Challenge-5

Chen Zi Xin

2023-09-11

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
outer = function() {
        x = 5

        inner = function() {
                x = 10
                print(paste("inner:", x))
        }

        inner()
        print(paste("outer:", x))
}

{
        outer()
        print(paste("global:", x))
}
```

```
## [1] "inner: 10"
## [1] "outer: 5"
## [1] "global: 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:

```
total <- function(sample_size, our_mean =0, our_sd=1)

  {
  total <- rnorm(sample_size,
mean = our_mean,
sd = our_sd)

  mean(total)

}
total(sample_size = 15)
```

```
## [1] -0.2924323
```

```
total <- function(sample_size, our_mean =10, our_sd=11)

  {
  total <- rnorm(sample_size,
mean = our_mean,
sd = our_sd)

  mean(total)

}
total(sample_size = 15)
```

```
## [1] 8.65328
```

```
total <- function(sample_size, our_mean =15, our_sd=20)

  {
  total <- rnorm(sample_size,
mean = our_mean,
sd = our_sd)

  mean(total)

}
total(sample_size = 15)
```

```
## [1] 18.73293
```

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
 updated_total = function(x)
   {total <- x + total
   return(total)
 }

 updated_total(3)
```

```
## [1] 103
```

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
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:

```r
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
create_meme<- function(image_path,meme_text) {
  img<- image_read(image_path)

meme <- img %>%
  image_annotate(text = meme_text,
                  gravity = 'south',
                  location = "+0+100",
                  size = 200,
                  strokecolor = "black",
                  color = "white")
image_write(meme,path = "meme_output.png")
return(meme)
}

create_meme("/Users/chenzixin/Documents/NM2207/Week-5/dog.png", " This is fine.")
```

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
text_analysis_game <-function(sentence)
{
word_count <- strsplit(sentence, "")[[1]]
n_words <- length(word_count)

n_char<- nchar(sentence)

word_length <- sapply(word_count,nchar)
avg_length <- mean(word_length)

cat ("Here are the results :\n")
cat ("Number of words:",n_words, "\n")
cat ("Number of Characters",n_char,"\n")
cat ("Average word length",avg_length, "\n")

score <- (n_words*2) + (n_char/10) + (avg_length*2)

if (score < 2)
{skill_level <- " Dont give up. Keep practicing! "}
else if (score >= 20 & score == 40)
{skill_level <- " Not bad, good job!"}
else { skill_level <- " Amazing job!"}

cat ("Your score is:", score, "\n")
cat ("Your communication skill level is:", skill_level, "\n")
}

text_analysis_game("testing")
```

```
## Here are the results :
## Number of words: 7
## Number of Characters 7
## Average word length 1
## Your score is: 16.7
## Your communication skill level is:  Amazing job!
```