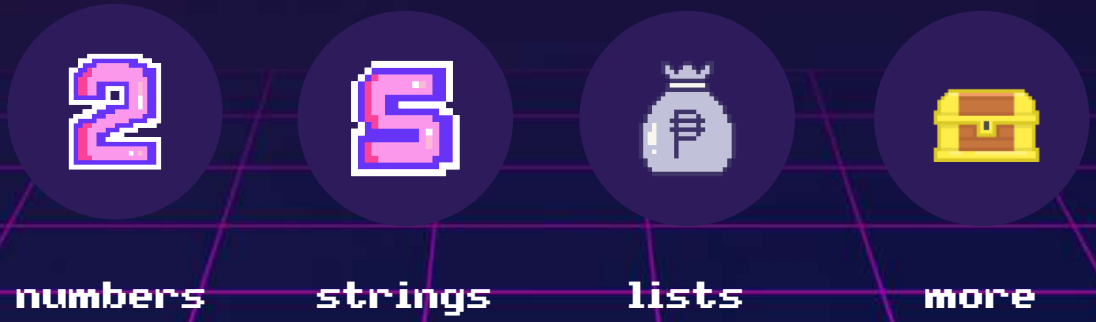
2 LEARNING BASICS

OBJECTIVES

- Creating and manipulating variables such as integers, strings and lists.
- Using Boolean expressions in conditional statements such as if ... else.
- Use iterative structures like for loops and while loops.
- Deep dive into functions which are built-in or user defined.
- Exploring the most common errors and bugs when learning.

2.1
CREATING VARIABLES



2.1 CREATING VARIABLES

We label and store data elements in memory by creating _____.

We shall pick unique _____ that describes the data as good labels.

To _____ it a value we simply use the equals (=) sign.

assign

variables

condition

names

WHAT DOES THIS DO?

```
coins = 0
print(coins)
```

Value Stored

Variable Name

For a coin collector game a good label to store the number of coins collected would be "coins".

A. input

B. output value

C. assign value

Multiple Choice

NUMBER VARIABLES

Number variables are useful in games to perform mathematical _____.

We can label and store whole numbers in a variable of type _____.

We can label and store _____ numbers in a variable of type float.

float	real	calculations	integer

What is happening?

```
coins = 100
bonus = 30
score = (coins * 2) + 30
print("Your score: ", score)
```

Arithmetic

Short Answer

INTERPRET CODE LIKE A PRO

As the user is playing we use an integer variable to store the number of coins collected and bonus coins that are awarded at the end. The score the player sees on the screen is based on a calculation that has coins and bonus.

INTEGER OR FLOAT?

16

age

−3.1

temperature

24.6

distance

3

lives

ARITHMETIC OPERATIONS

```
a = 10
b = 2
c = a + b # addition
print(c)
c = a - b # subtraction
print(c)
c = a * b # multiplication
print(c)
c = a / b # division
print(c)
```

```
12
8
20
5
```

GUESS THE OUTPUT

```
balance = 350
price_of_cat = 250
balance = balance - price_of_cat
print(balance)
```

A. 1.4

B. 600

C. 100

Multiple Choice

MORE ARITHMETIC

```
a = 5.0
b = 2.0
c = a % b # remainder after division
print(c)
c = a // b # floor division
print(c)
c = a ** b # power
print(c)
```

```
1.0
2.0
25.0
```

LESSON CHALLENGE

- Time to put the theory into practice.
- There is a warm-up exercise and a more difficult exercise.
- You need to answer questions that are marked by a todo.
- You have to use all you learned so far.

STRING VARIABLES

String variables are used to store data that is _____ in nature.

We can label and store a sequence of _____ e.g., "Hi there, Tom!".

Any keyboard _____ by the user should be stored in a string variable.

characters	real	alphanumeric	input

STRING VARIABLES

- Strings can be assigned to variables.
- In this example we are assigning the string tiggEr91 to the username variable.
- You need to use quotation marks to indicate the start and end of a string.
- String variables in Python are flexible and you can join multiple string variables to create a new one.

```
username = "tiggEr91"
```

WHAT DOES THIS DO?

```
username = "tiggEr91"
greeting = "Hi there, " + username
```

Plus Operator

Quote Marks

Quotation marks indicate that the value of a variable is of type string.

A. input

B. join strings

C. loop

Multiple Choice

DID YOU UNDERSTAND?

COMPLETE THE PROGRAM

Write a program that stores a suffix at in a variable and create other string variables for possible words by joining a prefix with the suffix.

```
suffix = ______________

______________ = "h" + suffix

bat = "b" + ______________

print("Words ending with ", suffix)

print(hat, bat)
```

hat

suffix

"at"

Fill in the Blanks

STRING VARIABLES

- Python enables us to perform more complex operations on string variables by giving us a number of built-in functions.
- For a word search game it might be useful to count the number of characters in a string using the function len() to award the player points.
- A gentle reminder that a built-in function is a bundle of code that we can instantly use when we install Python.

GUESS THE OUTPUT

```
user_word = "amaze"
count_z = user_word.count("z")
word_length = len(user_word)
bonus_points = count_z * 2
points = word_length + bonus_points
print(points)
```

A. 1

B. amaze

C. 7

Multiple Choice

INTERPRET CODE LIKE A PRO

As the user is playing we use a string variable to store a word found . Points are awarded based on the length of the word. Additional bonus points are awarded for the occurrance of special letters like "z". The program displays the total points awarded for the given word.

LESSON CHALLENGE

- Time to put the theory into practice.
- You will build a small component of a word search game.
- You have to use all you learned so far.
- Find your task!

LIST VARIABLES

A list is a data structure that can store a _____ of data items.

We can store multiple data items under _____ unique label.

Every data item in a list has a particular _____ which is a number.

output | collection | one | position

LIST VARIABLES

One label

```
fruit = ["apple", "banana", "cherry", "apple"]
```

Collection

Multiple values separated by a comma inside square brackets

```
numbers = [6, 7, 13, 2, 45]
```

0 1 2 3

Position

The first position or index in a list is 0

LIST VARIABLES

- Working with lists in Python is easy.
- An item from a list can be accessed by typing the name of the list and the position within square brackets.
- Each data item can be treated like a regular variable.
- Just remember that the first position is 0.

```
first_fruit = fruit[0]
print(first_fruit)

print(fruit[2])
```

```
apple
cherry
```

LIST VARIABLES

- Python enables us to perform more complex operations on list variables by giving us a number of built-in functions.
- For example count the number of occurrances of a data item in a list of work using the function count().
- A gentle reminder that a built-in function is a bundle of code that we can instantly use when we install Python.
- We will cover functions in more detail very soon.

LIST OPERATIONS

```
fruit = ["apple", "banana", "cherry", "apple"]
apple_count = fruit.count("apple")
print(apple_count)

fruit.reverse()
print(fruit)
```

Output List

You can easily display a list variable using the print function

```
2
['apple', 'cherry', 'banana', 'apple']
```

GUESS THE OUTPUT

```
my_numbers = [7, 2, 1, 4]
print(my_numbers[3])
```

A. 7

B. 1

C. 4

Multiple Choice

LESSON CHALLENGE

- Time to put the theory into practice.
- You will continue to build a small component of a word search game.
- You have to use all you learned so far.
- Find your task!