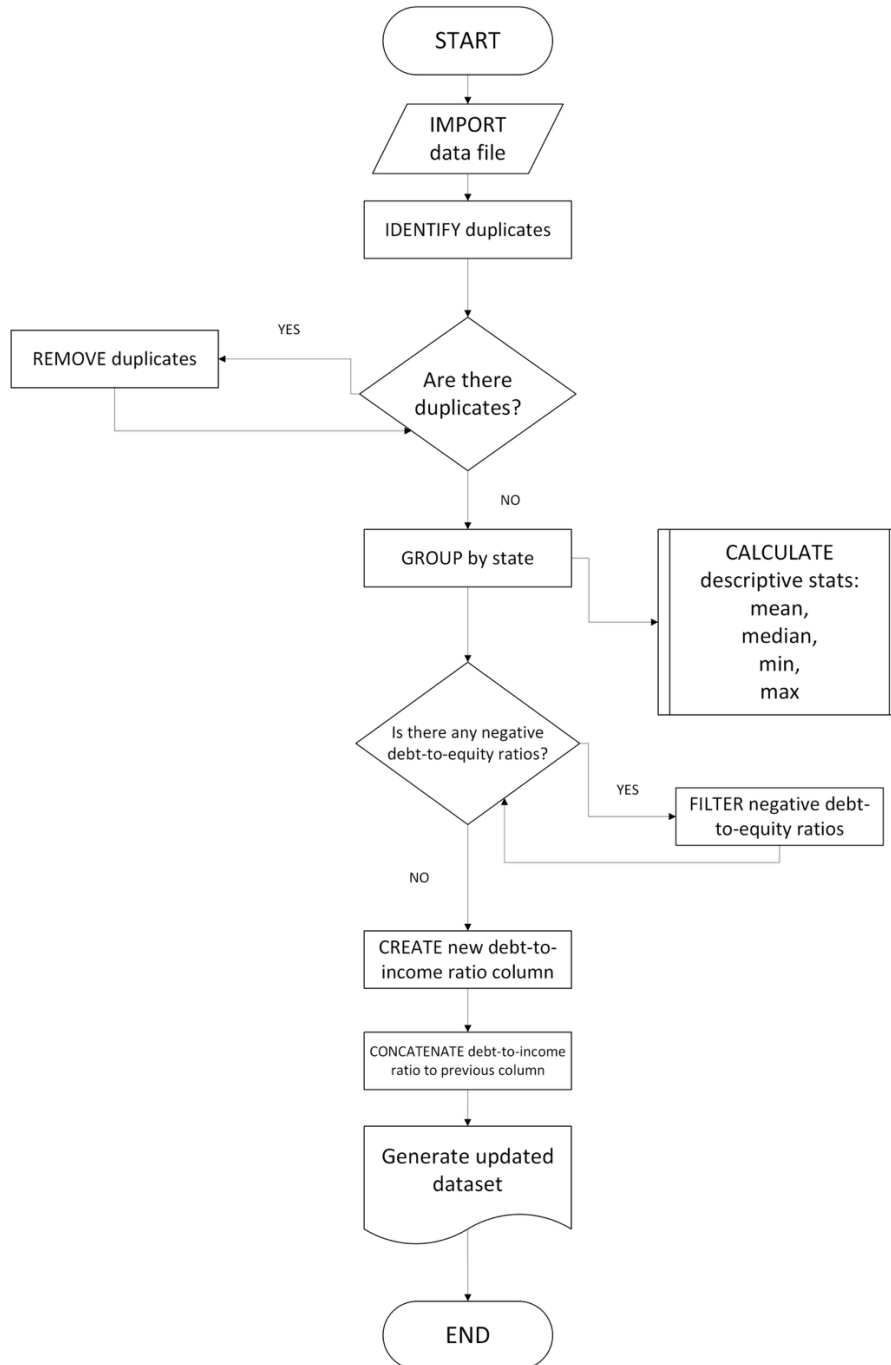


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D598 – Analytics Programming
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QKN1 — QKN1 Task 1: Program Planning

A. Create a flowchart for a program to perform the required task.

Using Microsoft Visio, I created a flowchart using the D598 Data Set to perform the required task.



B. Write pseudocode for a program to perform the required task.

The pseudocode for this program will be written for the Python language.

START

1. IMPORT the dataset from "D598_Data_Set.xlsx" into a data frame called df
2. IDENTIFY any duplicate rows in df
 - CALL df.duplicated() to detect duplicates
 - STORE duplicates in a separate data frame if needed
 - IF duplicates exist:
 - REMOVE duplicates from df using df.drop_duplicates()
3. GROUP df BY "Business State"
 - CALCULATE descriptive statistics (mean, median, min, max)
 - STORE this grouped result as a new data frame called df_by_state
4. FILTER df to find rows where "Debt to Equity" is less than 0
 - STORE this filtered result as df_negative_dte
5. CREATE a new column "Debt to Income Ratio"
 - CALCULATE by dividing "Total Long-term Debt" by "Total Revenue" for each row
 - STORE this in a new data frame called df_dti
6. CONCATENATE the df_dti column to the original df
 - STORE the result as df_combined
7. GENERATE updated dataset as output (e.g., export or prepare for reporting)

END

C. Provide an explanation of the relationship between the flowchart and pseudocode that does the following:

1. Describe the logic behind the flowchart and pseudocode.

The logic behind the flowchart and pseudocode follows a step-by-step approach that mirrors the data analysis workflow:

1. The program starts with importing the data file
2. Duplicate rows are identified to ensure data integrity before performing any further analysis on the dataset

3. The data is grouped by the 'Business State' field. For each group, the descriptive statistics (mean, median, min, max) are calculated.
4. The filtering of any businesses with negative debt-to-equity ratios happens to flag any potential risk indicators that a business or stakeholder should know.
5. The creation of a new column contains the 'debt-to-income ratio' by dividing each business's long-term debt by its total revenue.
6. The new ratio column is merged back into the original dataset to ensure all variables are available for analysis or reporting.
7. The updated dataset is generated as a report.

2. Explain the alignment between flowchart and pseudocode.

The flowchart and the pseudocode align with each other because the pseudocode contains the written steps of each element shown in the flowchart.

FLOWCHART	PSEUDOCODE
Start	START
Import dataset	IMPORT the dataset into a dataframe
Identify duplicates	IDENTIFY any duplicate rows
Group by state and calculate stats	GROUP BY "Business State" and CALCULATE descriptive stats (mean, median, min, max)
Filter negative debt-to-equity	FILTER where "Debt-to-Equity" < 0
Create debt-to-income ratio column	CREATE column by dividing long-term debt by total revenue
Concatenate debt-to-income ratio to original column	CONCATENATE new column with original column
Generate updated dataset	GENERATE updated dataset
End	END

D. Acknowledge sources, using in-text citations and references, for content that is quoted, paraphrased, or summarized.

No external sources were referenced in this task.