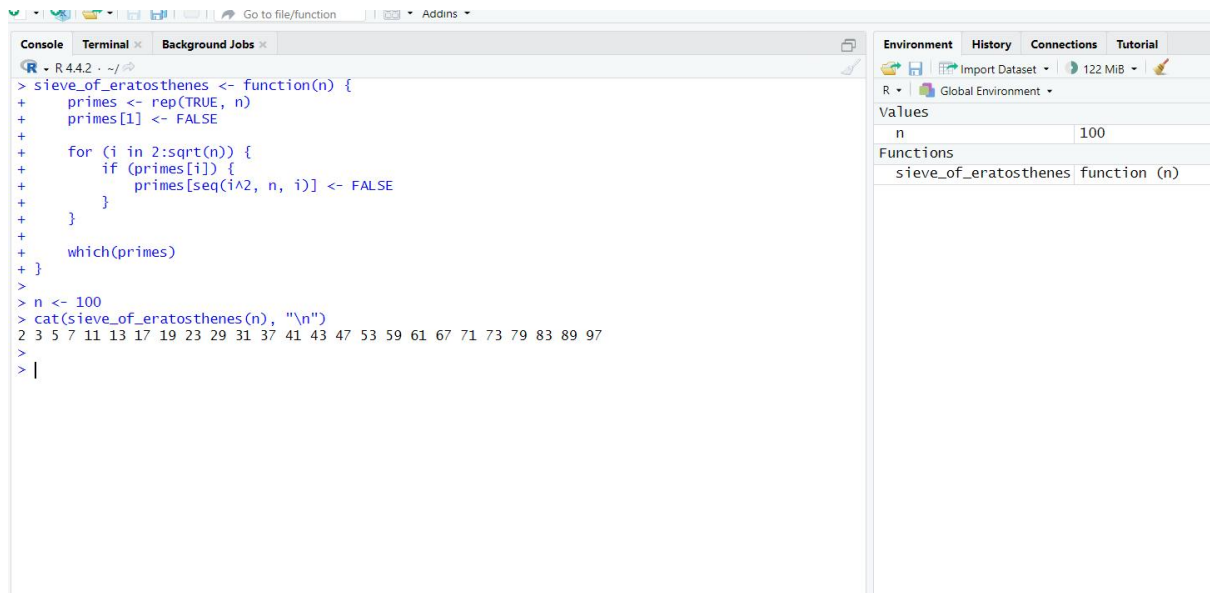


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## LAB-2

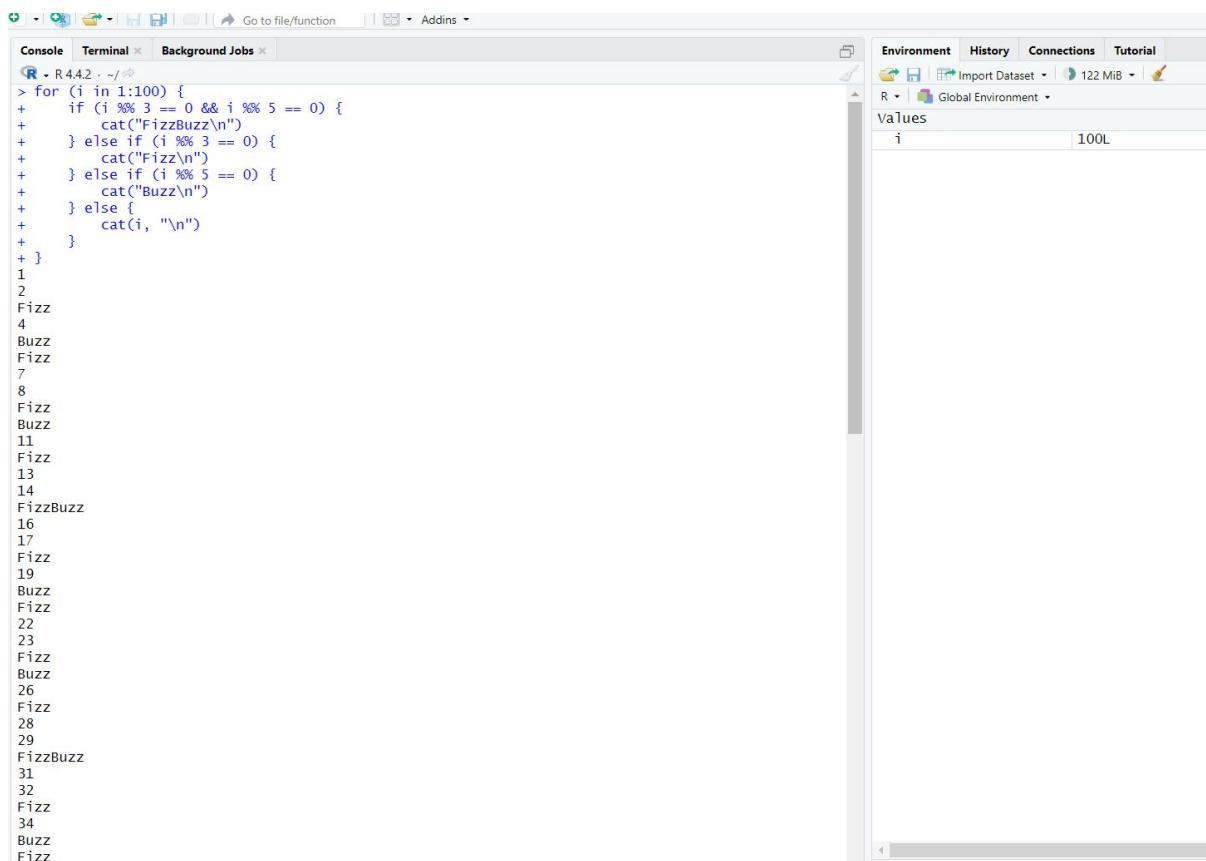
1. Write a R program to get all prime numbers up to a given number (based on the sieve of Eratosthenes).



```
> sieve_of_eratosthenes <- function(n) {
+   primes <- rep(TRUE, n)
+   primes[1] <- FALSE
+   for (i in 2:sqrt(n)) {
+     if (primes[i]) {
+       primes[seq(i^2, n, i)] <- FALSE
+     }
+   }
+   which(primes)
+ }
> n <- 100
> cat(sieve_of_eratosthenes(n), "\n")
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97
>
> |
```

Environment	History	Connections	Tutorial
R	Global Environment	122 MiB	
Values			
n		100	
Functions			
sieve_of_eratosthenes		function (n)	

2. Write a R program to print the numbers from 1 to 100 and print "Fizz" for multiples of 3, print "Buzz" for multiples of 5, and print "FizzBuzz" for multiples of both.



The screenshot shows the R Studio interface. The console window displays the following R code and its output:

```
> for (i in 1:100) {  
+   if (i %% 3 == 0 && i %% 5 == 0) {  
+     cat("FizzBuzz\n")  
+   } else if (i %% 3 == 0) {  
+     cat("Fizz\n")  
+   } else if (i %% 5 == 0) {  
+     cat("Buzz\n")  
+   } else {  
+     cat(i, "\n")  
+   }  
+ }  
1  
2  
Fizz  
4  
Buzz  
Fizz  
7  
8  
Fizz  
Buzz  
11  
Fizz  
13  
14  
FizzBuzz  
16  
17  
Fizz  
19  
Buzz  
Fizz  
22  
23  
Fizz  
Buzz  
26  
Fizz  
28  
29  
FizzBuzz  
31  
32  
Fizz  
34  
Buzz  
Fizz
```

The Environment pane on the right shows the Global Environment with a variable 'i' of type '100L'.

3. Write a R program to extract first 10 English letters in lower case and last 10 letters in upper case and extract letters between 22nd to 24th letters in upper case.

The screenshot shows the RStudio interface. The Console pane on the left contains the following R code and its output:

```
> letters_lower <- letters[1:10]
> letters_upper <- toupper(letters[17:26])
> letters_between_22_24 <- toupper(letters[22:24])
>
> cat("First 10 letters in lowercase:", paste(letters_lower, collapse = ""), "\n")
First 10 letters in lowercase: abcdefghij
> cat("Last 10 letters in uppercase:", paste(letters_upper, collapse = ""), "\n")
Last 10 letters in uppercase: QRSTUVWXYZ
> cat("Letters between 22nd and 24th in uppercase:", paste(letters_between_22_24, collapse = ""),
"\n")
Letters between 22nd and 24th in uppercase: VWX
>
> |
```

The Environment pane on the right shows the following variables:

Variable	Class	Value
letters_between_22_24	chr	[1:3] "V" "W" "X"
letters_lower	chr	[1:10] "a" "b" "c" "d" "e" "f" "g" "h" "i" "j"
letters_upper	chr	[1:10] "Q" "R" "S" "T" "U" "V" "W" "X" "Y" "Z"

4. Write a R program to find the factors of a given number.

The screenshot shows the RStudio interface. The Console pane on the left contains the following R code and its output:

```
> find_factors <- function(n) {
+   factors <- which(n %%% 1:n == 0)
+   return(factors)
+ }
>
> n <- 36
> cat("Factors of", n, "are:", find_factors(n), "\n")
Factors of 36 are: 1 2 3 4 6 9 12 18 36
>
> |
```

The Environment pane on the right shows the following variables:

Variable	Value
n	36

The Functions pane shows the function `find_factors` defined as `function (n)`.

5. Write a R program to find the maximum and the minimum value of a given vector.

ConsoleTerminal ×Background Jobs ×

R • R 4.4.2 • ~ /

> vec <- c(12, 5, 8, 19, 3, 25, 1)

>

> max\_value <- max(vec)

> min\_value <- min(vec)

>

> cat("Maximum value:", max\_value, "\n")

Maximum value: 25

> cat("Minimum value:", min\_value, "\n")

Minimum value: 1

>

> |

EnvironmentHistoryConnectionsTutorial

R • Global Environment •

123 MiB

Values

max_value	25
min_value	1
vec	num [1:7] 12 5 8 19 3 25 1