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:

```r
# Enter code here
x <- 5
shadowing <- function() {
  x <- 10
  cat("Inside the function, x =", x, "\n")
}
shadowing()
```

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

```r
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:

```r
# Enter code here
total <- 0
add_to_total <- function(value) {
  total <<- total + value
}
add_to_total(5)
add_to_total(10)
add_to_total(7)
cat("Accumulated total:", total)
```

```
## Accumulated total: 22
```

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:

```r
# Enter code here
total <- 100
addto_total <- function(value) {
  total <<- total + value
  return(total)
}
cat("Initial total:", total, "\n")
```

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

```r
newtotal <- addto_total(50)
cat("Updated total after adding 50:", newtotal, "\n")
```

```
## Updated total after adding 50: 150
```

```r
newtotal <- addto_total(25)
cat("Updated total after adding 25:", newtotal, "\n")
```

```
## Updated total after adding 25: 175
```

```r
cat("Final total (global variable):", total, "\n")
```

```
## Final total (global variable): 175
```

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:

```r
# 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

Solutions:

```
# Enter code here
#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
```

```
#brew install imagemagick@6
```

```
generate_meme <- function(text, image_path) {
  meme <- image_read(image_path)
  meme <- image_annotate(meme, text, gravity = "center", color = "white", size = 20, boxcolor = "pink")
  image_browse(meme)
  output_path <- paste0("meme", format(Sys.time(), "%Y%m%d%H%M%S"), ".jpeg")
  image_write(meme, output_path)
  print(meme)
  #return(output_path)
}

text_input <- "But the banana doesnt have a head"
generate_meme(text_input, "meme20230911201658.jpeg")
```

```
##   format width height colorspace matte filesize density
## 1   JPEG   600    277       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:

```
# Enter code here
analyze_text_game <- function(sentence) {
  cat("hello world")
  #sentence <- readline(prompt="Type here")
  sentence <- "sajkfh afjkl aljkf alfjk"
  words <- unlist(strsplit(sentence, "\\s+"))
  no_words <- length(words[[1]])
  no_chars <- nchar(sentence)
  avg_word_length <- no_chars / no_words

  cat("Number of words:", no_words, "\n")
  cat("Number of characters:", no_chars, "\n")
  cat("Average word length:", avg_word_length, "\n")
  skill_level <- ifelse(avg_word_length < 4, "Basic", "Advanced")
  cat("Communication skill level:", skill_level, "\n")
}
analyze_text_game()
```

```
## hello worldNumber of words: 1
## Number of characters: 24
## Average word length: 24
## Communication skill level: Advanced
```