Lab 1: Loan Amortization

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## Algorithm

1. Initialize variables.
   1. These will include the principal, lifetime, the lifetime in months, the interest rate, the monthly interest rate, the monthly payment and the payment period.
2. Print a program title.
3. Ask the user for the loan parameters.
   1. These will be the principal, the lifetime and the interest rate
   2. The principal:
      1. This will be stored as a double because it represents an amount of money.
      2. The user will be asked for a principal amount until they enter a positive whole number or decimal.
   3. The lifetime:
      1. This number will be either 5, 10, or 15.
      2. The user will be prompted until they enter one of these three numbers.
   4. The interest rate:
      1. This user will be prompted until they enter a positive decimal number.
      2. The user is prompted to enter the annual interest rate as a percentage
      3. The number will be stored in decimal format be dividing the input by 100
   5. It was decided that because the primary user will be financial representatives, each input should be requested until it is entered correctly.
4. Find the monthly interest rate.
   1. The monthly interest rate is found by dividing the annual interest rate by 12.
5. Find the life of the loan in months.
   1. The lifetime of the loan in months is found by dividing the yearly lifetime by 12.
6. Find the ideal monthly payment for the loan.
   1. The ideal monthly payment is determined using the formula:  
      P \* (r(1+r)^n) / (((1+r)^n)-1)   
      Where P is principle, r is monthly interest rate and n is the number of months. (Courtesy Dr. Poole)
7. Print a summary of the loan parameters for the user.
   1. Show the user the principal, life in years, annual interest rate, and monthly payment in an organized table
8. Print an amortization table for the user.
   1. This will use a recursive function where each payment period will be a function call.
   2. The function will be given the payment number, the payment amount, the monthly interest rate, the remaining loan principal, and the total number of months.
   3. The function will print a table row containing the payment number, the amount paid, the interest accrued, the principal reduction and the new balance.
   4. It will then call the amortization function again until the number of months has been reached, ending the recursion.
   5. The first time that it is called (payment number 1) it will print the header for the table.
9. The program will pause and wait for user input before exiting.

## Screenshots

### A screenshot of a computer screen Description automatically generated

A screenshot of a computer screen

Description automatically generated

A screen shot of a computer

Description automatically generated

## Integrity Statements

* I have not shared the source code in my program with anyone other than the pre-approved human sources.
* I have not used source code obtained from another student, or any other unauthorized source, either modified or unmodified.
* If any source code or documentation used in my program was obtained from another source, such as the course textbook or course notes, that has been clearly noted with a proper citation in the comments of my program.
* I have not knowingly designed this program in such a way as to defeat or interfere with the normal operation of any machine it is graded on or to produce apparently correct results when in fact it does not.