



Boston University
Electrical & Computer Engineering
EC464 Capstone Senior Design Project

Final Testing Report



Reproducibility, Reusability, Readability (RE3)

Submitted to

Ana Trisovic
anatrivic@g.harvard.edu

by

Team #5
RE3

Team Members

Andreas Francisco De Melo Oliveira andoliv@bu.edu
Ethan Hung ehung@bu.edu
Jyotsna Penumaka jyotsnap@bu.edu
Layan Bahaidarah layanb@bu.edu
Lukas Rosario lukasr@bu.edu

Summary of Equipment and Setup

Hardware:

- Computer/Laptop - *Thats is it!*

Software:

- Front End
 - React JS web application
 - Tailwind CSS
 - Firebase JavaScript SDK
- Backend:
 - Google Firebase
 - Firestore
 - Storage
 - Authentication
 - Python Scripts/Notebooks
 - Flask
 - Miniconda3
 - Docker

Set Up:

Since our project is just software based, all of the set up required is to simply access the re3.ai website to access our platform.

Local Set-up:

In order to run the app locally, run npm start to load our web app. Also to run the server backend code for the readability page you can execute the following commands:

- To open the project on a web browser, follow the following steps:
 - cd 21-05-Re3/re3-client
 - npm install
 - npm start
- To run the flask server that calls our machine learning model:
 - cd Re3-readability/flask_api/app
 - python3 main.py
- To build and run projects in a docker container:
 - cd 21-05-Re3/docker-app
 - source venv/bin/Activate
 - python3 app.py
 - celery -A app.celery worker --loglevel=info
 - redis-cli ping
 - brew services start redis

Detailed Measurements Taken:

1. Rated snippets while using the previous and back buttons and verify ratings are saved correctly in Firestore.
2. Uploaded a file into the choose file box and obtained a red, yellow, and green readability score.
3. We displayed appropriate suggestions using the suggestion box once the user uploads the code, including:
 - a. Breaking up your lines
 - b. Diminish the periods in your lines
 - c. Diminishing the parentheses in your lines
 - d. Commenting your code if no comments are found
 - e. Diminishing the number of assignments in your lines
 - f. Users should be able to specify the files they would like to upload.
4. Files uploaded through our reproducibility service were stored in google storage.
5. We were able to decide the order in which files are run in the docker.
6. We were able to specify the R version of their choice
7. The following information should be collected and saved to firestore:
 - a. Author name
 - b. Title
 - c. Key Words
8. On submitting information and clicking “Run Code”:
 - a. The specified R version was used to run the docker file.
 - b. The files were downloaded into the container from google firestore

- c. The files successfully finished the build and run process and output the results,
which is success or error
 - d. The user was able update the R version from the user page.
9. Readability scores were generated upon uploading and then saved to firestore.

Conclusions:

Overall, our final testing went well, since we successfully met all our goals. The group demonstrated our readability and reproducibility platform to Professor Pisano, Professor Osama and Professor Hirsh, and all the TAs. Professor Osama tested our readability platform which was built using R code snippets with python scripts, it still produced acceptable scores with sensible suggestions, which further proves the validity of our machine learning model. A conclusion the team came up with was that we need to clean up our repository and add READMEs wherever necessary so that users viewing our open source repository can understand our work. This is especially important because our project aims to improve the readability and reproducibility of research code, and a messy repository would directly contradict our project's purpose. During our testing meeting, there was also talk of potentially turning our project into a research paper, which our group has been working diligently on. We have been working together with our client on this paper and it can be seen in the link below.

We hope to publish our work done for this project. During the course of the semester, we have been writing our research paper while we have been working on finishing the project. Here is what we have so far.

Research Paper for IEEE International Conference on eScience:

https://drive.google.com/file/d/1_xxcsicLHBXTluiNdYnVwg0swU2mXZYP/view?usp=sharing

Future Work:

- Write a final report.
- Write the user manual.
- Add README for the readability and reproducibility.
- Clean up the repository.

Photos of platform:

The screenshot shows a web application interface with a blue header bar containing a menu icon, 'My Account', and 'Sign out'. The main content area is titled 'Code and Dataset Information'. It features several input fields: 'Author Name' (with placeholder 'ex: John Doe, Jane Doe'), 'Title' (with placeholder 'ex: A Study in Reproducibility'), 'R Version Used' (a dropdown menu with 'Select Version'), 'Files to Upload' (with an 'Add Files' button and a checkmark icon), and 'Information' (with an 'Enter Information' button). To the right of these fields are two blue boxes labeled 'Unordered' and 'Ordered'. The 'Unordered' box contains three items: 'snippet1.R', 'snippet2.R', and 'snippet3.R', each with a close icon. The 'Ordered' box is empty. At the bottom center is a black 'Run Code' button.

Figure 1 : Collect information about the research project dependencies to reproduce code. The user should be able to upload their files and order the files depending on how the user wants to run the files in the container:

The screenshot shows a modal dialog titled 'Licenses and associated keywords' overlaid on the 'Code and Dataset Information' form. The modal has a close button in the top right corner. It contains three input fields: 'Code License:' (with placeholder 'ex: Apache License 2.0'), 'Data License:' (with placeholder 'ex: PDDL'), and 'Key Words:' (with placeholder 'ex: R code, Reproducibility'). At the bottom of the modal is a blue 'Done' button. The background form is partially visible, showing the 'Author Name' field and the 'Run Code' button.

Figure 2: Collect information about the research project, the user plans to upload

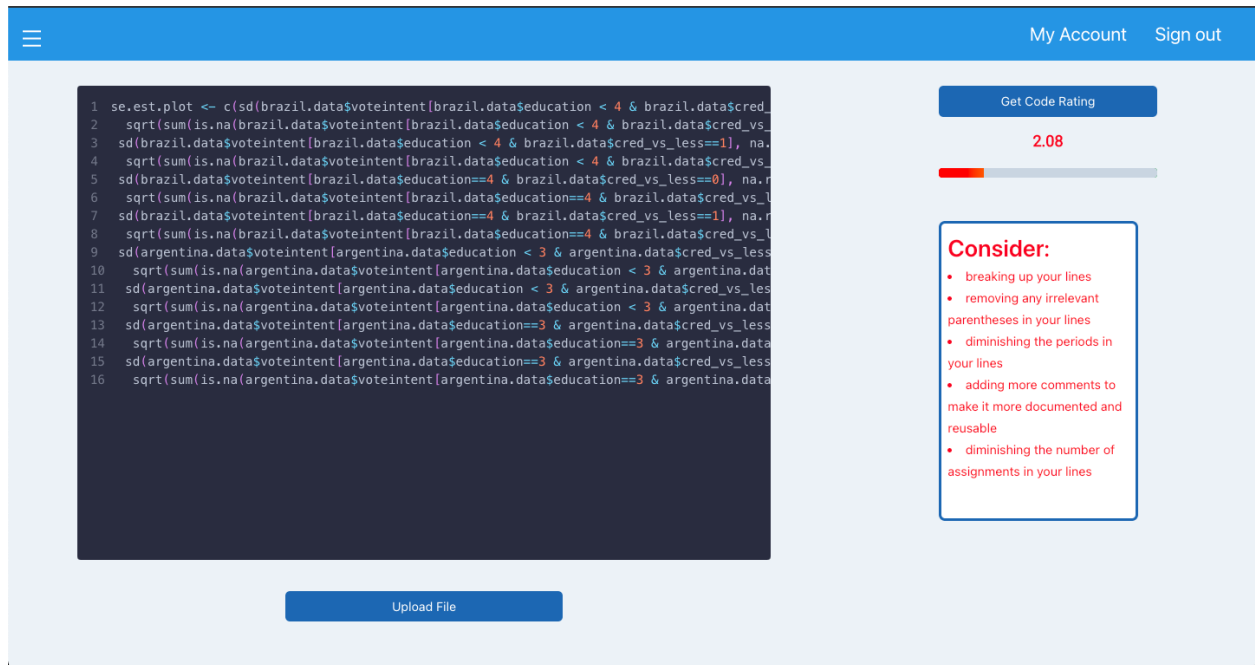


Figure 4: Upload file on the readability page and the code readability rating of such file with suggestions

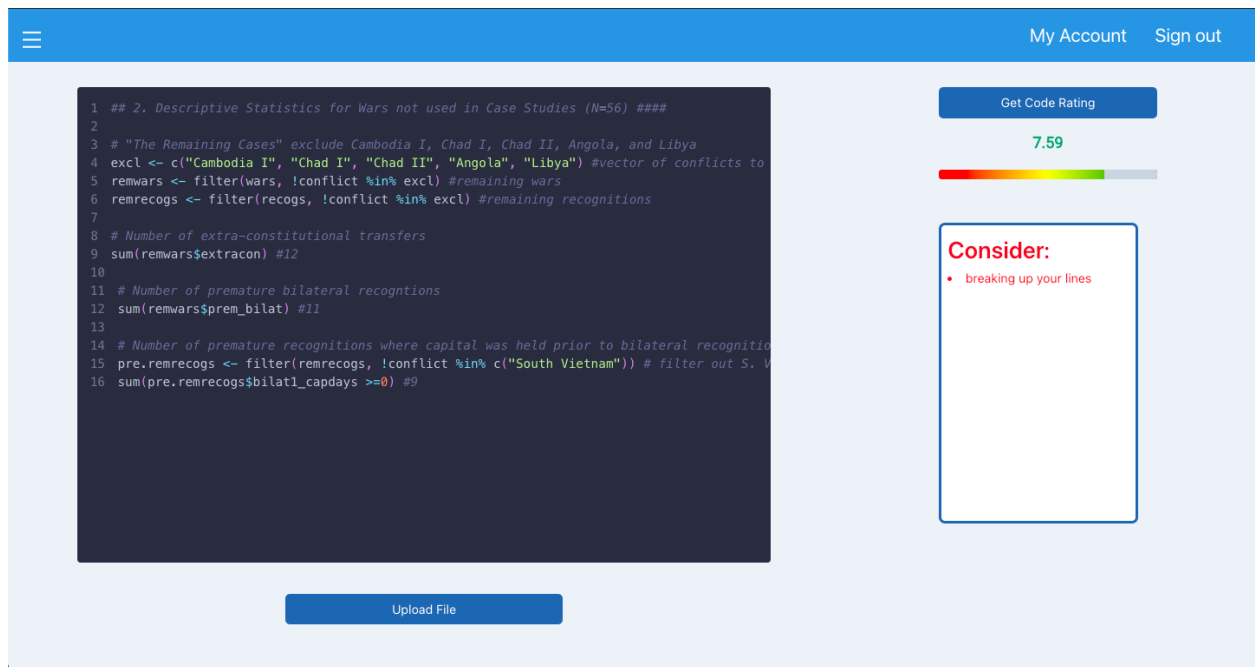


Figure 5: Upload file and get better rating if code is more organized and well commented

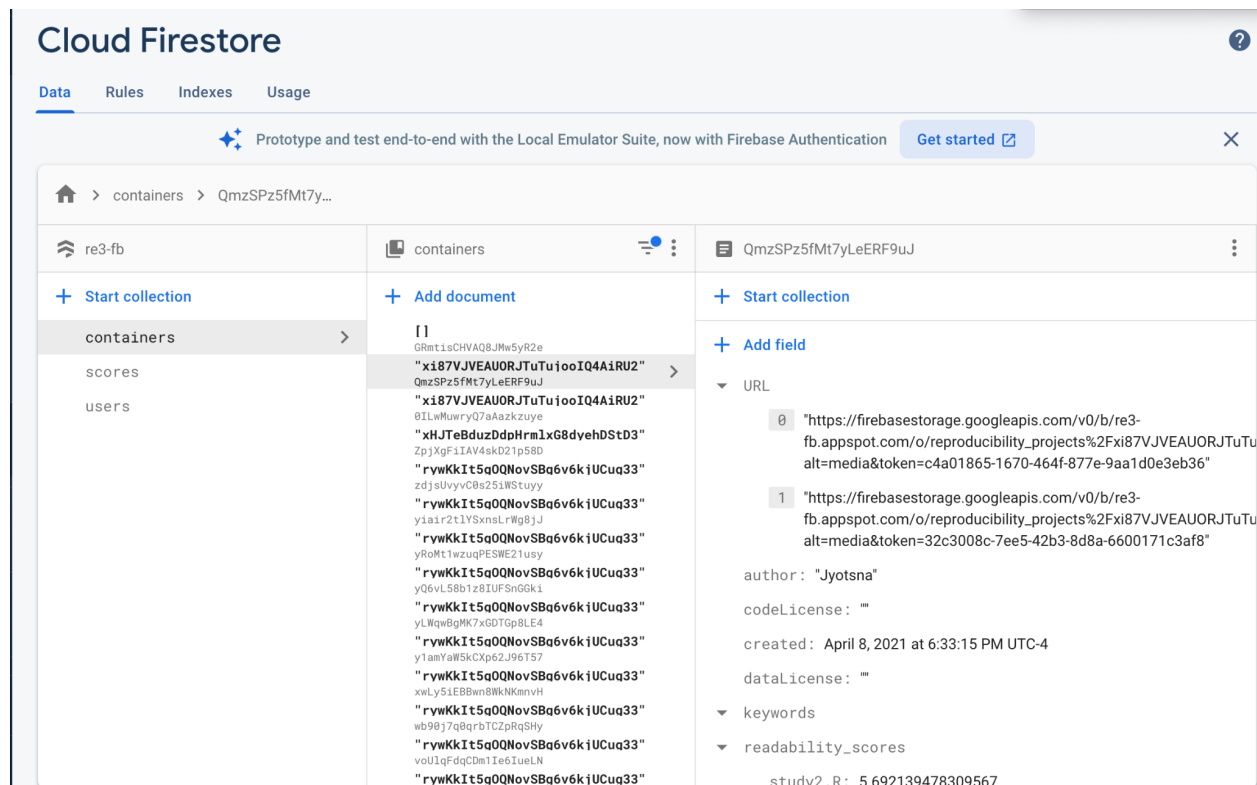


Figure 7: Upload the file projects to Firebase Storage and save the links in the firestore

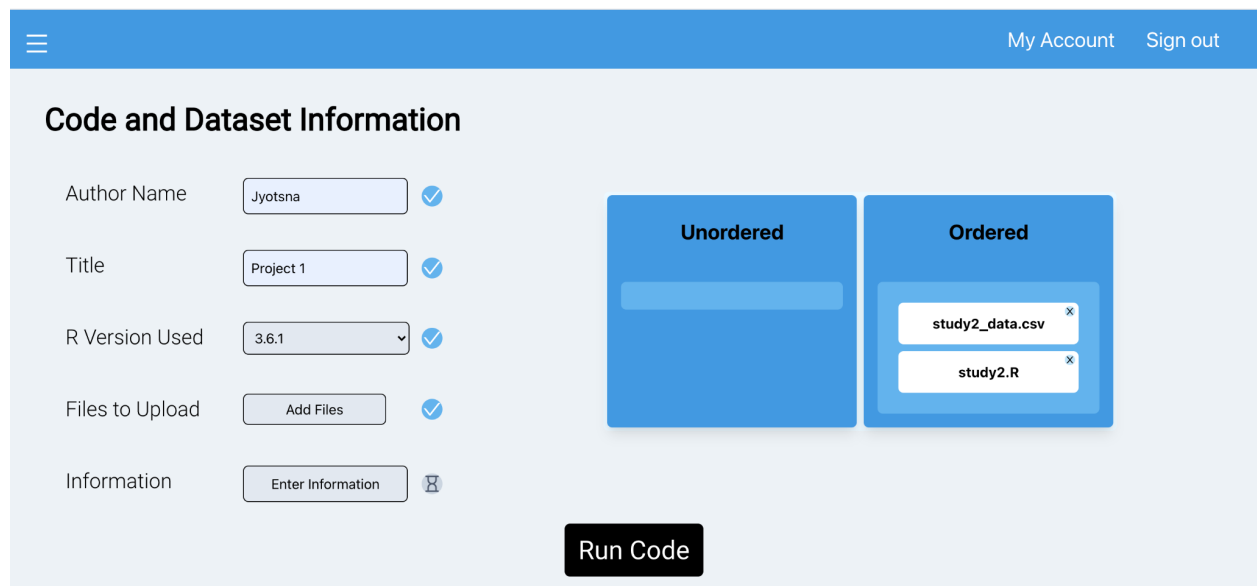


Figure 8: The reproducibility UI

Google Cloud Platform

RE3deploy

Search products and resources

Cloud Build

Dashboard

History

Triggers

Settings

Build history

STOP STREAMING BUILDS

Region

global

Filter

Enter property name or value

	Build	Source	Ref	Commit	Trigger Name	Created	Duration
✔	130673d2	Google Cloud Storage	-	-	-	4/8/21, 7:02 AM	4 min 23 sec
✔	11abd64d	Google Cloud Storage	-	-	-	4/8/21, 6:41 AM	5 min 53 sec
✔	3ce2280e	Google Cloud Storage	-	-	-	4/8/21, 6:09 AM	3 min 56 sec
✔	9abfdad2	Google Cloud Storage	-	-	-	4/8/21, 5:59 AM	4 min 6 sec
✔	3849b76e	Google Cloud Storage	-	-	-	4/8/21, 5:59 AM	4 min 27 sec
✔	925bb297	Google Cloud Storage	-	-	-	4/8/21, 5:34 AM	4 min 3 sec
✔	b458cdb1	Google Cloud Storage	-	-	-	4/8/21, 5:32 AM	3 min 57 sec
✔	623b8a5f	Google Cloud Storage	-	-	-	4/8/21, 5:27 AM	2 min 52 sec
✔	53e6b6d9	Google Cloud Storage	-	-	-	4/7/21, 4:20 PM	3 min 51 sec
✔	f04e97b3	Google Cloud Storage	-	-	-	4/7/21, 4:11 PM	3 min 16 sec
✔	508a37e3	-	-	-	-	4/6/21, 5:15 PM	1 min 16 sec

Figure 9: Running the code files in a container

My Account

Sign out

Past Projects:

Logs Project

finished

Check Readability of code files

Start new Reproducible project

Figure 10: All the uploaded Research projects are displayed in the user's personal page

Project File(s) Scores

snippet5: 6.34

snippet66: 2.68

Categories	Current information	Edited information
Author Name:	Layan	<input type="text" value="Layan"/>
Title:	Logs Project	<input type="text" value="Logs Project"/>
Key Words:	help	<input type="text" value="help"/>
R Version:	2.7	<input type="text" value="2.7"/>
Data License:	N/A	<input type="text" value="ex: PDDL"/>
Code License:	N/A	<input type="text" value="ex: Apache License 2.0"/>

Edit

Update

Project Logs

Run Logs

Build Logs

Figure 11: User is able to update the information about the research project.