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**BSc in Science in Computing & Multimedia**

**Semester 1**

**2024-2025**

**Practical Laboratory Examination**

**Module Title** Programming Essentials

**Module Code BSC10924**

**Group A**

**Assessment Type** Practical Lab Exam

**Weighting** 40%

**Maximal Possible Mark:** 100 marks

**Submission Date:** 11th November 2024

**Duration: 2 hours 30 minutes**

**Instructions**:

* Students can use their own notes, but NO other external resources.
* Section 2-(b) needs to be submitted as Python code (must be .py file) through Moodle.
* All other answers need to be submitted in single word document through Moodle.
* Student ID must be used as part of the file names for both files submitted.

**Section 1: (5 x 10 Marks)**

1. **Explain the concept of variables in Python. (4 marks)  
   Describe how to declare a variable and give an example of creating an integer variable and a string variable. (6 marks)**

The variables are a form of data within a programming language that allows us to store different values, like a variable in mathematics, variables in programming languages can hold a great numbers of different values, from numbers, strings, sets, arrays, single characters, etc.

To create a variable you need to give it a name that doesn’t violate the already set of names for the programming language, these are called reserved names that hold a specific function within the program, this and other examples of exception for the name of a variable, for example starting a variable name with a number, will prevent us from creating a functioning variable in programming languages overall, hence why as developers we need to be meticulous with our work.

To create an integer variable, write the following in python:

Number1 = 2

To create a string variable:

lastName = “Cruel”

in the case of python the variables do not need to be predefined as the data that they represent, like in C, python will understand the data we are entering as we assign the value to the variable.

1. **Explain the use of the input() and print() functions in Python. (4 marks)  
   Write a code example where the program asks the user for their name and then greets them by printing "Hello, [Name]!". (6 marks)**

The input() is a functionality in python that allows users to input data in the program the developer created, this can be store in a variable and called back when a print() function is utilized. Print() will print any string or defined variable that the developer writes in the code to the output system set in the computer, usually the terminal or a screen.

Program:

name = (input("Please enter your Name:"))

print(f"Hello! {name}!")

1. **Explain the purpose of if statements in Python. (4 marks)  
   Write a simple if-else statement in Python that checks if a variable age is greater than or equal to 18, and prints "Adult" if true and "Minor" if false. (6 marks)**

The if statements can be simplified as conditions within a program’s code to execute a functionality within a program or make comparison to check what result was obtained from a previous user input or operation.

E.g., If the number the user entered is 2, then set the print() function to print to the screen the number entered is bigger than 1

Program:

age = int(input("Please enter your age:"))

if age >= 18:

    print("You are an adult")

else:

    print("You are a minor")

1. **What is a for loop in Python and when is it used? (4 marks)  
   Provide an example of a for loop in Python that iterates over a list of colours (["red", "green", "blue"]) and prints each colour. (6 marks)**

A loop is a function in python that helps the developer iterate through a piece of code where the lines need to executed more than once, for example navigating or printing the values of an array or a list with a for loop, counting numbers and printing them to the terminal or simply nesting a big piece of code within a while loop in order to create a game that can be replayed until the user is done with it.

l\_colors = ["red", "green", "blue"]

i = 0

for i in range(3):

    print(l\_colors)

    i+= 1

#loop footer

1. **Explain the concept of nested if statements in Python. (4 marks)  
   Write a nested if statement that checks if a variable num is positive and even, printing "Positive and even" if both conditions are true, or "Other" otherwise. (6 marks)**

The nested if statements serve a way to check more than one condition needed to execute lines of code.

Program:

num = int(input("Please enter any number:"))

if num > 0:

    if num % 2 == 0:

        print("The number you entered is positive and even")

    else:

        print("The number you entered is positive but uneven")

elif num <= 0:

    print("the number enteres is either a negative number or 0")

**Section 2: (50 Marks)**

Write a Python program for a retail store that calculates a discount based on each customer’s age and the total amount spent on a product. The program should run in a loop to process multiple customers, and only stop when the user chooses to exit.

The store offers the following discounts:

1. Age-based Discount: If the customer is below 18 years old, they get a 10% discount on the product price.
2. Promotion: If the total price after the age-based discount is over €100, the customer receives an additional €10 discount.

Requirements:

1. Use a while loop to allow multiple customer entries.
2. Use input() to get the customer’s age and product price.
3. Apply an if statement to determine eligibility for each discount.
4. Display the final price and any discounts applied.
5. After processing each customer, ask if the user wants to enter details for another customer. Exit if the answer is "no."

**Example Input and Output:**

|  |
| --- |
| **Input**  Please enter your age: 17  Please enter the price of the product (Euro): 120 |

|  |
| --- |
| **Output**  The final price is: 98 Euro.  You have earned: 10% discount and €10 promotion discount. |

|  |
| --- |
| **Continuation Prompt**  Would you like to enter another customer? (yes/no): yes |

|  |
| --- |
| **Next Input**  Please enter your age: 20  Please enter the price of the product (Euro): 80 |

|  |
| --- |
| **Output**  The final price is: 80 Euro.  You have earned: No discounts or promotions. |

|  |
| --- |
| **Exit Prompt**  Would you like to enter another customer? (yes/no): no |

**Explanation of Program Logic:**

* The program should use a while loop that continues until the user inputs "no" when asked if they want to enter another customer.
* For each customer:
  + Get the age and price.
  + Apply the 10% discount if the customer is under 18.
  + Apply an additional €10 discount if the resulting price is over €100.
  + Print the final price and list any discounts or promotions earned.

(a) Implement above requirements in Python.

**[40 marks]**

(b) Create two sets of test data to test your program.

**[10 marks]**

Program’s sets of data:

A screen shot of a computer program

Description automatically generated

Code will be provided via moodle in a .py file