

SECTION 1:

*Introduction to Python*

**Lesson 1 Exercises:**

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| (1) | Write a program that prints your full name to the screen |

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| (2) | Write a program that prints your full name, your address and your email to the screen on separate lines |

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| (3) | Write a program to print a shopping list of five items to the screen (one per line). For example, the output could look like  To buy:  \*\*\*\*\*\*\*\*\*\*\*  Bread  Milk  Butter  Sugar  Tea |

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| (4) | Write a program that prints the following to the screen  \*\*\*\*\*\*\*  \*\*\*\*\*\*  \*\*\*\*\*  \*\*\*\*  \*\*\*  \*\*  \* |

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| (5) | Write a program that prints the following to the screen  \*\*\*\*\*\*\*  \*\*\*\*\*\*  \*\*\*\*\*  \*\*\*\*  \*\*\*  \*\*  \*  \*\*  \*\*\*\*  \*\*\*\*\*  \*\*\*\*\*\*  \*\*\*\*\*\*\* |

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| (6) | Write a program that prints the following to the screen  **Menu del Dia:**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Soupa  Paella  Pimientos  Patats alioi  Helado  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Vino o cerveza o aqua  7€ |

**Lesson 2(a) Exercises:**

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| (1) | Write a program that declares two whole numbers. The program should determine and print the sum and product of the numbers in the following format:  The sum of the numbers is X  The product of the numbers is Y |

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| (2) | Write a program that acts like a mini-calculator. The program should create three variables, the first variable should store the text “Welcome to the mini-calculator”, the second and third variables should store numbers. The program should print the welcome message and the results of adding, subtracting and multiplying the numbers. For example, given the numbers 10 and 2 the following should print:  Welcome to the mini-calculator  10+2 = 20  10-2 = 12  10\*2 = 20 |

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| (3) | Write a program that computes and displays the number of seconds in a year. You may assume the year is not a leap year. |

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| (4) | Write a program that computes and displays the number of metres in 1000 kilometres. |

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| (5) | Write a program that converts a value in euro to its equivalent in Canadian dollars. You can assume that 1€ = 1.25$. |

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| (6) | Write a program that takes any measurement in pounds and converts it to kilograms (There are 2.2 pounds in a kilogram). |

**Lesson 2(b) Exercises:**

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| (1) | Write a program that converts a value, given in degrees Celcius, to its Fahrenheit equivalent (Fahrenheit = 9 / 5 \* Celcius + 32). |

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| (2) | Write a program that calculates the VAT on the value of a goods item. The current VAT rate is 23%. |

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| (3) | Write a program that calculates the allowance for the distance travelled for a salesperson. The current is 66c per km. For example, if the distance is 100km the salesperson receives €66. |

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| (4) | Write a program that declares two variables to store the values 12, and 10. Perform the following calculations (using the variables you have just created) and print the results of each calculation.  (a): 12%10 (b): 10%12 |

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| (5) | Write a program that determines and prints each digit of a three-digit number. The program should output the following (assuming the number is 250):  The first digit is 2  The second digit is 5  The third digit is 0 |

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| (6) | Write a program that determines and prints each digit of a four-digit number. The program should use a single print statement but should print the output in the following format given (for example) the number 2787:  The digits in the four digit number 2787 are:  2  7  8  7 |

**Lesson 3 Exercises:**

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| (1) | Write a program that declares three numbers and stores the value 47 in the first, 89 in the second and 10 in the third. Print the values to the screen.  Create another variable called result that stores the value of the first number multiplied by the second number. Print the result to the screen. Then store the value of the second number multiplied by the third number in the variable called result. Print the answer to the screen. |

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| (2) | Add comments to the above program to explain what it does. |

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| (3) | Write a program that creates four integer variables called, num\_1, num\_2, num\_3 and num\_4. Each variable should store the value 10.  Perform the following arithmetic and check your answers are correct.   1. Multiply all numbers together (answer is 10000) 2. Add the first three numbers together and multiply by 5 (answer is 150) 3. Add the first number to the second number multiplied by 2 (answer is 40) |

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| (4) | Write a program that calculate the value of the following expression: 3 + 4 \* 5 |

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| (5) | Write a program that calculate the value of the following expression: 1 /2 + (3 \* 4 /5) |

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| (6) | Write a program that calculate the value of the following expression: (2 + 3/5) \* (9/3 – 2) |

**Lesson 4 Exercises:**

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| (1) | Write a program that imports the turtle library and creates a Turtle (and Screen) that draws a rectangle. |

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| (2) | Write a program that imports the turtle library and creates a Turtle (and Screen) that draw a square. Set the background colour to blue and the line colour to white. |

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| (3) | Write a program that creates a triangle in pink and then draws a box around the triangle in blue. |

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| (4) | Write a program that creates a rectangle whose length is twice its width. |

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| (5) | Write a program that draws a pink rectangle and then a red triangle. |

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| (6) | Write a program that creates the following shape: |

**Lesson 5 Exercises:**

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| (1) | Write a program that performs addition. The program should ask the user to enter two numbers and should print the sum of the numbers to the screen with an appropriate message. |

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| (2) | Write a program that asks the user to enter (1) their name and (2) their favourite colour. The program should print out both Strings. |

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| (3) | Write a program that asks the user to enter a two digit number. The program should print out each of the digits in the number, in reverse order. For example, if the user enters 23, the program should print:  The number entered was 23.  The second digit is 3.  The first digit is 2. |

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| (4) | Write a program that asks the user to enter two numbers. The program should then print their sum and product to the screen. |

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| (5) | Write a program that asks the user to enter a value in degrees Celcius. It should then convert this value to its Fahrenheit equivalent (Fahrenheit = 9 / 5 \* Celcius + 32). |

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| (6) | Write a program that asks the user to input a distance in kms. The program should then calculate the allowance for the distance travelled for a salesperson. The current is 66c per km. For example, if the distance is 100km the salesperson receives €66. |

**Lesson 6 Exercises:**

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| (1) | Write a program that asks the user to enter two Strings. The program should:   * Print each String * Print the length of each String * Print the first String in uppercase and the second in lowercase * Print the character at the second position in the first String. |

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| (2) | Write a program that asks the user to enter a five-letter word. The program should print out the word. The program should also print each character in the word on a new line.  For example, given the String “Hello” the program should print:  Hello  H  e  l  l  o |

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| (3) | Write a program that prints each of the characters of a a word in reverse (print the last char first). For example, given the String “Hello” the program should print:  o  l  l  e  h |
| (4) | Write a program that asks the user to enter their first name and their second name. The program should then print a welcome message as follows: Welcome! <first name> <second name>. |

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| (5) | Write a program that asks the user to enter a three digit number. The program should print the sum of the individual digits in the number. For example, if the user enters 123, the program should print: The sum of the digits is 6. |

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| (6) | Write a program that asks the user to input their first name, their middle initial and their surname. The program should output their name in the following format, irrespective of whether capital letters were used or not:  Welcome! John A. Griffin |

**Lesson 7 Exercises:**

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| (1) | Write a program that checks to see if an age is greater than or equal to 18. If it is, print out that the person can vote, otherwise print that they cannot vote. |

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| (2) | Write a program that asks the user to enter the value 1 or 2. If the user enters a 1 then a pink square on a red background should be drawn. If the user enters a two then a yellow square on a black background should be drawn. |

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| (3) | Write a program that asks the user to enter a number. The program should determine if the number is odd or even and print a message to the screen. For example:  The number 111 is odd  The number 224 is even |

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| (4) | Write a program that asks the user to enter a three digit number. The program should determine whether the entered number is less than or greater than 500. |

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| (5) | Write a program that asks the user to enter a value in degrees Celsius and also a value in degrees Fahrenheit. A conversion should take place so the values are in the same scale and the largest one should be printed to the screen, in both in Celsius value and Fahrenheit value. |

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| (6) | Write a program that asks the user to enter a three digit number and print to the screen whether all digits are even, all digits are odd or there is a mixture of add and even digits. |

**Lesson 8 Exercises:**

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| (1) | Write a program that asks the user to enter a number between 1 and 12. The program should then print out the corresponding month. For example, the value 1 would result in January being printed and the value 12 should result in December being printed. |

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| (2) | Write a program that asks the user to choose from a menu with values 1 for addition, 2 for subtraction, 3 for multiplication and 4 for division. The program should then ask the user to enter two numbers and perform the appropriate arithmetic. |

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| (3) | Write a program that asks the user to choose from a menu of three items labelled 1 for square, 2 for triangle and 3 for another shape. The program should print a square in orange on a blue background if 1 is entered, a triangle in yellow on a red background if 2 is entered and any other shape of your choice if 3 is entered |

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| (4) | Write a program that checks to see what grade an exam mark should be allotted. If the grade > 70 a mark of excellence should be awarded, if the grade > 55 and < 70 a mark of merit should be awarded and all other marks should be awarded a fail. |

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| (5) | Write a program that asks the user to enter a number between 1 and 12 to represent a month of the year. (January – December inclusive). For example, if the user enters 2, the program should print  The month is February |

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| (6) | Write a program that asks the user to select an item from a menu. The menu should display as follows:  1: Raining  2: Sunny  3: Snowing  4: Cloudy  The system should print an appropriate sentence for the corresponding number, for example, if the user selects 1 the program could print  Put your coat on, it is raining outside. |



SECTION 2:

*Loops, Lists, Dictionaries and Functions*

**Lesson 9: While loop Exercises:**

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| (1) | Write some Python code that will print out all numbers between 1 and 100 using a while loop. |

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| (2) | Write some Python code that will print out the numbers 1 to 10 squared, i.e. 1, 4, 9, 16, …, 100 using a while loop. |

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| (3) | Write some Python code that will print out the times tables for the number 5. |

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| (4) | Write some Python code that will print out all even numbers between 1 and 50. |

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| (5) | Write some Python code that will print out all odd numbers between 1 and 50. |

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| (6) | Write a program that prints the following to the screen five times using a while loop  \*\*\*\*\*\*\*  \*\*\*\*\*\*  \*\*\*\*\*  \*\*\*\*  \*\*\*  \*\*  \* |

**Lesson 10: While loop Exercises:**

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| (1) | Write some Python code to check the user inputs a number greater than 100. The code should then print the square of that number to the screen. |

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| (2) | Write some Python code that will ask the user to enter a String. The code should check that the string has a length of between 5 and 10 characters. The inputted string along with its length should be printed to the screen. |

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| (3) | Write some Python code that will create a Turtle to draw the following shape using a loop (it is drawing a square and then a bigger square outside it and so on): |

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| (4) | Write a program to print a row of 5 stars to the screen. |

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| (5) | Write a program that’s asks the user to enter a number *n,* the program should then print a single star on *n* lines. |

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| (6) | Write a program that adds all sequential numbers, starting from 1, until the sum is equal to or exceeds 100. |

**Lesson 10b: For loop Exercises:**

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| (1) | Write some Python code that will print out the numbers -10, -8, -6, -4, -2, 0, 2, 4, 6, 8, 10 using a for loop. |

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| (2) | The following Python code will print out the three times tables:    Can you print out the four times tables using a similar structure? Modify your code to make your output more informative, i.e. your output should be something similar to: |

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| (3) | Try writing a program that will ask the user to input an integer, between 0 and 12, and print the correct times table. Test with all of the tables up to 12. |

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| (4) | Write a program that prints the following to the screen five times using a for loop  \*\*\*\*\*\*\*  \*\*\*\*\*\*  \*\*\*\*\*  \*\*\*\*  \*\*\*  \*\*  \* |

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| (5) | Write a program to print a row of 5 stars to the screen using a for loop. |

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| (6) | Write a program that adds all sequential numbers, starting from 50, until the sum is equal to or exceeds 1000, using a for loop. |

**Lesson 11: Lists Exercises:**

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| (1) | Create a list called myList with the following six items: 45, 62.3, “welcome”, True, 43, 756. |

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| (2) | Create a list with elements of type String, int and float. Print out the length of the list. Using a while loop can you go through the list and print out the contents of it. |

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| (3) | Create a list of integer numbers. Using a loop sum the integers together and print the sum to the screen. You should then modify all elements in your list to be double their current value? |

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| (4) | Create a list of numbers which we will use to move a turtle around the screen. The list should have 20 values of numbers. Create a new turtle and using a loop go through the list and move the turtle forward by each element value in the list, then turn left and move forward that amount again, before moving on to the next element in the list. |

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| (5) | Write Python statements to do the following:   1. Insert the value “cat” at position 3. 2. Insert the value 99 at the start of the list. 3. Find the element at position 5. |

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| (6) | Write a program that has a list containing whole numbers. The program should print the sum of the even numbers in the list. |

**Lesson 12: Dictionaries Exercises:**

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| (1) | Create a dictionary with the number 1-10 representing their corresponding letter (1:A, 2:B, 3:C,...). Print the contents of the dictionary and its length. |

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| (2) | Create a dictionary with the letters A-J as keys, with each key corresponding to a person’s name beginning with that letter (you should choose the names). Print out the contents of the dictionary and then change the values that the keys A and C are storing and reprint your dictionary. |

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| (3) | Using the dictionary created in Q2, use a loop to list out the values stored in the dictionary. |

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| (4) | Create a dictionary with the numbers 1-10 such that the value stored is the index \* 2. For example, key 4 should have a value 8 and the key 9 a value 18. Using a loop print out the sum of all the numbers stored. |

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| (5) | Create a dictionary with the numbers 1-10 such that the value stored is the index squared. For example, key 4 should have a value 16 and the key 9 a value 81. Using a loop print out the sum of all the numbers stored. |

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| (6) | Create a dictionary such that the key is a person’s PPS number and the value is their date of birth representing with a string, for example: 12122004. The program should ask the user to enter a person’s name and then print out their date of birth in the format: 12/12/2004. |

**Lesson 13: Functions Exercises:**

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| (1) | Write a Python function called mySchool() which will print details about your school to the screen (you can choose what to print inside the function). |

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| (2) | Write a Python function called squareNo() which will print out the square (number \* number) of each number from 0 to 10. |

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| (3) | Write a Python function called timesTables() that will print the times tables of some number. |

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| (4) | Write a Python function called stars() which will print a row of stars to the screen. You can decide how many stars to print. |

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| (5) | Write a Python function called menu() which will print a sample restaurant menu of your choosing to the screen. |

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| (6) | Write a Python function called numbers() which will ask the user to input a number between 1 and 10 and print the word for that number. For example, if the user enters 4, the program will print four. |

**Lesson 14: Functions Exercises:**

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| (1) | Write a Python function that will take in two integer parameters and prints the sum of these numbers, the difference of these numbers and the product of these numbers. |

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| (2) | Write a Python function that takes in three numbers and will check to see which of the numbers is the biggest and which is the smallest. The answers should be printed to the screen. |

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| (3) | Write a Python function that takes in a String as input. Using a while loop go through each character in the String and print it to the screen one at a time. |

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| (4) | Write a Python function that will take in a String and a number as parameters and prints the inputted string the amount of times corresponding to the number. For example, if the parameters are Hello and 4 the program should print:  Hello Hello Hello Hello |

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| (5) | Write a Python function called numbers() which accepts a number between 1 and 10 as a parameter. If a number greater than 10 or less than 1 the program should print an error message. Otherwise it should print the word for that number. For example, if the user enters 4, the program will print four. |

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| (6) | Write a Python function that accepts a single letter as a parameter. If the letter is a vowel it should print a message to state this. Otherwise it should print not a vowel. |

**Lesson 15: Functions Exercises:**

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| (1) | Write a Python function that will take in a number representing a distance in centimetres. It should return the equivalent of the number in metres (1m = 100cm). |

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| (2) | Write a Python function to take in a parameter of type String. Your procedure should use a loop to go through each character of the String and count them. It should return this total to a variable outside the procedure and print it to the screen. |

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| (3) | Write a Python function that will calculate how much VAT to pay on a purchase. Your procedure should take in a value and then add 23% VAT to it. The answer should be returned to the code outside the procedure and the answer displayed on the screen with the original value. |

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| (4) | Write a Python function which will take in two numbers one representing the speed of a car (in km/hr) and another representing the time taken (in hrs) to travel a particular distance. Your function should calculate and return the distance travelled using the formula:  **Distance = Speed \* Time** |

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| (5) | Write a Python function that takes a list of whole numbers as a parameter and returns their sum. |

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| (6) | Write a Python function that takes a dictionary as a parameter and a key. The function should determine the value associated with the key, or else a value of -1 if the value is not found. |