Challenge-5

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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:

```
# Enter code here

x <- 5
local_variable_shadow <- function () {x <- 10
x
}

local_variable_shadow()
```

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

```
x
```

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

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:

```
# Enter code here

total <- 0
add_total <- function (value) {
  total <<- total+value
  }

add_total(2)
add_total(14)
add_total(94)

total
```

```
## [1] 110
```

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:

```
# Enter code here
total <- 100

add_return_total <- function(value) {
  total <<- total+value
  return(total)
}

total
```

```
## [1] 100
```

```
add_return_total(30)
```

```
## [1] 130
```

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:

```
# Enter code here
outer_function <- function () {x<-5
inner_function <- function () {
  x
}
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 (https://cran.r-project.org/web/packages/magick/vignettes/intro.html)

Solutions:

```
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
```

```
generate_meme <- function(text_input, output_file) {
  meme <- image_read(output_file)
  meme <- image_annotate(meme, text_input, gravity = "south", size = 30)
  image_write(meme, path = "meme2.jpg")
  print(meme)

}


generate_meme("When your code finally compiles!", "loopy.png")
```

```
##   format width height colorspace matte filesize density
## 1    PNG   512    512       sRGB  TRUE        0   72x72
```

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:

```
text_analysis_game <- function() {
  cat("Welcome to the Text Analysis Game!\n")
  cat("Enter a sentence to analyze your communication skills.\n")

  # Get user input
  user_input <- readline(prompt = "Enter a sentence: ")

  # Split the input sentence into words
  words <- strsplit(user_input, "\\s+")[[1]]

  # Calculate statistics
  num_words <- length(words)
  num_characters <- nchar(user_input)
  avg_word_length <- num_characters / num_words

  cat("\nText Analysis Results:\n")
  cat("Number of words:", num_words, "\n")
  cat("Number of characters:", num_characters, "\n")
  cat("Average word length:", round(avg_word_length, 2), "characters\n")

  # Determine communication skill level
  skill_level <- ifelse(avg_word_length <= 4, "Basic",
                        ifelse(avg_word_length <= 6, "Intermediate", "Advanced"))

  cat("Communication Skill Level:", skill_level, "\n")
}

# Run the game
text_analysis_game()
```

```
## Welcome to the Text Analysis Game!
## Enter a sentence to analyze your communication skills.
## Enter a sentence:
##
## Text Analysis Results:
## Number of words: 0
## Number of characters: 0
## Average word length: NaN characters
## Communication Skill Level: NA
```