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

shadowing_demo <- function() {
  x <- 10
  cat("Inside the function: x =", x, "\n")
}
shadowing_demo()
```

```
## Inside the function: x = 10
```

```
cat("Outside the function: x =", x, "\n")
```

```
## Outside the function: x = 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

# Initialize a global variable total
total <- 0

# Create a function that adds the argument to the global total
add_to_total <- function(x) {
  # Use the <<- operator to modify the global variable
  total <<- total + x
}

add_to_total(10)
cat("Total =", total, "\n")
```

```
## Total = 10
```

```
add_to_total(20)
cat("Total =", total, "\n")
```

```
## Total = 30
```

```
add_to_total(30)
cat("Total =", total, "\n")
```

```
## Total = 60
```

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_to_total <- function(x) {
  total <<- total + x
  return(total)
}

cat("Initial total:", total, "\n")
```

```
## Initial total: 100
```

```
new_total <- add_to_total(20)
cat("Total after adding 20:", new_total, "\n")
```

```
## Total after adding 20: 120
```

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() {
    cat("Value of x from inner_function:", x, "\n")
  }
  cat("Value of x from outer_function:", x, "\n")
  inner_function()
}

outer_function()
```

```
## Value of x from outer_function: 5
## Value of x from inner_function: 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:

```
# Enter code here
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(input_text, image_path, output_path) {
  img <- image_read(image_path)

  text_color <- "black"
  font_size <- 150
  text_x <- 90
  text_y <- 90
  font_path <- "/Users/iannnlee/Desktop/nus y3s1/NM2207 Computational Media Literacy/Week-5/Challenge/F

  img <- image_annotate(
    img,
    input_text,
    size = font_size,
    color = text_color,
    location = "+x+y",
    gravity = "northwest",
    boxcolor = "pink",
    strokecolor = "blue",
    font = font_path
  )

  image_write(img, path = output_path)

  cat("Meme created and saved as", output_path, "\n")
}

input_text <- "HELP MY BRAIN IS GONE TODAY HAS BEEN A LONG DAY :/"
image_path <- "/Users/iannnlee/Desktop/nus y3s1/NM2207 Computational Media Literacy/Week-5/Challenge/ra
output_path <- "my_meme.jpg"

generate_meme(input_text, image_path, output_path)
```

```
## Meme created and saved as my_meme.jpg
```

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
# Enter code here
text_analysis_game <- function() {
  sentence <- tolower(readline("Enter a sentence: "))

  words <- strsplit(sentence, "\\s+")[[1]]
  num_words <- length(words)
  num_chars <- nchar(sentence)
  avg_word_length <- num_chars / num_words

  skill_level <- ifelse(
    avg_word_length < 4,
    "Novice",
    ifelse(avg_word_length < 6, "Intermediate", "Expert")
  )

  cat("Text Analysis Results:\n")
  cat("Number of words:", num_words, "\n")
  cat("Number of characters:", num_chars, "\n")
  cat("Average word length:", avg_word_length, "\n")
  cat("Communication Skill Level:", skill_level, "\n")
}

text_analysis_game()
```

```
## Enter a sentence:
## Text Analysis Results:
## Number of words: 0
## Number of characters: 0
## Average word length: NaN
## Communication Skill Level: NA
```