal places. Sort by the calculated field in descending order.

      HINT: This query will show 420 records and 6 fields.

b. We wish to display the payroll-per-win for teams in the AL East and NL East divisions. Create a query listing the season, team name, division name, and payroll. Also, include a field to calculate the payroll per win.

   You can calculate the payroll per win using the formula:

$$\frac{[TeamStatistics.Payroll]}{[TeamStatistics.Wins]}$$

   Only display records for teams in AL East and NL East divisions.

   Format the calculated field as currency.

   HINT: This query will show 140 records and 5 fields.

c. Create a query to calculate statistics for each season. List, for each season, the average payroll and the average of each team's average player age.

   Format the average payroll as currency and the average player age as a standard-type number with 2 decimal places. Sort by average payroll in descending order.

   HINT: This query will show 14 records and 3 fields.

d. We wish to compare records of each American League division. Create a query listing, for each division name, the sum of wins, sum of losses, and average payroll.

   Only display records for the American League. Do not display the league in the results.

   Format the sums as standard-type numbers with no decimal places. Format the average payroll as currency.

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

e. We want to find how many teams are in each division. Craete a query listing, for each division name, the count of its teams.

   Your results must include all divisions, even if they have no teams.

   Format the count as a standard-type number with no decimal places.

   HINT: This query will show 10 records and 2 fields.

f. We want to compare the payrolls of the most-winning team or teams for each season. Copy-and-paste this SQL code into a new query:

```
SELECT Season, TeamName, Wins, Losses, Round(Wins / (Wins +
Losses), 3) AS WinPercentage, Payroll
FROM TeamStatistics AS T1
INNER JOIN Teams ON T1.TeamAbbrv = Teams.TeamAbbrv
WHERE Wins = (
SELECT MAX(Wins) FROM TeamStatistics AS T2
WHERE T2.Season = T1.Season)
ORDER BY Season;
```

IMPORTANT: Do not make any modifications to this query other than entering the above SQL code.

HINT: This query will show 15 records and 6 fields.

7. Using the Form Wizard, create a form with subform. The main form should display the team name. The subform must display a datasheet with all *TeamStatistics* table fields.

   Name the main form *TeamData* and the subform *TeamDataSubform*.

8. Using the Report Wizard, create a report to show the results of the *Query6c* query. Display all fields from the query.

   Sort by season in ascending order. Use a tabular layout and portrait page orientation. Name the report *SalarySummary*.

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

9. Run the Compact and Repair Database utility on your database. Ignore any errors you receive when running the utility.

Microsoft PowerPoint Portion

10. Create a new Microsoft PowerPoint presentation named **examreview2_bpp_*lastname_firstname*.pptx**.

11. In the presentation, create the following slides:

    a. *Title Slide*-type slide listing a title for the presentation, your name, course section, and an automatically updating date.

    b. *Title and Content*-type slide titled `Team Payrolls`. Add the chart from the *Payroll Chart* sheet of the **chart.xlsx** Microsoft Excel workbook to the content area of the slide.

12. Create *Title and Content*-type slides to answer four of the five analysis questions below. Respond to one question per slide. Title each slide with the name of the question being answered (e.g., "Question 12a").
    a. Is there a relationship between team payrolls and how many games they win? Why do you think this is the case or not?
    b. Which division a team is in roughly correlates with its location in the country. Is there a pattern between payrolls for the various divisions and where their teams are located? Why might this be?
    c. Is it possible for a team to have good performance with a low payroll? Explain your reasoning.
    d. Some teams have high total payroll, but the median of their individual player salaries is fairly low. How could this be?
    e. Why might it be difficult for a relatively poor, low-spending team to be able to increase its salary spending?
13. We wish to apply formatting to the presentation. Use your best judgment to create a professional-looking presentation.
    a. Apply one design theme of your choice to all slides.
    b. Apply an animation of your choice to the *Team Payrolls* chart.
    c. Apply slide transitions of your choice to all slides.
    d. Edit the parent (top-most) slide master to add the **batter.png** image to the bottom left corner of the slides. Size the image to be 1.0-inch high by 0.61-inches wide.

       NOTE: Depending on the design theme used, the image may not appear on title slides. This is acceptable as long as the image is correctly added to the slide master.
    e. Add your name, an automatically updating date, and the slide number to the footer of all slides except the title slide.

Grading Rubric

This is a practice assignment and is worth no points. A comparable Exam would be worth 200 points and graded using this rubric, with partial credit awarded as appropriate:

Step 3	5 points	Step 8	12.5 points
Steps 4a-b	12.5 points	Steps 10a-b	12.5 points
Step 5	10 points	Steps 12a-e (pick 3 of 5)	10 points each
Steps 6a-f	15 points each	Steps 13a-e	15 points
Step 7	12.5 points		

The analysis questions in Steps 12a-e can be evaluated using this rubric:

Standard	Meets Requirements (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.

Acknowledgments

The image in the introduction appears courtesy of VectorPortal.com [2].

References

[1] "MLB Team Salary Payroll Tracker," *spotrac.com*. Available: *https://www.spotrac.com/mlb/payroll/_/year/2025*. Accessed: July 31, 2025.
[2] VectorPortal.com, *Baseball player vector illustration*. 2017. Available: *https://vectorportal.com/vector/baseball-player-vector-illustration/24600*.
[3] "MLB Standings and Records: Regular Season," *MLB.com*. Available: *https://www.mlb.com/standings/mlb/2017*. Accessed: July 31, 2025.