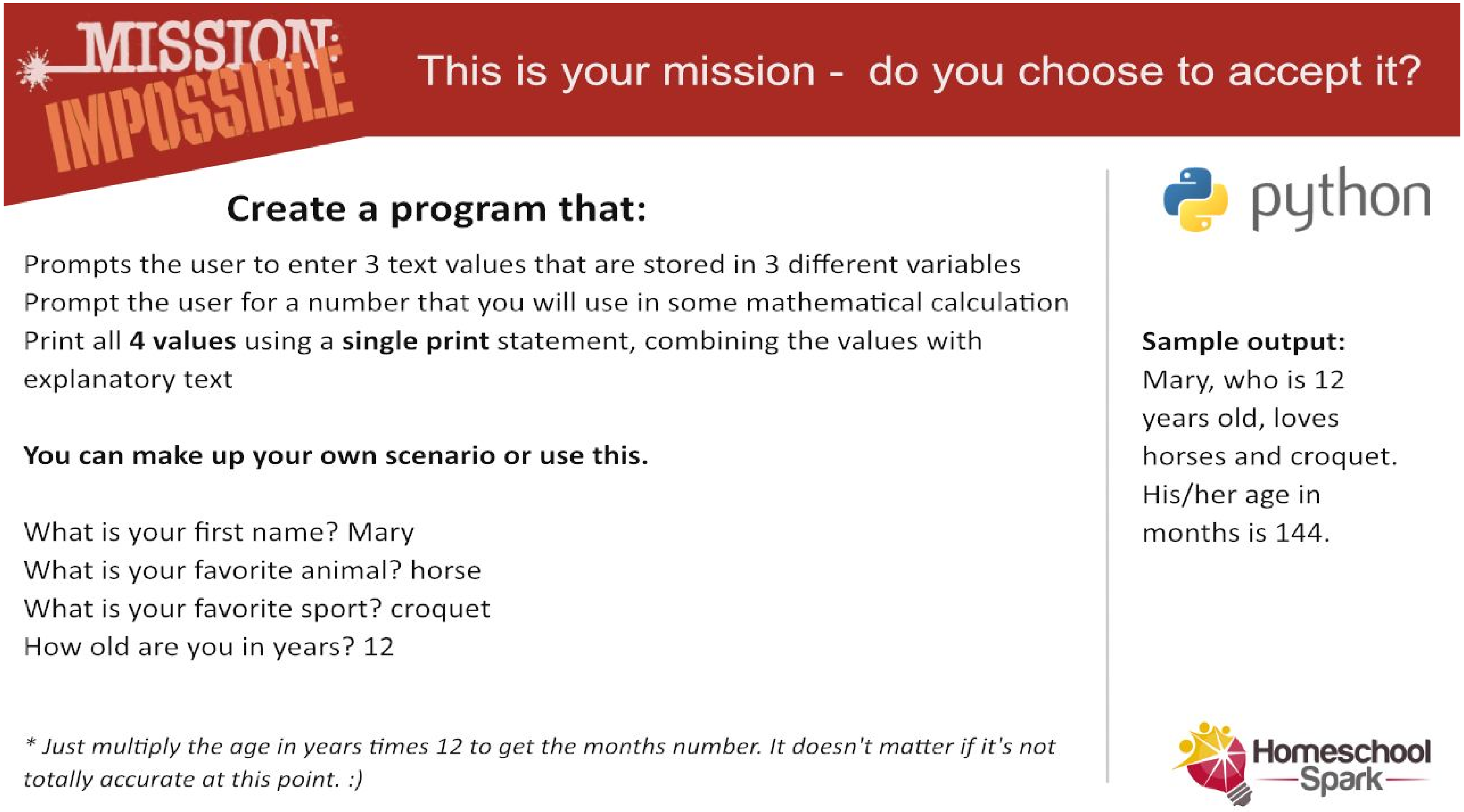
# Python Programming 1 Assignments

This file includes the assignment specifications for each of the fifteen programming assignments.

The details of these assignments are also described in the instructional video sessions. They're just provided here for your convenience, so they're all available in one place.

Additionally, videos explaining my coding solution for each assignment is provided, however students should make every effort to code their own program before viewing the solution video.

## Assignment 1 – Variables, Input, and Print



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### Create a program that:

Prompts the user to enter 3 text values that are stored in 3 different variables
Prompt the user for a number that you will use in some mathematical calculation
Print all **4 values** using a **single print** statement, combining the values with explanatory text

**You can make up your own scenario or use this.**

What is your first name? Mary
What is your favorite animal? horse
What is your favorite sport? croquet
How old are you in years? 12

** Just multiply the age in years times 12 to get the months number. It doesn't matter if it's not totally accurate at this point. :)*

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**Sample output:**
Mary, who is 12 years old, loves horses and croquet. His/her age in months is 144.

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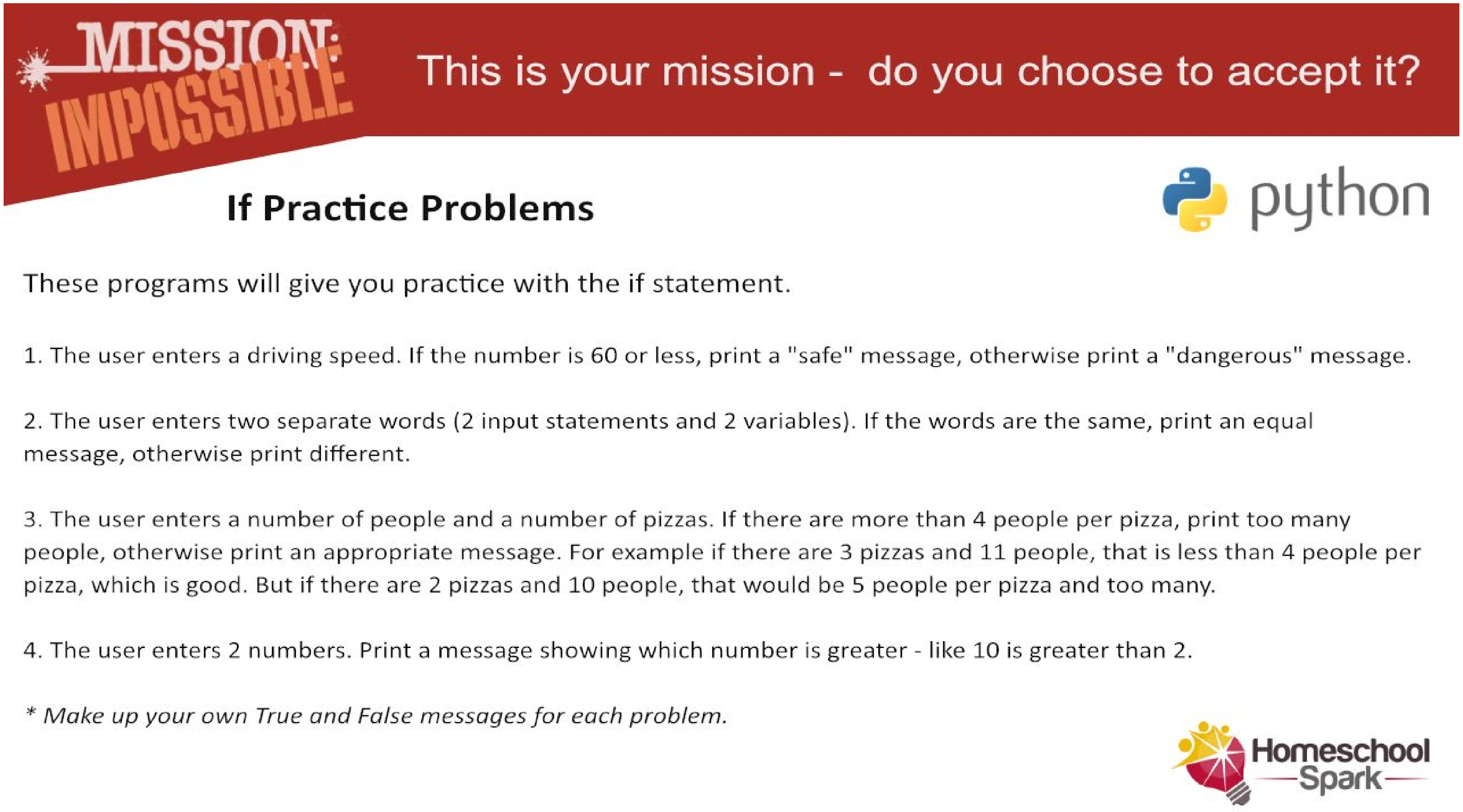
## Assignment 2 – Simple If Statements



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### If Practice Problems

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These programs will give you practice with the if statement.

1. The user enters a driving speed. If the number is 60 or less, print a "safe" message, otherwise print a "dangerous" message.

2. The user enters two separate words (2 input statements and 2 variables). If the words are the same, print an equal message, otherwise print different.

3. The user enters a number of people and a number of pizzas. If there are more than 4 people per pizza, print too many people, otherwise print an appropriate message. For example if there are 3 pizzas and 11 people, that is less than 4 people per pizza, which is good. But if there are 2 pizzas and 10 people, that would be 5 people per pizza and too many.

4. The user enters 2 numbers. Print a message showing which number is greater - like 10 is greater than 2.

** Make up your own True and False messages for each problem.*

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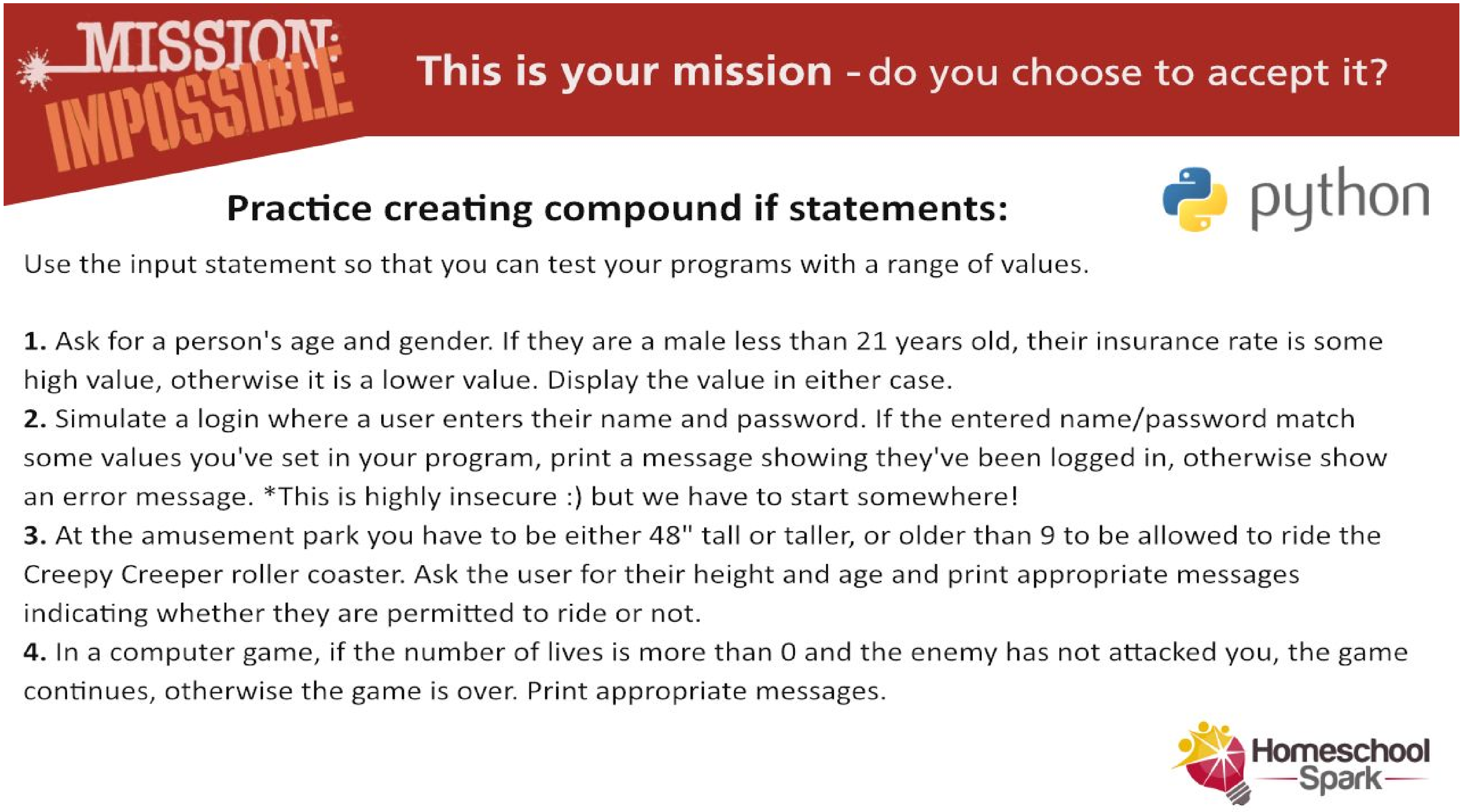
## Assignment 3 – If Statements With Boolean Operators



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**Practice creating compound if statements:**

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Use the input statement so that you can test your programs with a range of values.

**1.** Ask for a person's age and gender. If they are a male less than 21 years old, their insurance rate is some high value, otherwise it is a lower value. Display the value in either case.

**2.** Simulate a login where a user enters their name and password. If the entered name/password match some values you've set in your program, print a message showing they've been logged in, otherwise show an error message. *This is highly insecure :) but we have to start somewhere!

**3.** At the amusement park you have to be either 48" tall or taller, or older than 9 to be allowed to ride the Creepy Creeper roller coaster. Ask the user for their height and age and print appropriate messages indicating whether they are permitted to ride or not.

**4.** In a computer game, if the number of lives is more than 0 and the enemy has not attacked you, the game continues, otherwise the game is over. Print appropriate messages.

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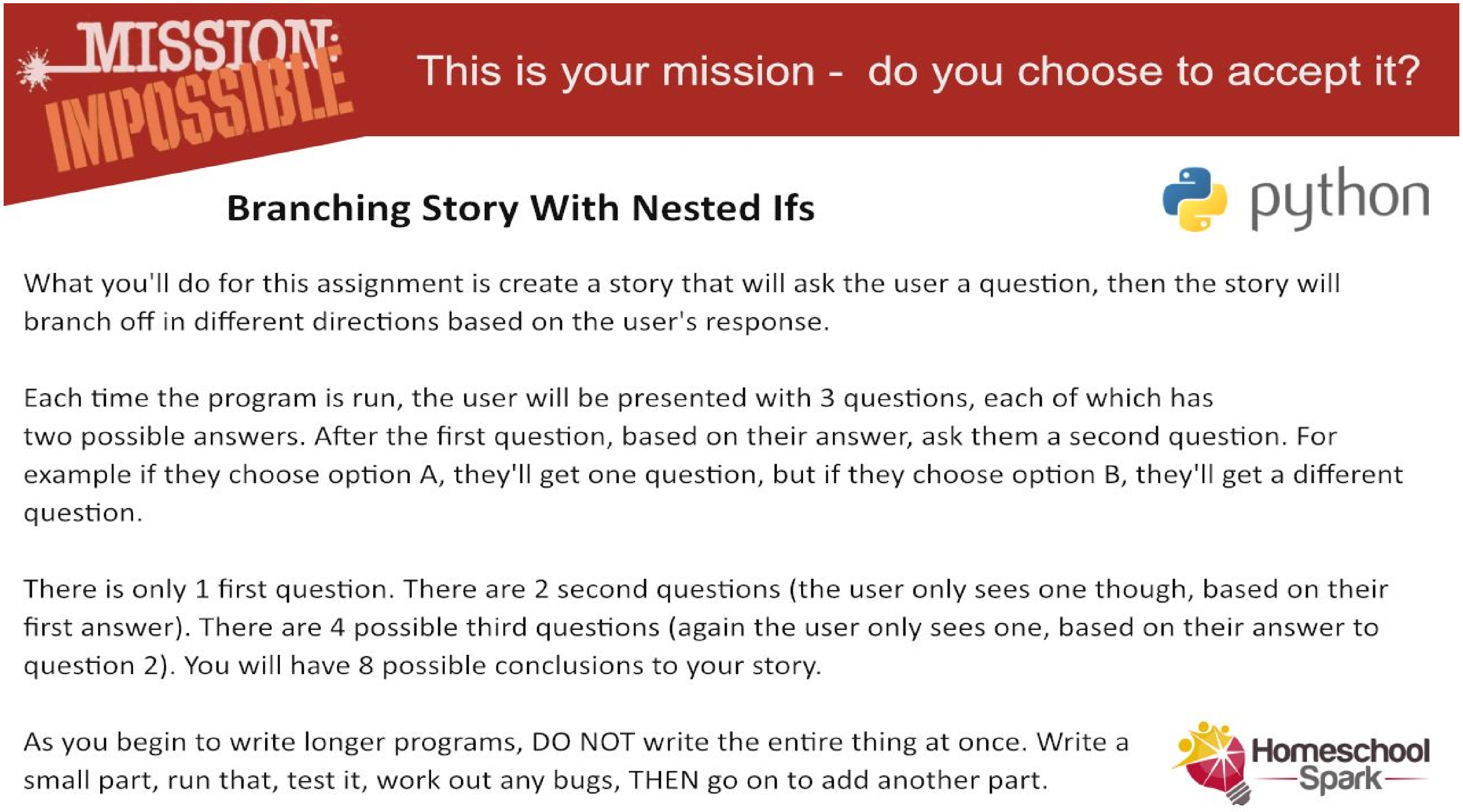
## Assignment 4 – Branching Story With If Statements



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### Branching Story With Nested Ifs

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What you'll do for this assignment is create a story that will ask the user a question, then the story will branch off in different directions based on the user's response.

Each time the program is run, the user will be presented with 3 questions, each of which has two possible answers. After the first question, based on their answer, ask them a second question. For example if they choose option A, they'll get one question, but if they choose option B, they'll get a different question.

There is only 1 first question. There are 2 second questions (the user only sees one though, based on their first answer). There are 4 possible third questions (again the user only sees one, based on their answer to question 2). You will have 8 possible conclusions to your story.

As you begin to write longer programs, DO NOT write the entire thing at once. Write a small part, run that, test it, work out any bugs, THEN go on to add another part.

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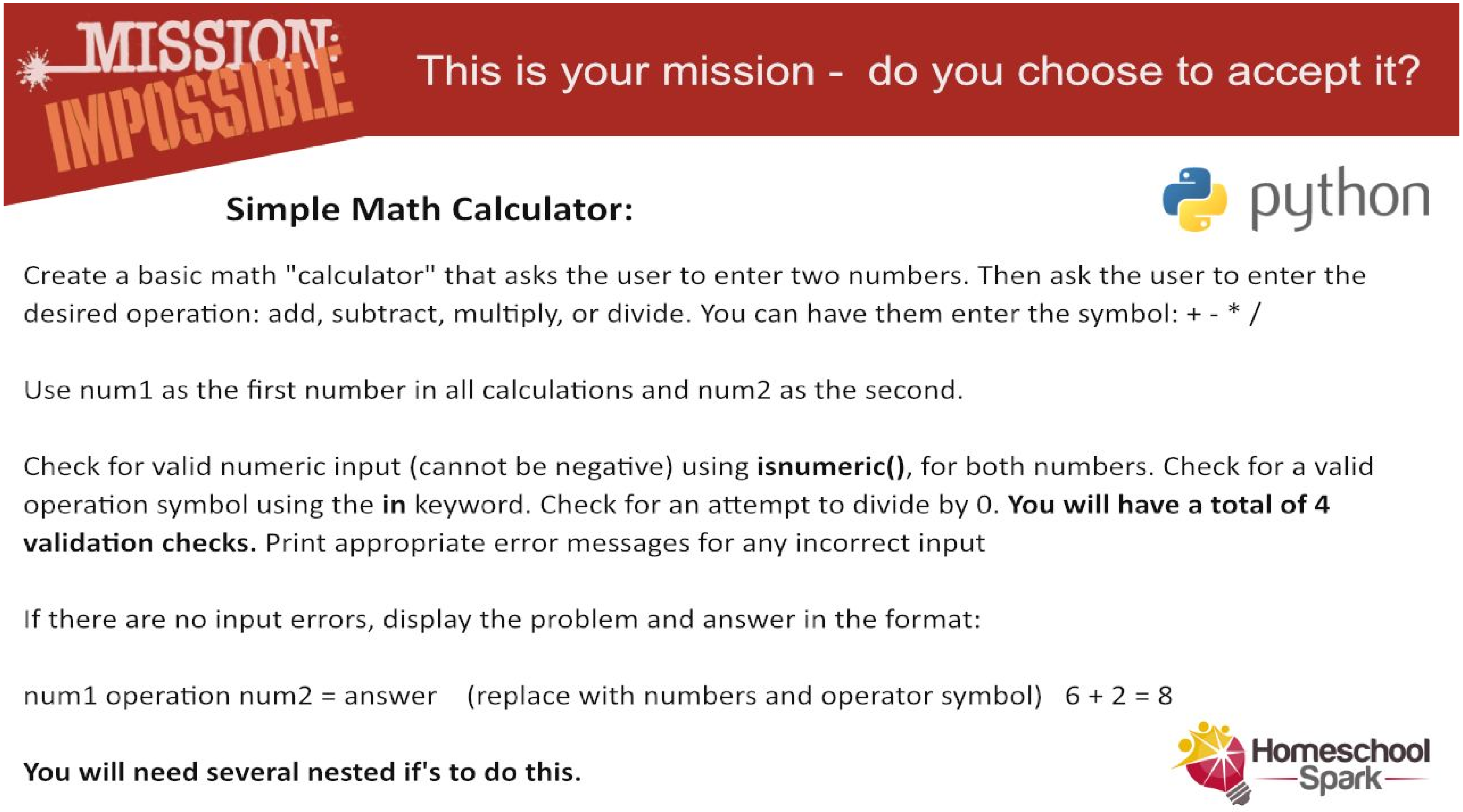
## Assignment 5 – Simple Math Calculator



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### Simple Math Calculator:

Create a basic math "calculator" that asks the user to enter two numbers. Then ask the user to enter the desired operation: add, subtract, multiply, or divide. You can have them enter the symbol: + - * /

Use num1 as the first number in all calculations and num2 as the second.

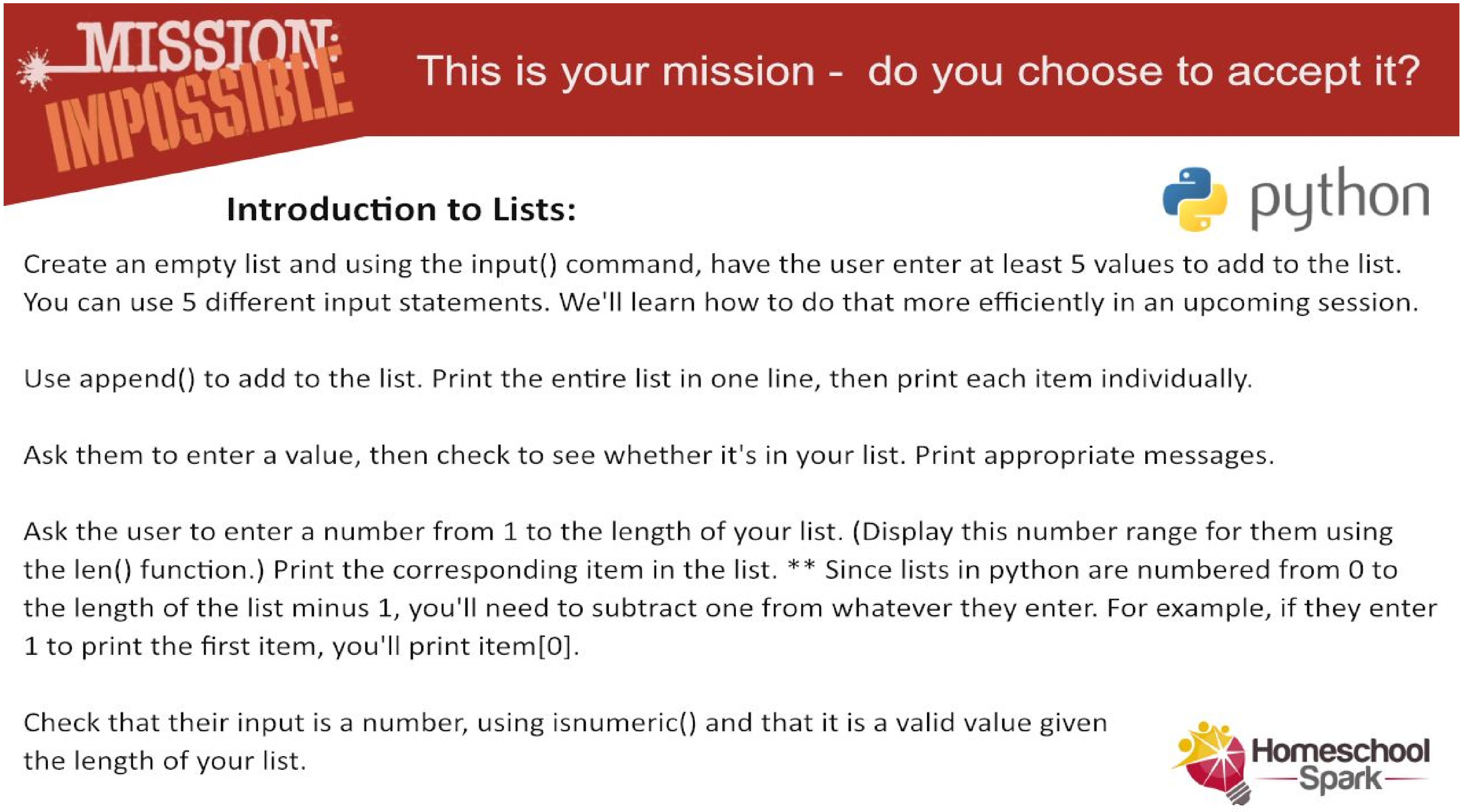
Check for valid numeric input (cannot be negative) using **isnumeric()**, for both numbers. Check for a valid operation symbol using the **in** keyword. Check for an attempt to divide by 0. **You will have a total of 4 validation checks.** Print appropriate error messages for any incorrect input

If there are no input errors, display the problem and answer in the format:

num1 operation num2 = answer    (replace with numbers and operator symbol)   6 + 2 = 8

**You will need several nested if's to do this.**

## Assignment 6 – Intro to Lists



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### Introduction to Lists:

Create an empty list and using the input() command, have the user enter at least 5 values to add to the list. You can use 5 different input statements. We'll learn how to do that more efficiently in an upcoming session.

Use append() to add to the list. Print the entire list in one line, then print each item individually.

Ask them to enter a value, then check to see whether it's in your list. Print appropriate messages.

Ask the user to enter a number from 1 to the length of your list. (Display this number range for them using the len() function.) Print the corresponding item in the list. ** Since lists in python are numbered from 0 to the length of the list minus 1, you'll need to subtract one from whatever they enter. For example, if they enter 1 to print the first item, you'll print item[0].

Check that their input is a number, using isnumeric() and that it is a valid value given the length of your list.

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## Assignment 7 – Student Test Scores

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### For Loops:

Ask the user for a number of test scores.

Use a for loop that repeats that number of times to enter the scores, adding each score to a total and appending it to a list.

Test scores should be in the range 0 to 100. Print appropriate error messages for non-numeric input or numbers not in that range.

Calculate the average of all test scores. (Average is the total of the scores, divided by the number of scores)

Then use your list to print each test score and its difference from the average.

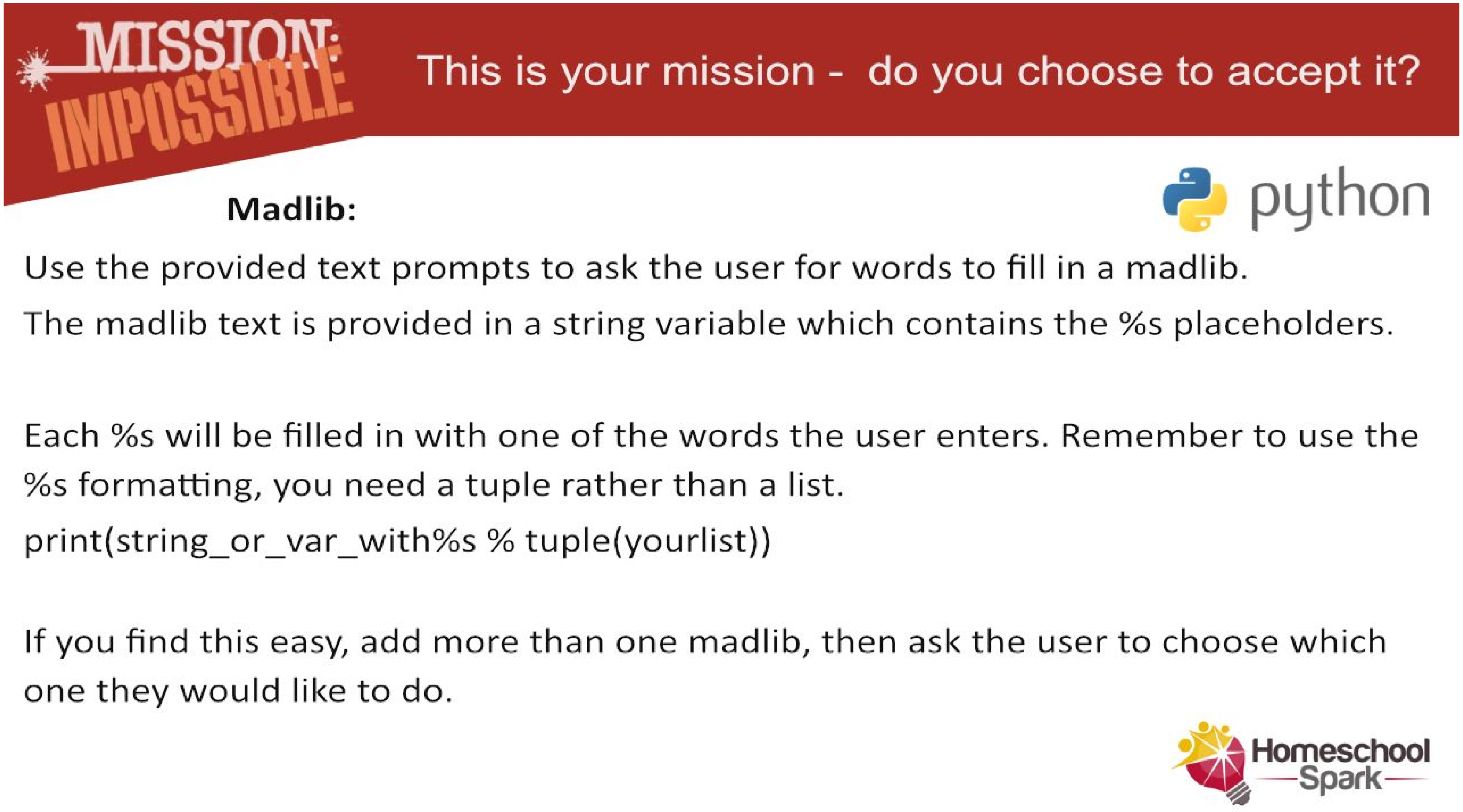
Let's say there were five scores entered: 20, 80, 90, 60, and 100. The average would be: 70 (350/5)

The first score: 20 is 50 below the average. The second score 80 is 10 above the average, etc.

Format your output as desired.

You'll need two for loops to do this, since you can't determine the average until all the scores are totaled.

## Assignment 8 – Madlib



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**Madlib:**

python

Use the provided text prompts to ask the user for words to fill in a madlib.

The madlib text is provided in a string variable which contains the %s placeholders.

Each %s will be filled in with one of the words the user enters. Remember to use the %s formatting, you need a tuple rather than a list.

```
print(string_or_var_with%s % tuple(yourlist))
```

If you find this easy, add more than one madlib, then ask the user to choose which one they would like to do.

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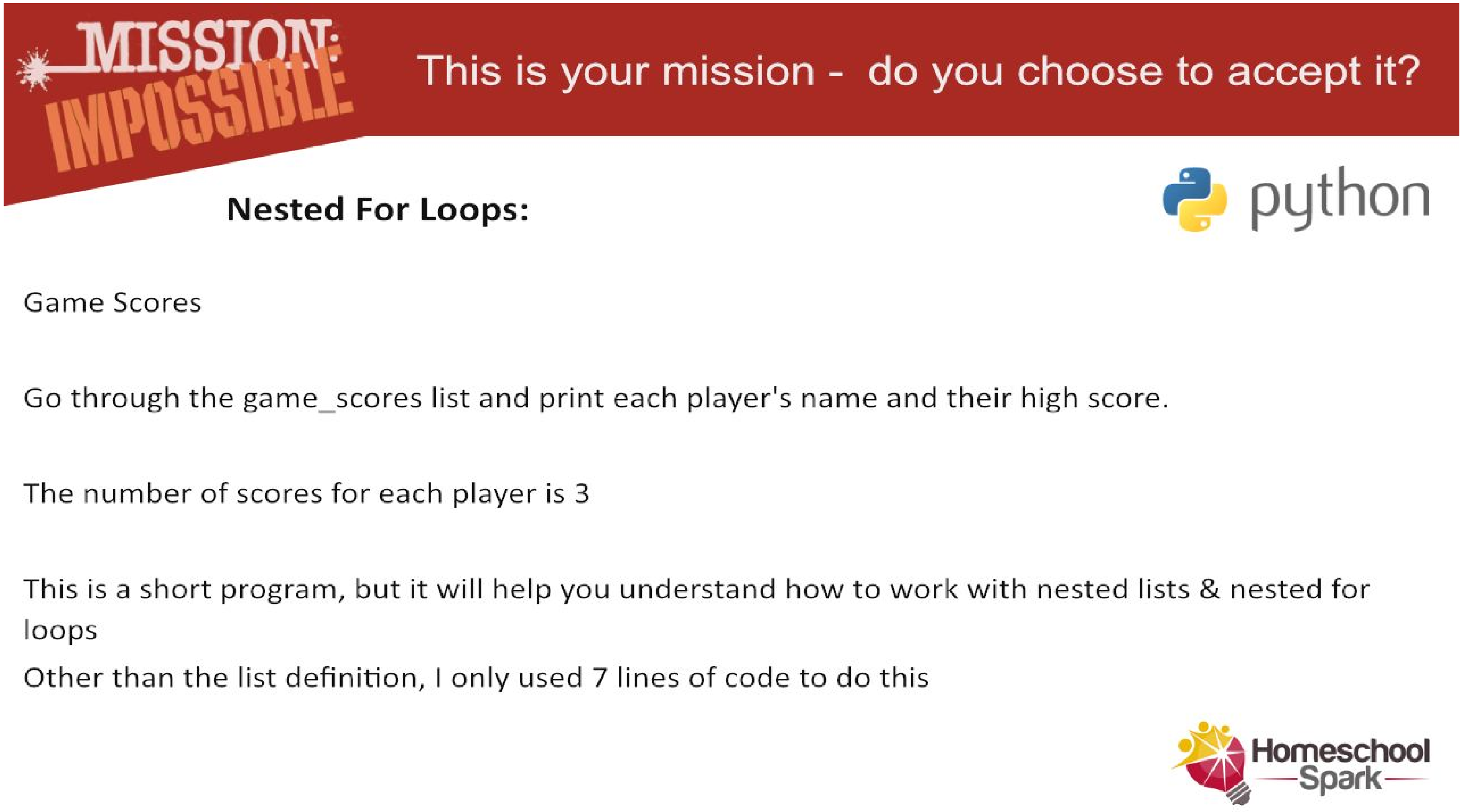
## Assignment 9 – Player Scores



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**Nested For Loops:**

Game Scores

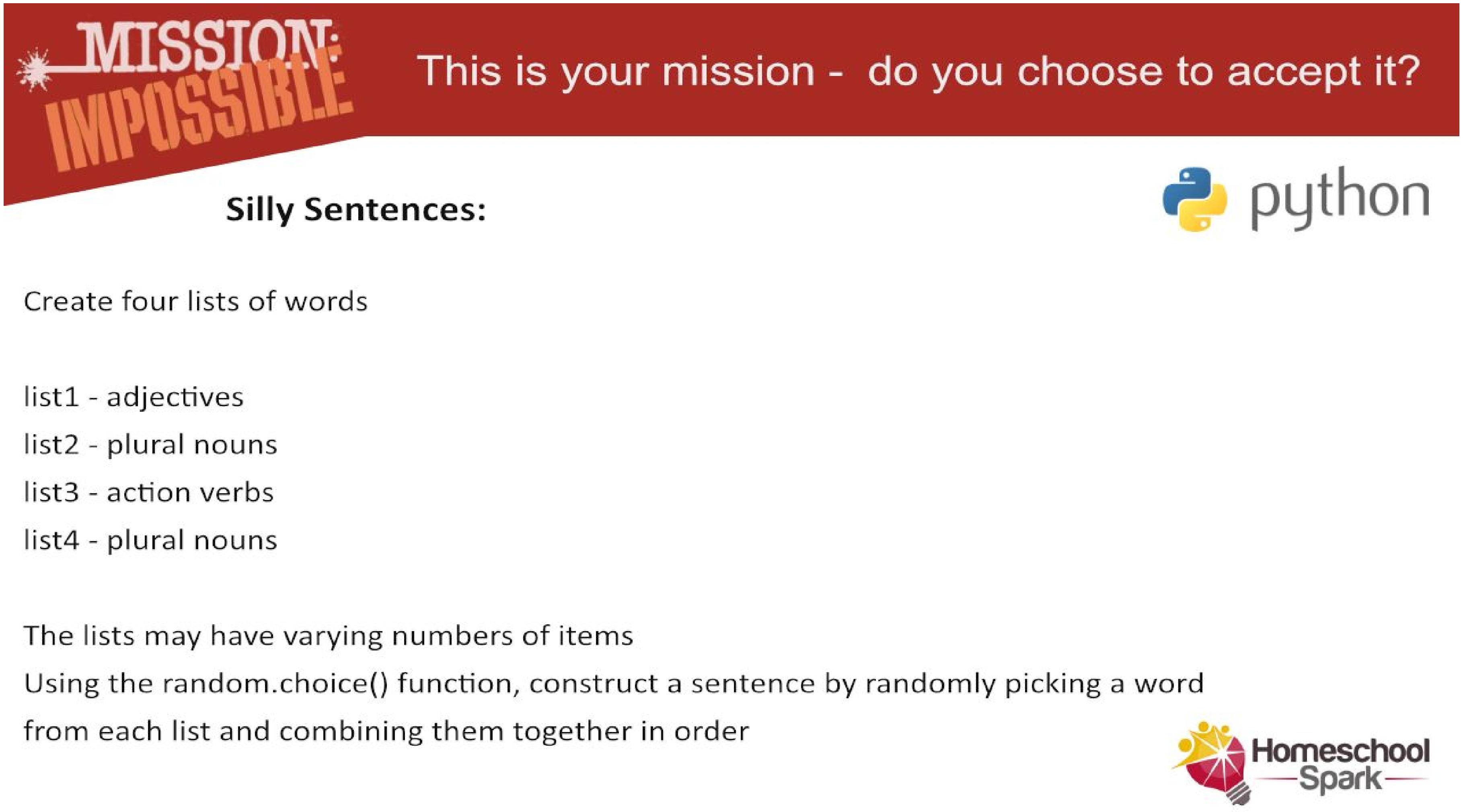
Go through the game_scores list and print each player's name and their high score.

The number of scores for each player is 3

This is a short program, but it will help you understand how to work with nested lists & nested for loops

Other than the list definition, I only used 7 lines of code to do this

## Assignment 10 – Random (Silly) Sentences



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**Silly Sentences:**

python

Create four lists of words

list1 - adjectives

list2 - plural nouns

list3 - action verbs

list4 - plural nouns

The lists may have varying numbers of items

Using the random.choice() function, construct a sentence by randomly picking a word from each list and combining them together in order

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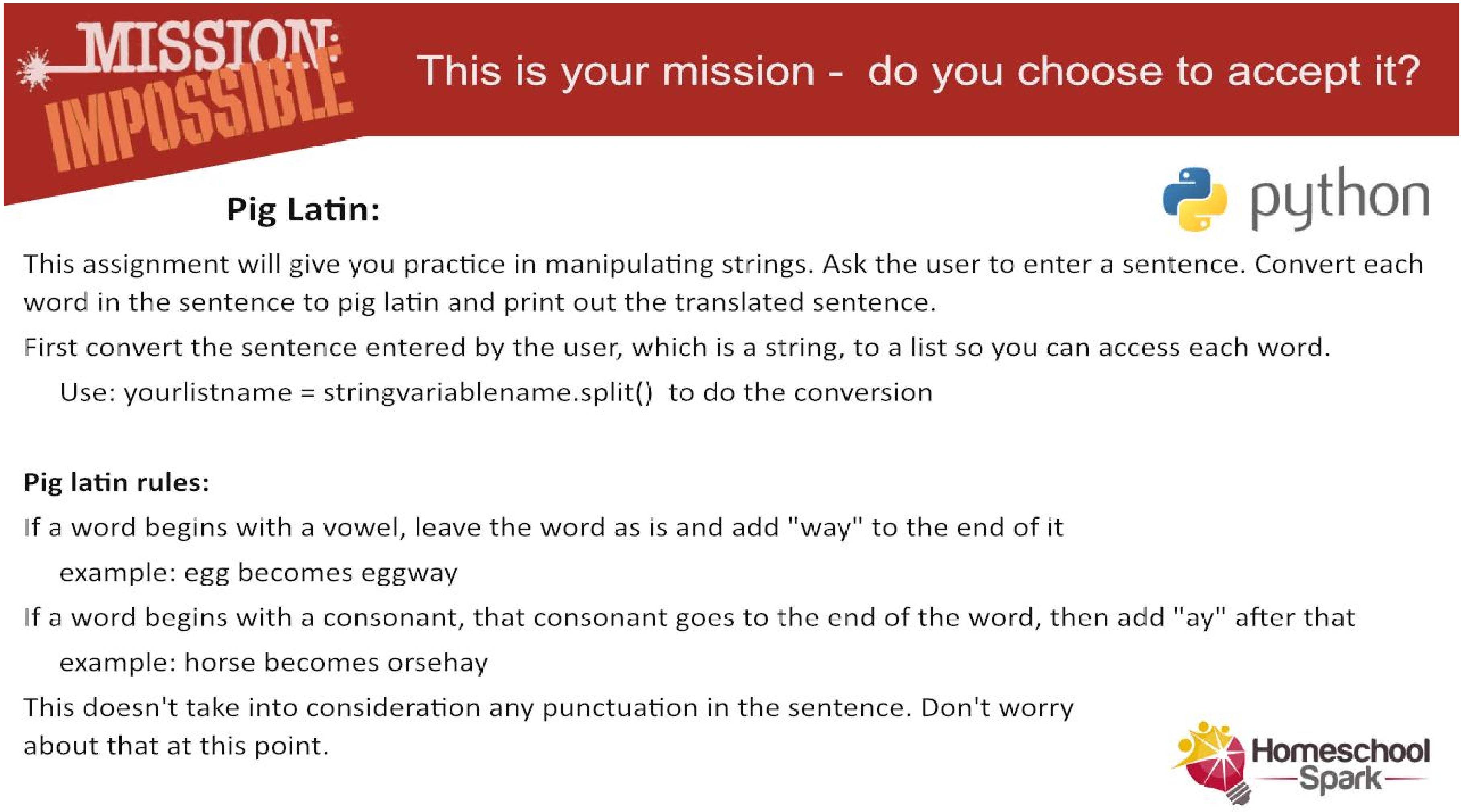
## Assignment 11 – Pig Latin



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**Pig Latin:**

This assignment will give you practice in manipulating strings. Ask the user to enter a sentence. Convert each word in the sentence to pig latin and print out the translated sentence.

First convert the sentence entered by the user, which is a string, to a list so you can access each word.

Use: yourlistname = stringvariablename.split()  to do the conversion

**Pig latin rules:**

If a word begins with a vowel, leave the word as is and add "way" to the end of it

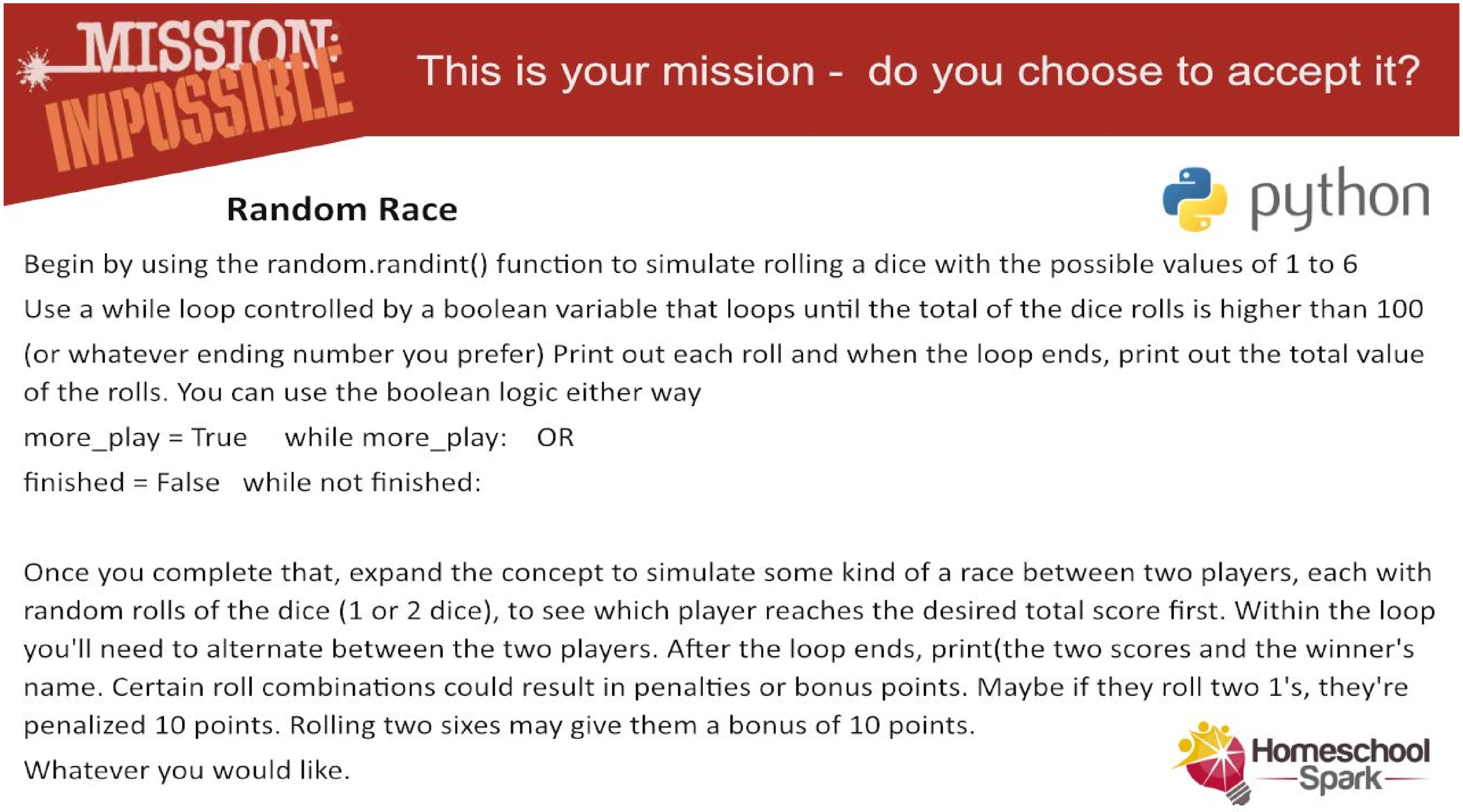
example: egg becomes eggway

If a word begins with a consonant, that consonant goes to the end of the word, then add "ay" after that

example: horse becomes orsehay

This doesn't take into consideration any punctuation in the sentence. Don't worry about that at this point.

# Assignment 12 – Race/Contest Simulation



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## Random Race

Begin by using the random.randint() function to simulate rolling a dice with the possible values of 1 to 6

Use a while loop controlled by a boolean variable that loops until the total of the dice rolls is higher than 100 (or whatever ending number you prefer) Print out each roll and when the loop ends, print out the total value of the rolls. You can use the boolean logic either way

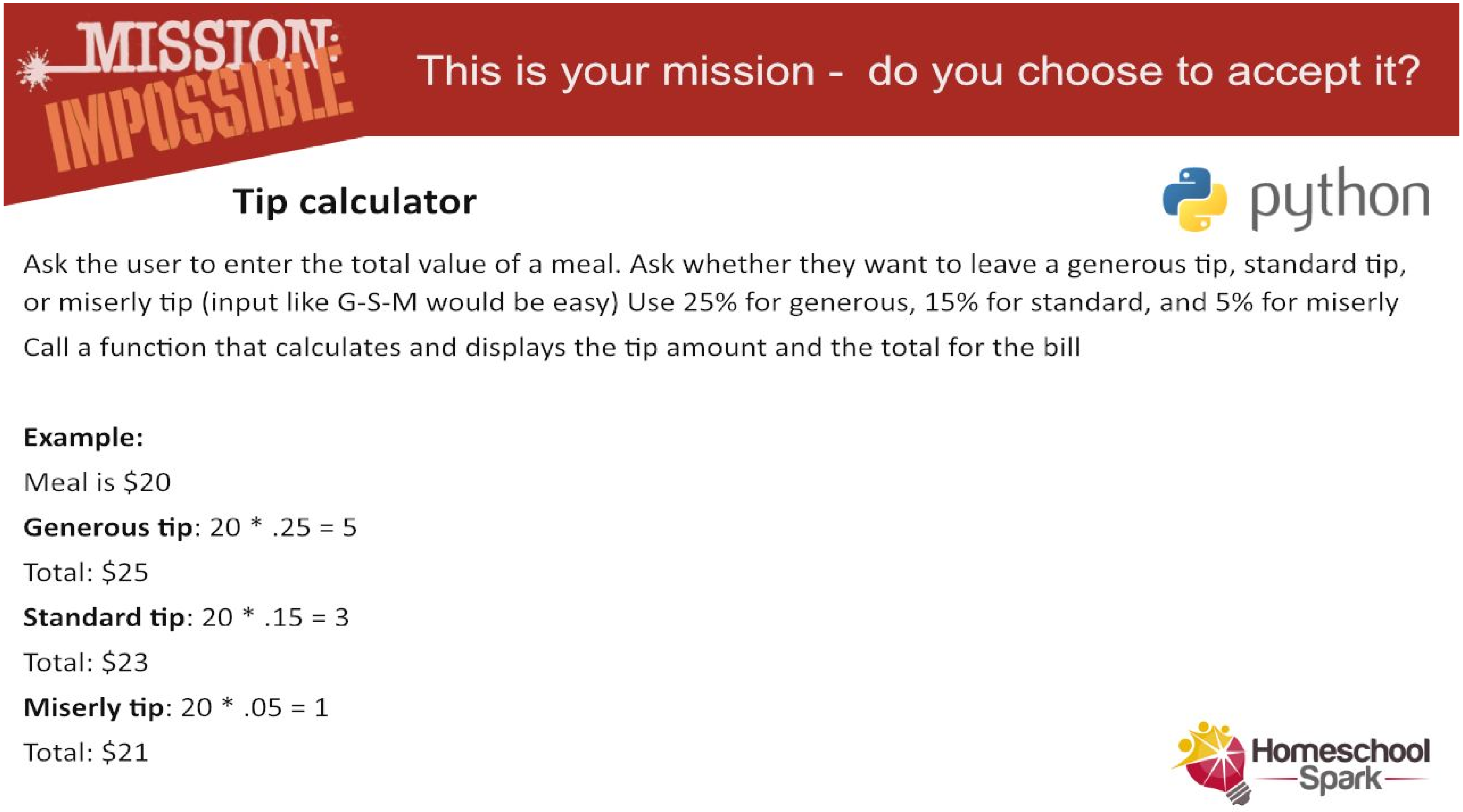
more_play = True     while more_play:    OR

finished = False    while not finished:

Once you complete that, expand the concept to simulate some kind of a race between two players, each with random rolls of the dice (1 or 2 dice), to see which player reaches the desired total score first. Within the loop you'll need to alternate between the two players. After the loop ends, print(the two scores and the winner's name. Certain roll combinations could result in penalties or bonus points. Maybe if they roll two 1's, they're penalized 10 points. Rolling two sixes may give them a bonus of 10 points.

Whatever you would like.

## Assignment 13 – Tip Calculator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### Tip calculator

Ask the user to enter the total value of a meal. Ask whether they want to leave a generous tip, standard tip, or miserly tip (input like G-S-M would be easy) Use 25% for generous, 15% for standard, and 5% for miserly

Call a function that calculates and displays the tip amount and the total for the bill

**Example:**

Meal is $20

**Generous tip**: 20 * .25 = 5

Total: $25

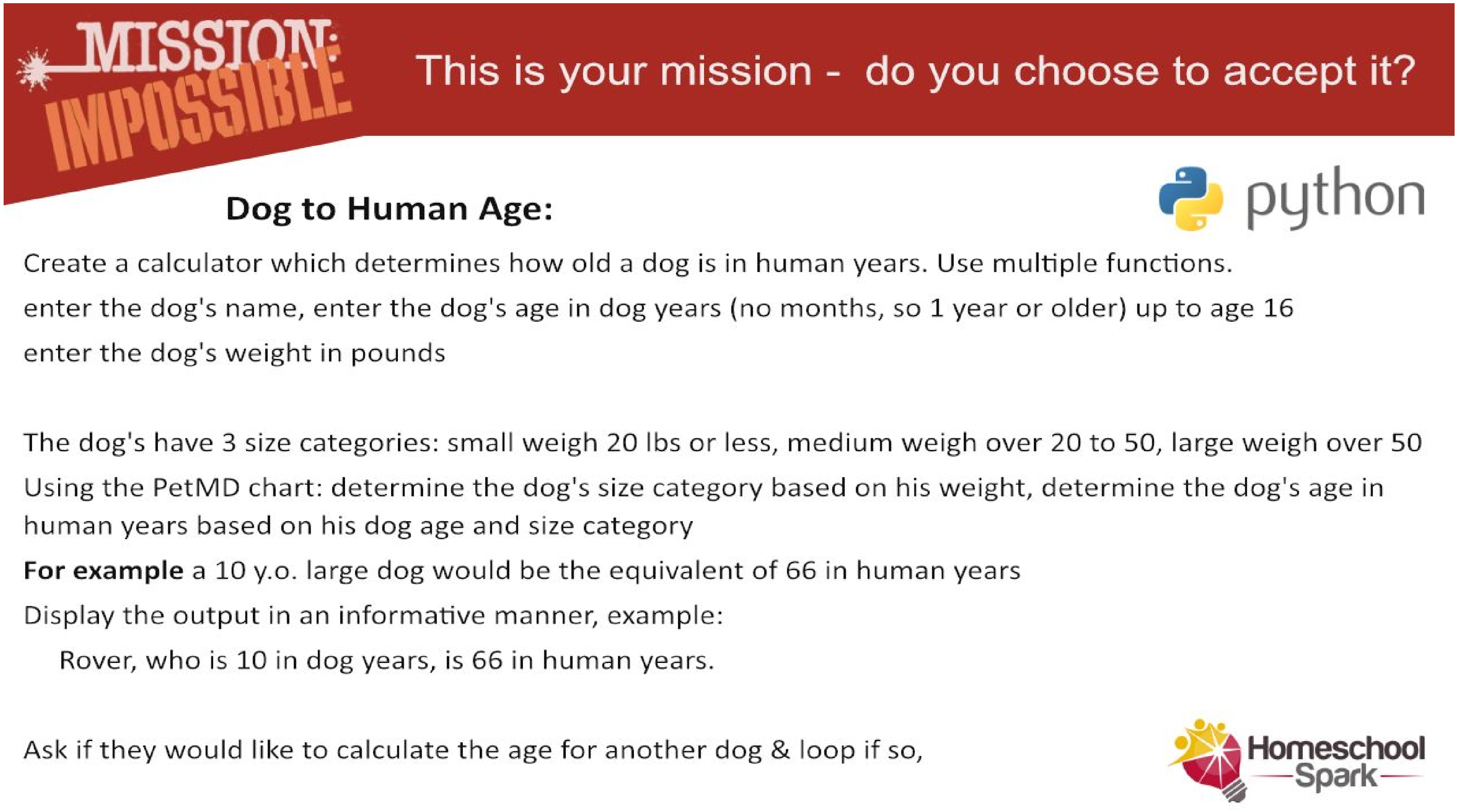
**Standard tip**: 20 * .15 = 3

Total: $23

**Miserly tip**: 20 * .05 = 1

Total: $21

## Assignment 14 – Dog-Human Age Calculator



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### Dog to Human Age:

Create a calculator which determines how old a dog is in human years. Use multiple functions.

enter the dog's name, enter the dog's age in dog years (no months, so 1 year or older) up to age 16

enter the dog's weight in pounds

The dog's have 3 size categories: small weigh 20 lbs or less, medium weigh over 20 to 50, large weigh over 50

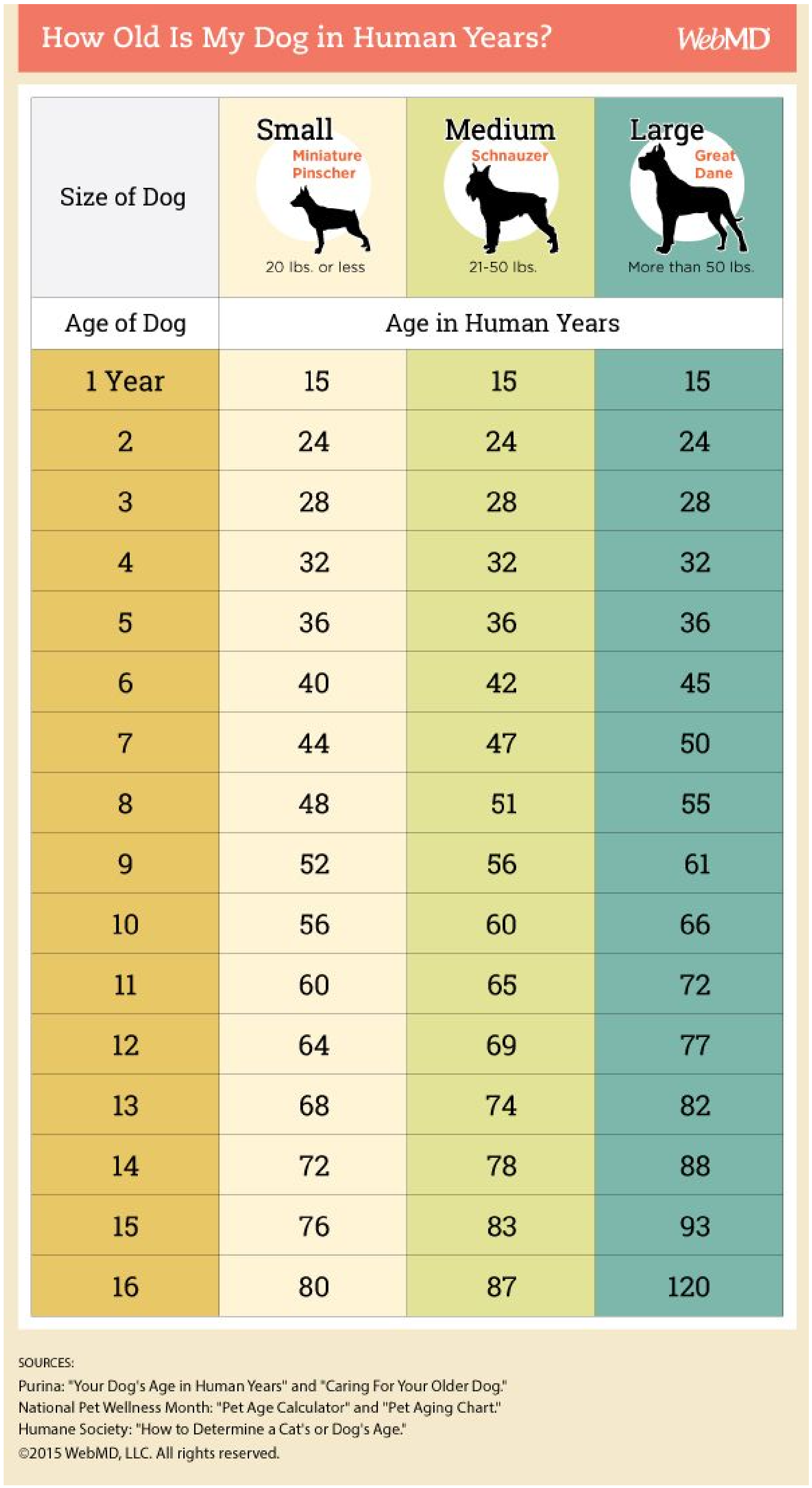
Using the PetMD chart: determine the dog's size category based on his weight, determine the dog's age in human years based on his dog age and size category

**For example** a 10 y.o. large dog would be the equivalent of 66 in human years

Display the output in an informative manner, example:

Rover, who is 10 in dog years, is 66 in human years.

Ask if they would like to calculate the age for another dog & loop if so,



## How Old Is My Dog in Human Years?

WebMD

| Size of Dog | Small<br>Miniature Pinscher<br>20 lbs. or less | Medium<br>Schnauzer<br>21-50 lbs. | Large<br>Great Dane<br>More than 50 lbs. |
|---|---|---|---|
| Age of Dog | Age in Human Years | | |
| 1 Year | 15 | 15 | 15 |
| 2 | 24 | 24 | 24 |
| 3 | 28 | 28 | 28 |
| 4 | 32 | 32 | 32 |
| 5 | 36 | 36 | 36 |
| 6 | 40 | 42 | 45 |
| 7 | 44 | 47 | 50 |
| 8 | 48 | 51 | 55 |
| 9 | 52 | 56 | 61 |
| 10 | 56 | 60 | 66 |
| 11 | 60 | 65 | 72 |
| 12 | 64 | 69 | 77 |
| 13 | 68 | 74 | 82 |
| 14 | 72 | 78 | 88 |
| 15 | 76 | 83 | 93 |
| 16 | 80 | 87 | 120 |

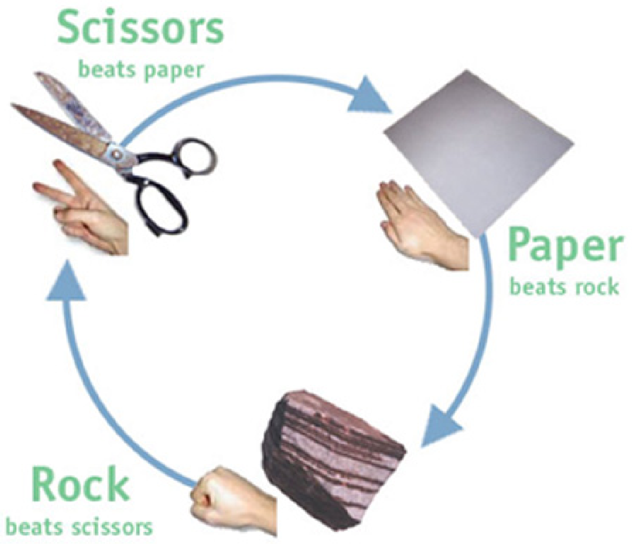
SOURCES:
Purina: "Your Dog's Age in Human Years" and "Caring For Your Older Dog."
National Pet Wellness Month: "Pet Age Calculator" and "Pet Aging Chart."
Humane Society: "How to Determine a Cat's or Dog's Age."

## Assignment 15 – Rock, Paper Scissors

### Program Assignment 15

For this assignment, you'll create the Rock, Paper Scissors game where a user plays against the computer.

Paper covers a Rock
Rock smashes Scissors
Scissors cut Paper
Equal choice is a tie.



The computer chooses its move by using a random number generator to pick a number. That number will represent the Rock, Paper, or Scissors

Create a while loop so the program can be played repeatedly. At the end of each "round" ask the user if he wants to play again. Keep playing until the user responds N.

Display who wins each round and a message like "Rock smashes Scissors."

After each round, display the score for each player.

After all rounds are over, congratulate the overall winner.

You **MUST** use functions in this assignment. Here are some suggestions.

**Directions** - display introductory info and directions to the user

**Get user play**
returns: “Rock”, “Paper” or “Scissors”

**Get computer play**
returns: “Rock”, “Paper” or “Scissors”

**Check For Win**
This compares the two moves and returns the winner

**Update Score**
update the player and computer’s scores (could do this in check for win instead)

**Display Score**

Avoid changing global variables within the functions