novikovPrac1.R

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# Часть 1 -----------------------------------------------------------------  
  
# Задание 1 ---------------------------------------------------------------  
  
x <- 2  
y <- 4  
x

## [1] 2

y

## [1] 4

z <- x  
x <- y  
y <-z  
x

## [1] 4

y

## [1] 2

x2 <- 2  
y2 <- 4  
x2

## [1] 2

y2

## [1] 4

x2 <- x2 + y2  
y2 <- x2 - y2  
x2 <- x2 - y2  
x2

## [1] 4

y2

## [1] 2

# Задание 2 ---------------------------------------------------------------  
  
x <- 3.5  
y <- "2,6"  
z <- 1.78  
h <- TRUE  
  
typeof(x)

## [1] "double"

typeof(y)

## [1] "character"

class(z)

## [1] "numeric"

class(h)

## [1] "logical"

h <- as.integer(h)  
h

## [1] 1

y <- sub(",", ".", y)  
y <- as.numeric(y)  
y

## [1] 2.6

x <- as.character(x)  
x

## [1] "3.5"

# Задание 3 ---------------------------------------------------------------  
  
dohod <- 1573  
  
dohod <- log(dohod)  
  
# Задание 4 ---------------------------------------------------------------  
  
N <- readLines(con = "test.txt", n = 1, encoding = "UTF-8")  
N <- as.numeric(N)  
2\*N-1

## [1] 31

# Часть 2 -----------------------------------------------------------------  
  
# Задание 1 ---------------------------------------------------------------  
  
g <- c(1, 0, 2, 3, 6, 8, 12, 15, 0, NA, NA, 9, 4, 16, 2, 0)  
g[1]

## [1] 1

g[length(g)]

## [1] 0

g[3:5]

## [1] 2 3 6

g[g == 2 & !is.na(g)]

## [1] 2 2

g[g > 4 & !is.na(g)]

## [1] 6 8 12 15 9 16

g[g %% 3 == 0 & !is.na(g)]

## [1] 0 3 6 12 15 0 9 0

g[g > 4 & g %% 3 == 0 & !is.na(g)]

## [1] 6 12 15 9

g[(g < 1 | g > 5) & !is.na(g)]

## [1] 0 6 8 12 15 0 9 16 0

which(g == 0)

## [1] 2 9 16

which(g >= 2 & g <= 8)

## [1] 3 4 5 6 13 15

sort(g[g != 2], na.last = T)

## [1] 0 0 0 1 3 4 6 8 9 12 15 16 NA NA

# Задание 2 ---------------------------------------------------------------  
  
vec1 <- c(1, 2, 3, 4)  
vec2 <- 1:10  
vec1[length(vec1)] <- NA  
vec1

## [1] 1 2 3 NA

vec2[length(vec2)] <- NA  
vec2

## [1] 1 2 3 4 5 6 7 8 9 NA

# Задание 3 ---------------------------------------------------------------  
  
vec3 <- c(0, NA, 2, 3, NA, NA, 8, 9)  
which(is.na(vec3))

## [1] 2 5 6

# Задание 4 ---------------------------------------------------------------  
  
f <- c(NA, 0, NA, 3, 6, 8, 12, 15, 0, NA, NA, 9, 4, 16, 2, 0)  
sum(is.na(f))

## [1] 4

# Задание 5 ---------------------------------------------------------------  
  
id1 <- 1:100  
id1

## [1] 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18  
## [19] 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36  
## [37] 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54  
## [55] 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72  
## [73] 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90  
## [91] 91 92 93 94 95 96 97 98 99 100

id2 <- sample(1:100)  
id2

## [1] 48 47 59 21 88 13 45 51 90 85 36 11 75 15 69 26 10 57  
## [19] 17 92 65 24 56 40 70 94 89 64 78 83 66 91 55 68 53 46  
## [37] 97 22 72 8 98 52 16 43 3 31 42 28 2 81 39 71 74 84  
## [55] 7 82 87 29 76 41 77 25 95 18 27 61 1 50 38 14 100 23  
## [73] 54 9 80 35 60 93 49 99 44 6 96 62 67 86 58 73 20 12  
## [91] 19 32 4 30 33 5 63 79 37 34

# Задание 6 ---------------------------------------------------------------  
  
country <- c("France", "Italy", "Spain")  
country

## [1] "France" "Italy" "Spain"

years <- 2017:2020  
years

## [1] 2017 2018 2019 2020

# Задание 7 ---------------------------------------------------------------  
  
income <- c(10000, 32000, 28000, 150000, 65000, 1573)  
income

## [1] 10000 32000 28000 150000 65000 1573

avg <- sum(income) / length(income)  
avg

## [1] 47762.17

income\_class <- ifelse(income < avg, 0, 1)  
income\_class

## [1] 0 0 0 1 1 0

# Задание 8 ---------------------------------------------------------------  
  
coords <- as.numeric(readLines("coords.txt", 14))  
coords

## [1] 20 4 187 5 214 4 68 3 23 19 49 6 74 12

p <- 5.76  
result <- sum(abs(coords)^p)^(1/p)  
result

## [1] 228.6307

write(result, "result.txt")  
  
# Задание 9 ---------------------------------------------------------------  
  
coords <- as.numeric(readLines("coords.txt", 14))  
if(length(coords) <= 2){  
 print("Невозможно посчитать разности, слишком мало значений.")  
} else{  
 coords  
 first\_diff <- diff(coords)  
 first\_diff  
 second\_diff <- diff(coords, 2)  
 second\_diff  
 all\_diff <-c(first\_diff, second\_diff)  
 all\_diff  
 write(all\_diff, "diff\_vectors.txt")  
}