



UNIVERSITY OF
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Financial Information Systems
Assignment 2

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Loan Repayment Calculator

Amount(A)

Enter Amount

Rate(R)

Enter Rate

Number of months(N)

Enter number of months

Calculate

Payment Number	PaymentAmount	PrincipalAmount	InterestAmount	OutstandingBalance

1.3 Calculations:

The calculations for loan repayment are done using equal total payments method. The formulas are as follows:

Constant Payment (Equal Total Payments)
$PAYMENT_n = (R_n \times A) / [1 - (1 + R_n)^{-N}]$
$PP_n = PAYMENT_n \times (1 + R_n)^{-(1 + N - n)}$
$INT_n = PAYMENT_n - PP_n$
$OB_n = (INT_n / R_n) - PP_n = OB_{n-1} - PP_n$

Where: $PAYMENT_n$ = PaymentAmount

PP_n = PrincipalAmount

INT_n = InterestAmount

OB_n = Outstanding Balance

The calculation also returns the last payment as zero if the amount is small i.e between 0 and 1 or if the amount results in a negative value. The results of all calculations are rounded to two digits.

An example of application running given $A = 100000$, $R = 5$ and $N = 36$:

Loan Repayment Calculator

Amount(A)

100000

Rate(R)

5

Number of months(N)

36

Calculate

	Payment Number	PaymentAmount	PrincipalAmount	InterestAmount	OutstandingBalance
1	1	£2997.09	£2580.42	£416.67	£97420.38
2	2	£2997.09	£2591.18	£405.91	£94827.22
3	3	£2997.09	£2601.97	£395.12	£92226.83
4	4	£2997.09	£2612.81	£384.28	£89614.39
5	5	£2997.09	£2623.7	£373.39	£86989.9
6	6	£2997.09	£2634.63	£362.46	£84355.77
7	7	£2997.09	£2645.61	£351.48	£81709.59
8	8	£2997.09	£2656.63	£340.46	£79053.77
9	9	£2997.09	£2667.7	£329.39	£76385.9

Fig 1.2

1.4 Assumptions:

The application assumes that all currencies entered are in pound and returns the results in pounds.
The executable file is in windows executable(.exe) format.

2.About the application:

The application is built in python using the pyqt5 framework and QML is used for styling the elements in the application.

The documentation for pyqt5 can be found [here](#).

The documentation for QML can be found [here](#).

2.1 Classes and functions:

The application is created using one class(Ui_MainWindow) consisting of three classes.

The three functions are :

1. setup:
This function is responsible for setting up the main window which consists of labels, text boxes,table and button. It also applies QML formatting to the elements
2. retranslateUi:
This function is for translating the header text in the setup function and linking them to the required header files.
3. Calc:
This function is used to calculate the values required by passing the values provided by the user and populating the output table.

3.Running the application:

The application can be run directly on windows PC. The python file was converted to exe using pyinstaller.

This can be done by installing pyinstaller using the following command in command prompt.

pip install pyinstaller

Open command prompt in the folder containing pyinstaller. If python is installed in the system, then this path would look something like

C:\Users\Username\AppData\Local\Programs\Python\Python39\Scripts

The python source file can be converted into exe using command.

pyinstaller – Fw filename.py

4.Challenges in development of application:

For the development of this application, I had to learn PyQt5 and QML. I would have preferred to show a dialog box or in-textbox error if input was anything other than number but I was not able to find sufficient documentation/videos to implement it. Although the current input validation method serves the purpose. Another modification was to display the table only when the button is clicked but connections that would need to be made to achieve the same were complicated and needed deeper understanding of PyQt.