

Лабораторная работы №1

Знакомство с Julia

Кузнецова С. В.

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Российский университет дружбы народов, Москва, Россия

Информация

- Кузнецова София Вадимовна
- Российский университет дружбы народов

- Подготовить рабочее пространство и инструментарий для работы с языком программирования Julia, на простейших примерах познакомиться с основами синтаксиса Julia.

Выполнение лабораторной работы

Подготовка инструментария к работе

Установка необходимых приложений

```
PS C:\Users\sofik> Set-ExecutionPolicy Bypass -Scope Process -Force; [System.Net.ServicePointManager]::SecurityProtocol
= [System.Net.ServicePointManager]::SecurityProtocol -bor 3072; iex ((New-Object System.Net.WebClient).DownloadString('h
https://community.chocolatey.org/install.ps1'))
ПРЕДУПРЕЖДЕНИЕ: 'choco' was found at 'C:\ProgramData\chocolatey\bin\choco.exe'.
ПРЕДУПРЕЖДЕНИЕ: An existing Chocolatey installation was detected. Installation will not continue. This script will not
overwrite existing installations.
If there is no Chocolatey installation at 'C:\ProgramData\chocolatey', delete the folder and attempt the installation
again.

Please use choco upgrade chocolatey to handle upgrades of Chocolatey itself.
If the existing installation is not functional or a prior installation did not complete, follow these steps:
  - Backup the files at the path listed above so you can restore your previous installation if needed.
  - Remove the existing installation manually.
  - Rerun this installation script.
  - Reinstall any packages previously installed, if needed (refer to the lib folder in the backup).

Once installation is completed, the backup folder is no longer needed and can be deleted.
```

Рис. 1: Установка менеджера пакетов Chocolatey

```
PS C:\Users\sofik> choco install far -y
Chocolatey v2.5.1
Installing the following packages:
far
By installing, you accept licenses for the packages.
far v3.0.6446 already installed.
  Use --force to reinstall, specify a version to install, or try upgrade.

Chocolatey installed 0/1 packages.
  See the log for details (C:\ProgramData\chocolatey\logs\chocolatey.log).

Warnings:
- far - far v3.0.6446 already installed.
  Use --force to reinstall, specify a version to install, or try upgrade.
```

Рис. 2: Установка Far Manager

Установка необходимых приложений

```
PS C:\Users\sofik> choco install notepadplusplus -y
Chocolatey v2.5.1
Installing the following packages:
notepadplusplus
By installing, you accept licenses for the packages.
notepadplusplus v8.8.5 already installed.
Use --force to reinstall, specify a version to install, or try upgrade.

Chocolatey installed 0/1 packages.
See the log for details (C:\ProgramData\chocolatey\logs\chocolatey.log).

Warnings:
- notepadplusplus - notepadplusplus v8.8.5 already installed.
Use --force to reinstall, specify a version to install, or try upgrade.
```

Рис. 3: Установка Notepad++

```
PS C:\Users\sofik> choco install julia -y
Chocolatey v2.5.1
Installing the following packages:
julia
By installing, you accept licenses for the packages.
julia v1.11.6 already installed.
  Use --force to reinstall, specify a version to install, or try upgrade.

Chocolatey installed 0/1 packages.
  See the log for details (C:\ProgramData\chocolatey\logs\chocolatey.log).

Warnings:
- julia - julia v1.11.6 already installed.
  Use --force to reinstall, specify a version to install, or try upgrade.
```

Рис. 4: Установка Julia

Установка необходимых приложений

```
PS C:\Users\sofik> choco install anaconda3 -y
Chocolatey v2.5.1
Installing the following packages:
anaconda3
By installing, you accept licenses for the packages.
anaconda3 v2025.6.0 already installed.
Use --force to reinstall, specify a version to install, or try upgrade.

Chocolatey installed 0/1 packages.
See the log for details (C:\ProgramData\chocolatey\logs\chocolatey.log).

Warnings:
- anaconda3 - anaconda3 v2025.6.0 already installed.
Use --force to reinstall, specify a version to install, or try upgrade.
```

Рис. 5: Установка Anaconda Distribution (Python 3.x)

Установка необходимых пакетов

```
PS C:\Users\sofik> julia

      _       _       _
     /_      /_      /_
    /_/_    /_/_    /_/_
   /_/_/_  /_/_/_  /_/_/_
  /_/_/_/_/_/_/_/_/_/_/_
 /_/_/_/_/_/_/_/_/_/_/_/
/_/_/_/_/_/_/_/_/_/_/_/_/

Documentation: https://docs.julialang.org

Type "?" for help, "]?" for Pkg help.

Version 1.11.6 (2025-07-09)
Official https://julialang.org/ release

(@v1.11) pkg> add IJulia
  Resolving package versions...
  No Changes to `C:\Users\sofik\.julia\environments\v1.11\Project.toml`
  No Changes to `C:\Users\sofik\.julia\environments\v1.11\Manifest.toml`

(@v1.11) pkg>
```

Рис. 6: Установка пакетов для работы с Jupyter

Основы синтаксиса Julia на примерах

```
[85]: typeof(3), typeof(3.5), typeof(3/3.5), typeof(sqrt(3+4im)), typeof(pi)

[85]: (Int64, Float64, Float64, ComplexF64, Irrational{:π})

[87]: 1.0/0.0, 1.0/(-0.0), 0.0/0.0

[87]: (Inf, -Inf, NaN)

[89]: typeof(1.0/0.0), typeof(1.0/-0.0), typeof(0.0/0.0)

[89]: (Float64, Float64, Float64)

[91]: for T in [Int8,Int16,Int32,Int64,Int128,UInt8,UInt16,UInt32,UInt64,UInt128]
println("$(\lpad(T,7)): [$(typemin(T)),$(typemax(T))]"
end

      Int8: [-128,127]
      Int16: [-32768,32767]
      Int32: [-2147483648,2147483647]
      Int64: [-9223372036854775808,9223372036854775807]
      Int128: [-170141183460469231731687303715884105728,170141183460469231731687303715884105727]
      UInt8: [0,255]
      UInt16: [0,65535]
      UInt32: [0,4294967295]
      UInt64: [0,18446744073709551615]
      UInt128: [0,340282366920938463463374607431768211455]
```

Рис. 7: Примеры определения типа числовых величин

```
[93]: Int64(2.0), Char(2), typeof(Char(2))
```

```
[93]: (2, '\x02', Char)
```

```
[95]: convert(Int64, 2.0), convert(Char, 2)
```

```
[95]: (2, '\x02')
```

```
[97]: typeof(promote(Int8(1), Float16(4.5), Float32(4.1)))
```

```
[97]: Tuple{Float32, Float32, Float32}
```

Рис. 8: Примеры приведения аргументов к одному типу

```
[99]: function f(x)
      x^2
      end
```

```
[99]: f (generic function with 1 method)
```

```
[101]: f(4)
```

```
[101]: 16
```

```
[103]: g(x)=x^2
```

```
[103]: g (generic function with 1 method)
```

```
[105]: g(8)
```

```
[105]: 64
```

Рис. 9: Примеры определения функций


```
[107]: a = [4 7 6]
      b = [1, 2, 3]
      a[2], b[2]
```

```
[107]: (7, 2)
```

```
[109]: a = 1; b = 2; c = 3; d = 4
      Am = [a b; c d]
```

```
[109]: 2x2 Matrix{Int64}:
      1  2
      3  4
```

```
[111]: Am[1,1], Am[1,2], Am[2,1], Am[2,2]
```

```
[111]: (1, 2, 3, 4)
```

```
[115]: aa = [1 2]
      AA = [1 2; 3 4]
      aa*AA*aa'
```

```
[115]: 1x1 Matrix{Int64}:
      27
```

```
[117]: aa, AA, aa'
```

```
[117]: ([1 2], [1 2; 3 4], [1; 2;:])
```

Рис. 10: Примеры работы с массивами

Самостоятельная работа

Примеры для задания №1

```
[120]: write("myfile.txt", "Hello, world!\nMy name is Sofia.\n")
```

```
[120]: 32
```

```
[122]: io = open("myfile.txt", "r")  
read(io, String)
```

```
[122]: "Hello, world!\nMy name is Sofia.\n"
```

```
[125]: readline("myfile.txt")
```

```
[125]: "Hello, world!"
```

```
[128]: readlines("myfile.txt")
```

```
[128]: 2-element Vector{String}:  
      "Hello, world!"  
      "My name is Sofia."
```

```
[131]: print("Hello, World!")
```

```
Hello, World!
```

```
[133]: println("Hello", ",", " World!")
```

```
Hello, World!
```

```
[135]: show("Hello, World!")
```

```
"Hello, World!"
```

Рис. 11: Примеры работы с функциями для чтения/записи/вывода информации на экран

```
[141]: ex1 = Meta.parse("(4 + 4) / 2")
```

```
[141]: :((4 + 4) / 2)
```

Рис. 12: Пример работы с функцией parse

Примеры для задания №3

[143]: $1 + 1$

[143]: 2

[145]: $5 - 1.0$

[145]: 4.0

[147]: $2.0 + 3.0$

[147]: 5.0

[149]: $2.0 * 3.0$

[149]: 6.0

[151]: $6 / 2$

[151]: 3.0

[153]: $7.0 \% 6$

[153]: 1.0

[155]: 2^5

[155]: 32

Рис. 13: Примеры работы базовых математических операций

Примеры для задания №3

```
[157]: 1 == 1
```

```
[157]: true
```

```
[159]: 2 != 2
```

```
[159]: false
```

```
[161]: 5.0 < 5
```

```
[161]: false
```

```
[165]: 3 > 2.7
```

```
[165]: true
```

```
[167]: x = true  
      !x
```

```
[167]: false
```

```
[169]: x = true  
      y = false  
      x || y
```

```
[169]: true
```

Рис. 14: Примеры работы базовых математических операций

Примеры для задания №4

```
[173]: using LinearAlgebra
A = [1 2 3; 5 3 8; 7 9 3]

[173]: 3x3 Matrix{Int64}:
 1  2  3
 5  3  8
 7  9  3

[175]: det(A)

[175]: 91.0

[177]: tr(A)

[177]: 7

[179]: inv(A)

[179]: 3x3 Matrix{Float64}:
-0.692308  0.230769  0.0769231
 0.450549 -0.197802  0.0769231
 0.263736  0.0549451 -0.0769231

[181]: B = [1 1 1; 1 1 1; 1 1 1]
A - B

[181]: 3x3 Matrix{Int64}:
 0  1  2
 4  2  7
 6  8  2

[183]: A + B

[183]: 3x3 Matrix{Int64}:
 2  3  4
 6  4  9
 8 10  4

[185]: A * B

[185]: 3x3 Matrix{Int64}:
 6  6  6
16 16 16
19 19 19
```

Рис. 15: Примеры работы с операциями над матрицами

Вывод

- В ходе выполнения лабораторной работы были получены навыки по подготовке рабочего пространства и инструментария для работы с языком программирования Julia, а также познакомились на простейших примерах с основами синтаксиса Julia.

Список литературы. Библиография

[1] Julia Documentation: <https://docs.julialang.org/en/v1/>

Спасибо за внимание!