



Interview Task: Analysis of SA Banking Industry

Prepared for Interview Candidates
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1 Knowledge

Investigate MATLAB* Functional Programming and Object-Oriented Programming by completing the exercise below. Be prepared to explain your logic and problem-solving technique. You may be asked questions relating to how you have implemented your solution:

- Functions
- Datatypes
- Objects
- Methods
- Properties
- Handle and value classes
- Inheritance

**Please let us know if you would prefer to do the task in python.*

2 Scenario

All South African Banks are required to submit detailed financial reports to the South African Reserve Bank (SARB) each month. SARB's Bank Supervision Department analyses this data to ensure that the banks are investing the deposits that they take from the public responsibly, and the raw data from these reports are made available to the general public. One of these reports is the BA900 report, which contains a detailed Balance Sheet which gives a breakdown of the bank's assets and liabilities.

Naturally, banks like to take advantage of this publicly available information about their competitors and analyse the data to determine where they fit into the market and try to gain insight into how their competitors operate so that they can try to gain a competitive edge.

3 Task

Download three months' worth of recent BA900 data from the SARB website.

The full data is available here:

<https://www.resbank.co.za/en/home/what-we-do/statistics/releases/banking-sector-information/banks-ba900-economic-returns>

You can download the data for a particular month by clicking on that month, and then clicking the download link in "Download a zip file containing all the CSV files for the month". You will need to download the data for a few months (at least three) for the tasks below.

Other useful links may include (these are a bonus):

- SARB Web API help page: <https://custom.resbank.co.za/SarbWebApi/Help>
- Example API link using the help page:
 - <https://custom.resbank.co.za/SarbWebApi/SarbData/IFData/GetInstitutionData/BA900/2022-06-01/TOTAL>

Create a **functional or object-oriented** MATLAB* program (one that utilises MATLAB functions/classes) to:

1. Read in the values from the "TOTAL" column of the BA900 data for the given set of bank codes in Table 1 for a set of months for the following lines:
 - a. "Deposits" (item 1) – this is the total amount of money that is deposited in the bank by others. Call this "Deposits"
 - b. "Deposits, Loans and Advances" (item 110) – this is the total amount of money lent to others. Call this "Loans"
2. Sort the given set of banks in order of their market share in terms of the latest month (deposits value for the bank divided by the corresponding value in the TOTAL data).
3. Calculate the loan-to-deposit ratio for each bank in each month.
4. Extend your code by adding any several other analyses that you find interesting.
5. Create a short presentation (5-10min) to explain the problem you solved, as if you were presenting to one of our banking clients and you wanted to share the insight you gained from your analysis of the data with them. You can choose which bank you want to present as, and your insight need not be based on the financial implications of the data but rather just on what your data analysis suggests.

Table 1 - Banks and bank codes

Bank Name	Code
Capitec	333107
Investec	25054
ABSA	34118
FNB	416053
Standard Bank	416061
Nedbank	416088

Optional: Implement at least **one** of the following tasks:

- Write unit tests for each function and/or method that you write for steps 2 and 3.
- How would you need to change the program if the format of the SARB data were to change (for example, if a column or row were to be added to the files? Implement functionality to handle this.
- If the data were moved from static files into a database, how would your code change to fetch data from the database? Implement a simple interface to fetch the data from a database.
- If a customer had written their own set of long and complex MATLAB functions to carry out an analysis, how would you incorporate them into your own code. Write an interface to run custom functions on the data.
- Build a simple graphical user interface. What would happen if there were two users of your program and only one wanted the interface?

4 Presentation

Be prepared to present the presentation that you created in step 5, and show the MATLAB code that you wrote. You will need to demonstrate the usage of your program and explain the code.

5 Helpful Resources

If you are unfamiliar with MATLAB: [MATLAB Onramp](#) (2-hour tutorial)

If you are unsure whether to use Object-oriented Design: [Approaches to Writing MATLAB programs](#)