

# UI Design Final: Literate Programming Editor

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# Background: Literate Programming

- A paradigm where you embed code in comments, not the other way around
- Leads to more readable, reproducible, debuggable code
- Invented by Donald Knuth (right)

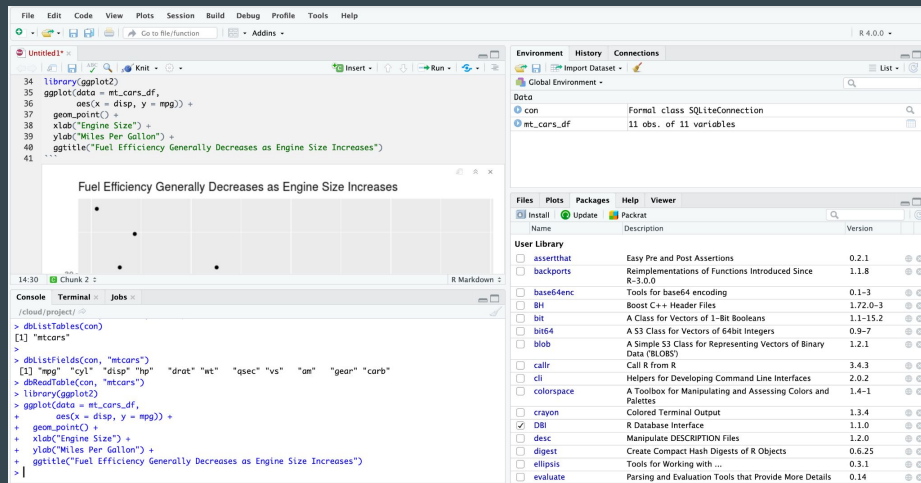
Modern examples:

- Jupyter Notebooks
- R Markdown



# R Markdown / RMD

- R Markdown and R Studio (right)
  - Creates documents with embedded code and output
- Uses regular Markdown triple-backtick code chunks
  - Adds code output after them
- JKnit is a pet project lightweight FOSS version of RMD



```
```python
print('Hello, world!')
```
```



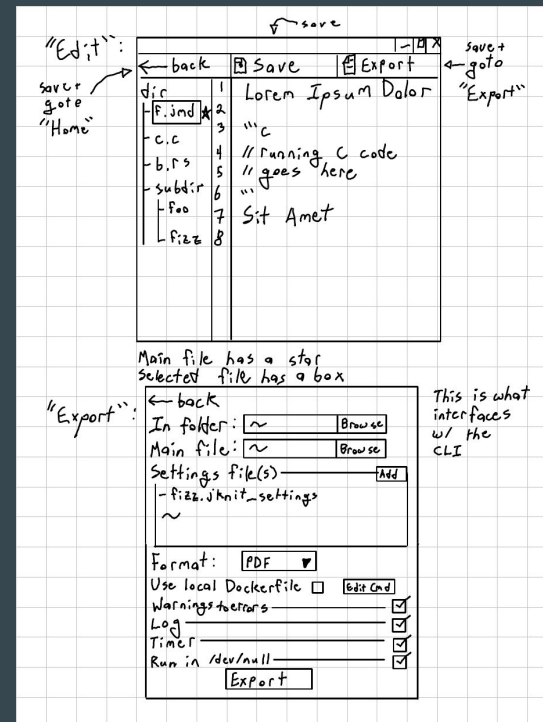
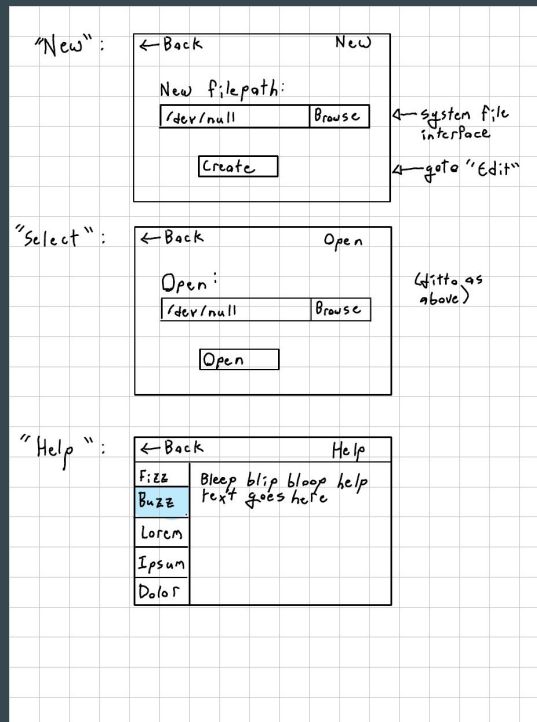
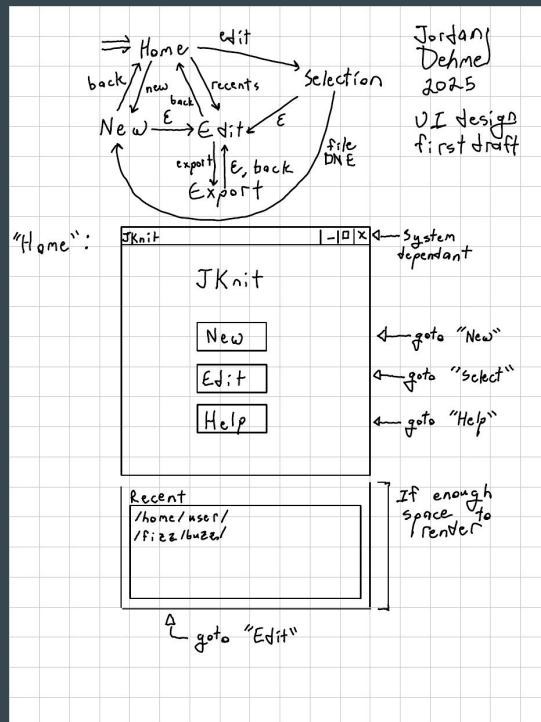
```
print('Hello, world!')
```

Hello, world!

# Requirements

- Who is it for?
  - Mathematicians and computer scientists who want to create documents with running code in them
- What is “success”?
  - Compile static documentation
  - Avoid bloat
  - Be open-source
  - Be lightweight and intuitive, targeting those who do not have CLI experience
- User stories
  - “I need to write a report for my math class”
  - “I need to modify and export a JMD file someone sent me”
  - “I need to quickly explain this software to my students”

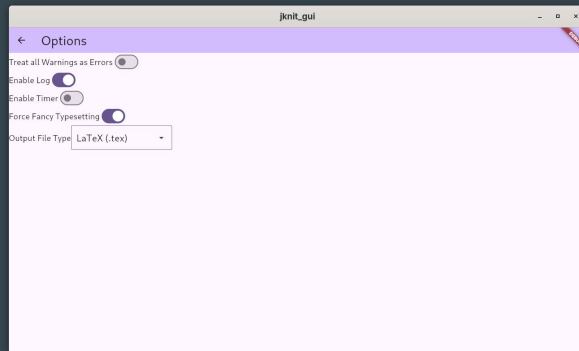
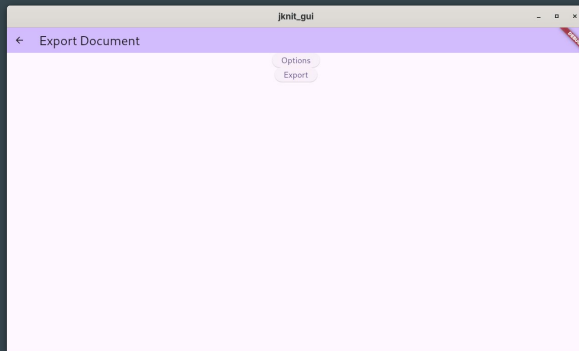
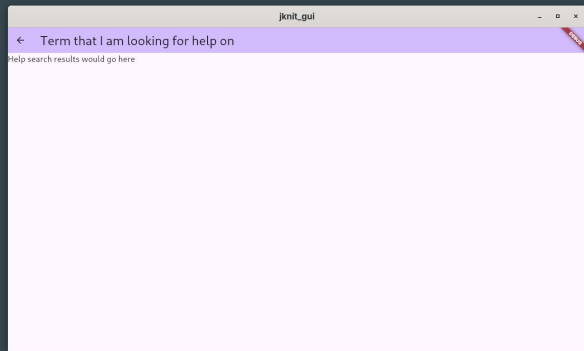
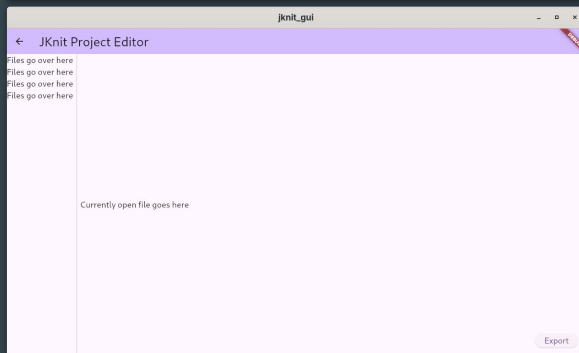
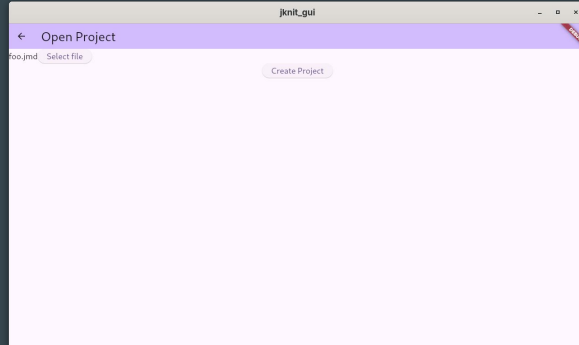
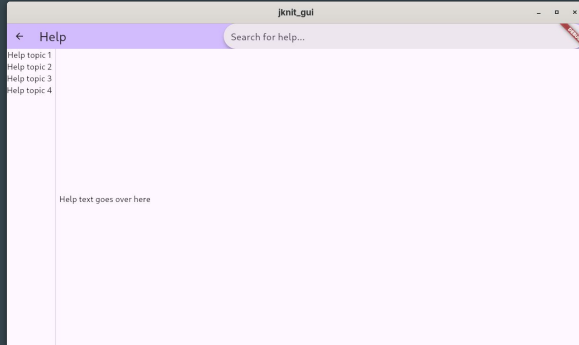
# First (Paper) Draft



# UI/UX Test - Key Outcomes

- Had a non-CS student try to complete several user stories
- Overall impression: Overly technical and lacking in help.
- Recommendations:
  - Help search bar
  - "Advanced settings" on export screen
  - "Edit" button should say "open"
  - Help menu should be more intuitive

# Proof of Concept in Flutter



# Conclusion / Future Work

After more iteration, we now have a JKnit GUI that is:

1. Intuitive
2. Explainable

Future work:

- Document viewer after export
- Portability (especially Windows) testing



**Current Best Iteration (Demo)**

# Sources

- Knuth's literate programming
  - [https://en.wikipedia.org/wiki/Literate\\_programming](https://en.wikipedia.org/wiki/Literate_programming)
- R Markdown
  - <https://rmarkdown.rstudio.com/>
- JKnit (previous work)
  - <https://github.com/jorbDehmel/jknit>
- Image sources
  - <https://www.dataquest.io/blog/r-markdown-tips-tricks-and-shortcuts/>
  - <https://www.businessinsider.de/karriere/bewerbung/bill-gates-liebt-donald-knuth-the-art-of-computer-programming-2017-5/>