Лабораторная работа 3

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Выполнение

Циклы while и for

```
n=0
while n<10
    n+=1
    println(n)
end
```

```
1
2
3
4
5
6
7
8
9
10
```

```
for n in 1:2:10
    println(n)
end
myfriends = ["Ted", "Robyn", "Barney", "Lily", "Marshall"]
for friend in myfriends
    println("Hi $friend, it's great to see you!")
end
```

Условные выражения

1]:
```
N=15
if (N % 3 == 0) && (N % 5 == 0)
    println("FizzBuzz")
elseif N % 3 == 0
    println("Fizz")
elseif N % 5 == 0
    println("Buzz")
else
    println(N)
end
```

```
FizzBuzz
```

12]:
```
x = 5
y = 10
(x > y) ? x : y
```

12]:
```
10
```

Функции

```
function sayhi(name)
println("Hi $name, it's great to see you!")
end
# функция возведения в квадрат:
function f(x)
x^2
end
```

```
f (generic function with 1 method)
```

```
v = [3, 5, 2]
sort(v)
v
sort!(v)
v
```

```
3-element Vector{Int64}:
 2
 3
 5
```

```
map(f, [1, 2, 3])
```

Сторонние библиотеки (пакеты) в Julia

Задание 1

```
for i in 1:100
    println(i)
end
```

```
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
```

```
i = 1
while i <= 100
    println(i^2)
    i+=1
end
```

Задание 2

```
N=10
if N % 2 == 0
    println("четное")
else
    println("нечетное")
end
```

```
четное
```

```
N=10
(N % 2 == 0) ? println(" четное") : println(" нечетное")
```

```
 четное
```

Рис. 1: 2

```
function add_one(x)
    x+1
end
add_one(2)
```

```
3
```

Рис. 2: 2

```
x= fill(1, 3 * 3)
q=collect(0:(length(x)-1))
x=reshape(map(+,x,q),(3,3))
```

```
3×3 Matrix{Int64}:
 1  4  7
 2  5  8
 3  6  9
```

Рис. 3: 4

Задание 5

```
]: A=[1 1 3; 5 2 6; -2 -1 -3]
```

```
]: 3×3 Matrix{Int64}:
    1   1   3
    5   2   6
   -2  -1  -3
```

```
]: A^3
```

```
]: 3×3 Matrix{Int64}:
   0  0  0
   0  0  0
   0  0  0
```

```
]: for i in 7:1:9
       A[i]+= A[i-3]
   end
   A
```

```
]: 3×3 Matrix{Int64}:
    1   1   4
    5   2   8
   -2  -1  -4
```

Задание 6

```
B = Array{Int32, 2}(undef,15,3)
for i in 1:15
    B[i,1] = 10
    B[i,2] = -10
    B[i,3] = 10
end
B
```

```
15×3 Matrix{Int32}:
 10  -10  10
 10  -10  10
 10  -10  10
 10  -10  10
 10  -10  10
 10  -10  10
 10  -10  10
 10  -10  10
 10  -10  10
 10  -10  10
 10  -10  10
 10  -10  10
 10  -10  10
 10  -10  10
 10  -10  10
```

```
C = (B')*B
C
```

```
3×3 Matrix{Int32}:
  1500  -1500   1500
 -1500   1500  -1500
  1500  -1500   1500
```

Задание 7

```
z = zeros(Int64,6,6)
```

```
6×6 Matrix{Int64}:
 0  0  0  0  0  0
 0  0  0  0  0  0
 0  0  0  0  0  0
 0  0  0  0  0  0
 0  0  0  0  0  0
 0  0  0  0  0  0
```

```
e= ones(Int64,6,6)
```

```
6×6 Matrix{Int64}:
 1  1  1  1  1  1
 1  1  1  1  1  1
 1  1  1  1  1  1
 1  1  1  1  1  1
 1  1  1  1  1  1
 1  1  1  1  1  1
```

```
z1=z
for i in 1:6
    if i != 1
        z1[i, i-1] = e[i,i-1]
    end
    if i != 6
        z1[i,i+1] = e[i,i+1]
    end
end
z1
```

```
6×6 Matrix{Int32}:
 0  1  0  0  0  0
 1  0  1  0  0  0
 0  1  0  1  0  0
 0  0  1  0  1  0
 0  0  0  1  0  1
 0  0  0  0  1  0
```

```
z2 =z
for i in 1:1:6
    z2[i,i]= 1
    if (i+2 <=6)
        z2[i,i+2]=e[i,i+2]
    end
    if (i-2 >=1)
        z2[i,i-2]=e[i,i-2]
    end
end
z2
```

```
6×6 Matrix{Int64}:
 1  0  1  0  0  0
 0  1  0  1  0  0
 1  0  1  0  1  0
 0  1  0  1  0  1
 0  0  1  0  1  0
 0  0  0  1  0  1
```

```
z3 = z
for i in 1:1:6
    if (9-i <=6)
        z3[i,9-i]=e[i,9-i]
    end
    if (5-i>=1)
        z3[i,5-i]=e[i,5-i]
    end
end
z3
```

```
6×6 Matrix{Int64}:
 1  0  1  1  0  0
 0  1  1  1  0  0
 1  1  1  0  1  1
 1  1  0  1  1  1
 0  0  1  1  1  0
 0  0  1  1  0  1
```

Вывод

Мы освоили применение циклов функций и сторонних для Julia пакетов для решения задач линейной алгебры и работы с матрицами.