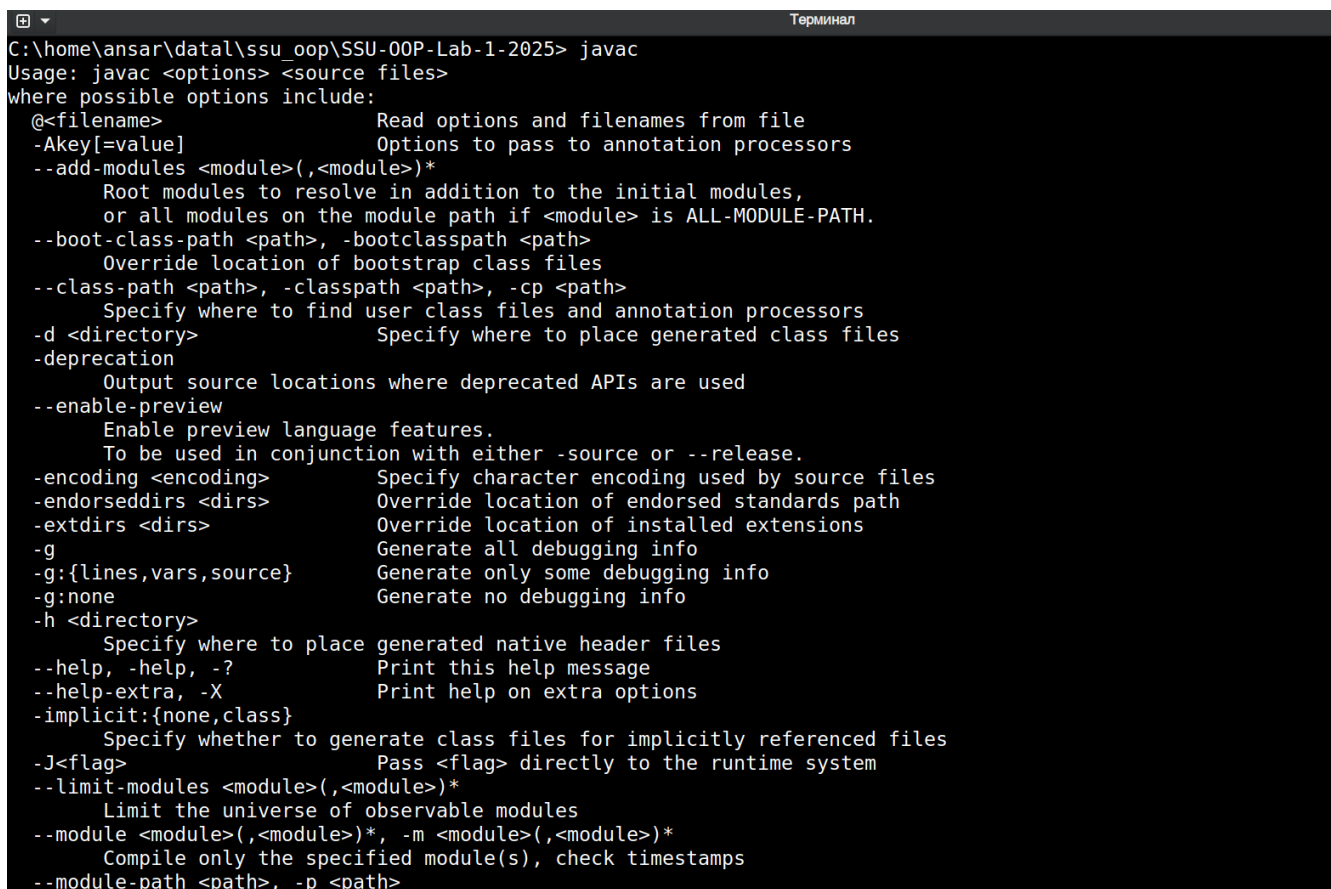


Самарский национальный исследовательский  
университет имени академика С. П. Королёва

## Лабораторная работа №1

Выполнил:  
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Абдуллин А.Р.

# 1 Задание

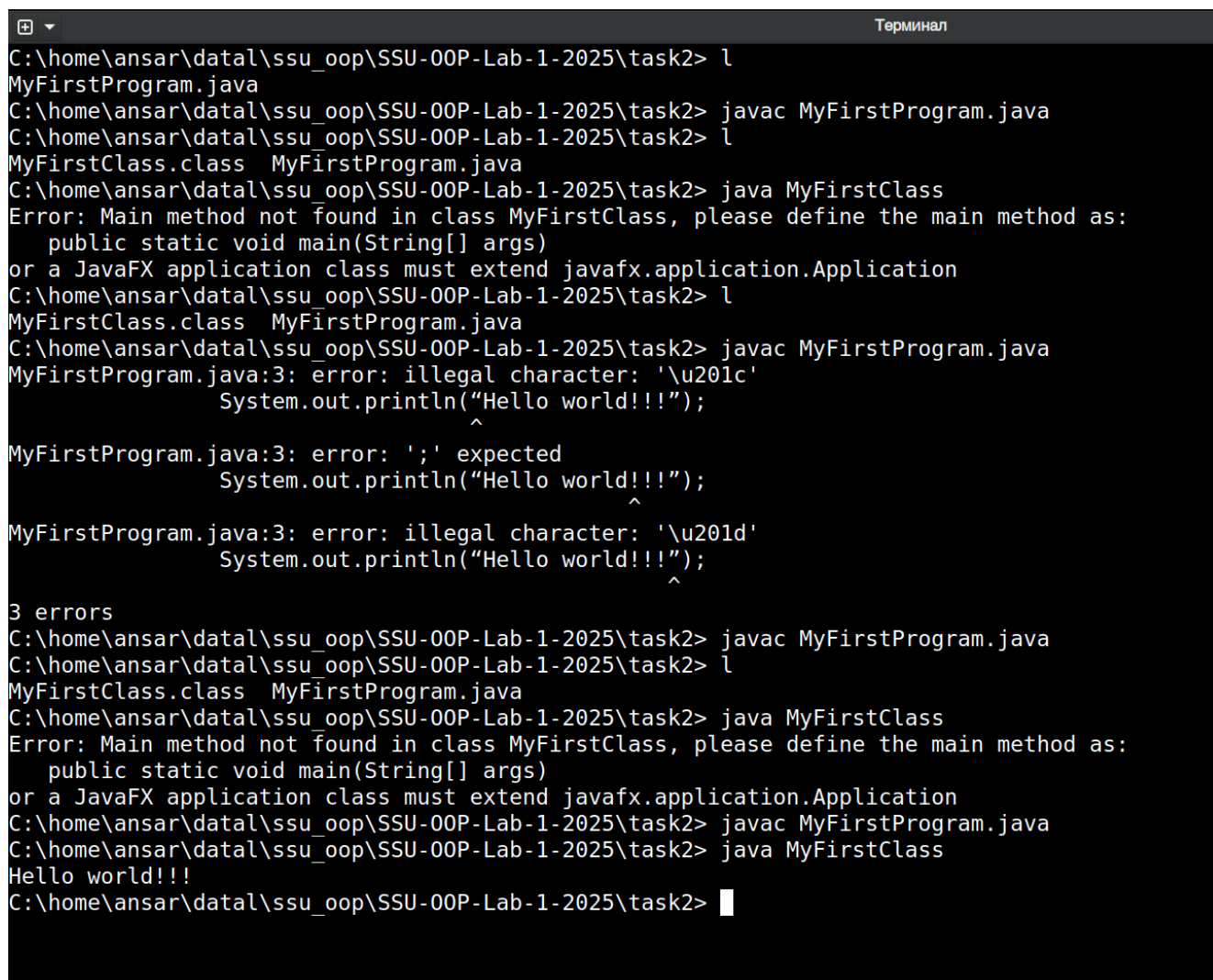


```
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025> javac
Usage: javac <options> <source files>
where possible options include:
  @<filename>                Read options and filenames from file
  -Akey[=value]              Options to pass to annotation processors
  --add-modules <module>(,<module>)*
                             Root modules to resolve in addition to the initial modules,
                             or all modules on the module path if <module> is ALL-MODULE-PATH.
  --boot-class-path <path>, -bootclasspath <path>
                             Override location of bootstrap class files
  --class-path <path>, -classpath <path>, -cp <path>
                             Specify where to find user class files and annotation processors
  -d <directory>             Specify where to place generated class files
  -deprecation
                             Output source locations where deprecated APIs are used
  --enable-preview
                             Enable preview language features.
                             To be used in conjunction with either -source or --release.
  -encoding <encoding>       Specify character encoding used by source files
  -endorseddirs <dirs>        Override location of endorsed standards path
  -extdirs <dirs>             Override location of installed extensions
  -g                          Generate all debugging info
  -g:{lines,vars,source}      Generate only some debugging info
  -g:none                     Generate no debugging info
  -h <directory>              Specify where to place generated native header files
  --help, -help, -?           Print this help message
  --help-extra, -X            Print help on extra options
  -implicit:{none,class}      Specify whether to generate class files for implicitly referenced files
  -J<flag>                    Pass <flag> directly to the runtime system
  --limit-modules <module>(,<module>)*
                             Limit the universe of observable modules
  --module <module>(,<module>)*, -m <module>(,<module>)*
                             Compile only the specified module(s), check timestamps
  --module-path <path>, -p <path>
```

Рис. 1:

Ввел команды javac и java в терминал, получил описание

## 2 Задание



```
Терминал
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task2> l
MyFirstProgram.java
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task2> javac MyFirstProgram.java
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task2> l
MyFirstClass.class  MyFirstProgram.java
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task2> java MyFirstClass
Error: Main method not found in class MyFirstClass, please define the main method as:
    public static void main(String[] args)
or a JavaFX application class must extend javafx.application.Application
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task2> l
MyFirstClass.class  MyFirstProgram.java
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task2> javac MyFirstProgram.java
MyFirstProgram.java:3: error: illegal character: '\u021c'
    System.out.println("Hello world!!!");
                        ^
MyFirstProgram.java:3: error: ';' expected
    System.out.println("Hello world!!!");
                        ^
MyFirstProgram.java:3: error: illegal character: '\u021d'
    System.out.println("Hello world!!!");
                        ^
3 errors
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task2> javac MyFirstProgram.java
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task2> l
MyFirstClass.class  MyFirstProgram.java
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task2> java MyFirstClass
Error: Main method not found in class MyFirstClass, please define the main method as:
    public static void main(String[] args)
or a JavaFX application class must extend javafx.application.Application
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task2> javac MyFirstProgram.java
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task2> java MyFirstClass
Hello world!!!
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task2> █
```

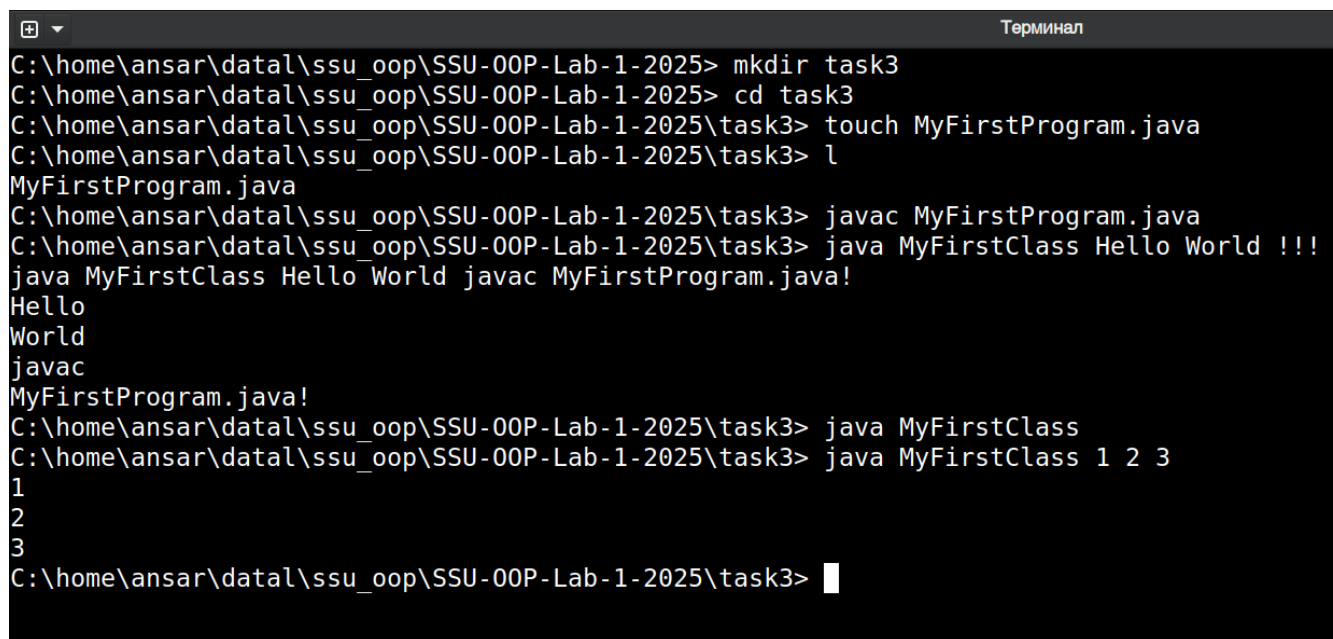
Рис. 2:

Создал файл с пустым классом MyFirstClass, при запуске выдает ошибку и просит объявить метод main.

Определил метод main, перекомпилировал и получил ошибку синтаксиса, исправил.

Перекомпилировал, выдало ошибку: метод main не публичный и статичный. Исправил, программа собралась правильно.

### 3 Задание

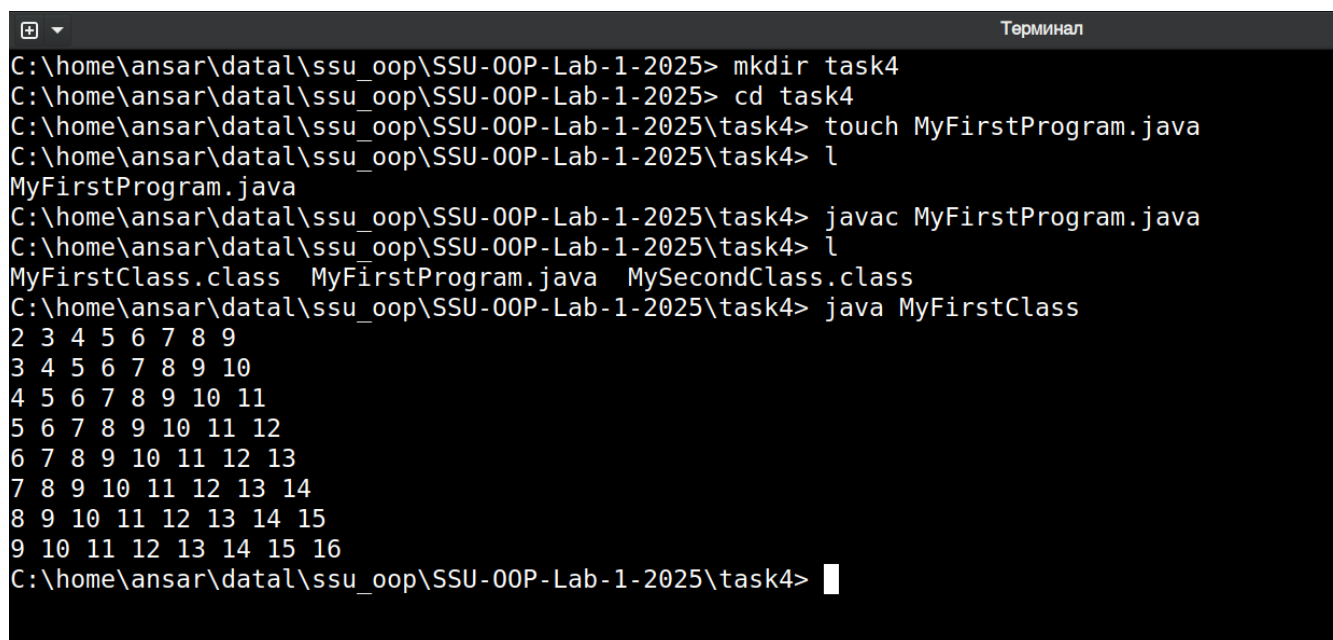


```
Терминал
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025> mkdir task3
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025> cd task3
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task3> touch MyFirstProgram.java
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task3> l
MyFirstProgram.java
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task3> javac MyFirstProgram.java
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task3> java MyFirstClass Hello World !!!
java MyFirstClass Hello World javac MyFirstProgram.java!
Hello
World
javac
MyFirstProgram.java!
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task3> java MyFirstClass
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task3> java MyFirstClass 1 2 3
1
2
3
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task3> █
```

Рис. 3:

Изменил определение метода main, теперь он выводит строки массива параметров передаваемые при запуске программы.

### 4 Задание

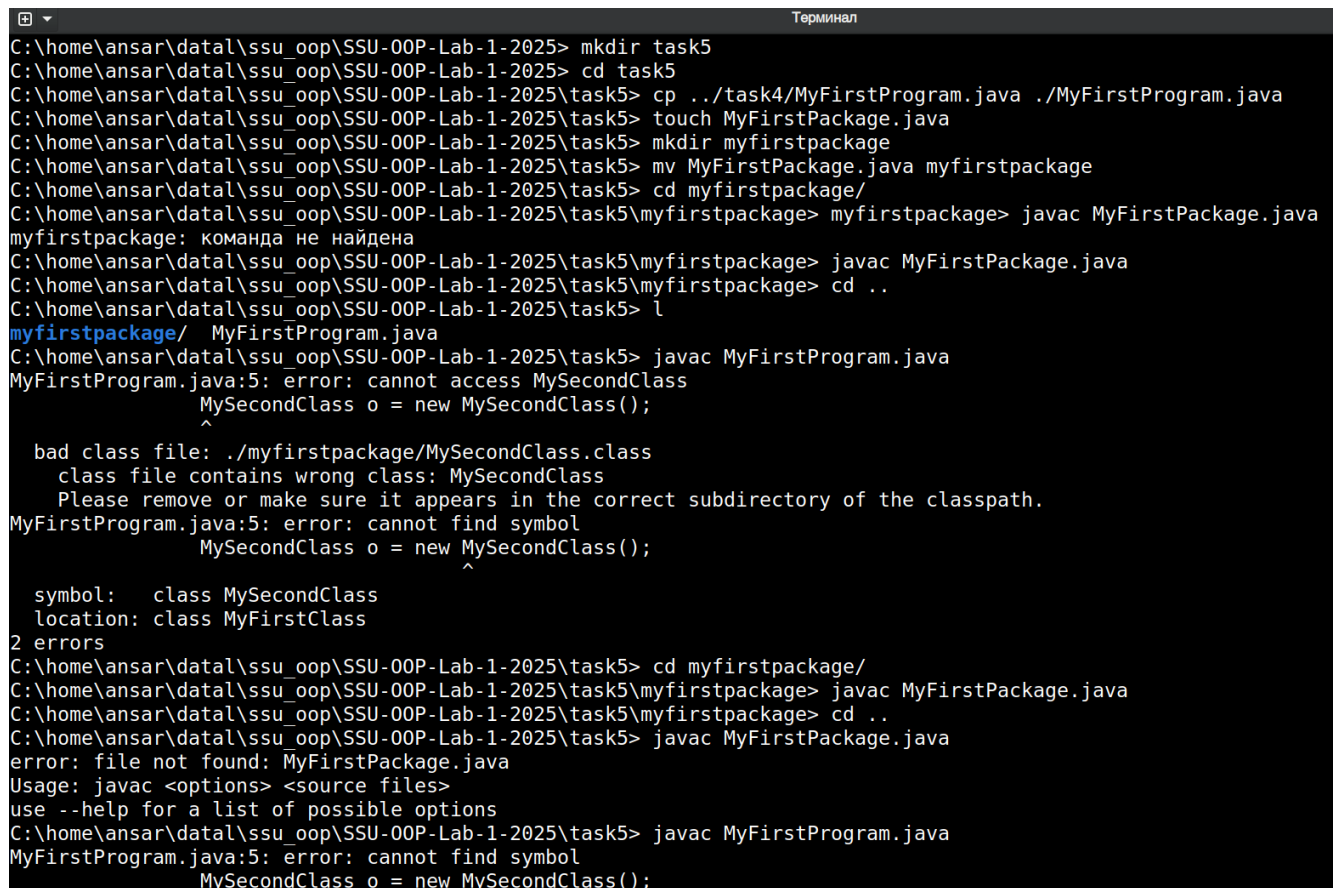


```
Терминал
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025> mkdir task4
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025> cd task4
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task4> touch MyFirstProgram.java
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task4> l
MyFirstProgram.java
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task4> javac MyFirstProgram.java
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task4> l
MyFirstClass.class MyFirstProgram.java MySecondClass.class
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task4> java MyFirstClass
2 3 4 5 6 7 8 9
3 4 5 6 7 8 9 10
4 5 6 7 8 9 10 11
5 6 7 8 9 10 11 12
6 7 8 9 10 11 12 13
7 8 9 10 11 12 13 14
8 9 10 11 12 13 14 15
9 10 11 12 13 14 15 16
C:\home\ansar\data\ssu_oop\SSU-00P-Lab-1-2025\task4> █
```

Рис. 4:

Добавил в класс два частных целочисленных поля, добавил методы для получения/изменения частных полей, добавил метод операцию с числами, добавил конструктор создающий объект и инициализирующий его поля нулями. Переопределил метод `main` заменив квадратные скобки методами класса.

## 5 Задание



Терминал

```
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025> mkdir task5
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025> cd task5
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task5> cp ../task4/MyFirstProgram.java ./MyFirstProgram.java
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task5> touch MyFirstPackage.java
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task5> mkdir myfirstpackage
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task5> mv MyFirstPackage.java myfirstpackage
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task5> cd myfirstpackage/
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task5\myfirstpackage> myfirstpackage> javac MyFirstPackage.java
myfirstpackage: команда не найдена
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task5\myfirstpackage> javac MyFirstPackage.java
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task5\myfirstpackage> cd ..
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task5> l
myfirstpackage/  MyFirstProgram.java
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task5> javac MyFirstProgram.java
MyFirstProgram.java:5: error: cannot access MySecondClass
    MySecondClass o = new MySecondClass();
    ^
bad class file: ./myfirstpackage/MySecondClass.class
  class file contains wrong class: MySecondClass
  Please remove or make sure it appears in the correct subdirectory of the classpath.
MyFirstProgram.java:5: error: cannot find symbol
    MySecondClass o = new MySecondClass();
    ^
  symbol:   class MySecondClass
  location: class MyFirstClass
2 errors
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task5> cd myfirstpackage/
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task5\myfirstpackage> javac MyFirstPackage.java
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task5\myfirstpackage> cd ..
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task5> javac MyFirstPackage.java
error: file not found: MyFirstPackage.java
Usage: javac <options> <source files>
use --help for a list of possible options
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task5> javac MyFirstProgram.java
MyFirstProgram.java:5: error: cannot find symbol
    MySecondClass o = new MySecondClass();
```

Рис. 5:

```

Терминал
C:\home\ansar\datallssu_oop\SSU-00P-Lab-1-2025\task5\myfirstpackage> cd ..
C:\home\ansar\datallssu_oop\SSU-00P-Lab-1-2025\task5> javac MyFirstPackage.java
error: file not found: MyFirstPackage.java
Usage: javac <options> <source files>
use --help for a list of possible options
C:\home\ansar\datallssu_oop\SSU-00P-Lab-1-2025\task5> javac MyFirstProgram.java
MyFirstProgram.java:5: error: cannot find symbol
    MySecondClass o = new MySecondClass();
                        ^
  symbol:   class MySecondClass
  location: class MyFirstClass
MyFirstProgram.java:5: error: cannot find symbol
    MySecondClass o = new MySecondClass();
                        ^
  symbol:   class MySecondClass
  location: class MyFirstClass
2 errors
C:\home\ansar\datallssu_oop\SSU-00P-Lab-1-2025\task5> cd myfirstpackage/
C:\home\ansar\datallssu_oop\SSU-00P-Lab-1-2025\task5\myfirstpackage> l
javac MyFirstPackage.java MySecondClass.class
C:\home\ansar\datallssu_oop\SSU-00P-Lab-1-2025\task5\myfirstpackage> javac MyFirstPackage.java
C:\home\ansar\datallssu_oop\SSU-00P-Lab-1-2025\task5\myfirstpackage> cd ..
C:\home\ansar\datallssu_oop\SSU-00P-Lab-1-2025\task5> javac MyFirstProgram.java
C:\home\ansar\datallssu_oop\SSU-00P-Lab-1-2025\task5> l
MyFirstClass.class myfirstpackage/ MyFirstProgram.java
C:\home\ansar\datallssu_oop\SSU-00P-Lab-1-2025\task5> java MyFirstClass
2 3 4 5 6 7 8 9
3 4 5 6 7 8 9 10
4 5 6 7 8 9 10 11
5 6 7 8 9 10 11 12
6 7 8 9 10 11 12 13
7 8 9 10 11 12 13 14
8 9 10 11 12 13 14 15
9 10 11 12 13 14 15 16
C:\home\ansar\datallssu_oop\SSU-00P-Lab-1-2025\task5>

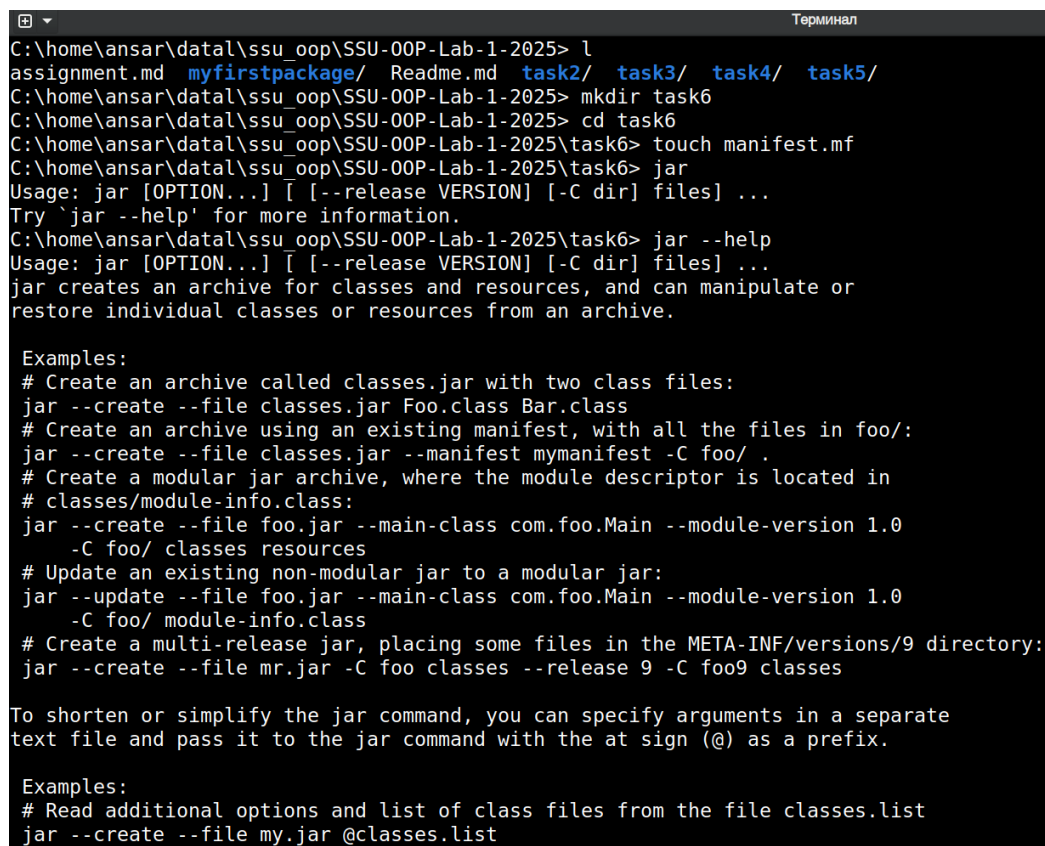
```

Рис. 6:

Создал файл MyFirstPackage, скопировал в него класс MySecondClass из прошлого задания, переместил ее в субдиректорию и прокомпилировал. Вернулся назад, прокомпилировал файл MyFirstProgram получил ошибку доступа к классу MySecondClass.

Определил пакет myfirstpackage в файле MyFirstPackage, перекомпилировал оба файла, получил ошибку: MyFirstProgram не видит класс MySecondClass. Сделал класс и его методы публичными, изменил название класса, так как публичный класс пакета должен совпадать с названием файла. Перекомпилировал, программа собралась без ошибок.

## 6 Задание



```
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025> l
assignment.md  myfirstpackage/  Readme.md  task2/  task3/  task4/  task5/
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025> mkdir task6
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025> cd task6
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task6> touch manifest.mf
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task6> jar
Usage: jar [OPTION...] [ [--release VERSION] [-C dir] files] ...
Try `jar --help' for more information.
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task6> jar --help
Usage: jar [OPTION...] [ [--release VERSION] [-C dir] files] ...
jar creates an archive for classes and resources, and can manipulate or
restore individual classes or resources from an archive.

Examples:
# Create an archive called classes.jar with two class files:
jar --create --file classes.jar Foo.class Bar.class
# Create an archive using an existing manifest, with all the files in foo/:
jar --create --file classes.jar --manifest mymanifest -C foo/ .
# Create a modular jar archive, where the module descriptor is located in
# classes/module-info.class:
jar --create --file foo.jar --main-class com.foo.Main --module-version 1.0
-C foo/ classes resources
# Update an existing non-modular jar to a modular jar:
jar --update --file foo.jar --main-class com.foo.Main --module-version 1.0
-C foo/ module-info.class
# Create a multi-release jar, placing some files in the META-INF/versions/9 directory:
jar --create --file mr.jar -C foo classes --release 9 -C foo9 classes

To shorten or simplify the jar command, you can specify arguments in a separate
text file and pass it to the jar command with the at sign (@) as a prefix.

Examples:
# Read additional options and list of class files from the file classes.list
jar --create --file my.jar @classes.list
```

Рис. 7:

```
Терминал
--date=TIMESTAMP    The timestamp in ISO-8601 extended offset date-time with
                    optional time-zone format, to use for the timestamps of
                    entries, e.g. "2022-02-12T12:30:00-05:00"

Other options:

-?, -h, --help[:compat]  Give this, or optionally the compatibility, help
--help-extra             Give help on extra options
--version                Print program version

An archive is a modular jar if a module descriptor, 'module-info.class', is
located in the root of the given directories, or the root of the jar archive
itself. The following operations are only valid when creating a modular jar,
or updating an existing non-modular jar: '--module-version',
'--hash-modules', and '--module-path'.

Mandatory or optional arguments to long options are also mandatory or optional
for any corresponding short options.

C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task6> jar cfm myfirst.jar manifest.mf ./
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task6> l
manifest.mf  MyFirstClass.class  myfirst.jar  myfirstpackage/
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task6> mkdir MyJar
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task6> mv myfirst.jar MyJar
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task6> cd MyJar
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task6\MyJar> java -jar myfirst.jar
2 3 4 5 6 7 8 9
3 4 5 6 7 8 9 10
4 5 6 7 8 9 10 11
5 6 7 8 9 10 11 12
6 7 8 9 10 11 12 13
7 8 9 10 11 12 13 14
8 9 10 11 12 13 14 15
9 10 11 12 13 14 15 16
C:\home\ansar\datal\ssu_oop\SSU-00P-Lab-1-2025\task6\MyJar> █
```

Рис. 8:

Ввел jar, изучил параметры команды. Создал манифест-файл и ввел в него необходимые данные. Создал архив myfirst.jar, используя команду jar cfm myfirst.jar manifest.mf ./ перенес файл в субдиректорию и запустил программу командой java -jar myfirst.jar