Car Purchase at Auto Dealer

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Description of the Program

1) Selling Car to the Customer

We have an auto dealer who sells cars of specific make and year. The customer is asked for his requirements and the dealer finds cars in his inventory that matches the specified criteria.

The dealer carries the below cars in his inventory:

- Make – BMW, Mercedes, Nissan, Toyota, Honda, Volkswagen, Ford
- Year – The dealer carries cars of each make between the years 2005 to 2018

The customer is asked to provide the below requirements:

- Price Point – The maximum the customer is willing to spend.
- Mileage – Mileage requirements on the car

Based on the above criteria, sale price for each car is calculated based on the below formula. It is assumed that sales tax is included in the base price.

Sale Price = Base Price + Adjustment made for Year + Adjustment made for mileage on car

The dealer compares this sales price to the customer's price point and accordingly adds cars to the shortlist. The price range in the shortlisted cars is between 85% of the price point and the price point.

The selected cars are then displayed to the customer. The program makes an assumption that the customer will be selecting a car from the selected vehicles.

2) Selling Auto Loan to the Customer

We would also like our customers to purchase auto loans from us. If the customer wants to proceed with the loan, the dealer asks the customer to provide information pertaining to the loan.

Below information is requested from the customer:

- Income
- Credit Score
- Down Payment
- Term of the loan

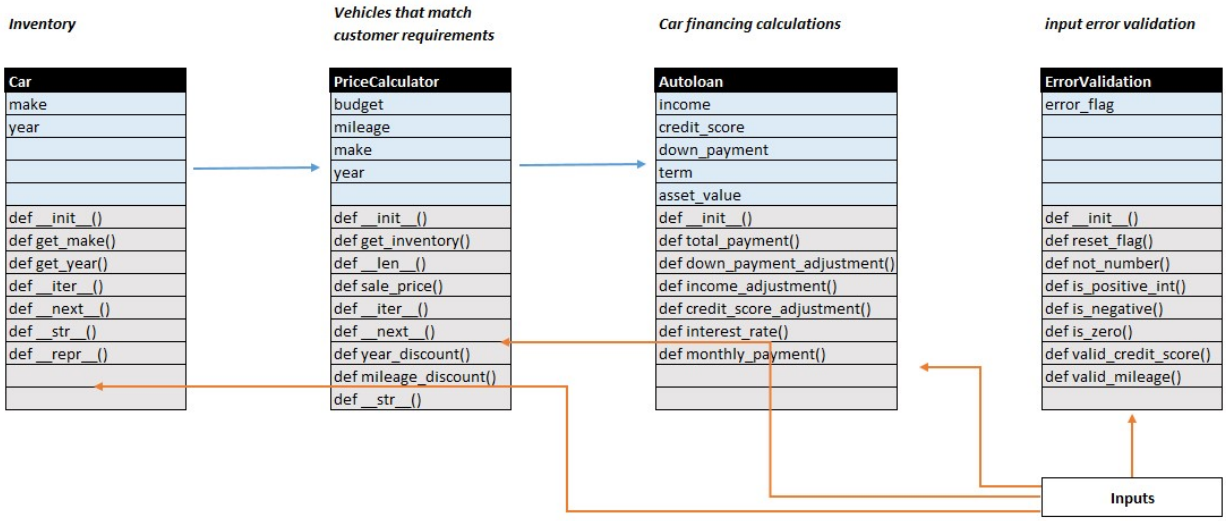
The rate calculated based on the below formula:

Rate of Interest = Base Rate + Adjustments for Loan to Income + Adjustment for Credit Score + Adjustment for Down Payment to Asset Value + Term of the Loan

Based on the rate and the loan amount, the monthly payment is provided to the customer.

Program Outline

Class Layout



- **Car**
  This class will provide the inventory list for the dealer
  - Attributes:
    - make: This will provide the list of cars the dealer carries
    - year: The dealer carries car of each make from year 2005 to 2018
  - Methods:
    - def __init__()
    - def get_make() – Get make
    - def get_year() – Get year
    - def __iter__() – iterate over year
    - def __next__() – iterate over year
    - def __str__() - print output
    - def __repr__() - print output

- **PriceCalculator**
  This class calculates the sale price of each car. We have the base price specified for each model.
  The price decreases based on the age and mileage on the car.
  This class takes in the budget and mileage input from the user and make and year from class Car
  - Attributes:
    - budget – Price point of the customer
    - mileage – Mileage on the car
    - make - From Car class
    - year – From Car class
  - Methods:
    - def __init__()

        - def get_inventory()
          calculate the inventory of the car dealer
        - def __len__()
          calculate the length of the car inventory list
        - def sale_price()
          calculate the sales price of each car in the inventory and compare to customer pricepoint
        - def __iter__()
          iterate over year
        - def __next__()
          iterate over year
        - def year_discount()
          calculate the year discount that needs to be applied to the base price
        - def mileage_discount()
          calculate the mileage discount that needs to be applied to the base price
        - def __str__()
          print output

- **Autoloan**
  This class calculates the rate of interest and the monthly payment amount for the auto loan
    - Attributes:
        - income – customer's income to calculate loan to income ratio
        - credit score
        - down payment – rate is adjusted based on customer's contribution to the asset value
        - term – term of the loan
        - asset value – to calculate the ratios for income coverage and down payment contribution
    - Methods:
        - def __init__()
        - def total_payment()
          amount owed to the car dealer
        - def down_payment_adjustment()
          returns the rate adjustment for the down payment. Higher the down payment, higher is the discount on the rate
        - def income_adjustment()
          returns the rate adjustment for buyer's income. Lower the loan to income ratio, higher is the discount on the rate
        - def credit_score_adjustment()
          returns the rate adjustment for credit core. Lower the credit score, risk is added to the rate
        - def interest_rate()
          interest rate calculation. Base rate + Adjustments

        - def monthly_payment()
          Calculate the monthly payment based on the loan amount, term and rate

- **ErrorValidation**
  Error Validation for input variables
    - Attributes:
        - error_flag – setting the error flag to “true”. This flag will be flipped to “false” if there is no error in the program
    - Methods:
        - def __init__()
        - def reset_flag()
        - def not_number()
        - def is_positive_int()
        - def is_negative()
        - def is_zero()
        - def valid_credit_score()
          Between 0 and 850
        - def valid_mileage()
          The dealer only has inventory between 0 and 120K miles