IMPORT random number generator

IMPORT time tracking functionality

FUNCTION create\_question(min\_num, max\_num):

    SET num1 = random integer between min\_num and max\_num

    SET num2 = random integer between min\_num and max\_num

    SET operator = random choice from ['+', '-', '\*']

    SET question = string of "num1 operator num2"

    IF operator is '+':

        SET answer = num1 + num2

    ELSE IF operator is '-':

        SET answer = num1 - num2

    ELSE:

        SET answer = num1 \* num2

    RETURN question, answer

FUNCTION ask\_question(question, correct\_answer):

    SET start\_time = current time

    TRY:

        PROMPT user for answer to question

        CONVERT user input to integer as user\_answer

        SET end\_time = current time

        SET response\_time = end\_time - start\_time

        SET is\_correct = (user\_answer equals correct\_answer)

        RETURN is\_correct, response\_time

    CATCH invalid input error:

        SET end\_time = current time

        SET response\_time = end\_time - start\_time

        RETURN False, response\_time

 FUNCTION main:

    WHILE True:

        // Welcome and difficulty selection

        DISPLAY "Welcome to Akash's Maths Test!"

        DISPLAY "Choose a difficulty: Easy (1/e/easy), Medium (2/m/medium), Hard (3/h/hard), Custom (4/c/custom)"

// Get valid difficulty choice

        WHILE True:

            PROMPT user for difficulty choice

            CONVERT choice to lowercase

            IF choice is '1' or 'e' or 'easy':

                SET difficulty = "Easy"

                SET questions = 5

                SET max\_num = 10

                BREAK

            ELSE IF choice is '2' or 'm' or 'medium':

                SET difficulty = "Medium"

                SET questions = 10

                SET max\_num = 20

                BREAK

            ELSE IF choice is '3' or 'h' or 'hard':

                SET difficulty = "Hard"

                SET questions = 15

                SET max\_num = 50

                BREAK

            ELSE IF choice is '4' or 'c' or 'custom':

                SET difficulty = "Custom"

                WHILE True:

                    TRY:

                        PROMPT user for number of questions

                        CONVERT input to integer as questions

                        IF questions < 1:

                            DISPLAY "Error: Number of questions must be at least 1."

                            CONTINUE

                        PROMPT user for maximum number

                        CONVERT input to integer as max\_num

                        IF max\_num < 2:

                            DISPLAY "Error: Maximum number must be at least 2."

                            CONTINUE

                        BREAK

                    CATCH invalid input error:

                        DISPLAY "Error: Please enter valid numbers."

                BREAK

            ELSE:

                DISPLAY "Invalid choice. Please select Easy, Medium, Hard, or Custom."

        DISPLAY "You have selected difficulty difficulty."

// Initialize variables

        SET score = 0

        INITIALIZE empty lists: correctness, response\_times, questions\_asked

        // Loop for questions

        FOR i from 0 to questions - 1:

            DISPLAY "Score: score"

            DISPLAY "Question i+1 of questions"

            IF i equals questions - 1:

                DISPLAY "Challenge question!"

                SET min\_num = max\_num

                SET question\_max\_num = max\_num \* 2

            ELSE:

                SET min\_num = max\_num / 2 (integer division)

                SET question\_max\_num = max\_num

            SET question, correct\_answer = create\_question(min\_num, question\_max\_num)

            APPEND question to questions\_asked

            SET is\_correct, response\_time = ask\_question(question, correct\_answer)

            APPEND is\_correct to correctness

            APPEND response\_time to response\_times

 SET points = 0

            IF is\_correct:

                IF i equals questions - 1:

                    SET base\_points = 20

                ELSE:

                    SET base\_points = 10

                SET points = maximum of 1 and (base\_points - integer part of response\_time)

                INCREMENT score by points

                IF points equals 1:

                    SET point\_str = "point"

                ELSE:

                    SET point\_str = "points"

                IF integer part of response\_time equals 1:

                    SET second\_str = "second"

                ELSE:

                    SET second\_str = "seconds"

                DISPLAY "Correct! You took response\_time (1 decimal place) second\_str and earned points point\_str."

            ELSE:

                IF integer part of response\_time equals 1:

                    SET second\_str = "second"

                ELSE:

                    SET second\_str = "seconds"

                DISPLAY "Incorrect. You took response\_time (1 decimal place) second\_str and earned 0 points."

// Display final results

        SET correct\_count = sum of correctness list

        IF questions > 0:

            SET percentage\_correct = (correct\_count / questions) \* 100

        ELSE:

            SET percentage\_correct = 0

        IF response\_times is not empty:

            SET avg\_response\_time = sum of response\_times / length of response\_times

        ELSE:

            SET avg\_response\_time = 0

        DISPLAY "=== Test Results ==="

        DISPLAY "Final Score: score"

        DISPLAY "Correct Answers: correct\_count/questions (percentage\_correct to 1 decimal place%)"

        DISPLAY "Average Response Time: avg\_response\_time to 1 decimal place seconds"

        // Question-by-question breakdown

        DISPLAY "=== Question Breakdown ==="

        FOR i from 0 to questions - 1:

            IF correctness[i] is True:

                SET status = "Correct"

            ELSE:

                SET status = "Incorrect"

            IF integer part of response\_times[i] equals 1:

                SET second\_str = "second"

            ELSE:

                SET second\_str = "seconds"

            DISPLAY "Question i+1: questions\_asked[i] - status (response\_times[i] to 1 decimal place second\_str)"

        // Ask to restart

        PROMPT user for restart choice

        CONVERT restart choice to lowercase

        IF restart is 'y' or 'yes':

            CONTINUE

        ELSE:

            DISPLAY "Thank you for playing Akash's Maths Test!"

            BREAK

CALL main