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# MSIS 615 - Introduction to Business Programming with Python
# Assignment 3
# Name: SUBHASHINI PAL
# Date: [09/20/2025]

import math
import random
# -----
# Problem 1
# -----
# This program tests a user's math skills by asking 3 questions
# from Assignment 2, Requirement 2. Each correct answer is worth 1 point.

# We will use a for-loop to ask the questions and calculate total score.

# List of math questions (question, correct_answer)
questions = [
    ("What is 5 + 7? ", 12),
    ("What is 9 - 3? ", 6),
    ("What is 4 * 3? ", 12)
]

score = 0

for q, ans in questions:
    try:
        user_ans = int(input(q))
        if user_ans == ans:
            print("Correct!")
            score += 1
        else:
            print("Incorrect. The correct answer is", ans)
    except ValueError:
        print("Invalid input. Please enter a number.")

print("\nYour total score is:", score, "out of", len(questions))

# -----
# Problem 2
# -----
# This program expands the bankAccounts class to include
# an interest rate. It allows setting the rate and calculating
# the expected yearly interest income with monthly compounding.

class bankAccounts:
    def __init__(self, owner, balance):
        self.owner = owner
        self.balance = balance
        self.rate = 0.01 # default interest rate = 1%

    def setRate(self, new_rate):
        """Set a new annual interest rate (as decimal, e.g., 0.08 for
8%)"""

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        self.rate = new_rate

    def getExpectedInterest(self):
        """Calculate yearly interest income with monthly compounding"""
        # Formula:  $A = P * (1 + r/12)^{12}$ 
        future_balance = self.balance * ((1 + self.rate/12) ** 12)
        interest_income = future_balance - self.balance
        return interest_income

# -----
# Testing Problem 2
# -----
print("\n=== Bank Account Test ===")
account = bankAccounts("John Smith", 1500)
account.setRate(0.08) # set interest rate to 8%
interest = account.getExpectedInterest()

print("Account Owner:", account.owner)
print("Balance: $", account.balance)
print("Rate:", account.rate * 100, "%")
print("Expected interest income in 1 year: $", round(interest, 2)):
    ${interest:.2f}")

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