

Lecture4Solutions

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Write programs to achieve the following tasks using a for loop.

1. Print the first 10 letters of the alphabet. Make use of the `LETTERS` vector pre-defined in R.

```
for (i in 1:10) {  
  val <- LETTERS[i]  
  print(val)  
}
```

```
## [1] "A"  
## [1] "B"  
## [1] "C"  
## [1] "D"  
## [1] "E"  
## [1] "F"  
## [1] "G"  
## [1] "H"  
## [1] "I"  
## [1] "J"
```

Another way to do it, without using for loop, is:

```
LETTERS[1:10]
```

```
## [1] "A" "B" "C" "D" "E" "F" "G" "H" "I" "J"
```

2. Construct a right-angled triangle, using asterisks (*). The pattern would look as follows:

```
'*'  
  
'**'  
  
'***'  
  
'****'  
  
'*****'  
  
'*****'
```

There are multiple ways to do this: I am list three here, one of them involves a function (`paste0`) we have not learned in class yet. Read about the function

```
## Method 1: nested for loops
numRows <- 5
for (i in 1:numRows){
  stars <- c()
  for (j in 1:i) {
    stars <- c(stars, "*")
  }
  print(stars)
}
```

```
## [1] "*"
## [1] "*" "*"
## [1] "*" "*" "*"
## [1] "*" "*" "*" "*"
## [1] "*" "*" "*" "*" "*"
```

Method 2: single for loop. It is essentially the same as the previous method. How?

```
numRows <- 5
stars <- c()
for (i in 1:numRows) {
  stars <- c(stars, "*")
  print(stars)
}
```

```
## [1] "*"
## [1] "*" "*"
## [1] "*" "*" "*"
## [1] "*" "*" "*" "*"
## [1] "*" "*" "*" "*" "*"
```

```
## Method 3: Using the paste function
numRows <- 5
stars <- ""
for (i in 1:numRows) {
  stars <- paste0(stars, "*")
  print(stars)
}
```

```
## [1] "*"
## [1] "***"
## [1] "****"
## [1] "*****"
## [1] "*****"
```

Note that the output is different from the previous methods!

3. Calculate the factorial of a given number. See the formula give here: <https://en.wikipedia.org/wiki/Factorial>

```
fact <- 1
num <- 10
for (i in 1:num) {
  fact <- fact*i
}
print(fact)
```

```
## [1] 3628800
```

4. A person has taken a loan from the bank worth Rs 1,00,000, at an interest rate of 6% per annum. Assuming the interest is simple, write a program to calculate the amount owed to the bank at the end of 5 years. Write a similar program, assuming compound interest.

```
numYears <- 5
principleAmount <- 100000
interest <- 6
# Simple interest
amountOwed <- principleAmount
for (i in 1:numYears) {
  amountOwed <- amountOwed + (6/100)*principleAmount
}
amountOwed
```

```
## [1] 130000
```

```
# Compound interest
amountOwed <- principleAmount
for (i in 1:numYears) {
  amountOwed <- amountOwed + (6/100)*amountOwed
}
amountOwed
```

```
## [1] 133822.6
```