**Fixed Deposit Calculator Module**

**Introduction to FD:**

A Fixed Deposit (FD), also known as ‘Term Deposit (TD)’, is a deposit held at a bank for a fixed term. A fixed deposit account allows customers to deposit money for a set period, earning a higher interest rate. These deposits have varying maturities, ranging from a day or a month to a few years.

When a fixed deposit is placed, the lender (the customer) understands that the money can only be withdrawn after the term has ended. In case of premature withdrawal, the bank may levy a penalty or not provide the interest rate as agreed for the full term.

When the term is over, the deposit can be withdrawn or held for another term, partly or fully.

Some banks may offer additional services to FD holders, such as loans against FD’s.

 FD investments are safe, as they are covered by insurance corporations for a certain amount, which varies across different countries. They also offer income tax and wealth benefits.

Banks issue separate receipts for every TD because each deposit is treated as a distinct contract. This receipt is known as the Fixed Deposit Receipt (FDR), which must be surrendered to the bank at the time of renewal or encashment.

Many banks give new instructions for matured deposits. On the date of maturity, such deposits are renewed for a similar term as the original deposit at the rate prevailing on the date of renewal.

**FD Calculator/Simulation:**

The Fixed Deposit Calculator is a tool that can determine the interest and the total amount a FD will accrue at the time of its maturity.

FD maturity calculations are complex, involving multiple variables. The calculator tool does complex calculations and provides the desired values with a click of a button. It also enables users to see various options and compare them before investing.

There are 2 types of TD calculations

* The fixed deposit calculator for simple interest with the formula

M = P + (P x r x t/100)

Where : M 🡪 Maturity amount

P 🡪 Principal amount

r 🡪 Rate of Interest

t 🡪 Tenure in years/months/days

If the tenure is in months, then it is

M = P + ((P x r x n)/(12\*100))

Where n 🡪 Tenure in months

If the tenure is in days, then it is

M = P + ((P x r x d)/(365 \*100))

Where d 🡪 Tenure in days

Simple interest is paid only on the principal at the end of the period.

* The fixed deposit calculator for compounding interest with the formula

M= P {(1 + r/n) ^nt}

Where M 🡪 Maturity amount

P 🡪 Principal amount

r 🡪 Rate of Interest

t 🡪 Term in years/months/days

n 🡪 Number of compounding periods

The number of compounding periods equals the term in years multiplied by the corresponding factor.

* Daily Compounding: 365x Per Year
* Monthly Compounding: 12x Per Year
* Quarterly Compounding: 4x Per Year
* Semi-Annual Compounding: 2x Per Year
* Annual Compounding: 1x Per Year

The compound interest gives more returns. The longer the tenure, the better the earnings.

This module should be standalone and used in the Fixed Deposit module to calculate and store the maturity details on the account.

Students, as part of this module, will do the following:

* Integrate with the products – pricing module to get the following
  + Product details
  + Rate matrix for customer Category.
  + Rate to be capped based on the category combination, like a max of 2% excess from the base rate
* Build an API for the calculator
* Build UI for Calculator 🡪 While building the UI, based on inputs, the rate should be retrieved from the product and pricing module.

The following should be the options:

* + Principal amount /investment amount
  + Customer Category and value. Possibility to capture a maximum of 2 categories. The additional percentage, as in the Rate matrix, should be displayed against each Category chosen. The Categories should be a dropdown from the rate matrix. The final rate should not exceed the maximum additional percentage allowed in any two categories. Also, display the additional percentage when the category is selected.

|  |  |
| --- | --- |
| Category | Additional Percentage |
| Senior Citizen | 1 |
| Employee | 1.5 |
| Silver | 0.5 |
| Gold | 1 |
| Platinum | 1.5 |

Matrixed Interest:



* Data Caching: Product and Interest rates won't change frequently; hence the interest rates can be cached on a daily basis for this module. Use In-memory caching and do it whenever there is a login to the system.

The output of this module provides the following:

* Maturity Value
* Maturity Date
* APY(Annual Percentage Yield)