Sample SBA #2

Description of the Project

National general elections have been a recurring feature among the democratic territories of the Caribbean. Every year, in one territory or another, citizens exercise their right to elect a government of their choice. However, the exercise is not without its attendant challenges of data management. Thousands of votes are cast on the day of the elections and an anxious, waiting public demands speed, efficiency and accuracy in the determination of results.

In preparation for the actual exercise, the Trinbarjam Elections Commission has hired you to ***simulate*** the elections exercise as a test run, prior to the actual elections which are to take place shortly in your country. You are required to utilize suitable wordprocessing, spreadsheet, database management as well as a programming application to design and implement computer-based solutions to the tasks involved in the simulation of the election process.

Spreadsheet

The Elections Commission has mandated that you design a spreadsheet that will accept pertinent data on constituencies and candidates' votes and generate information that would enable the outcome of the elections to be divulged to the population in the shortest possible time.

Four parties contest the elections: the Democratic Action Party (DAP), the Workers National Alliance (WNA), the United Progressive Movement (UPM), and the Peoples' Democratic Revolution (PDR). Elections are contested to determine representatives in **eight constituencies**. The representative being the candidate who gets the most votes in his/her constituency. Parties initially field candidates **in every constituency**.

1. Design a constituency spread sheet.
   Create a summary table to display:
   - The total Number of Electors,
   - The Number of votes cast,
   - The Number of Spoilt ballots.

   Calculate and display:
   - The **percentage** of Spoilt ballots.
   - The **percentage** of voter turnout.
   - The number of **General Votes**. **General Votes** are calculated as the votes cast – spoilt ballots.

The number of electors registered in each constituency ranges from 6,250 to 10,795. The percentage voter turnout in each constituency is projected to be from a low of 45% to a high of 82%. Number of votes cast is determined by the Number of Electors * % Voter Turnout. The percentage of spoilt ballots varies from one constituency to another, but never exceeds 2.5% in any constituency

On the same spread sheet, capture the following data: the candidate's name, party acronym, rating, % of votes, and number of votes received. The rating is a value from 1 to 4 and is determined by the results of a recent poll conducted in each constituency by a noted pollster. These ratings should be randomly applied to every candidate.

Apart from the candidate's rating, the pollster also supplies the % of votes each candidate is likely to receive, based on the popularity rating. The actual number of votes received is that percentage of the General votes.

Use a function to identify the winning candidate by displaying the word "Winner" in a red font colour.

Save your Workbook as ElectionSimulation2018.

2. Modify your spreadsheet to reflect the following.
   (i) Votes cast by Special voters must be considered and counted. **Special votes are no more than 1% of the total electorate. Insert a row** in an appropriate part of your spreadsheet table to record the number of special votes cast in each constituency.

   (ii) **Insert a column** in an appropriate part of your spreadsheet to record the number of special votes received by each candidate. The special votes for each constituency are **divided equally among** the candidates in that constituency. Insert another column which records the total votes received by each candidate in each constituency. Total votes received are calculated as General votes + Special votes.

   Copy this template worksheet and modify it to create eight named constituencies. **You must enter data for each candidate (4 of them) in each of the eight constituencies. (32 candidates in all)**

   Copy the worksheet for any one constituency and delete <u>any candidate</u>. Ensure that your data from the table updates automatically and correctly. (Required for proof of deletion only)
   Save your Workbook as **ElectionSimulation2018**.

3. Modify Workbook **ElectionSimulation2018** as follows:

   I. Create a new summary spreadsheet that lists the constituencies, and the total number of votes received by each party in each constituency. **Sort descending** by total votes received.
   II. Sort the candidates' data for **one constituency**. This should be sorted in **ascending order** by candidate last name, then in **descending order** on total votes received.
   III. Create a suitable chart that compares the votes received **by each party, by constituency**. Name this chart '**Votes by Constituency**'.
   IV. Create another chart that compares the parties by acronym and the **total number of votes** each received in the election. The chart must be labelled to show the number of votes received and the % of votes received overall. Name this chart '**Vote Distribution by Party**'.
   V. Copy the summary worksheet twice.
      a. On the first copy use a simple filter to show the summary results for the WNA party only.
      b. On the second copy use an advanced number filter to show total votes received between an upper and lower limit of your choice. (Choose a range that filters out at least one party.)

   Save the changes to Workbook **ElectionSimulation2018**

Database Management

You are asked to use a suitable application to manage data on candidates nominated to contest seats in the general elections. Three tables/files must be used to store the data. Relevant personal data on each candidate should be stored, including name, address, contact number, date of birth, sex, profession, constituency, party acronym and total votes received. Constituency data must also be maintained, including the constituency name, number of electors, number of votes cast, and number of special votes.

The **name** and **acronym** of each party must also be stored. Data must be sourced from the spreadsheet section of your project.

You should test your database by generating queries to find the following.

1. The candidate ID, name, sex and profession of all candidates from the Peoples, Democratic Revolution (PDR). Name this query "PDRInfo".

2. Special votes expressed as a percentage of the total number of electors in each constituency. Your query should also show the constituency name field. The percentage should be expressed to two places of decimal. [Calculation 1]. Name this query "PercentSpecialVotes".

3. All male candidates who are less than or equal to 40 years old and who received more than 40% of the votes cast in their respective constituencies. You must show the full name of the candidate, date of birth, age, the number of votes received as well as the total votes cast in the constituency. [Multiple condition and Calculation 2]. Name this query "FortyAndUnderMale".

4. Calculate the total votes received for each party from all constituencies. Show the party name, acronym and total votes received by each party. The party with the most votes is the winner by popular vote. Name this query "PopularVote".

Generate a report which lists the final results of the election. Note: You should first create a new query for this report, named "Report Query". The report should list the constituencies, party acronym, number of votes cast, number of votes received and name of all candidates. **The winning candidates must be clearly identified.**

The report should be grouped by constituency. Within each constituency the report should be sorted by number of votes received. It should also give the total and average number of votes cast in each constituency. The report should have a two-line title as follows:

"Official Results Trinbarjam National Elections"

Word processing

Each candidate must complete and submit a nomination form to the Trinbarjam Elections Commission. You are required to design the nomination form.
A single paragraph outlining the role of the Trinbarjam Elections Commission may be included.
Relevant personal data on each candidate should be requested, including name, address, date of birth, sex, profession, constituency, party full name and acronym.
The constituency which he/she intends to contest must also be indicated clearly.
The form must be designed on one side of letter sized paper and must have a 1.5" margin on the left side. The letterhead of the Trinbarjam Elections Commission must be placed at the top.

The results of the national elections must be delivered to every candidate.
Using a suitable feature of your Word Processing application, and data from the database section of your project, create a document which should be mailed to candidates. The letter should come from the Chairman of the Trinbarjam Elections Commission.

The first paragraph should congratulate and thank the candidate for the manner in which he/she conducted his/her campaign. (Insert the candidate's full name in the letter and the constituency contested.)

Another paragraph should congratulate the winners, and the winning party.

Finally, the chairman should invite the recipient of the letter to view the complete listing of results.

Insert the report "Official Elections Results" from your database into the document. (This may start on a new page with a suitable orientation.)

You are required to print letters addressed to the first three and last candidate only from your database listing.

The commission's letterhead should be placed at the head of your document and an appropriate footer inserted.

Problem-Solving

1. Develop an algorithm or write pseudocode to determine the winning candidate for a **single constituency** in the national elections. The algorithm must accept as input:

- The Constituency name.
- The full name of the four candidates and the corresponding party acronym
- Special votes and general (valid) votes. Assume special votes are the same in any **single constituency**.

The algorithm should then determine the number of votes each candidate receives and the winning candidate. The successful candidate is the one who received the most votes.
Output the name of the winner, the party acronym and the total number of votes he/she received.

2. Extend your algorithm in 1.) to cater for **all constituencies** in the elections.

3. Create a trace table to demonstrate the operation of your algorithm for any two constituencies. Relevant inputs, outputs and data changes must be shown.

Program Implementation

1. Using the programming language Pascal, write program code based on the algorithm in (2). Your final output should list all winning candidates in one concise table. You must also indicate the full Party name and acronym of the party that wins by popular vote. (The most votes received by a single party.)