```python
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# Description: This program is a random function program that can perform
# multiple functions, ranging from text display to math problems. It will
# utilize more Python functions as I learn them throughout the course.

# Sources used: https://www.hackerrank.com/
# https://www.w3schools.com/
#
# Defines the main function
def main():
    # Imports the math module for later functions
    import math

    # Prints the statement "Hi!"  5 times

    print("Hi! " * 5)

    # States hello to the user, date of program and requests user name

    print("Hello there user! Welcome to my random function program!")
    print("This program was created on", end=' ')
    print("9", "12", "2021", sep='-')
    print("Before proceeding, what is your name?")

    # Defines name as a variable for the user to enter their name

    name_user = input("Enter your name: ")

    # Prints: Hello "user's name"! Welcome to the random function program!"

    print("Hello", name_user + "!" "\nWelcome to the random function program!")
    print(
        "For this program, you have several options of functions to choose "
        "from, "
        "however let's start with an example.")

    # Define a whole set of unnecessary variables for the print statement below

    the = "The "
    drove = " drove the "
    to = " to "
    color = input("Enter a color: ")
    animal = input("Enter a name of an animal: ")
    name_vehicle = input("Enter vehicle name: ")
    name_city = input("Enter city name: ")

    # Print statement utilizing above variables and the + operator to combine
    # strings

    print(
        the + color + " " + animal + drove + name_vehicle + to + name_city +
        ".")
    print(
        "Ha! See? This program can perform any function it wants to. Now, "
        "input whatever you want and watch it output on the screen!")
    statement_user = input("Input text here: ")  # user input statement for fun
    print(statement_user)
    print(
        "Congratulations, you've now printed a statement. Now time for the "
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        "math "
        "problems!", "\n" "Enter a number below")

    # Creates a loop for the try and except functions
    # will be used throughout all functions requiring an integer
    # or floating point value to prevent crashes
    while True:
        try:
            # Sets variable for first number inputted
            first_num = (float(
                input()))  # uses float for all below since decimals can
            # accomodate more
            break
        except ValueError:
            print("Error. Must be a value.")
    # numbers
    print(first_num)
    print("Great! Now let's try adding that number and another number!")

    # Defines a variable for the addition operation and executes it
    while True:
        try:
            second_num = (float(input()))
            break
        except ValueError:
            print("Error. Must be a value.")
    # Adds first input to second input and creates a variable for it
    added_num = (
            first_num + second_num)
    print(added_num)  # prints variable value
    print("Now try subtracting a number from that number!")

    # Defines a variable for the subtraction operation and executes it
    while True:
        try:
            third_num = (float(input()))
            break
        except ValueError:
            print("Error. Must be a value.")
    sub_add = (added_num - third_num)
    print(sub_add)
    print("How about multiplication now?")

    # Defines a variable for the multiplication operation and executes it
    while True:
        try:
            mult_num = (float(input()))
            break
        except ValueError:
            print("Error. Must be a value.")
    # Multiplication of subtracted number by user value
    mult_add = (
            sub_add * mult_num)
    print(mult_add)
    print("Division?")

    # Defines a variable for the division operation and executes it
    while True:
        try:
            fourth_num = (float(input()))
            break
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        except ValueError:
            print("Error. Must be a value.")
    div_add = (
            mult_add / fourth_num)  # division of previous number by user
input
    print(div_add)
    print("Now let's use exponents!")

    # Defines a variable for the exponent operation and executes it
    while True:
        try:
            fifth_num = (float(input()))
            break
        except ValueError:
            print("Error. Must be a value.")
    # Previous number raised to exponent of user value
    expo_add = (
            div_add ** fifth_num)
    print(expo_add)

    # Defines a variable for the floor division operation and executes it

    print("Now onto some trickier problems, let's use floor division.")
    while True:
        try:
            sixth_num = (float(input()))
            break
        except ValueError:
            print("Error. Must be a value.")
    # Floor division of previous number and user value
    floor_div_add = (
            expo_add // sixth_num)
    print(floor_div_add)

    # Defines a variable for the modulus operation and executes it

    print("Continuing on, let's find a modulus.")
    while True:
        try:
            seventh_num = (float(input()))
            break
        except ValueError:
            print("Error. Must be a value.")
    # Modulus of previous number and inputted number
    modulus_add = (
            floor_div_add % seventh_num)
    print(modulus_add)

    # Creates a print statement and creates the grade variable
    # Uses boolean operators to check for user input values between
    # Certain numbers and prints the corresponding print statements
    print("Now let's check how well you did in your class.")
    while True:
        try:
            grade = int(input("Enter your grade: "))
            break
        except ValueError:
            print("Error. Must be a value.")
    if grade <= 100 and grade >= 90:
        print("You got an A!")
    elif grade <= 89 and grade >= 80:
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        print("Nice a B.")
    elif grade <= 79 and grade >= 70:
        print("C's get degrees.")
    elif grade <= 69 and grade >= 60:
        print("D")
    elif grade > 100 or grade < 0:
        print("Error")
    else:
        print("Fail")

    # Program for having a user select an input from 1-5

    # Creates variable for while loop

    continue_program = True

    while continue_program:

        # Prints choices for user to select from
        print("Enter the choice for what you would like to see")
        print("1")
        print("2")
        print("3")
        print("4")
        print("5")

        # User input
        user_choice = input()

        # Options that happen when the user selects a number
        if user_choice == "1":
            print("You have called function number 1")
        elif user_choice == "2":
            print("You have called function number 2")
        elif user_choice == "3":
            print("You have called function number 3")
        elif user_choice == "4":
            print("You have called function number 4")

        elif user_choice == "5":
            # Ends the loop if the user chooses 5
            continue_program = False
        # If the user selects any other input, prints the error message below
        else:

            print("Invalid selection. Try again.")
    # Program for calculating the average grade of 3 users

    # Sets total grade to 0 since no grade has been inputted
    total = 0

    # Creates a for loop that runs one time for a user name and 3 grade input
    for name in range(1):
        name = input("Please enter a name. ")
        for score in range(3):
            try:
                score = int(input("Please enter a grade. "))
            except ValueError:
                print("Error. Must be a value.")
            total = total + score
        # Takes the total and divides it by 3 to find average grade
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244         avg = total / 3
245         total = 0  # Resets the value to 0
246     print("Name:", name)
247     # Prints the average and formats it to 2 decimals
248     print("Average:", format(avg,
249                              '.2f'))
250 
251     # Creates a program to test if the user inputs a number and restarts if no
252     # number is inputted
253     program_on = True
254     # Creates while loop for program
255     while program_on:
256         firstNumber = input("Please enter a whole number: ")
257         # Tests to see if user input is an integer or not
258         try:
259             int(firstNumber)
260             print("Valid")
261             program_on = False
262         # If the input isn't an integer, prints error message and restarts
    loop
263         except ValueError:
264             print("That was not a valid number. Please try again.")
265 
266     # Defines a function for calculating the area given the radius
267     def calculate_area(radius):
268         area = math.pi * radius ** 2
269         print("The area of the circle given a radius of", radius, "is",
270               format(area, ".2f"))
271 
272     # Defines a function for calculating diameter given the radius
273     def calculate_diameter(radius):
274         area = radius * 2
275         print("Diameter of a circle with a radius of", radius, "is",
276               format(area, ".2f"))
277 
278     # Utilizes the two defined functions above and combines them
279     # into a defined calculate function
280     def calculate():
281         while True:
282             try:
283                 radius = int(input(
284                     "Here we have a program to calculate the area and "
285                     "diameter of a "
286                     "circle"" given a radius, please enter a radius. "))
287                 break
288             except ValueError:
289                 print("Error. Must be a decimal value.")
290         calculate_area(radius)
291         calculate_diameter(radius)
292 
293     calculate()
294     # Creates a variable for a user input
295     user_word_input = input(
296         "Here we will compare the ASCII values of two different words, "
297         "numbers, or "
298         "letters, if they are equal it will print True, if not it will print "
299         "False." "\n" "Enter a word or letter. ")
300     # Creates a second variable for user input
301     user_word_input_2 = input("Enter a second word or letter. ")
302     # If one input is not equal to the other, prints false
303     if user_word_input != user_word_input_2:
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        print("False")
    else:
        print("True")

    # Uses the not variable to print False since the variable is within the
    # range
    print(
        "Here we have assigned a value of 5 to the variable x. We shall use "
        "the not value so it prints that it's not in the range between 3-10")
    x = 5
    print(x, "is in the range of 3 < x < 10")
    print(not (3 < x < 10))


main()

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