

Programming Assignment 3 – Functional Programming (70 points)

Due Date – 11:59 PM, 12/05/2024

NO LATE submission will be accepted.

You **must** do this assignment on **your own**.

Functional programming is perfect for map, filter, reduce operations for transforming and / or processing data in a declarative way. In this assignment, you will use Scala to write functional programming style code for exercising data map, filter, reduce operations.

Task:

- Locate the **TODOs** in the given **StreamOperation.scala** and write the implementation for several functions for transforming data. Refer to the detailed comments there.

Code to get you started:

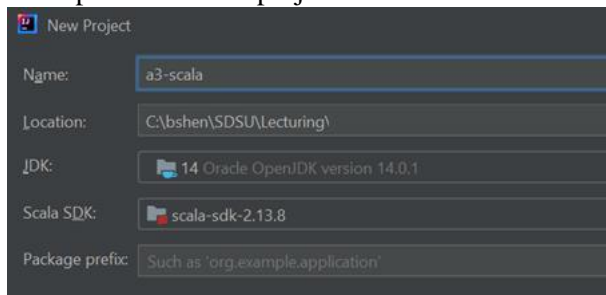
- You are given two scala source code files:
 - a. **StreamOperation.scala**
 - i. Sample functional programming code for map, filter, reduce
 - ii. **TODO sections:** **provide** your implementation of some functions. You **must implement these functions** according to the **comment section above** each function signature, also refer to the function body comments for implementation hints. You **must NOT change** other parts of the source code.
 - b. **Main.scala**
 - i. **Testing** code for debugging. You may want to write more code to test your implementation, particularly to use a good combination of different inputs (see comments / hints in the StreamOperation.scala and Main.scala).

Grading:

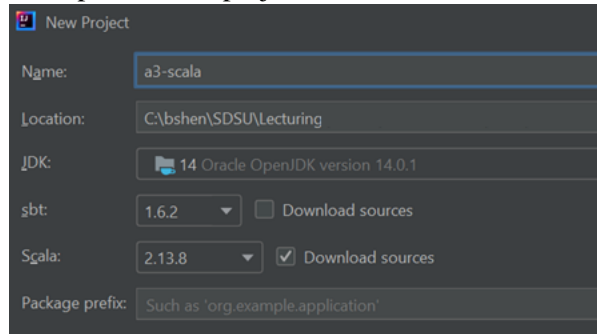
- Autograding accounts for **60** points.
- **Functional programming style** accounts for **10** points, you **must use functional programming (immutability, referential transparency, etc.)** to write the TODO code in the StreamOperation.scala; otherwise, you will lose these **10** points.

IntelliJ IDE project for developing, building, and testing the code:

- Set up the dev environment.
- Download the scala source code files from canvas.
- Create a new Scala project using IDEA or sbt template.
 - Use JDK 1.8 or 1.14, use Scala SDK 2.13.8
 - Example: Use IDEA project



- Example: Use sbt project



- In Location: specify the **project folder**.
- **Important related to source code compile / build:**
 - For IDEA project, to include a source code folder for build:
 - Put source code files into the **src** folder under the project folder, or
 - Right click the folder, then mark directory as **sources root**.
 - For sbt project:
 - All source code files need to be put into the **src/main/scala** folder under the project folder, those files will then be included in the build.
- Use IntelliJ IDE to **build** (compile), **run or debug** your code for testing.
 - Go to build menu to build project.
 - You can run or debug your code from an entry point in the **Main.scala**, Scala allows multiple application entry points.
 - In **Main.scala**
 - To debug or run Main_TestStreams, place the cursor to the beginning of the Main_TestStreams code, right click to run or debug (set break points) from there.

Programming references:

- Refer to Scala development environment setup guide (posted on Canvas).
- Programming in Scala textbook.
- <https://docs.scala-lang.org/scala3/book/introduction.html#>
- Lecture recording (posted on Canvas)

Turning In

You need to submit the following program artifacts on Canvass. Make sure that all submitted files contain your **name** and **Red ID**.

- You should **ONLY** submit **StreamOperation.scala** source file.
- **Important:**
 - Upload the file directly to Canvas.
 - Do NOT **compress / zip** files into a ZIP file and submit, submit all files as they are.

Academic honesty

Posting this assignment to any online learning platform and asking for help is considered academic dishonesty and will be reported.

An automated program structure comparison algorithm will be used to detect code plagiarism.

- Plagiarism detection generates similarity reports of your code with your peers as well as from online sources. **We will also include solutions from the popular learning platforms (such as chegg, github, chatgpt, etc.) and / or past submissions as part of the online sources used for plagiarism similarity detection.** Note not only the plagiarism detection checks for matching content, but also it checks the structure of your code.
- Refer to Syllabus for penalties on plagiarism.
- Note the provided source code in the code skeleton would be excluded in the plagiarism check.

SDSU's Center for Student Rights and Responsibilities have officially added plagiarism policies of using ChatGPT for academic work, as put below:

“Use of ChatGPT or similar entities [to represent human-authored work] is considered academic dishonesty and is a violation of the Student Code of Conduct. Students who utilize this technology will be referred to the Center for Student Rights and Responsibilities and will face student conduct consequences up to, and including, suspension.”