Lab Exercises: Day 2

PMIM102 – Introduction to Scientific Computing in Healthcare

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Exercise 1 – Flow chart

Design a program to control a fridge with a thermostat reading the temperature continuously and a cooling compressor that you can turn on and off

Exercise 2 – Functions

Write a function on R that computes the area of any rectangle.

+ Input arguments: side1, side2

+ Returns: area of the rectangle with dimensions side1 x side2.

Exercise 3 – Error solving

Locate the errors in the following script:

```
# Prints a hello message.
#
# Input arguments:
#    name: (str) Name to print
#
say_my_name <- function(name)

   print(paste('Hello', name))

}

# Returns the total price of a client's order
#
# Input arguments:
#    client: (str) Name of the client
#    num_carrots: (int) Number of carrots
#    num_potatoes: (int) Number of carrots
#    num_sweets: (int) Number of carrots
#    discount: (num) Discount percentage. Must be between 0 and 100.
#
# Returns: A personalized message with the total price of a client's order
#
order_name <- function(client, num_carrots, num_potatoes, num_sweets, discount) {

   # Price in pounds per unit
   price_carrots = 1
   price_potatoes = 0.65

   # Calculate the final price
   final_price = 1 - discount/100*(price_carrots*num_carrots + price_potatoes*num_potatoes +
price_sweets*num_sweets)

   say_my_name(client)
   print(paste('Your order price is £', final_price, sep=''))

}

# Get the Tony Stark's order
order_name("Tony Stark", 5, 10, 1, 101)
```

Exercise 4 – Functions

Write a function in R that receives a list of integers and an integer value, and returns the number of elements in the list with that value.

```
# Count of events in a list
#
# Input arguments:
#    l: (list of int) List of integers
#    v: (int) Value to count in l
#
# Returns: (int) Count of v events in l
#
count_event <- function(l, v){
    …
}
```

Exercise 5 – Functions

Write a function in R that receives a list of integers and returns the list of unique values.

```
# Finds the list of unique events
#
# Input arguments:
#    l: (list of int) List of integers
#
# Returns: (list of int) List of unique values
#
unique_events <- function(l, v){
    …
}
```

Exercise 6 – Functions

Write a function in R that receives a list of integers and an integer value, and returns the number of elements in the list with that value.

```
# Finds unique events in a list and counts their occurrence.
#
# Input arguments:
#    l: (list of int) List of integers
#
# Returns: (data.frame) A data.frame with columns “event” and “count”.
#
count_all_element <- function(l, v){
    …
}
```