

# Two Informix Tech Talks for 4GL Developers by Reuben Barclay

Date: Thursday, July 21, 2022, 2:00pm EST

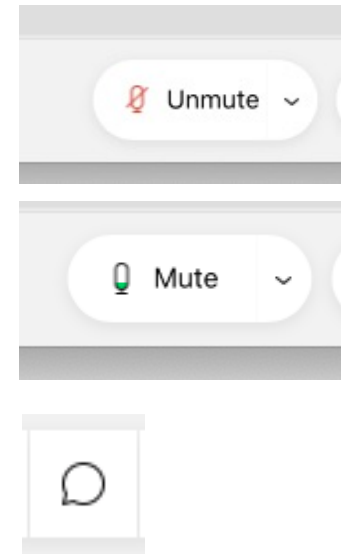
- Transforming Your System From Informix-4gl to Genero - The Many Options and First Steps.
- Wordle 4 Genero

Please register - <https://www.iug.org/en/services/next-webcast/>



# Webcast Guidelines

- **The Webcast is pre-recorded.**  
The replay and slides will be available on the IIUG Website
- **Please Mute your line.**  
Background sounds will distract everyone
- **Use the Chat Button** to ask questions



# who am i

## ➤ Reuben Barclay

- reuben.barclay@4js.com

## ➤ Four Js

- <https://www.4js.com>

## ➤ Auckland, New Zealand

## ➤ Two roles at Four Js

- Technical Consultant Asia Pacific Region
  - Australia, New Zealand, Malaysia, Taiwan
- Developer Relations Manager
  - WWDC (<https://4js.com/wwdc/>)
  - Forums ([https://forum.4js.com/fjs\\_forum/](https://forum.4js.com/fjs_forum/))
  - Ask-Reuben (<https://4js.com/ask-reuben/>)
  - Early Access Programs – Feature of the Day
  - etc



# My Story

## ➤ 1997-1999 - First Exposed Informix-4gl

- Developer @ Quanta Systems Ltd, Auckland, NZ
- Kerry Sainsbury was our R&D. Kerry was on IIUG board so that name may be familiar to a few

## ➤ 1999-2001 – Time in London, UK

- Developer / System Administration @ Fuller Smith & Turner, London, UK

## ➤ 2002-2008 – Back to New Zealand

- R&D at Quanta Systems Ltd
- Transformed our Informix-4gl application to Genero

## ➤ 2008–present – Consultant @ Four Js

- Helping transformations to Genero
- Improving the use of Genero



# Four Js Story

## ➤ Four Js Development Tools

- <https://4js.com/>
- Founded 1992
  - <https://4js.com/2012-it-was-twenty-years-ago-today/>
- Products
  - Universal Compiler, Business Development Systems (BDS)
    - 1990's, early 2000's
  - Genero
    - From 2003
- Read more at
  - <https://4js.com/files/documents/company/Genero-21st-Century-4GL-WhitePaper.pdf>
  - <https://4js.com/files/documents/company/Four-Js-sales-brochure.pdf>
  - <https://4js.com/files/documents/company/Genero-sales-brochure.pdf>



# Four Js Story

## ➤ Four Js Development Tools

- Partnerships with IBM including at one stage, an OEM arrangement “IBM Informix Genero”
- Acquired by Volaris Group September 2021
  - <https://explore.volarisgroup.com/press-room/volaris-enters-software-development-vertical-with-acquisition-of-four-js>
  - <https://www.volarisgroup.com/>
  - Volaris Group part of Constellation Software
    - <http://www.csisoftware.com/>
- Partnership with HCL January 2022
  - <https://blog.hcltechsw.com/onedb/hcl-software-enters-business-partnership-with-four-js-development-tools-to-modernize-applications-in-the-database-market/>



# Wordle 4 Genero by Reuben Barclay

## Informix Tech Talks by the IIUG



“**Wordle** is a web-based word game created and developed by Welsh software engineer Josh Wardle

...

Wardle initially created the game for himself and his partner to play,

...

The game was purchased by The New York Times Company in January 2022 for an undisclosed seven-figure sum”

<https://en.wikipedia.org/wiki/Wordle>





# Introduction

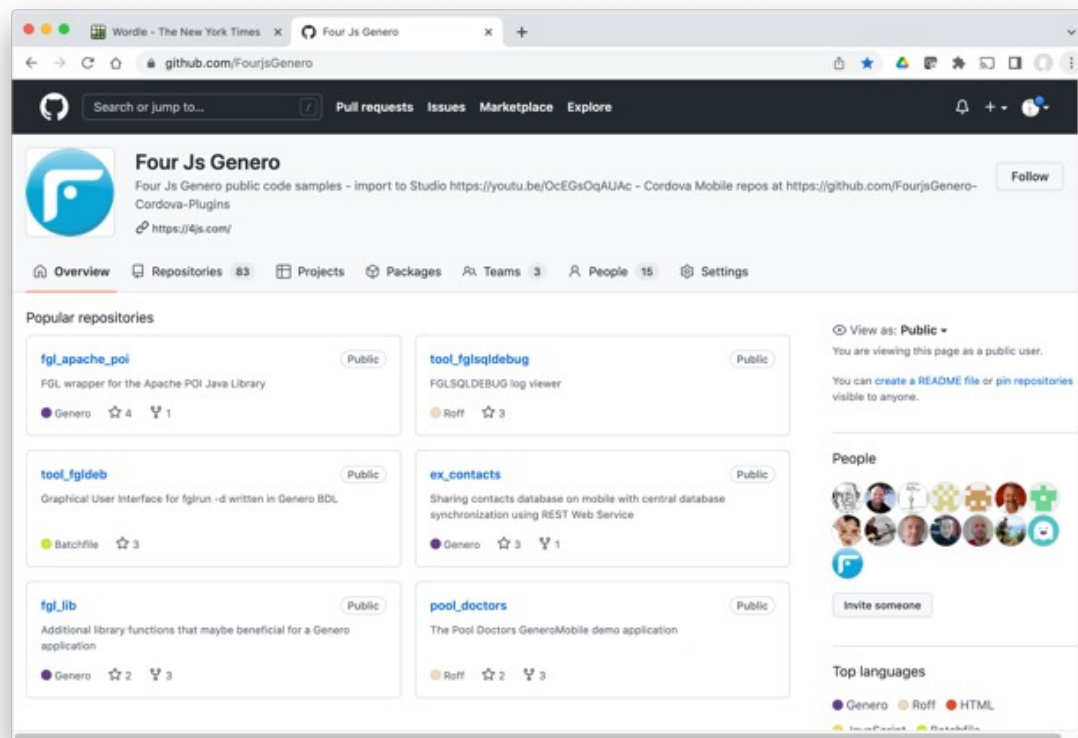
- I am showing how Wordle could potentially have been written in 4gl
- What I want you to see is the 20 years of Research and Development that we have added on top of the Informix-4gl base product in creating Genero that makes this possible



# GitHub

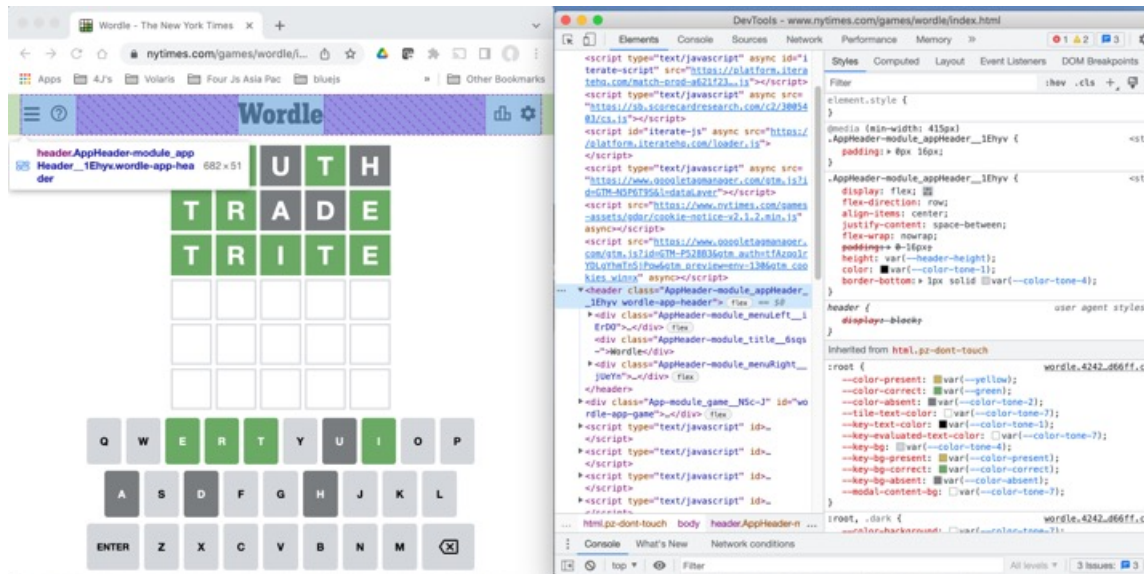
- Code for today's example can be found in our GitHub repository at

[https://github.com/FourjsGenero/app\\_wordle](https://github.com/FourjsGenero/app_wordle)



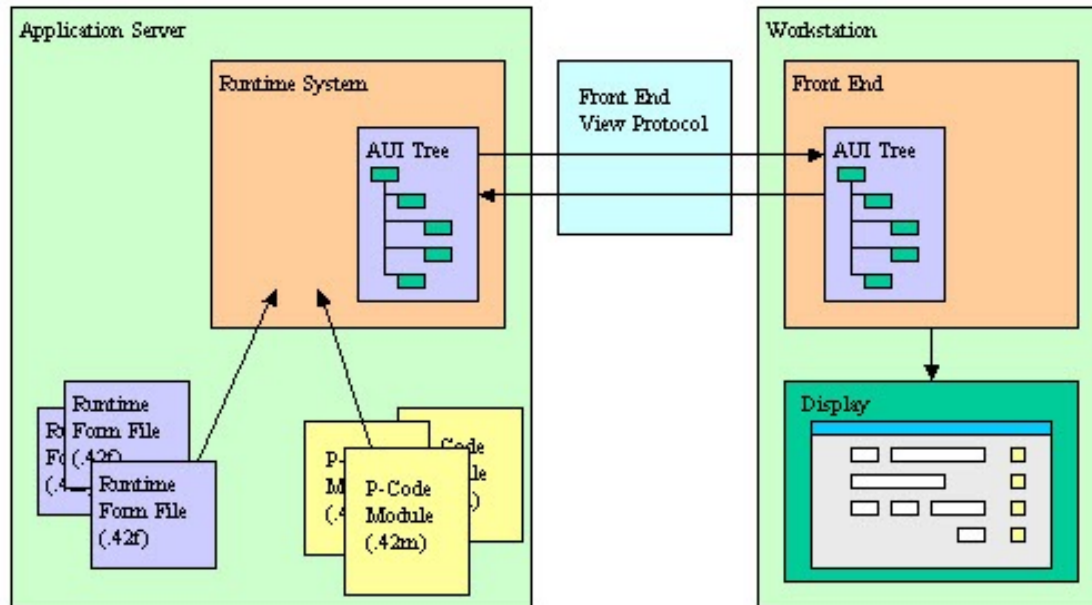
# Getting a List of Words

- Where am I going to get a list of 5 letter words ?
- Browser - Developer Tools
  - Skill you will need with Genero Browser Client customization is interrogating a website using a Browser Developer Tools



# Dynamic User Interface

- With Genero, all business logic remains on the runtime server
  - [http://4js.com/online\\_documentation/fjs-fgl-manual-html/#fgl-topics/c\\_fgl\\_DynamicUI\\_006.html](http://4js.com/online_documentation/fjs-fgl-manual-html/#fgl-topics/c_fgl_DynamicUI_006.html)



- See types of Genero Mobile apps for exception
  - [http://4js.com/online\\_documentation/fjs-fgl-manual-html/#fgl-topics/c\\_gm\\_what\\_is\\_mobileapp.html](http://4js.com/online_documentation/fjs-fgl-manual-html/#fgl-topics/c_gm_what_is_mobileapp.html)



# Reading a file of a list of words

➤ **Makes use of these classes ...**

➤ **base.Channel**

– To open a file and read lines from the file

[http://4js.com/online\\_documentation/fjs-fgl-manual-html/#fgl-topics/c\\_fgl\\_ClassChannel.html](http://4js.com/online_documentation/fjs-fgl-manual-html/#fgl-topics/c_fgl_ClassChannel.html)

➤ **base.StringTokenizer**

– To split the line based on a delimiter

– [http://4js.com/online\\_documentation/fjs-fgl-manual-html/#fgl-topics/c\\_fgl\\_ClassStringTokenizer.html](http://4js.com/online_documentation/fjs-fgl-manual-html/#fgl-topics/c_fgl_ClassStringTokenizer.html)

➤ **Genero comes with a number of packages/classes that have the functionality you need for writing business applications**

– XML, JSON, Files, Strings, File Systems, Maths, RegExp

– [http://4js.com/online\\_documentation/fjs-fgl-manual-html/#fgl-topics/c\\_fgl\\_section\\_library.html](http://4js.com/online_documentation/fjs-fgl-manual-html/#fgl-topics/c_fgl_section_library.html)

➤ **If we don't have it, you can import a C-Library or JAVA Library that does**

– [http://4js.com/online\\_documentation/fjs-fgl-manual-html/#fgl-topics/c\\_fgl\\_CExtensions\\_001.html](http://4js.com/online_documentation/fjs-fgl-manual-html/#fgl-topics/c_fgl_CExtensions_001.html)

– [http://4js.com/online\\_documentation/fjs-fgl-manual-html/#fgl-topics/c\\_fgl\\_JavaBridge\\_001.html](http://4js.com/online_documentation/fjs-fgl-manual-html/#fgl-topics/c_fgl_JavaBridge_001.html)



# ODI Database Layer

- **ODI Layer enables Genero to use many different databases other than Informix**
    - Oracle, SQL Server, PostgreSQL, SQLite etc
  - **In this example, I use SQLite.**
    - With Genero Mobile, this is the database used if the app is storing data on the device itself
  - **SQLite Library has an in-memory database.**
    - Handy for prototyping and small examples
- ```
CONNECT TO ":memory:+driver='dbmsqt'"
```



# Syntax Additions

- Lots of syntax has been added to Genero over the years
- Performance-Memory, Performance-Speed, Code Reliability, Code compression, Modern syntax
- Example includes
  - CONSTANT
  - STRING
  - BOOLEAN
  - TYPE
  - RETURNS
  - INOUT
  - SFMT
  - VAR
  - @
  - +=
  - Preprocessor macros



# Web Service

## ➤ To expose a function, add some web service attributes

```
FUNCTION todays_wordle()  
    ATTRIBUTES (WSGet, WSPath="/today")  
    RETURNS CHAR(5)  
  
    ...  
    SELECT word INTO todays_word  
    FROM word_list  
    WHERE idx = todays_word_idx  
  
    RETURN todays_word  
END FUNCTION
```

## ➤ Register and start web service

```
CALL com.WebServiceEngine.RegisterRestService("wordle_webservice","Wordle")  
CALL com.WebServiceEngine.Start()  
WHILE TRUE  
    LET result = com.WebServiceEngine.ProcessServices(-1)  
END WHILE
```





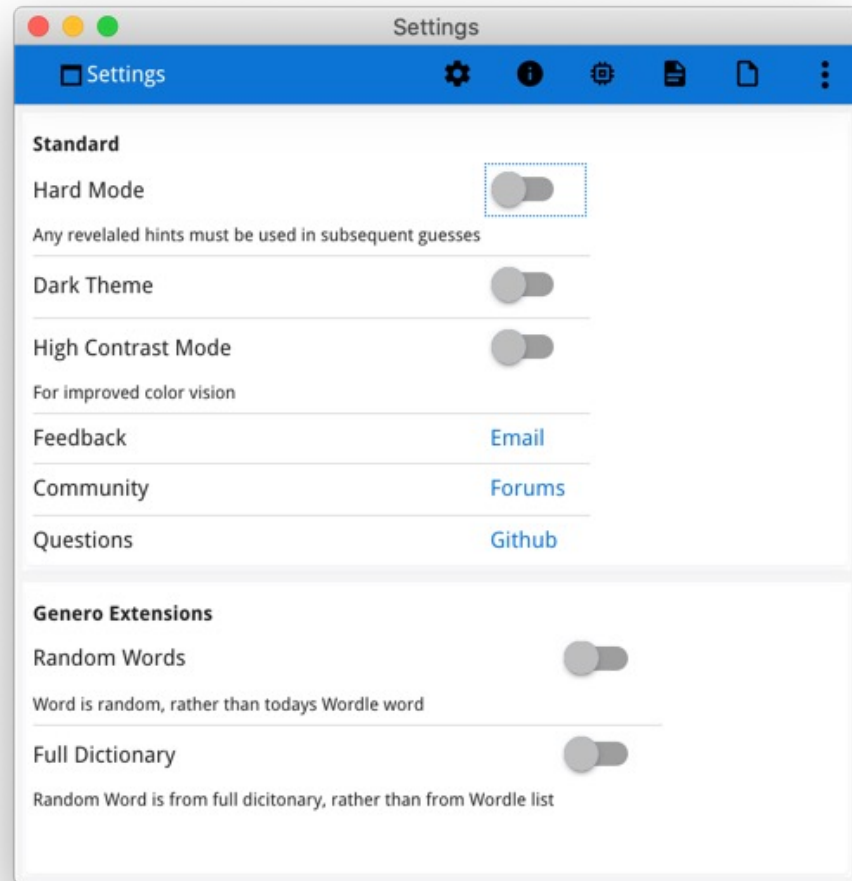
# GUI

## ➤ Extension of .per syntax

- Widgets
  - CheckBox
  - Button
  - etc
- Containers
  - VBox
  - Group
  - etc

## ➤ Proportional Fonts

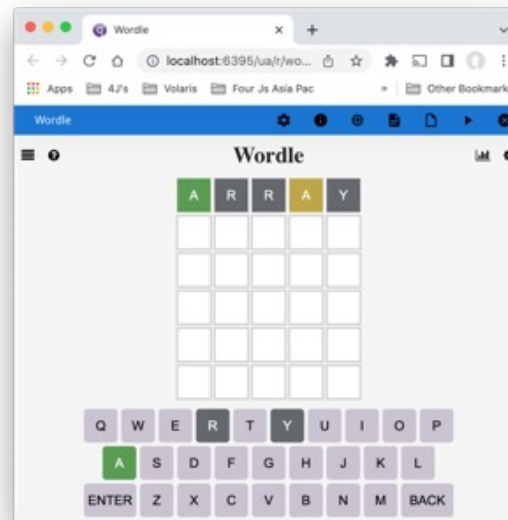
## ➤ Presentation Styles



# GUI – Universal Rendering

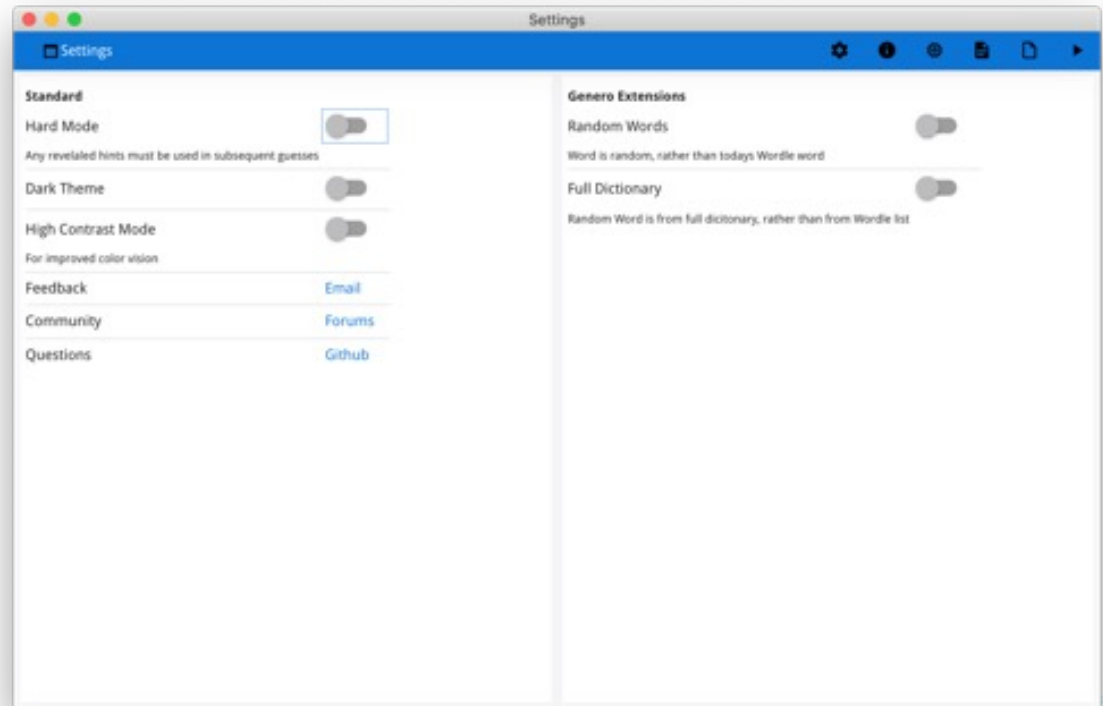
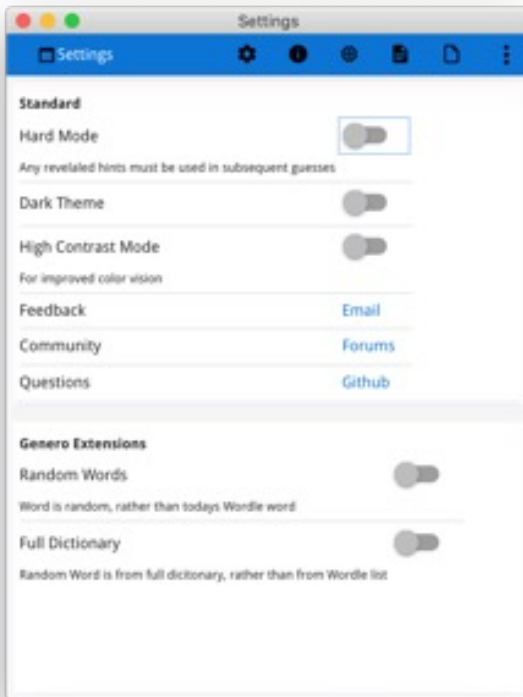
## ➤ Same Rendering Different Devices

- [http://4js.com/online\\_documentation/fjs-fgl-manual-html/#fgl-topics/c\\_fgl\\_Migrate\\_to\\_400\\_universal\\_rendering.html](http://4js.com/online_documentation/fjs-fgl-manual-html/#fgl-topics/c_fgl_Migrate_to_400_universal_rendering.html)



# GUI - Responsive

➤ Screen can alter to best fit front-end size



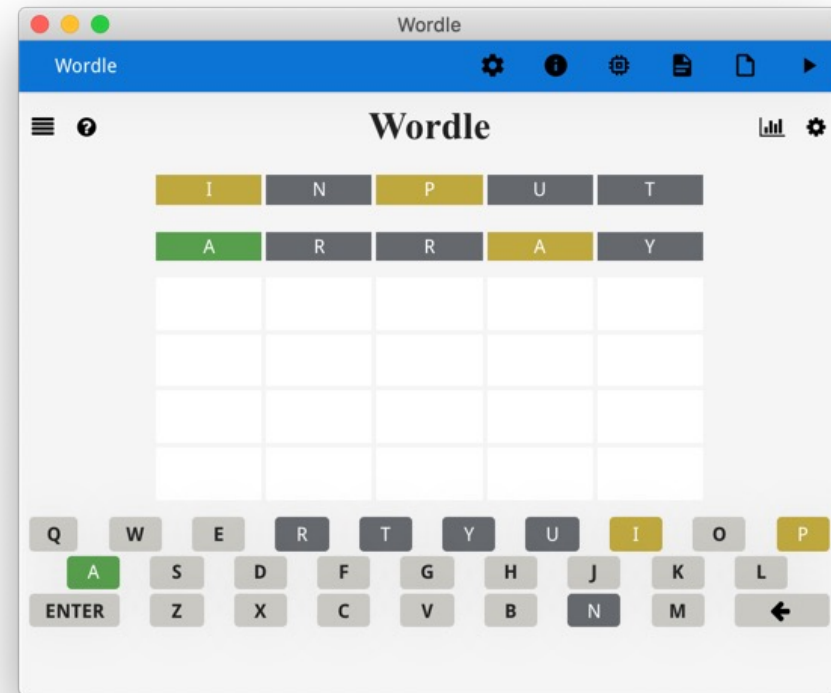
# GUI - Grid

## ➤ GRID has roots in arranging 80x25 terminal forms

- Does not give pixel by pixel control

## ➤ First attempt

- 30 single character LABELS
- 26+2 BUTTONS
- Arranged in 2 GRIDS
- MENU with 28 ON ACTION
- Can do better



# GUI - FGLSVGCANVAS

## ➤ FGLSVGCANVAS is a built-in WebComponent

- [http://4js.com/online\\_documentation/fjs-fgl-manual-html/#fgl-topics/c\\_fgl\\_fgl\\_web\\_components\\_fglsvgcanvas.html](http://4js.com/online_documentation/fjs-fgl-manual-html/#fgl-topics/c_fgl_fgl_web_components_fglsvgcanvas.html)

## ➤ Gives finer control

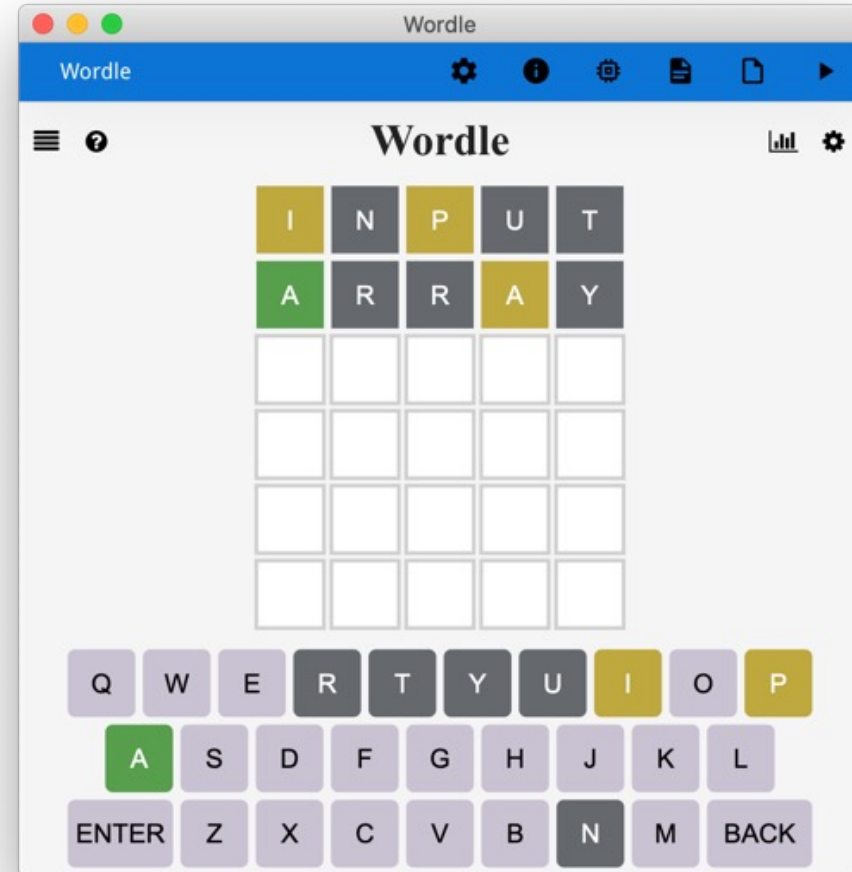
- Lines
- Shapes
- Text

## ➤ More coding required

## ➤ INPUT with 1 action (letter is parameter of action)

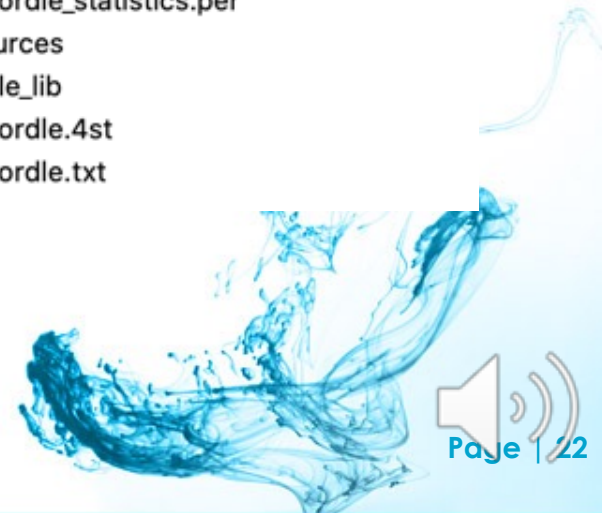
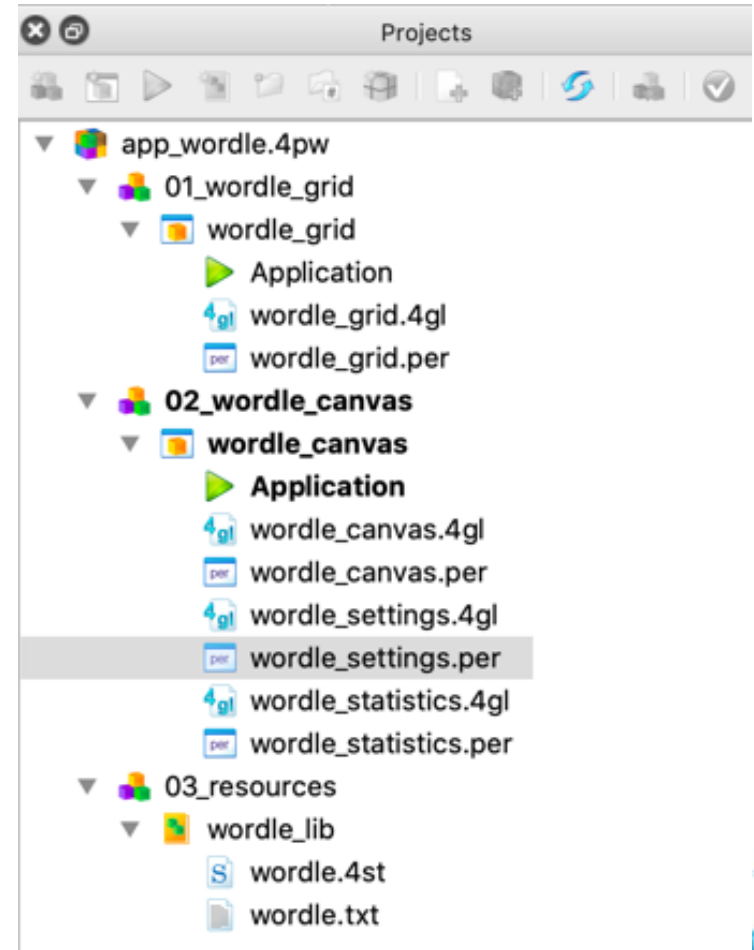
## ➤ Responsive

## ➤ Good for infographics, charts etc

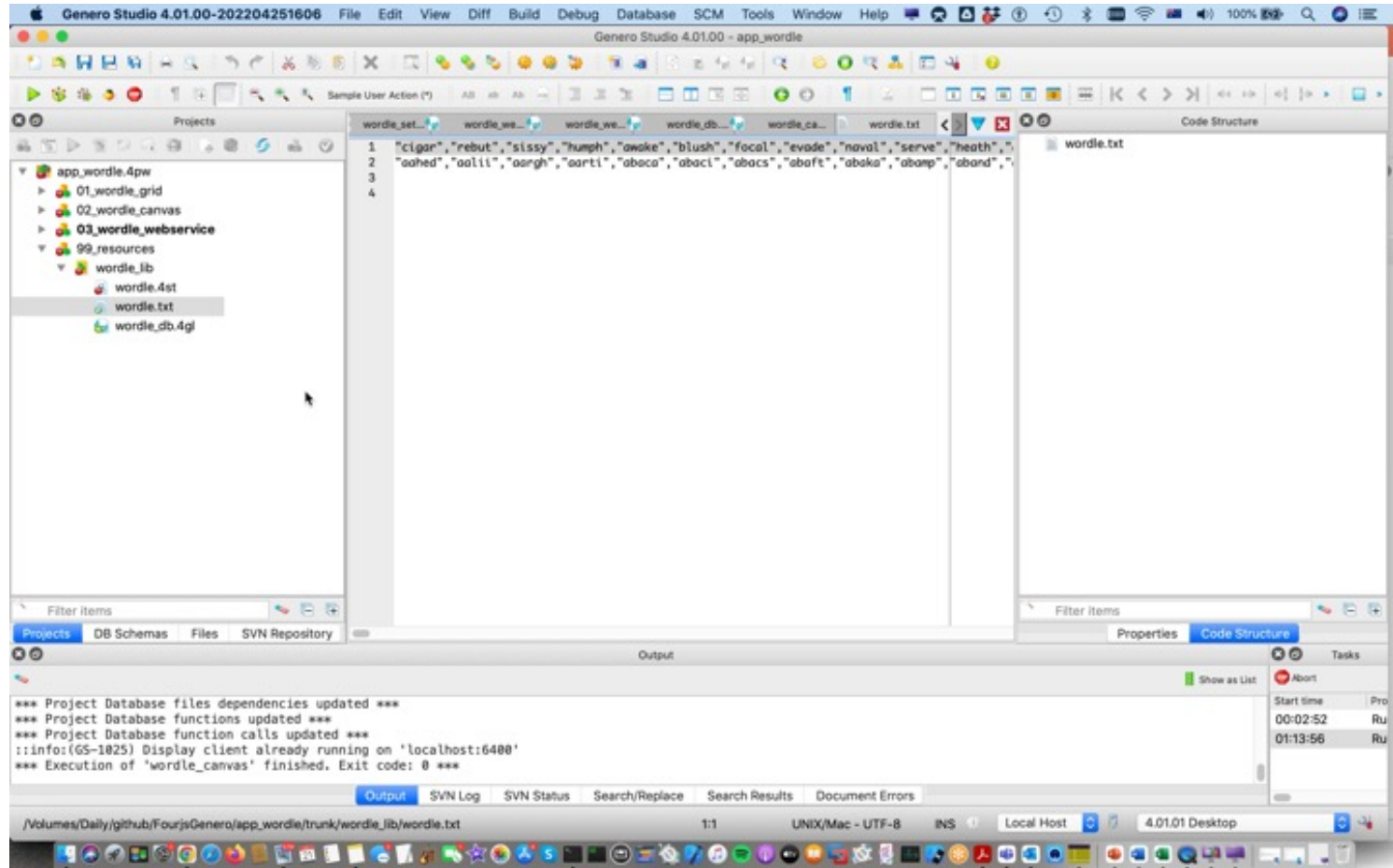


# GUI - FGSLVGCANVAS

- Within Repository ...
- 01\_wordle\_grid
  - Used GRID with many widgets
  - Use for prototyping, getting logic right
- 02\_wordle\_canvas
  - Replaced many widgets with fgsvgcanvas Web Component



# DEMO – Classes to read file



# DEMO – Web Services

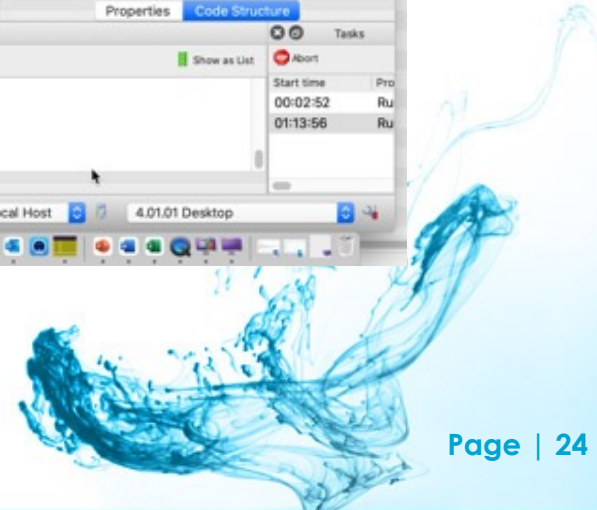
The screenshot displays the Genero Studio IDE interface. The main editor window shows the code for a web service module named `wordle_webservice.4gl`. The code includes two functions: `today's_word()` and `random_random()`. Both functions use a random selection algorithm to pick a word from a list. The `today's_word()` function also incorporates the current date to determine the index of the word to return.

```
1  IMPORT util
2
3  FUNCTION today's_word() ATTRIBUTES (WSGet, WSPath="/today") RETURNS CHAR(5)
4  DEFINE today's_word CHAR(5)
5  DEFINE today's_word_idx INTEGER
6
7  -- I think this is how wordle chooses its word
8  -- It has a 2309 element list of words and it just selects the next one each day
9  -- It is not actually random ...
10 LET today's_word_idx = ((TODAY - MDY(6, 19, 2021)) MOD 2309) + 1
11 SELECT word INTO today's_word FROM word_list WHERE idx = today's_word_idx
12
13 RETURN today's_word
14 END FUNCTION
15
16 FUNCTION random_random() ATTRIBUTES (WSGet, WSPath="/random") RETURNS CHAR(5)
17 DEFINE today's_word CHAR(5)
18 DEFINE today's_word_idx INTEGER
19
20 -- I think this is how wordle chooses its word
21 -- It has a 2309 element list of words and it just selects the next one each day
22 -- It is not actually random ...
23 LET today's_word_idx = util.Math.rand(2309)+1
24 SELECT word INTO today's_word FROM word_list WHERE idx = today's_word_idx
25
26 RETURN today's_word
27 END FUNCTION
```

The interface also shows a project tree on the left, an output window at the bottom with logs, and a code structure pane on the right.

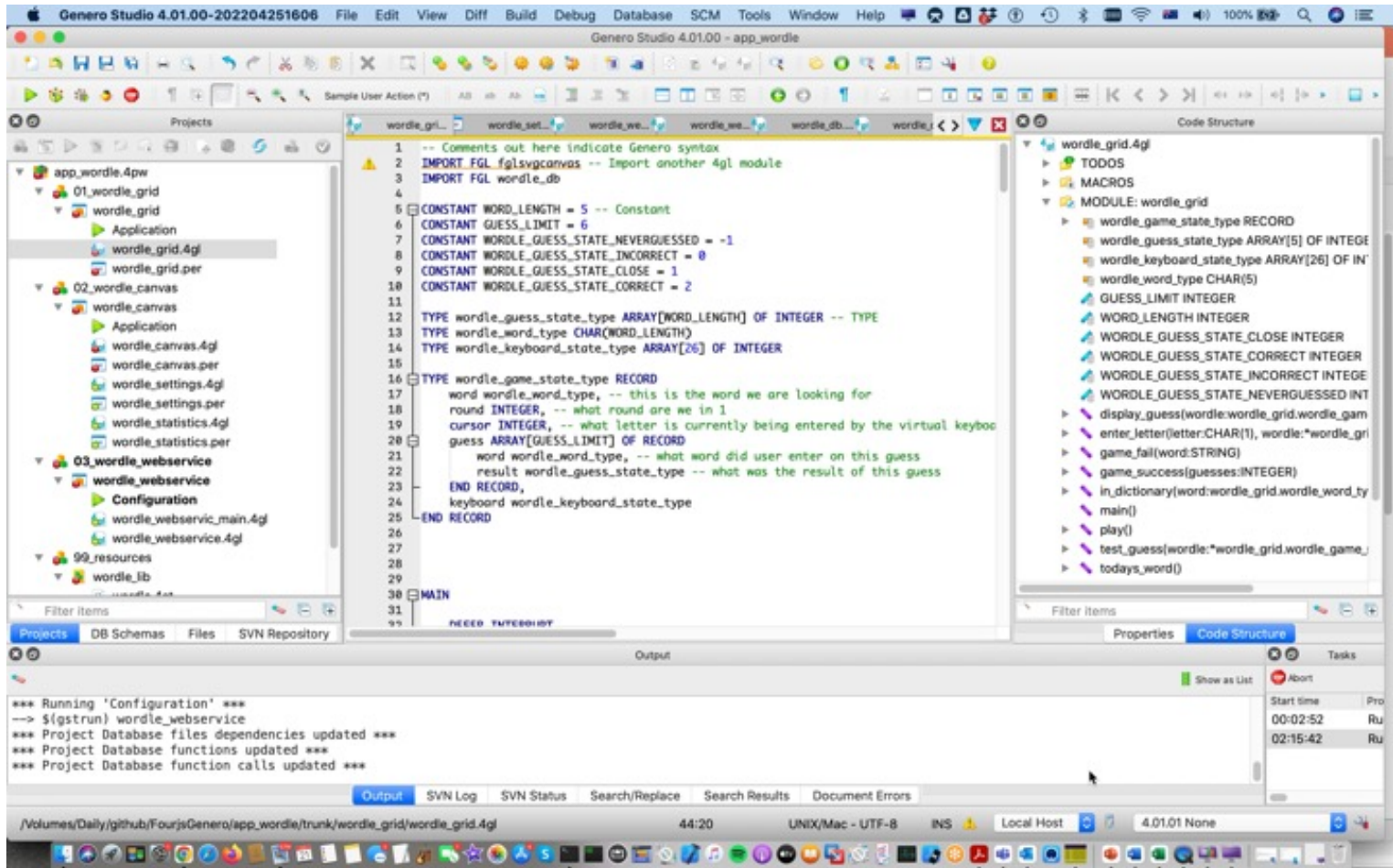
Output window logs:

```
*** Project Database files dependencies updated ***
*** Project Database functions updated ***
*** Project Database function calls updated ***
:::info:(65-1025) Display client already running on 'localhost:6400'
*** Execution of 'wordle_canvas' finished. Exit code: 0 ***
```

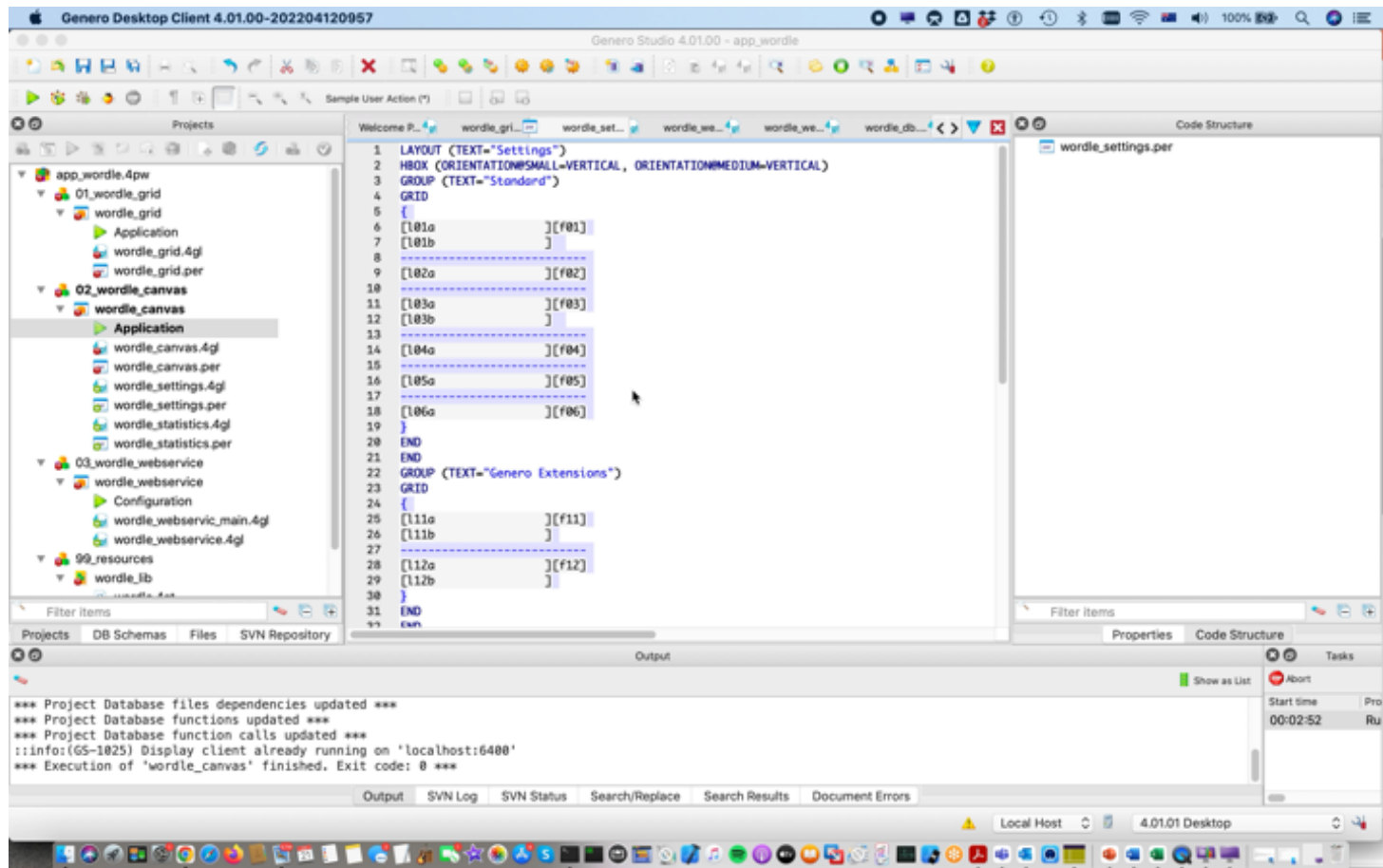




# DEMO – New Syntax and Studio



# DEMO – GUI Screen



# DEMO – Universal Rendering

The screenshot displays the Genero Studio 4.01.00 interface. The main window shows a code editor with the following code:

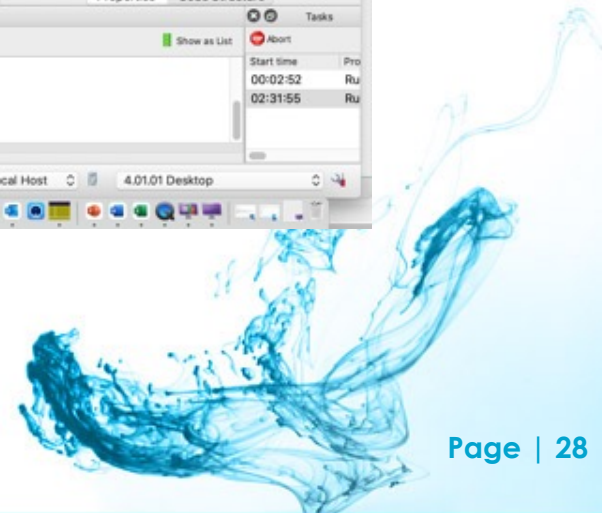
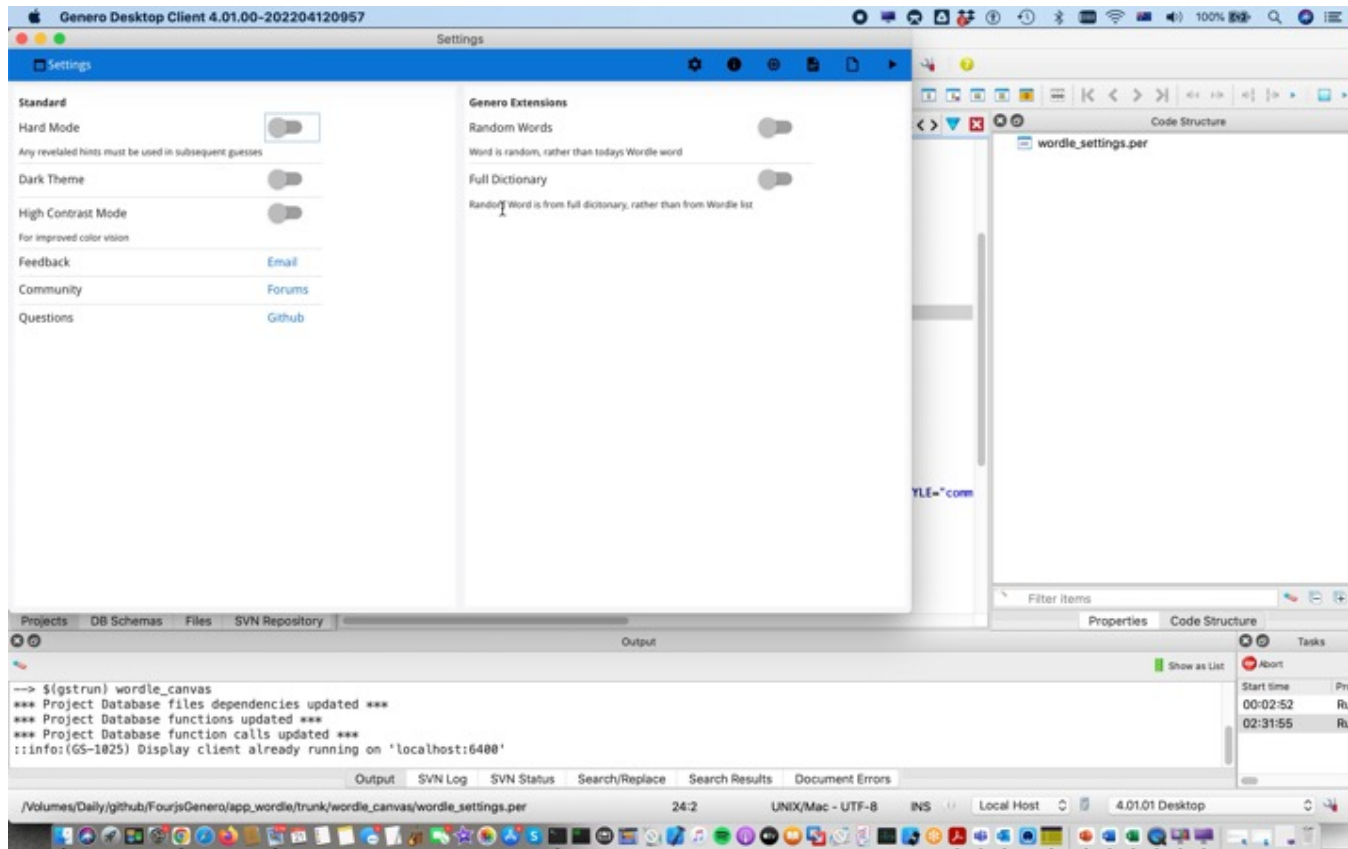
```
1 FUNCTION do_settings()
2 DEFINE rec RECORD
3   hard_mode BOOLEAN,
4   dark_theme BOOLEAN,
5   high_contrast_mode BOOLEAN,
6   random BOOLEAN,
7   full_dictionary BOOLEAN
8 END RECORD
9
10 OPEN WINDOW settings WITH FORM "wordle_settings"
11
12 INPUT BY NAME rec.* ATTRIBUTES(WITHOUT DEFAULTS=TRUE, ACCEPT=FALSE, CANCEL=FALSE)
13 BEFORE INPUT
14   #CALL DIALOG.setFieldActive("hard_mode", FALSE)
15   #CALL DIALOG.setFieldActive("dark_theme", FALSE)
16   #CALL DIALOG.setFieldActive("high_contrast_mode", FALSE)
17
18 ON ACTION feedback
19   CALL ui.Interface.frontCall("standard", "launchUrl", "mailto:ask-reuben@4js.
20
21 ON ACTION community
22   CALL ui.Interface.frontCall("standard", "launchUrl", "https://forum.4js.com
23
24 ON ACTION questions
25   CALL ui.Interface.frontCall("standard", "launchUrl", "https://github.com/Fo
26 ON ACTION close
27   EXIT INPUT
28
29 END INPUT
30 CLOSE WINDOW settings
31 END FUNCTION
```

The left sidebar shows a project tree for 'app\_wordle.4pw' with sub-projects like '01\_wordle\_grid', '02\_wordle\_canvas', and '03\_wordle\_webservice'. The bottom output console shows the following text:

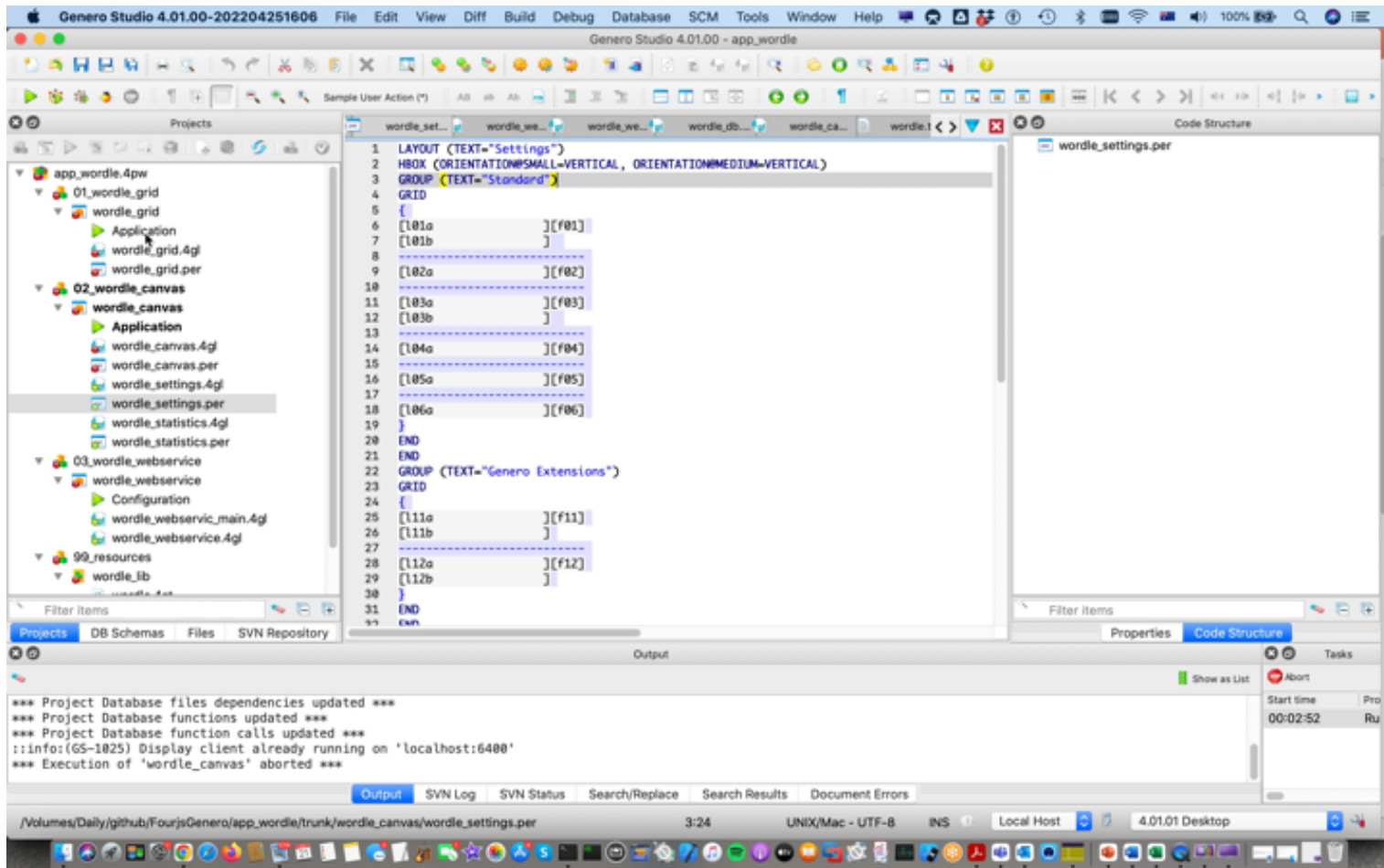
```
End of maintenance date: 2022/12/31 (Year/Month/Day).
Tools compilation successful.
*** Project Database files dependencies updated ***
*** Project Database functions updated ***
*** Project Database function calls updated ***
```



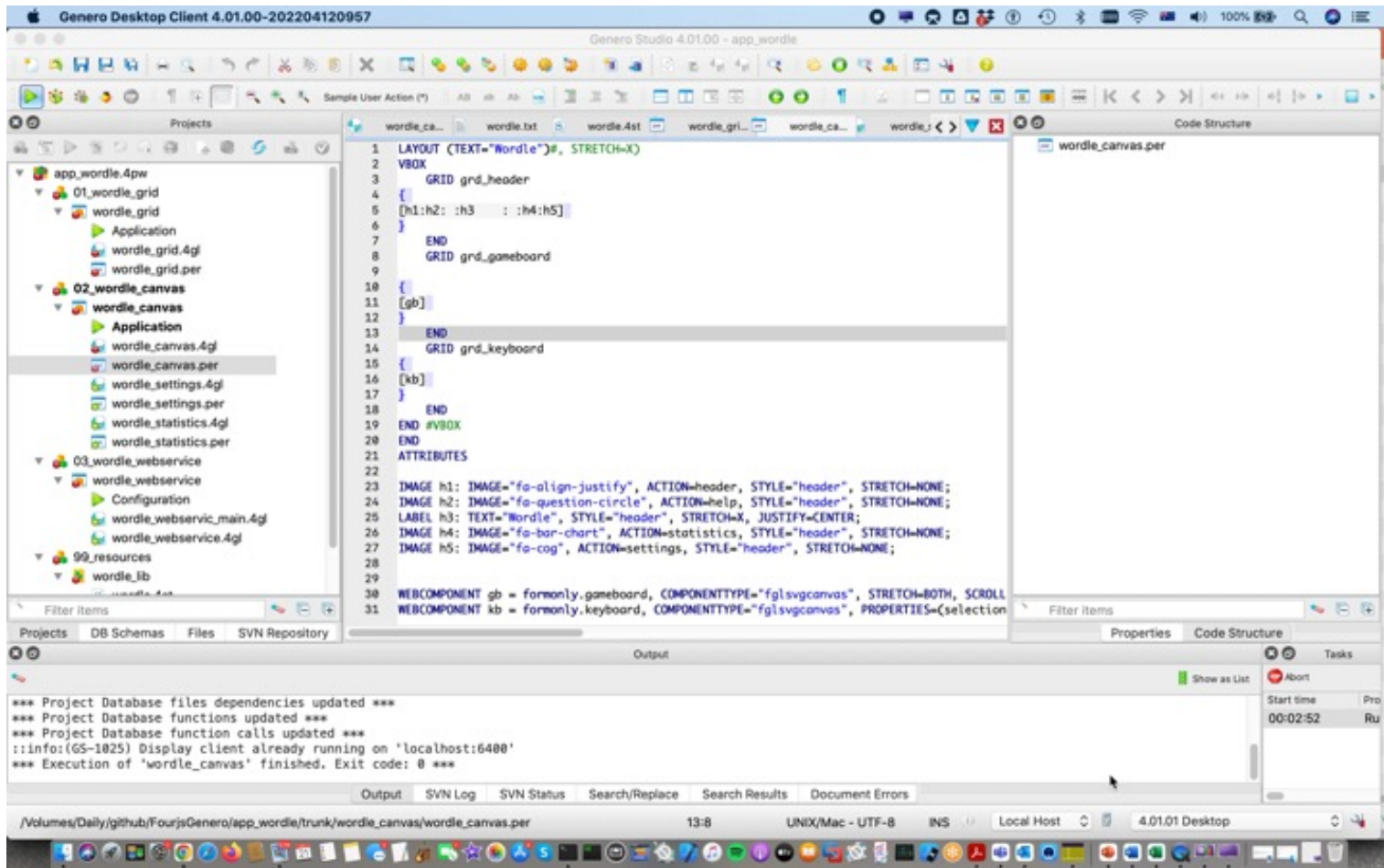
# DEMO – Responsive



# DEMO – FGLSVGCANVAS Screen



# DEMO – Play The Game



# TODO

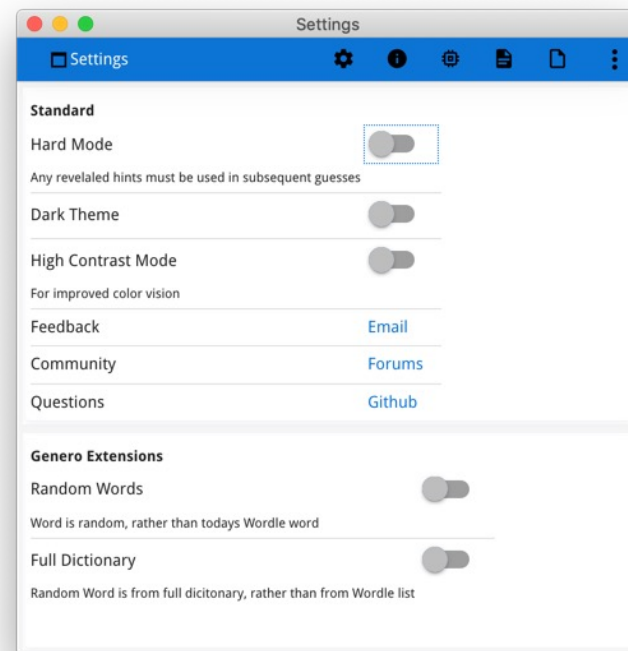
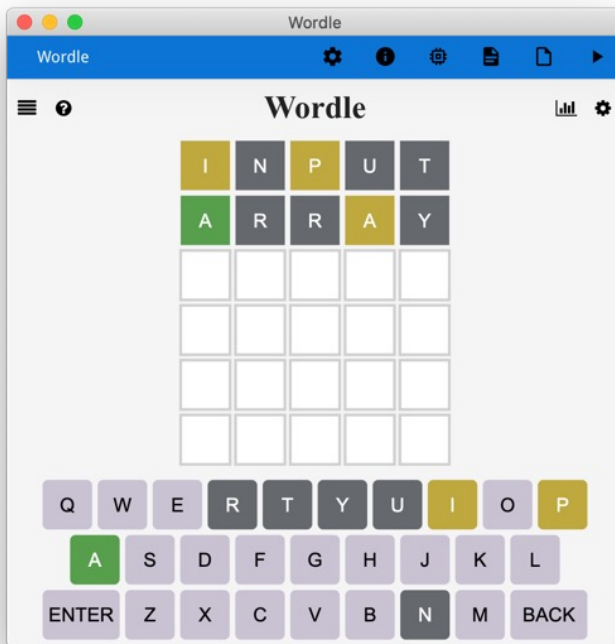
- Use FGLSVGCanvas again to create chart
- Make database permanent to keep statistics
- Add the Share functionality
- Bundle as a Genero Mobile app

- [http://4js.com/online\\_documentation/fjs-fgl-manual-html/#fgl-topics/c\\_fgl\\_section\\_mobile\\_apps.html](http://4js.com/online_documentation/fjs-fgl-manual-html/#fgl-topics/c_fgl_section_mobile_apps.html)



# Summary

- Your 4gl skills could be used to write applications that look like this





# For More GUI

- See Morgan's presentation – “Adding responsiveness to your Genero screens”

<https://4js.com/wwdc-21-online-conference-archive/#tab-id-2>

**Single Application – Multiple Devices**

- Single code base supporting multiple devices

Desktop/Browser

Tablet

Phone

**FOUR Js**  
The Power of Simplicity

WWDC 21  
<https://4js.com/wwdc21online/>  
November 29 - December 3 2021

Page 3.8

The slide displays three device views of a web application. The Desktop/Browser view shows a full-width layout with a header, a main content area with a profile picture and text, and a sidebar with a chart. The Tablet view shows a responsive layout with a header, a main content area with a profile picture and text, and a sidebar with a map. The Phone view shows a mobile-optimized layout with a header, a main content area with a profile picture and text, and a sidebar with a list of items.

# Thank You

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