Challenge-5

Annette

2023-09-11

```
knitr::opts_chunk$set(echo = TRUE)
```

Questions

Question-1: Local Variable Shadowing Create an R function that defines a global variable called `x` with a value of 5. Inside the function, declare a local variable also named `x` with a value of 10. Print the value of `x` both inside and outside the function to demonstrate shadowing.

Solutions:

```
x <- 5
local <- function(x) {x=10}

print(x)
```

```
## [1] 5
```

```
print(local(x))
```

```
## [1] 10
```

Question-2: Modify Global Variable Create an R function that takes an argument and adds it to a global variable called `total`. Call the function multiple times with different arguments to accumulate the values in `total`.

Solutions:

```
total <- 0
addition <- function(x) {
     total <<- x + total
}

addition(4)
addition(2423)
addition(32)
print(total)
```

```
## [1] 2459
```

Question-3: Global and Local Interaction Write an R program that includes a global variable `total` with an initial value of 100. Create a function that takes an argument, adds it to `total`, and returns the updated `total`. Demonstrate how this function interacts with the global variable.

Solutions:

```
total <- 100
add_to_total <- function(x) {
       total <<- x + total
      return(total)
}
add_to_total(4)
```

```
## [1] 104
```

```
add_to_total(12)
```

```
## [1] 116
```

Question-4: Nested Functions Define a function `outer_function` that declares a local variable `x` with a value of 5. Inside `outer_function`, define another function `inner_function` that prints the value of `x`. Call both functions to show how the inner function accesses the variable from the outer function's scope.

Solutions:

```
outer_function <- function(x=5) {
     inner_function <- function() {
         return(x)
     }
     return(inner_function())
}
outer_function()
```

```
## [1] 5
```

Question-5: Meme Generator Function Create a function that takes a text input and generates a humorous meme with the text overlaid on an image of your choice. You can use the `magick` package for image manipulation. You can find more details about the commands offered by the package, with some examples of annotating images here: https://cran.r-project.org/web/packages/magick/vignettes/intro.html

Solutions:

```
#install.packages("magick")
library(magick)
```

```
## Linking to ImageMagick 6.9.12.93
## Enabled features: cairo, fontconfig, freetype, heic, lcms, pango, raw, rsvg, webp
## Disabled features: fftw, ghostscript, x11
```

```r
generate_image <- function(image_directory,text) {
     frink <- image_read(image_directory)
     frink <- image_annotate(frink, text, color = "white", size = 30)
     image_write(frink, path = image_directory)
     return(frink)
}

generate_image("meme.jpeg", "NM2207 is ok")
```

Question-6: Text Analysis Game Develop a text analysis game in which the user inputs a sentence, and the R function provides statistics like the number of words, characters, and average word length. Reward the user with a "communication skill level" based on their input.

Solutions:

```r
word_game <- function(input_text) {
      number_of_characters <- nchar(input_text)
      number_of_words <- lengths(strsplit(input_text, ' '))
      average_word_length <- mean(nchar(input_text))

      character_level <- ifelse(number_of_characters<= 10, "Basic",
                                ifelse(number_of_characters<=15, "Intermediate", "Advanced"))

      word_level <-ifelse(number_of_words<= 5, "Basic",
                          ifelse(number_of_words<=10, "Intermediate","Advanced"))

      avg_word_level <- ifelse(average_word_length<=5, "Basic",
                               ifelse(average_word_length<=10, "Intermediate", "Advanced"))

      overall_score <- 0

      score_guide <- c(Basic=1, Intermediate=3, Advanced=5)

      skill_levels <- c(character_level, word_level, avg_word_level)

      for (level in unique(skill_levels)) {
      count <- sum(skill_levels == level)
      overall_score <- overall_score + (count * score_guide[level])
```

```
    }

    cat("Statistics:\n")
    cat("Number of words:", number_of_words, "\n")
    cat("Word Skill Level:", word_level, "\n")
    cat("Number of characters:", number_of_characters, "\n")
    cat("Character Skill Level:", character_level, "\n")
    cat("Average word length:", average_word_length, "\n")
    cat("Length Skill Level:", avg_word_level, "\n")
    cat("Communication Skill Level:", overall_score, "\n")

}


word_game("I hope that the midterm is not as difficult")
```

```
## Statistics:
## Number of words: 9
## Word Skill Level: Intermediate
## Number of characters: 43
## Character Skill Level: Advanced
## Average word length: 43
## Length Skill Level: Advanced
## Communication Skill Level: 13
```