



SAMPLER



macOS Script-able application guide book series①

# FileMaker Pro<sup>TM</sup> Scripting Book

## with AppleScript<sup>TM</sup>

### Supplements:

- ① Sample Scripts in this book
- ② Contextual menu helper scripts
- "Piyomaru Script Assistant" (Japanese version)

Author: Takaaki Naganoya  
Technical Supervisor: Masayuki Nii



A scripting guide for working with FileMaker Pro & AppleScript

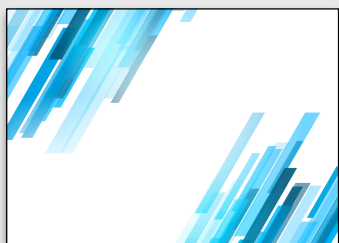
# Trademarks and Copyrights notice

FileMaker, FileMaker Pro and FileMaker Pro Advanced are the registered trademark of Claris International Inc. in United States and other countries in the world.

Mac, Macintosh, Mac OS X, OS X, macOS, AppleScript and Objective-C are the registered trademark of Apple, Inc. in United States and other countries in the world.

Used textures (From Vecteezy) :

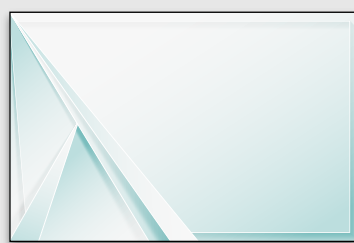
I use these textures under licencing agreement. Each copyrights are belongs to each authors.



Kirsty Pargeter



channelart



Zein Republic Studio



wngstd

Some illustrations and textures are from the book "Girl's Design Materials" by Mitsuko haino and her web site (<http://girlysozai.com>). I bought her book and use materials included in the supplement CD.

Copyrights of this book is holded by Takaaki Naganoya, Piyomaru Software.

# It's a FileMaker Pro + AppleScripting time!

***FileMaker Pro** provides a unique scripting language for automating your day-to-day operations. If your day-to-day work is done only within FileMaker Pro, it may be sufficient to use FileMaker Pro's own scripts.*

*However, if you are using other applications with FileMaker Pro (such as Mail.app, Safari, TextEdit, or your own application), you should **add AppleScript as a great partner for FileMaker Pro**. That's it!*

*Your future isn't just about adding FileMaker Pro to one of the applications called by AppleScript.*

*Surprisingly, you can also **call the macOS Cocoa API** from within FileMaker Pro via AppleScript.*

*This fact means that you have the option of distributing a ".fmp12" file packed with **everything you can do on your Mac**.*

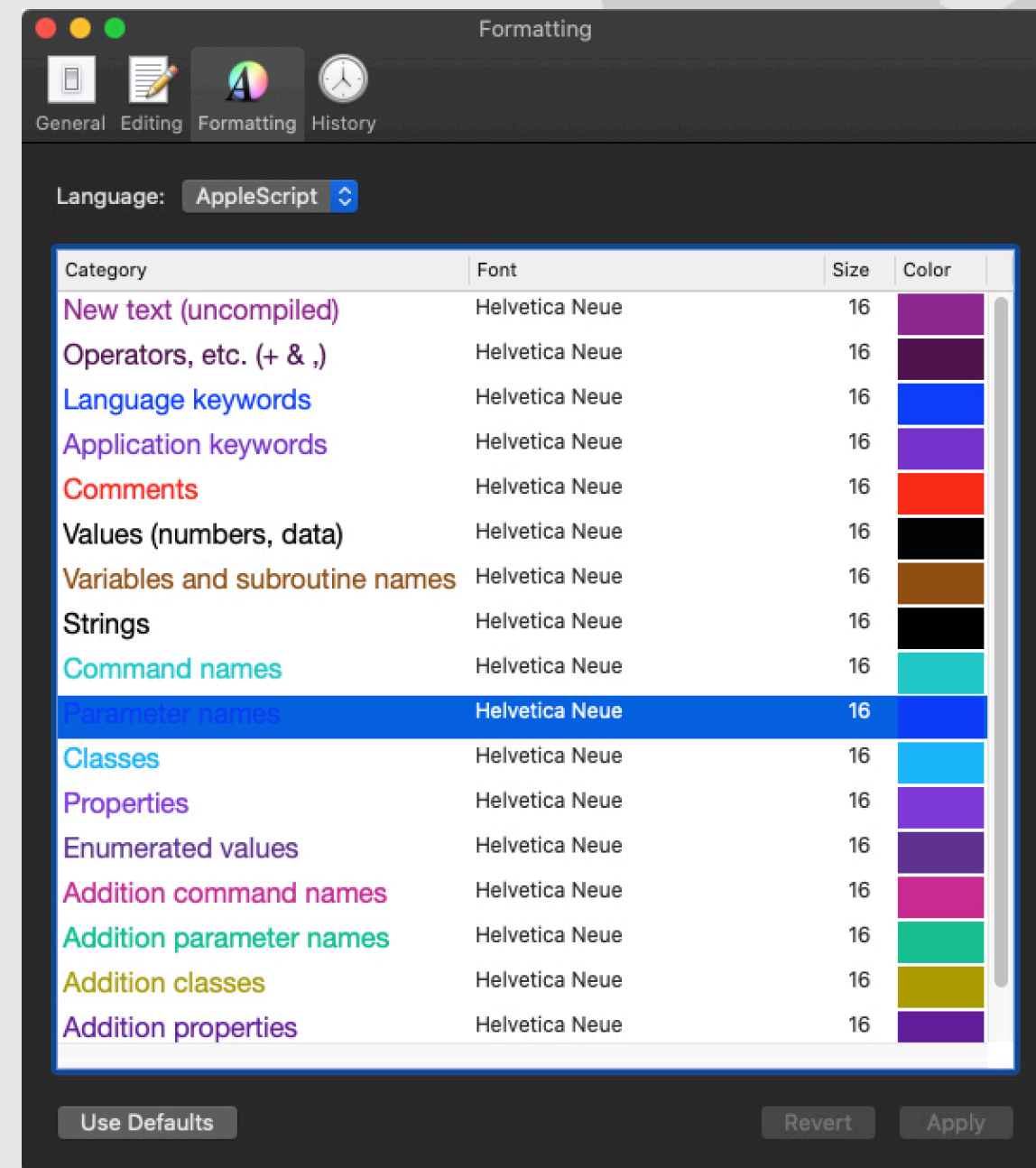
# Preface

*"AppleScript" is a scripting language that operates GUI applications for macOS, and assumes the existence of GUI applications.*

*So in this book, I explain how to operate the target application from AppleScript in an easy-to-understand manner, using a lot of screen snapshots.*

*First of all, run the GUI application from AppleScript, grasp the operation image with your own eyes, and have fun.*

*The contents of this book have been confirmed on macOS 10.15.7 (English user environment) + FileMaker Pro v19. We have also verified as much as possible in macOS 10.14.6 and 11.2 environments.*



▲ AppleScript's lexical color & font formatting in this book (Author's environment)



# About this book



*This book is a comprehensive explanation of the description of **controlling Claris' database application "FileMaker Pro" from AppleScript**, with an emphasis on the basics.*

*The difficulty level of each article is labeled as "**Beginner**", "**Intermediate**", and "**Advanced**" so that the content does not suddenly become difficult, but there are some exceptions difficulty level is increasing. Please refer to the **difficulty level display** of each article.*

*This book is intended for the client version of FileMaker Pro and assumes that you have a basic understanding of the operation. It include only the minimum part of cooperation with Server and Cloud.*

*For an explanation of AppleScript itself and detailed usage of the script editor, refer to Script Editor's help or AppleScript Language Guide.*

*I'm a Macintosh solution developer in Japan. My main programming language is AppleScript. Do you know the first Siri-like system on Mac was written in AppleScript? Yes, we wrote it in 2002. I wrote various systems by AppleScript and sell various AppleScript written applications on **Mac App Store** now.*

*The first edition of this e-book is written in Japanese language, my mother tongue. Oneday, some user on twitter told to me "Is there English version?" So, I translated my book to say "Yes". Though some sentences may be strange for native speakers, AppleScript itself is a kind of Universal Language. It runs everywhere. Enjoy!*



Beginner



**Level**



**Beginner**



**Intermediate**






**Advanced**

# About FileMaker Pro

*The function of the database software FileMaker Pro is to collect data and organize it in an easy-to-use manner. By associating more data than just one type of data, you can create a more powerful and easy-to-use database and use it immediately!*

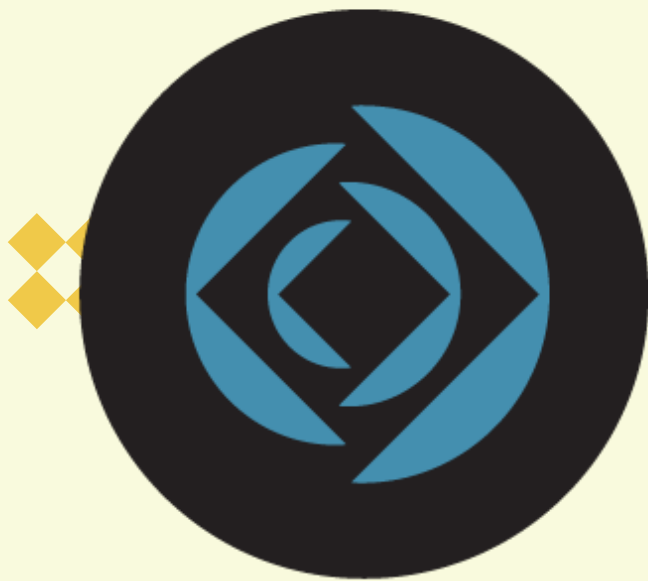
*Here's a quick introduction to FileMaker Pro. It's a basic content that is unnecessary for those who know it, but it also contains important content, so please take a look.*





# FileMaker Pro, a database application

## Flexible layout and styled text handling RDB



A database is a collection of information (data) that can be shared, updated, sorted, searched, printed etc.

FileMaker Pro is a cross-platform relational database whose database contain multiple tables in one database document file.

It have flexible layout making function and its text filed can store multi-styled and colored text like a word processors.

FileMaker Pro database can be shared with iOS device, Windows PC and Mac.

Originally, FileMaker Pro is made for classic MacOS. It is the most mac-like application, I think and I love it.

Product Name	FileMaker Pro	FileMaker Go	FileMaker Server	FileMaker Cloud
Support OS platforms	macOS, Windows	iOS, iPadOS	macOS, Windows, Linux	(Unknown)





**Level**



**Beginner**





**Intermediate**



**Advanced**

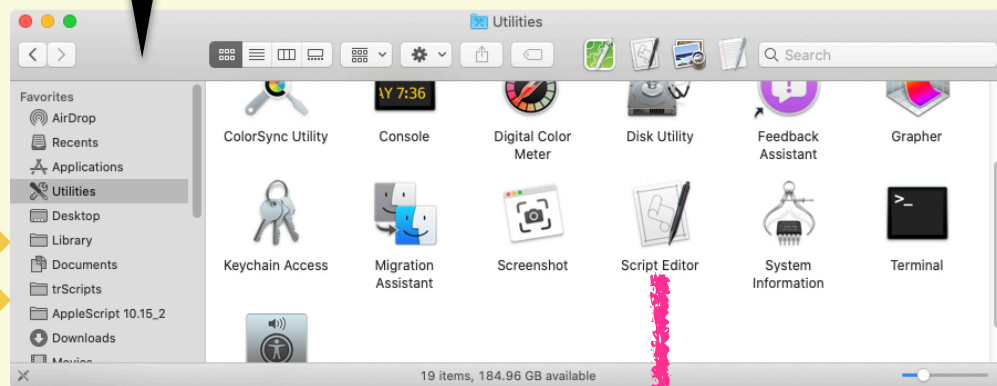
# Launch Script Editor

*The program that writes, saves, and executes AppleScript is the "Script Editor". It is included on all Macs. It's kind of like a quirky text editor, where you can save AppleScript documents or even save them as an application.*



# Launch Script Editor!

/Applications/Utilities



① Move to /Applications/Utilities folder

Launch Script Editor

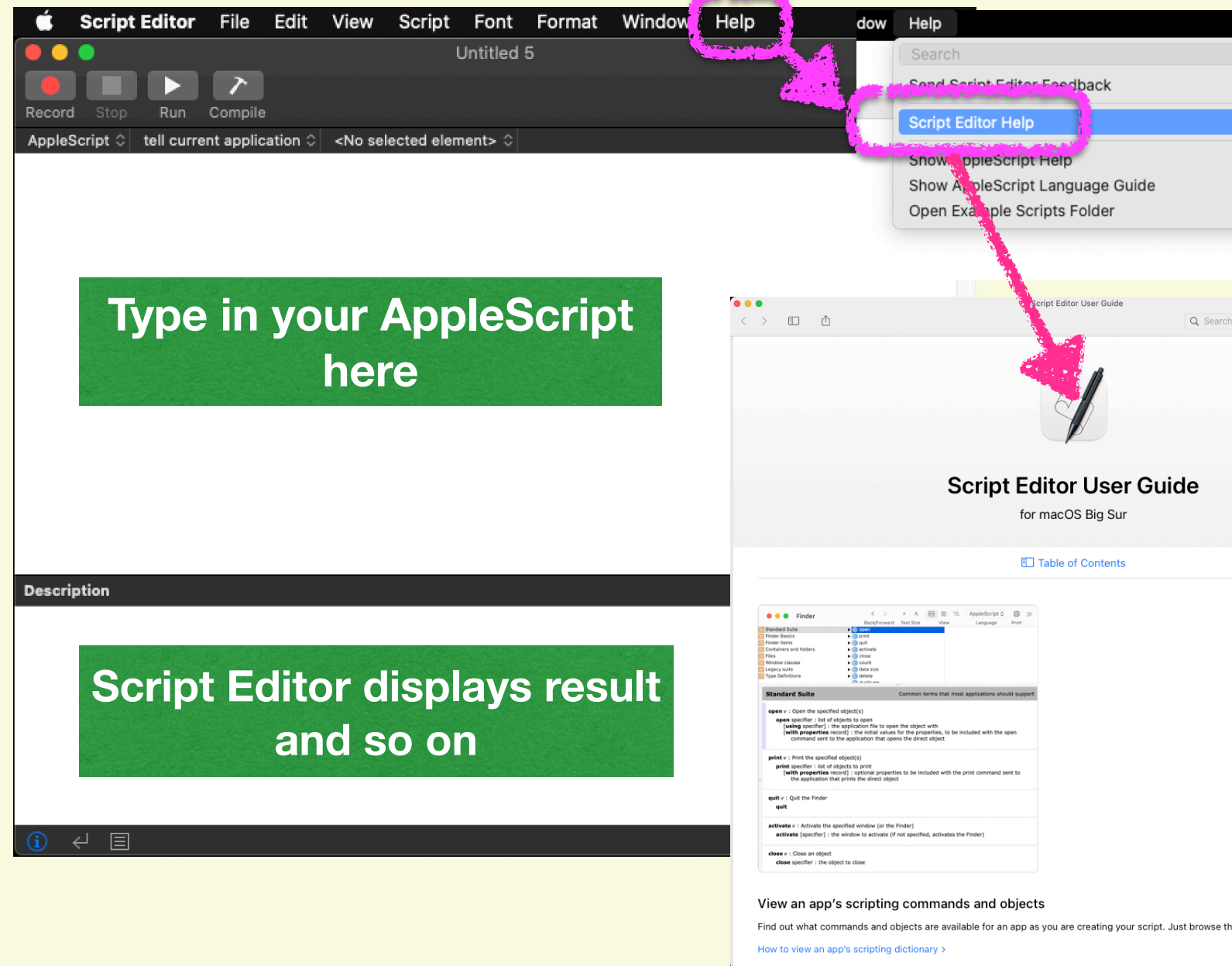


Until macOS 10.15



macOS 11.0 or later

② Launch Script Editor



③ This is the AppleScript editor & executer application, "Script Editor". Detailed information is available in "Script Editor Help" in help menu.



**Level**



**Beginner**



**Intermediate**



**Advanced**

# Security Settings in macOS



*The function to control applications on macOS from AppleScript requires authentication only for the first time using by "Security & Privacy" in System Preferences in macOS 10.12 or later.*

*FileMaker Pro v19 is not a "sandboxed" application. So, controlling FileMaker Pro does not require authentication, but if you want to control other applications, you need to know about authentication mechanism.*

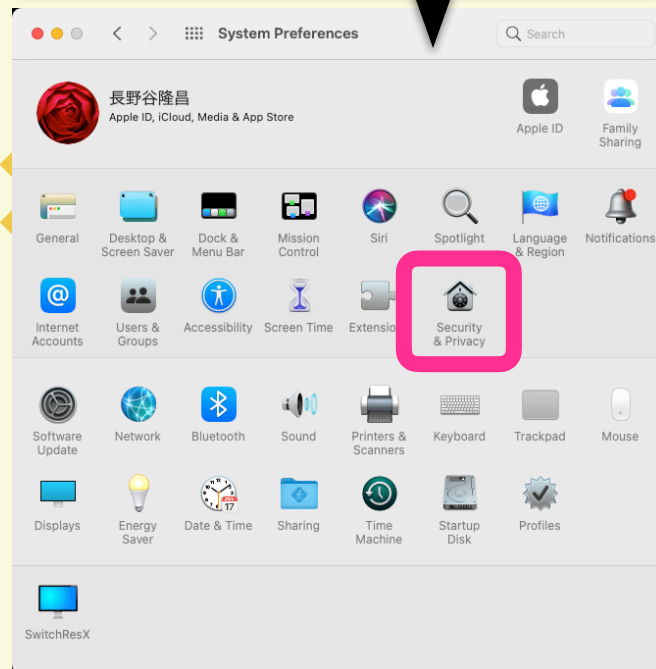


# "Security & Privacy" pane



System Preferences has AppleScript related privacy settings

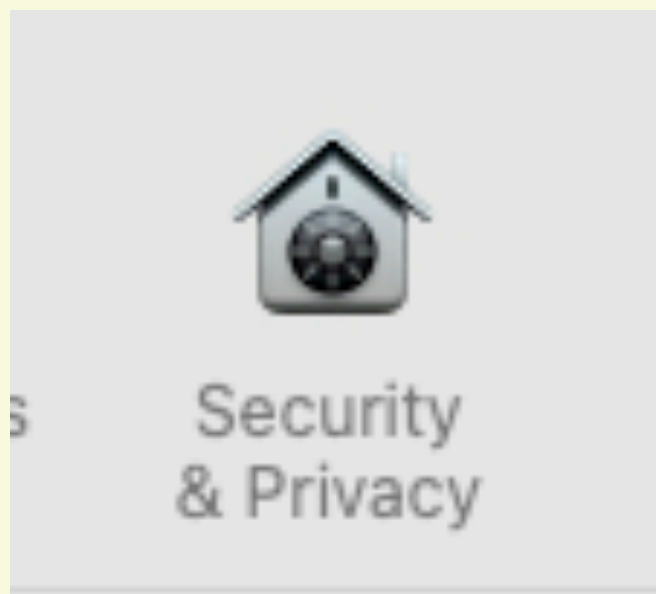
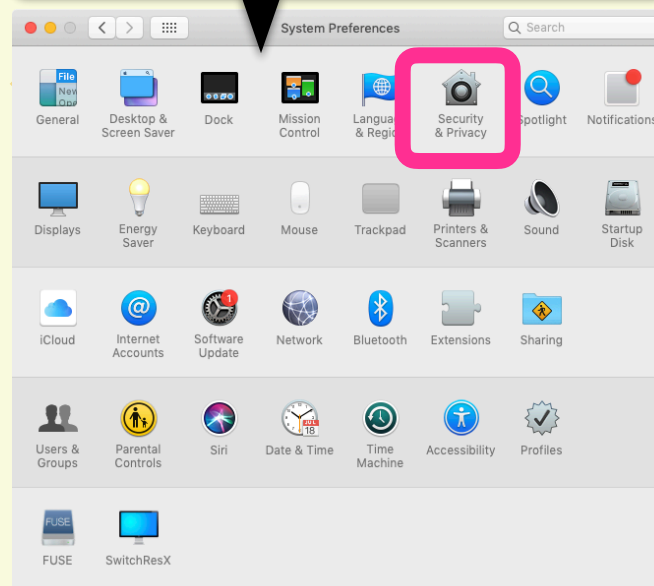
macOS 11.2



macOS 10.15.7



macOS 10.14.6



"Privacy" settings on recent macOS versions

	10.14	10.15	11.0
Automation	•	•	•
Full Disk Access	•	•	•
Files and Folders		•	•
Accessibility	•	•	•
Developer		•	•
Bluetooth			•
HomeKit			•
Media & Apple Music			•
Screen Recording			•
Input Monitoring		•	•
Speech Recognition		•	•
Microphone	•	•	•
Camera	•	•	•
Photos	•	•	•
Reminders	•	•	•
Calendars	•	•	•
Contacts	•	•	•
Location Services	•	•	•
Analytics & Improvements	•	•	•
Advertizing / Apple Advertizing	•	•	•



# Important privacy settings

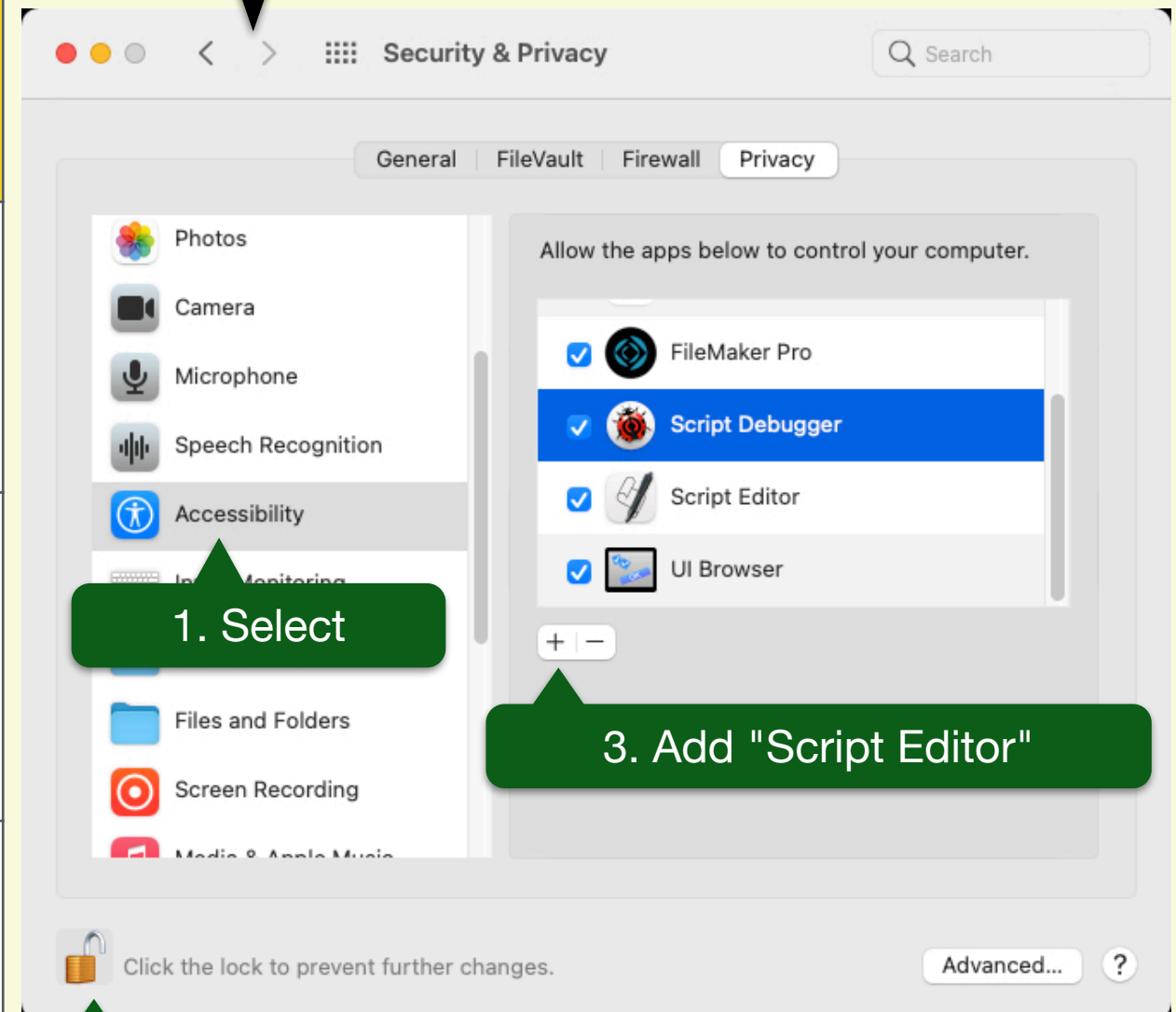


These items are AppleScript related settings

## Important privacy settings

Privacy	Description
Automation	Allow control other apps from AppleEvent. If you control other applications, this setting is required at the first time
Full Disk Access	Allow to apps to access data like Mail, Messages, Safari and certain administrativesettings for all users. If your AppleScript within FileMaker Pro access these resources, you have to add FileMaker Pro to this setting
Files & Folders	Allow the apps to access files and folders. If your AppleScript within your FileMaker Pro want to access local files or folders, you have to register FileMaker Pro to this.
Accessibility	Mainly for disabilities. AppleScript has functions to control from menus and buttons. Very important. <b>Register Script Editor and FileMaker Pro, at first.</b>

Set this **right now**





**Level**



**Beginner**



**Intermediate**



**Advanced**

# Set-up "Extended Privileges"



*In order to control FileMaker Pro from AppleScript, you need to allow the extended access right "Allow Apple Event and ActiveX to perform FileMaker operations (fmextscriptaccess)" on FileMaker Pro. Please make this setting first for each database document.*





# Add Extended Privileges to FMDB①

By default, we can not control FileMaker Pro application from AppleScript

File > Manage > Security...



キーワードで、イメージに合った色セットを

You have to set up with each database document to control FileMaker Pro from AppleScript

の色の組み合わせデータを柔軟に検索!!

## Word Color Palette

By Takaaki Naganoya  
@Piyomaru Software



**Level**



**Beginner**



**Intermediate**



**Advanced**

# Launch FileMaker Pro From AppleScript



*The easiest exercise to control FileMaker Pro from AppleScript is to start and stop FileMaker Pro application. It's easy, but you can feel of the conversation between application and AppleScript.*

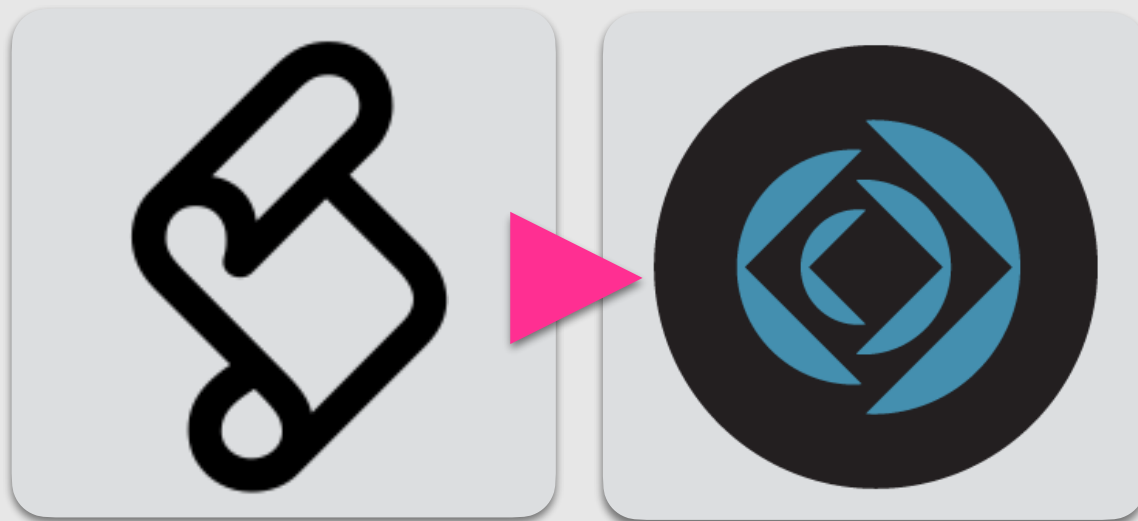




# Two control styles

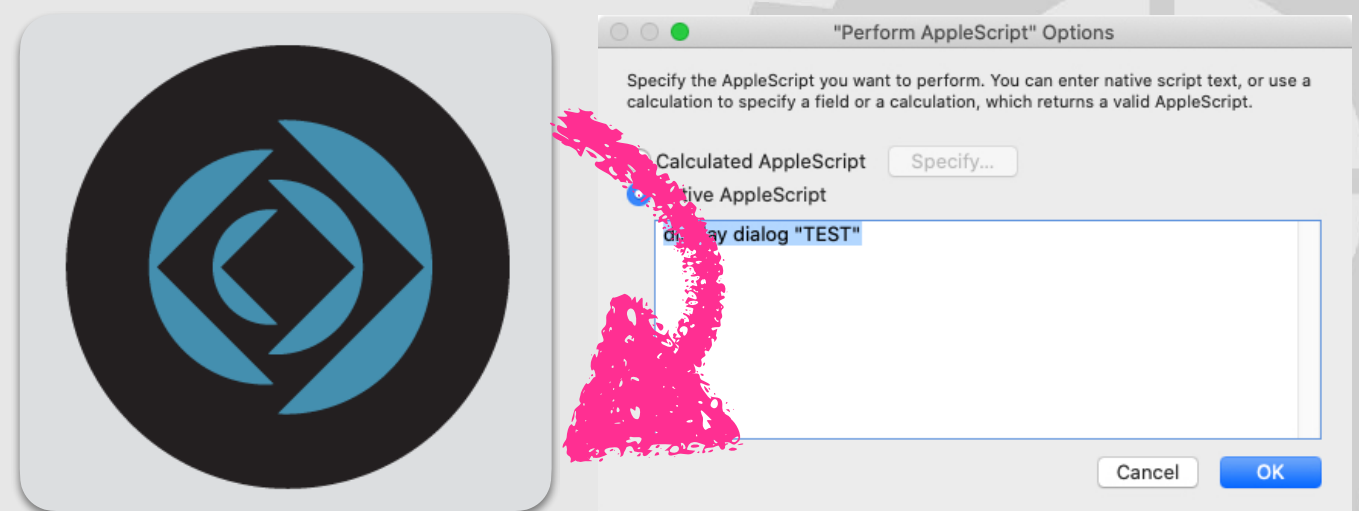
You can control FileMaker Pro by using AppleScript from inside or from external program

①Control from external program such as Script Editor



This style is easier  
I'll recommend this at the first time

②Control from internal script step "Execute AppleScript"



This style is more practical.  
In most of case, we use this.

## Caution 1:

In macOS 10.14 or later, you will be requested **Security & Privacy authentication** to control another application at the first time. Script Editor is a kind of **wildcard application** to control another. It never requested auth. But if you export your script to application or run from Script Menu, you'll have a experience to auth.

## Caution 2a:

FileMaker Pro's scripting keywords may conflict your script's variables and properties. If you meet such error, you have to sandwich the conflicted keyword by "|". For example, "ascending" goes "|ascending|".

## Caution 2b:

FileMaker Pro v18 or earlier version has "Advanced" version. It requires to another application name. So you have to identify current FileMaker application



**Level**



**Beginner**



**Intermediate**



**Advanced**

# Open Database

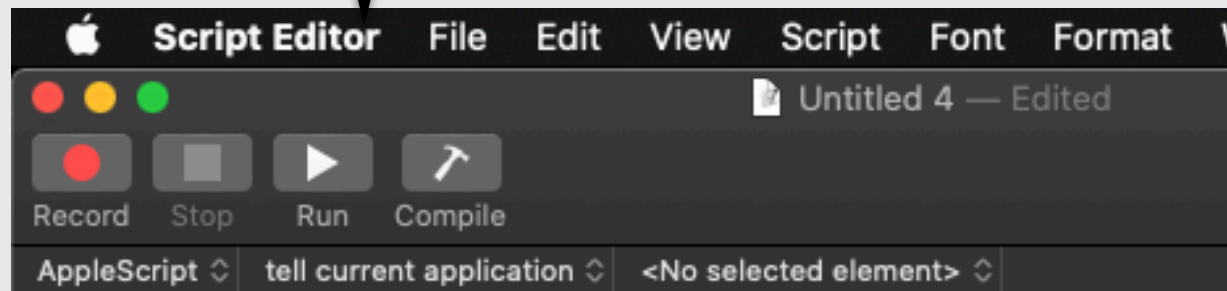


*This is the story of opening a FileMaker Pro database document to get information. You will experience the ability to retrieve a variety of information that cannot be seen on the GUI.*

# Name and extension of document

Get the name of opening database to close unnecessary database, mainly

Returns name of all **opening** documents



```
1 tell application "FileMaker Pro"
2   name of every document
3 end tell
```

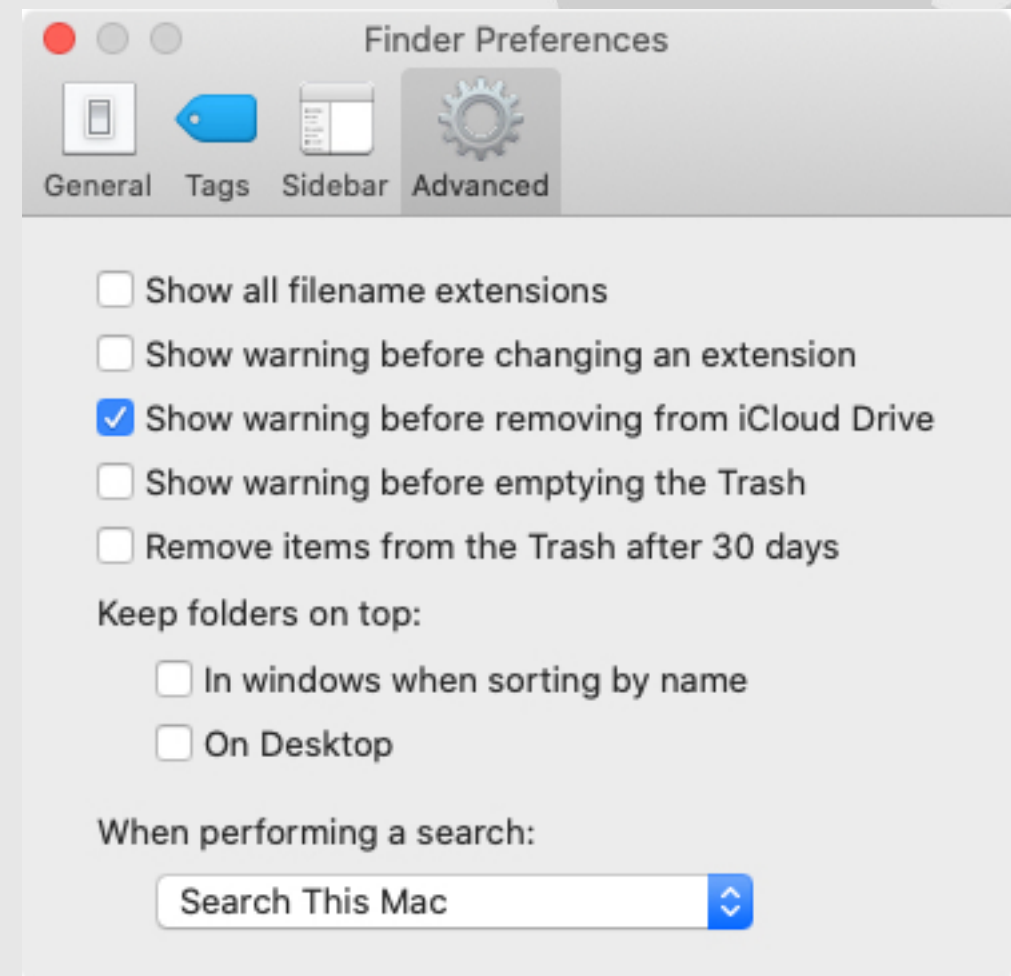
every document

If there is no document,  
this script returns null  
array, {}.

name extension is included

**Result:**  
{"wcp3.fmp12", "repetition.fmp12"}

The result of getting name of FileMaker Pro database is list (array). You can check database existence by counting this result items array.



Some application get effect from Finder setting "**Show all filename extensions**". If Finder display filename extension, iWork applications return document name with filename extension and vise versa.

FileMaker Pro is **\*not\*** affected by this Finder setting.





**Level**



**Beginner**



**Intermediate**




**Advanced**

# Open Remote Database



*FileMaker Pro v19 has a "peer-to-peer sharing" database sharing feature between clients, but it has been announced that this feature will be deprecated. AppleScript can also open databases on FileMaker Server.*

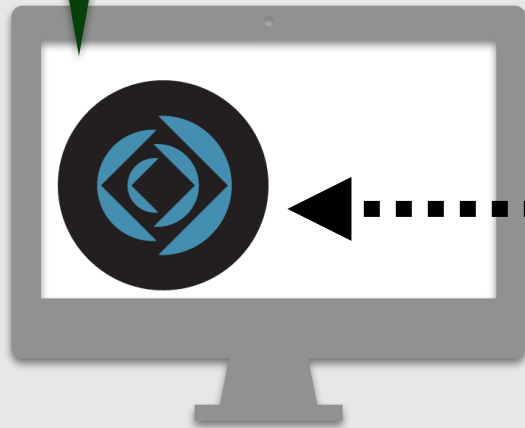




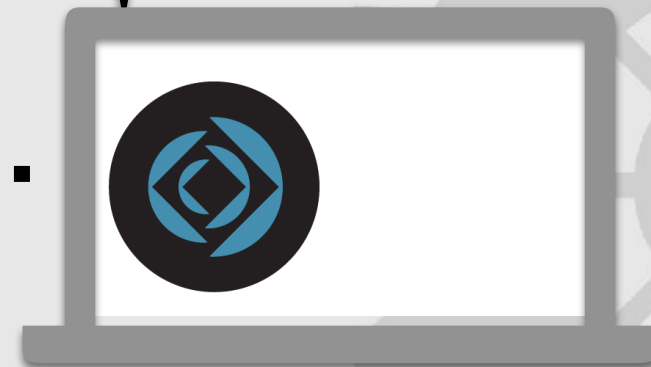
# 3 types of servers

FileMaker Pro has three database sharing methods

Server① (FileMaker Pro Client)



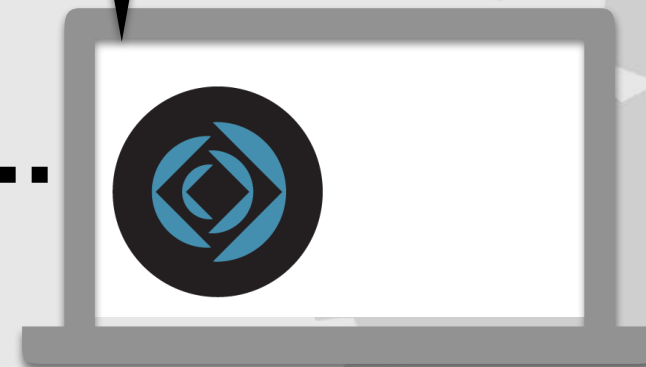
Peer to peer database sharing



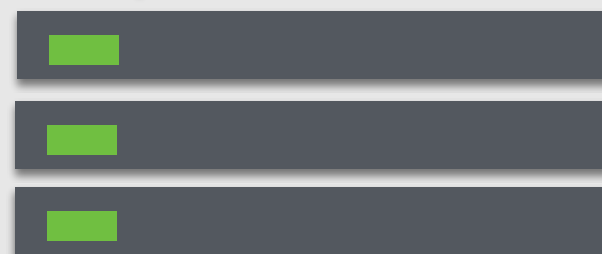
Server② (FileMaker Server)



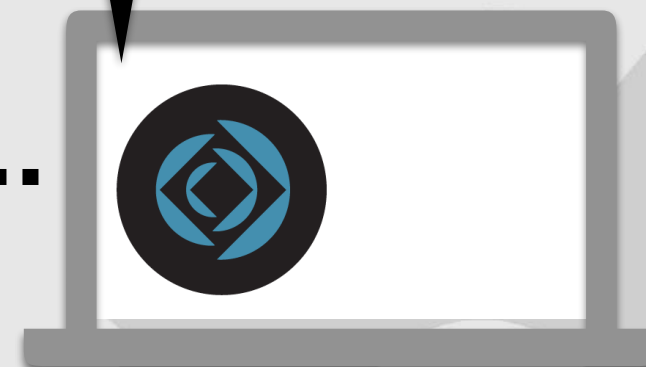
Client/Server (With SSL encryption)



Server③ (FileMaker Cloud)



Client/Server (With SSL encryption)





**Intermediate**



**Level**

**Beginner**



**Intermediate**



**Advanced**

# Get info from tables



*You can store multiple tables in a FileMaker Pro database document.*

*Though, you can't create a new table from AppleScript, you can get information from various type of field in a table.*

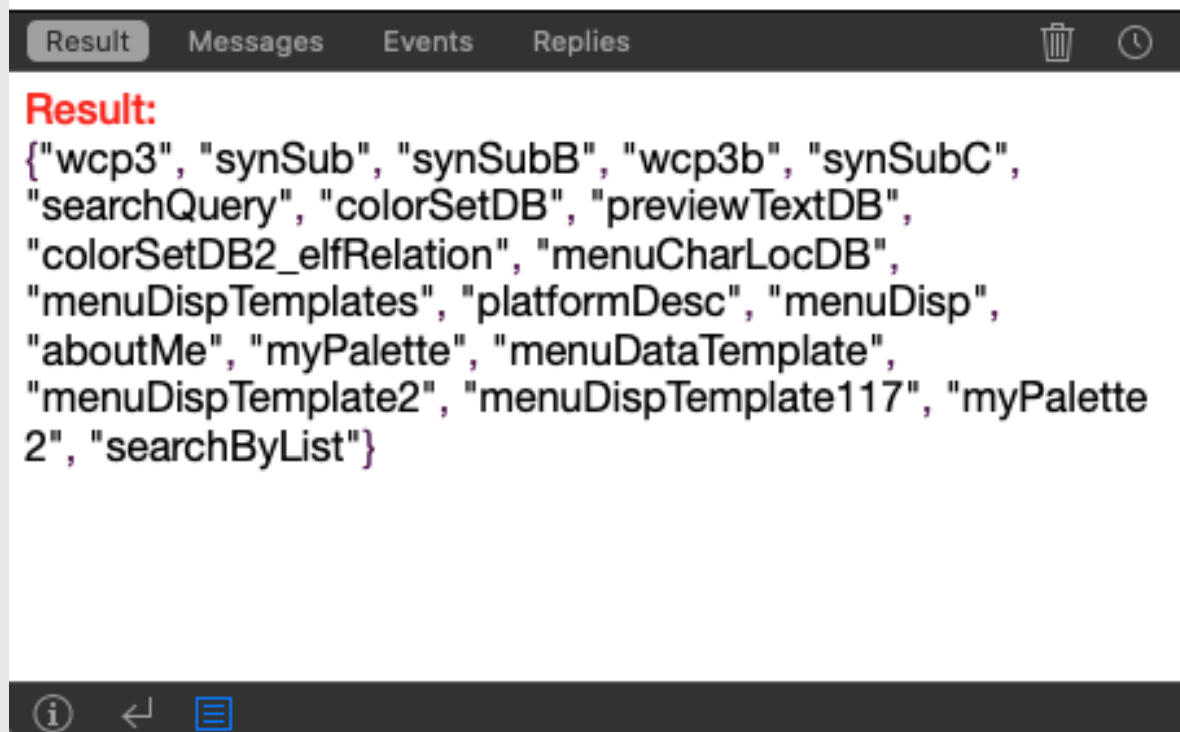
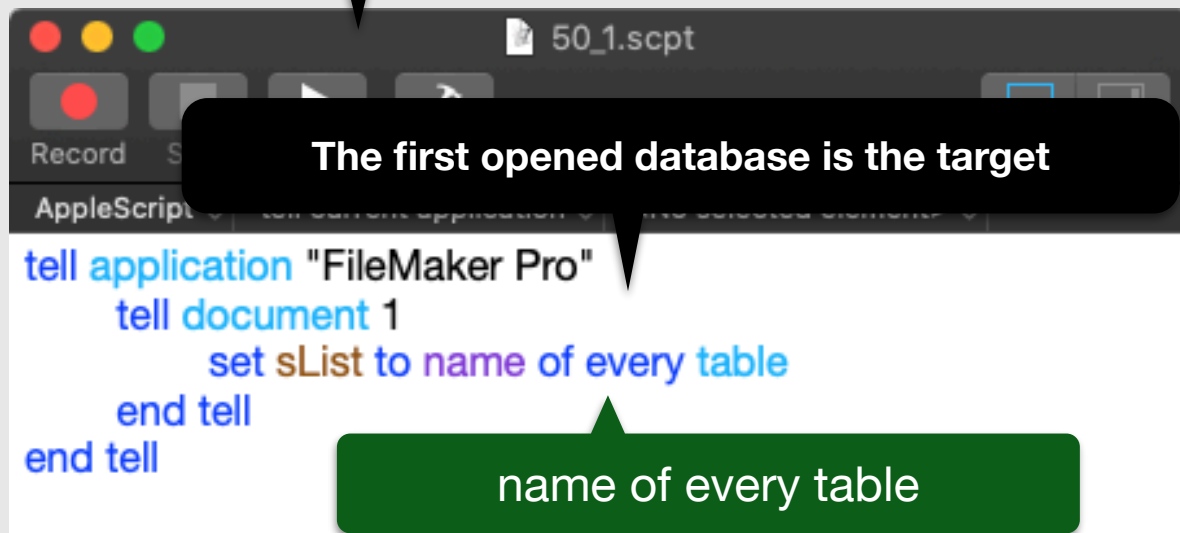




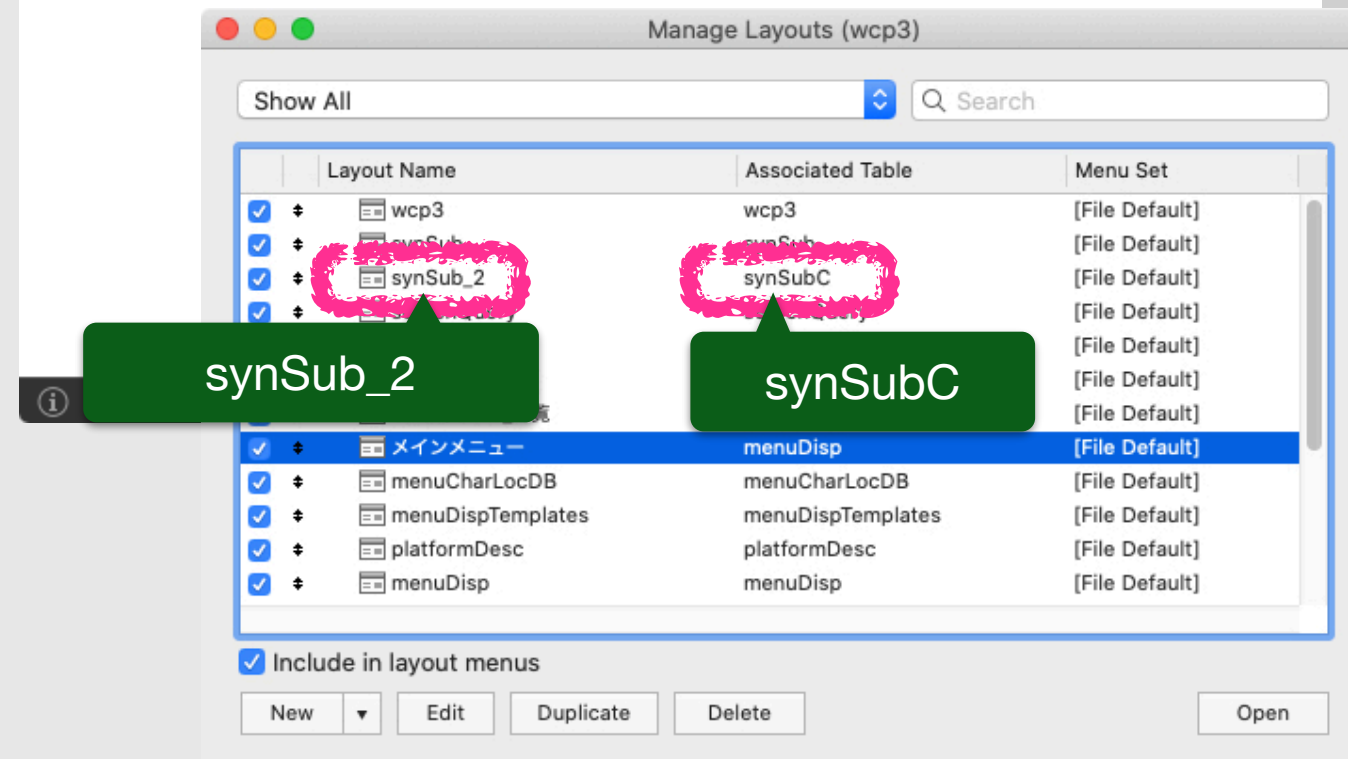
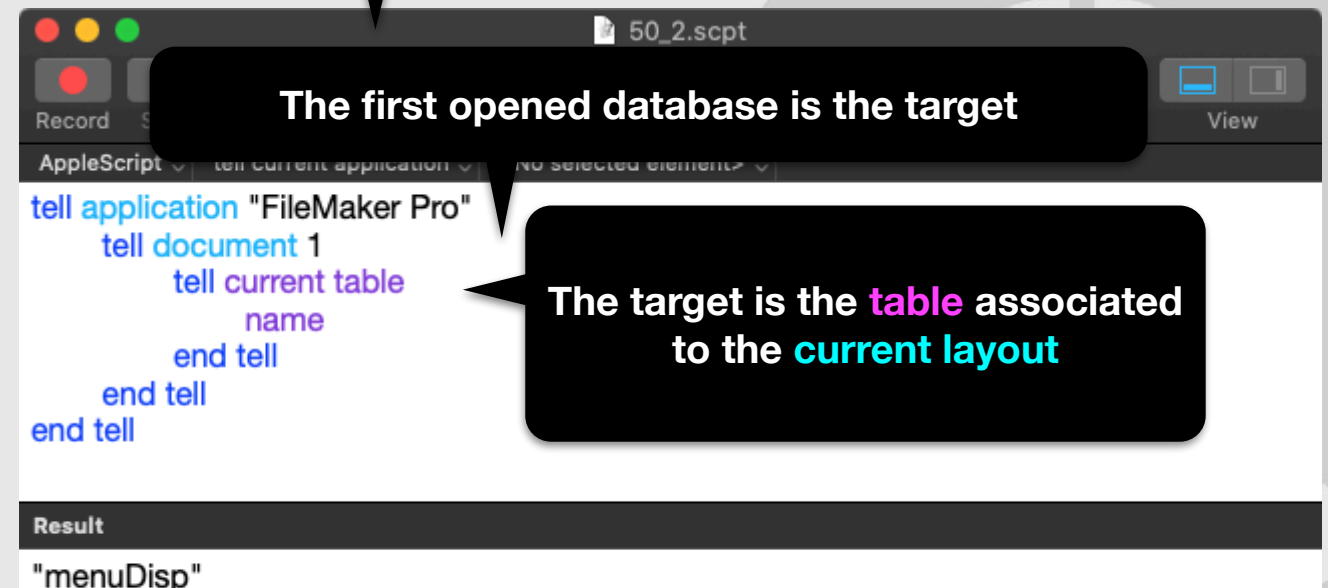
# Get table info from document

FileMaker Pro document contains multiple tables

Get name of every tables of current database



Get name of current displaying table







Level



Beginner



Intermediate




Advanced

# Change layout



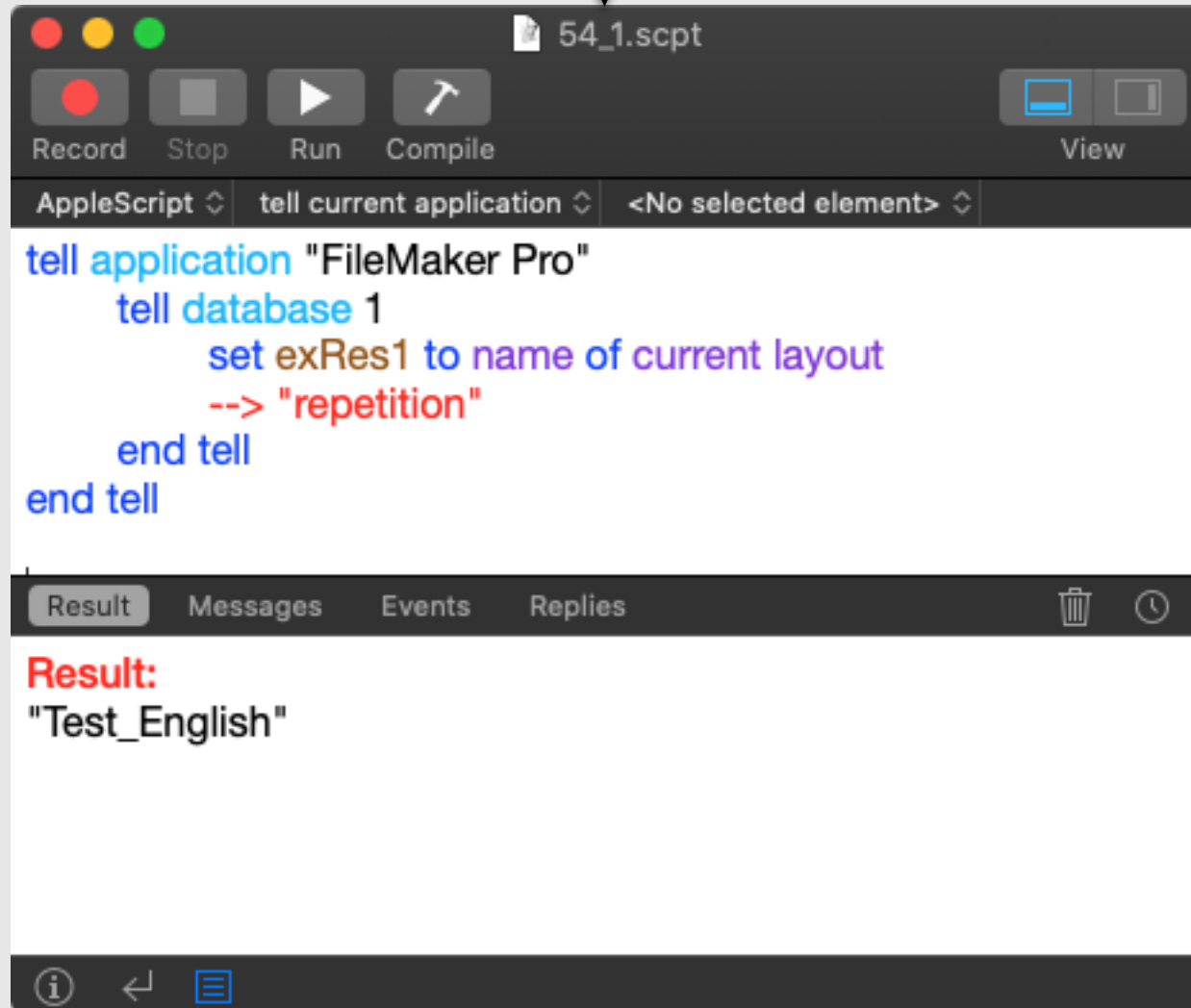
*Layout switching is a **very important** operation in the operation of FileMaker Pro.  
Originally, the layout switching itself shouldn't make much sense.  
Fields accessed from AppleScript must exist on the layout being displayed.  
So, you need to switch to the layout where the fields you want to access.*



# Check the existence of the layout

Specifying a non existing layout cause an error. You have to check the existence of the layout before.

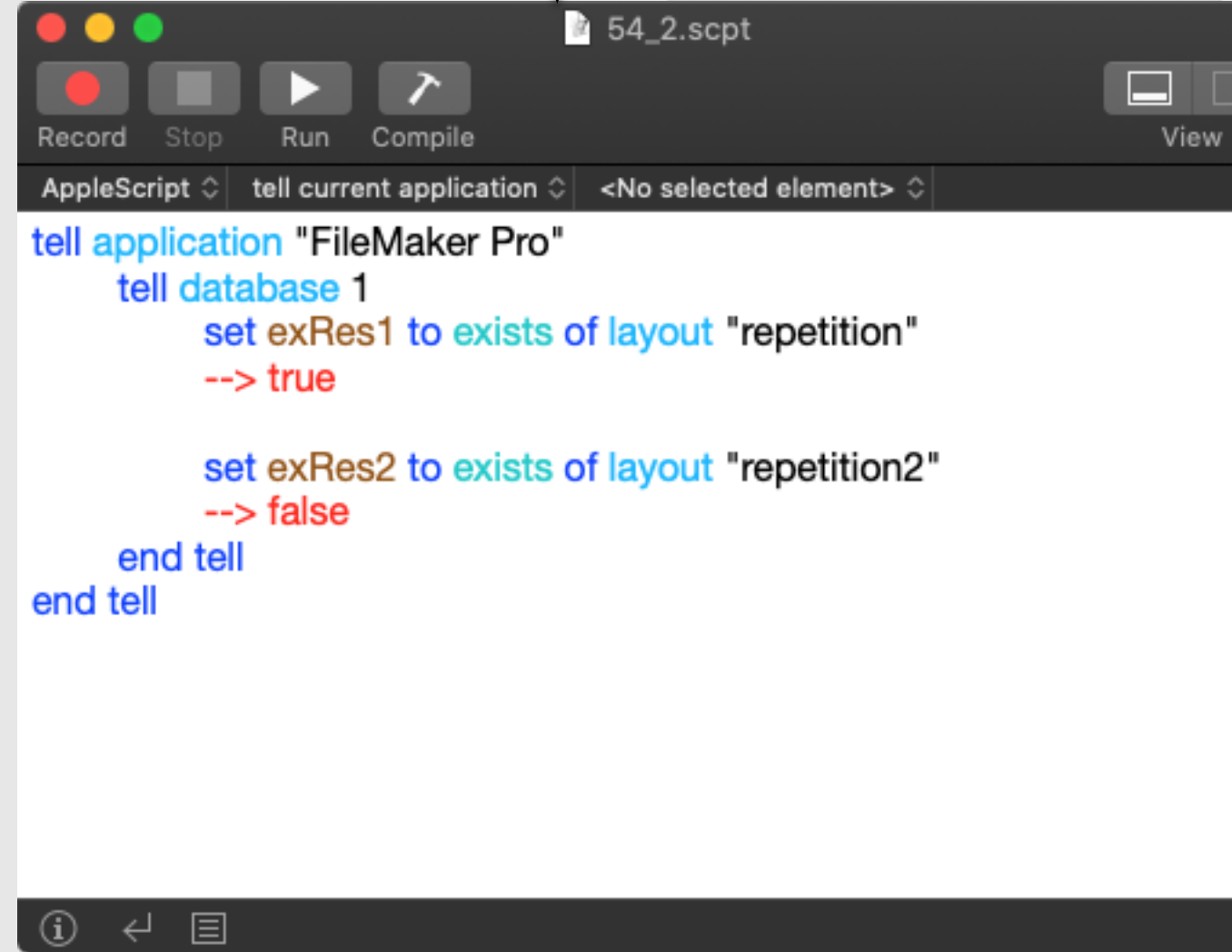
Get the name of current layout



```
tell application "FileMaker Pro"
    tell database 1
        set exRes1 to name of current layout
        --> "repetition"
    end tell
end tell
```

**Result:**  
"Test\_English"

Check the existence of the layout



```
tell application "FileMaker Pro"
    tell database 1
        set exRes1 to exists of layout "repetition"
        --> true

        set exRes2 to exists of layout "repetition2"
        --> false
    end tell
end tell
```



**Level**



**Beginner**



**Intermediate**




**Advanced**

# Get current record



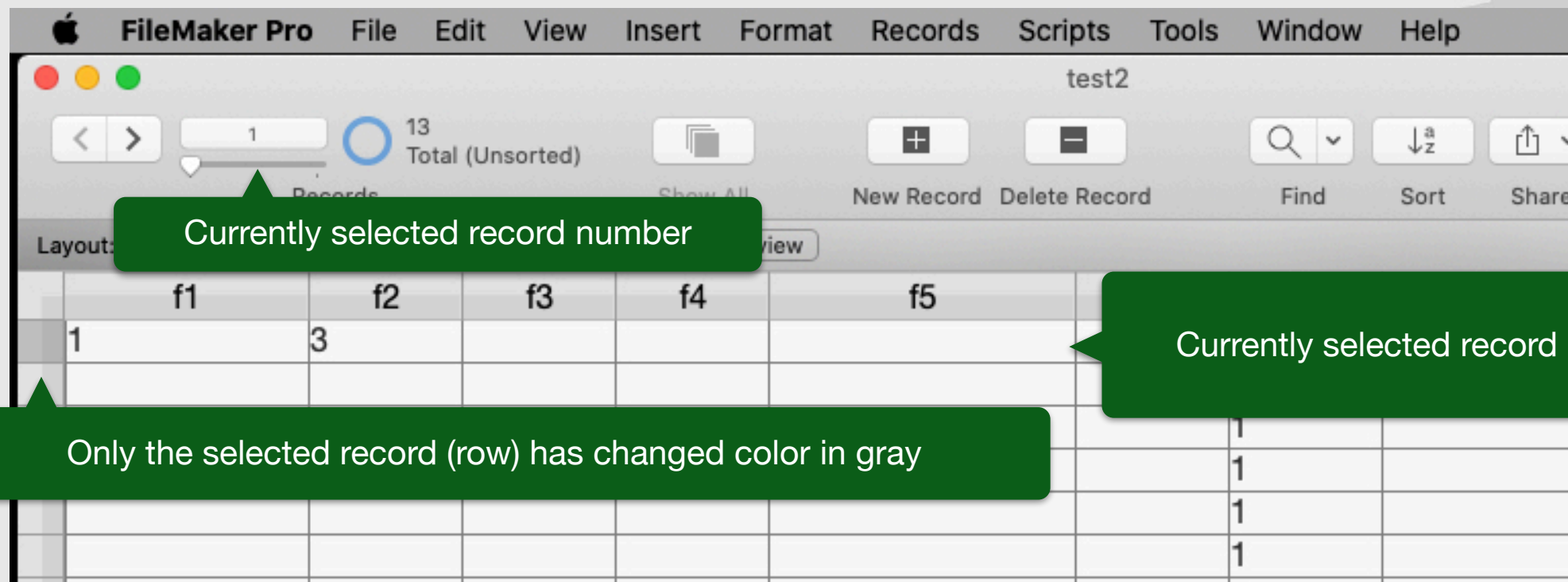
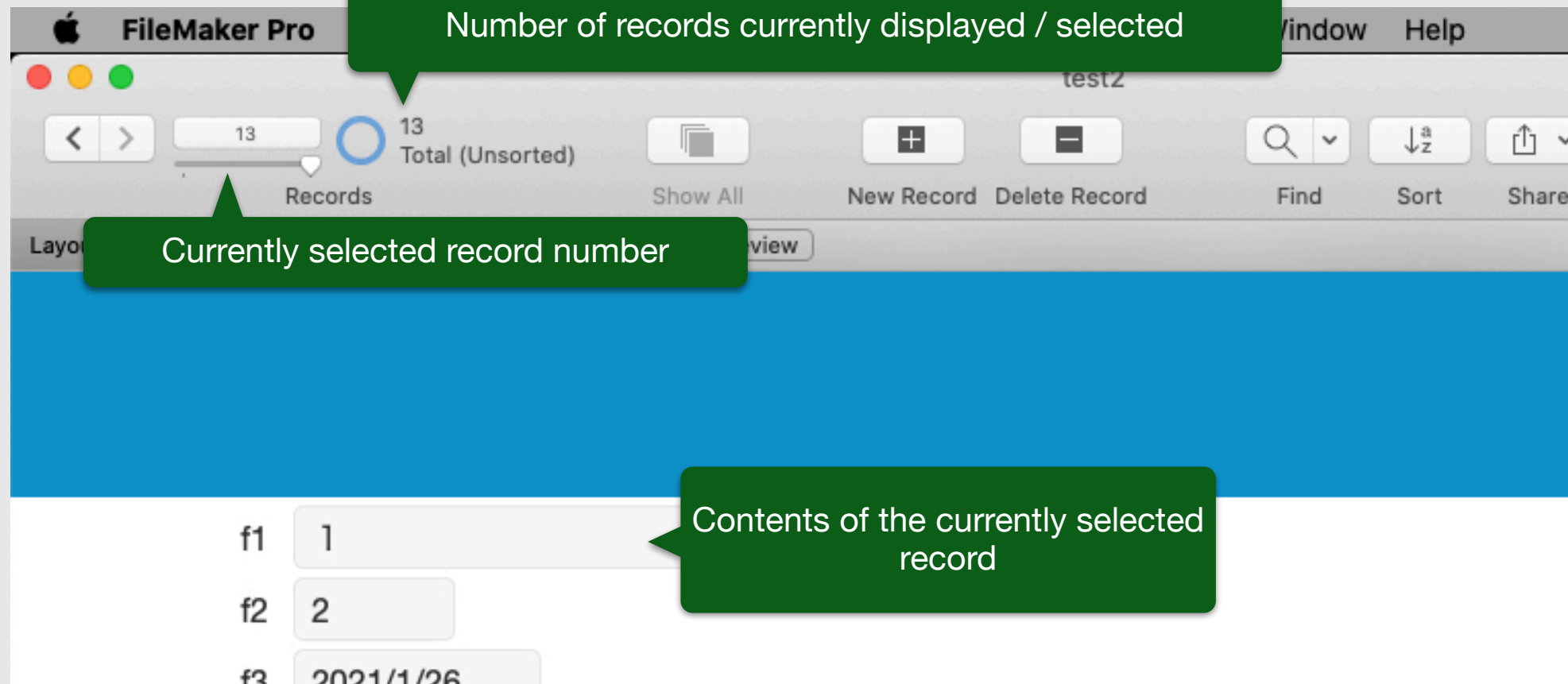
*If you want to work on a table in the database, the "identify the currently selected record" method and the "target a specific record" method are very important.*





# Get current record

About the definition of "currently selected record" that can be confirmed on the screen of FileMaker Pro







**Level**



**Beginner**




**Intermediate**



**Advanced**

# Get / set info from various fields



*This chapter describes how to populate and retrieve data from fields on FileMaker Pro documents.*

*You will learn how to specify field names and how to handle different types of fields.*



# Kinds of field

## FileMaker Pro's database's field types

Types	Data	Access from AppleScript
Text	Text (plain text, styled text)	Read/Write, Styled Text have to be set via clipboard
Number	Number	Read (result is text) /Write
Date	Date Text (YYYY/MM/DD)	Read/Write
Time	Time Text (hh:mm:ss)	Read/Write
Time stamp	Time stamp format text (YYYY/MM/DD hh:mm:ss)	Read/Write
Container	Image, PDF, Movie, CoreML model, fmp12	Read/Write
Calculation	Formula string	Read Only

✓ Text	⌘T
Number	⌘N
Date	⌘D
Time	⌘I
Timestamp	⌘M
Container	⌘R
Calculation	⌘L
Summary	⌘S

If you put an image in the container field, there are two patterns, one is the image itself and the other is the reference to the image file.

You can specify global storage, repeating field (array storage), etc. for each field. You will be manipulating field definitions from the FileMaker Pro GUI side. From the AppleScript side, fields cannot be defined.



Level



Beginner




Intermediate



Advanced

# Get current records in current view



*If the records in the database are conditionally selected by a search command, etc., the range of processing will be expanded if the target records in the selected state can be acquired.*





# Current records in the current view

## About the definition of current selected records

All = 10 records

record 1

record 2

record 3

record 4

record 5

record 6

record 7

record 8

record 9

record 10

Number of refinements = 4 records

View



Number of refinements = 4 records

All = 14 records

4 / 14 Found (Unsorted)

Records

Show All

New Record

Layout: test2 View As: Preview

repField	1	textField	1
	2	numField	3
	3	dateField	
	4	timeField	
	5	timestampField	
	6	containerField	
	7		
	8		
	9		
	10		



**Level**



**Beginner**



**Intermediate**



**Advanced**

# Make new record and set data



*You create a new record and populate a table in your FileMaker Pro database.*



# Create new record

Create new record on the table which is binded with current layout

```
tell application "FileMaker Pro"
  tell window 1
    set nRec to create new record
    --> record id 21.0 of window "repetition" of application
      "FileMaker Pro"
  end tell
end tell
```

Precondition for deletion

At first, you have to open the target database with FileMaker Pro

View mode must be "Browse Mode"

Create new record and get the record id of it

```
tell application "FileMaker Pro"
  tell window 1
    set nRec to create new record
    --> record id 21.0 of window "repetition" of application
      "FileMaker Pro"
    set anID to ID of nRec
    --> 21.0
  end tell
end tell
```





**Level**



**Beginner**



**Intermediate**



**Advanced**

# Sort a table

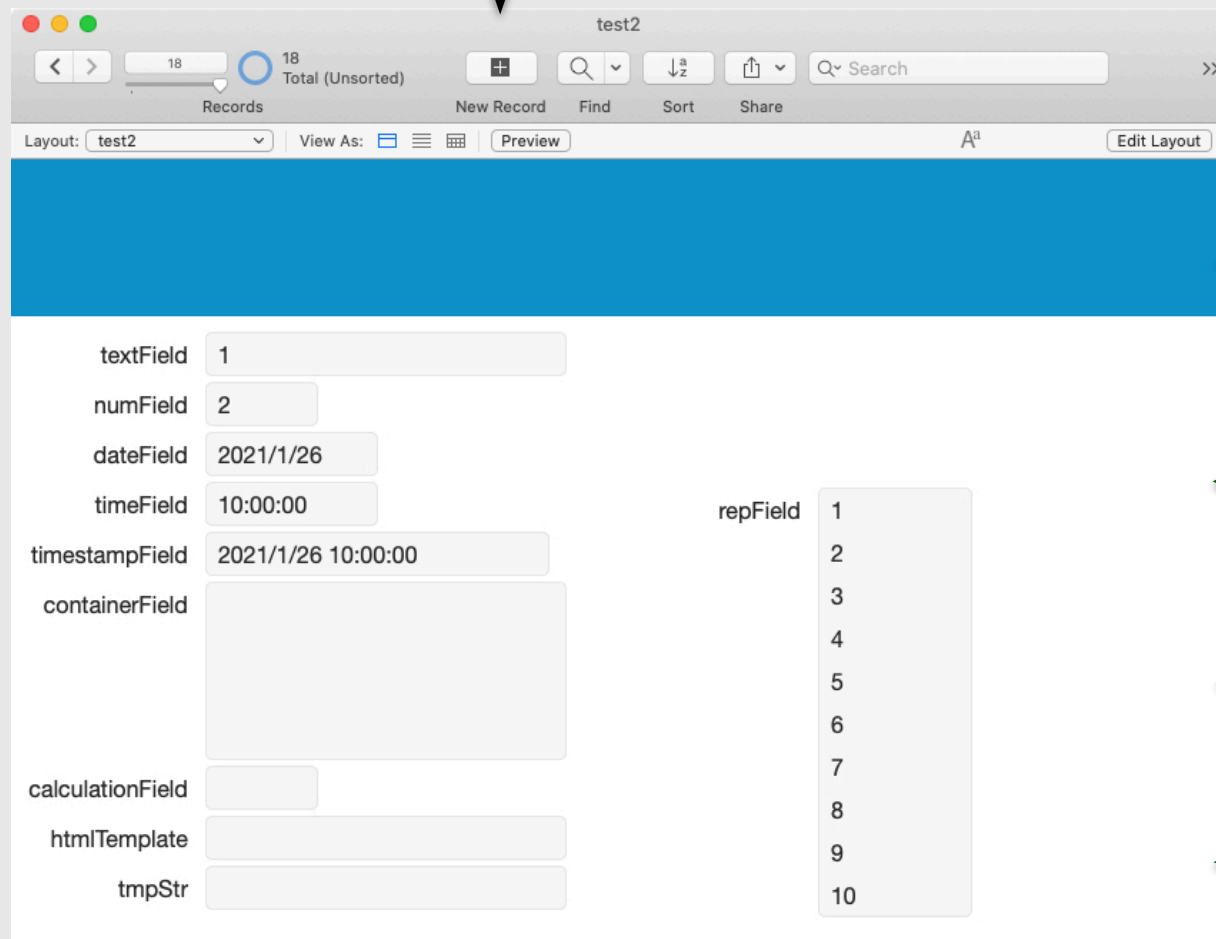


*You perform a sort on a table in a FileMaker Pro database with a reference field and sort direction.*



# Table sorting (from GUI)

## Sorting the target table by some sorting key field



### Precondition for sorting

Target database document is already opened by FileMaker Pro

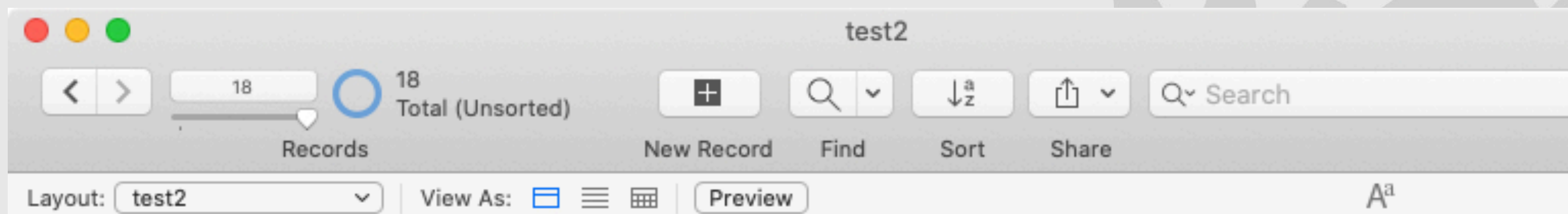
Sorting key fields exist on the current layout in the database

Records in the database exist at least one or more

View mode is "Browse Mode"

Sorting is effect with records in filtered view

You can check sorting or find status on GUI





**Level**

**Beginner**



**Intermediate**



**Advanced**

# Simple find



*You do a data search. You don't just have to do the search, you do the search after you're ready to see all the records.*

*Also, if there is no record that matches the search conditions, an error will occur, and you need to use an "error trap" that ignores the error.*





# Easy find command = show

## Simple search by using AppleScript's filter reference

① Display the target layout ( 's associated table)

document

② Show every record in the target DB

window

③ Execute find with "show" command

document

Error trap (try.....on error.....end try)

An error will occur if the corresponding record does not exist in ③. So, it is very important to prepare the error

If the **target database is extremely large** or the **network connection is very slow**, the request does not end **within 180 seconds**. In such a condition, you have to prepare the error by extending timeout

④ Get the result

window

```
tell application "FileMaker Pro"
  tell document 1
    show layout "repetition" --①
  end tell
  tell window 1
    show every record --②
  end tell
  tell document 1
    try
      show (every record whose cell "num2" = 2) --③
    on error
      return false
    end try
  end tell

  tell window 1
    set idList to ID of every record --④
    if class of idList is not equal to list then
      return {idList}
    else
      return idList
    end if
  end tell
end tell
```

If the result of ④ is one record, it returns as one id number.  
If the result of ④ is two or more record, it returns in array.



# Technical Supervisor's Afterword

---

The functionality of FileMaker is improving year by year, and FileMaker can cover a broad range of your demands. Now FileMaker Inc. moved to the Claris Inc. and they offers Internet-to-Internet integration solutions with Claris Connect. On the other hand, although AppleScript got started on 90's which Mac OS was the main stream, recently it has become less of a hot topic in the current macOS.

What can you realize with the combination of FileMaker & AppleScript? The answer is that you can do what FileMaker can't do. In other words, AppleScript widely expands the possibility of FileMaker. AppleScript can effectively control the user environment of the OS. The current Claris Connect can integrate over the Internet, while AppleScript is a technology that has long been able to work together with multiple applications within a single Mac. Why don't you leverage such a technology?

We hope that the information in this book and AppleScript-enabled applications is going to help you do things we have never thought possible.

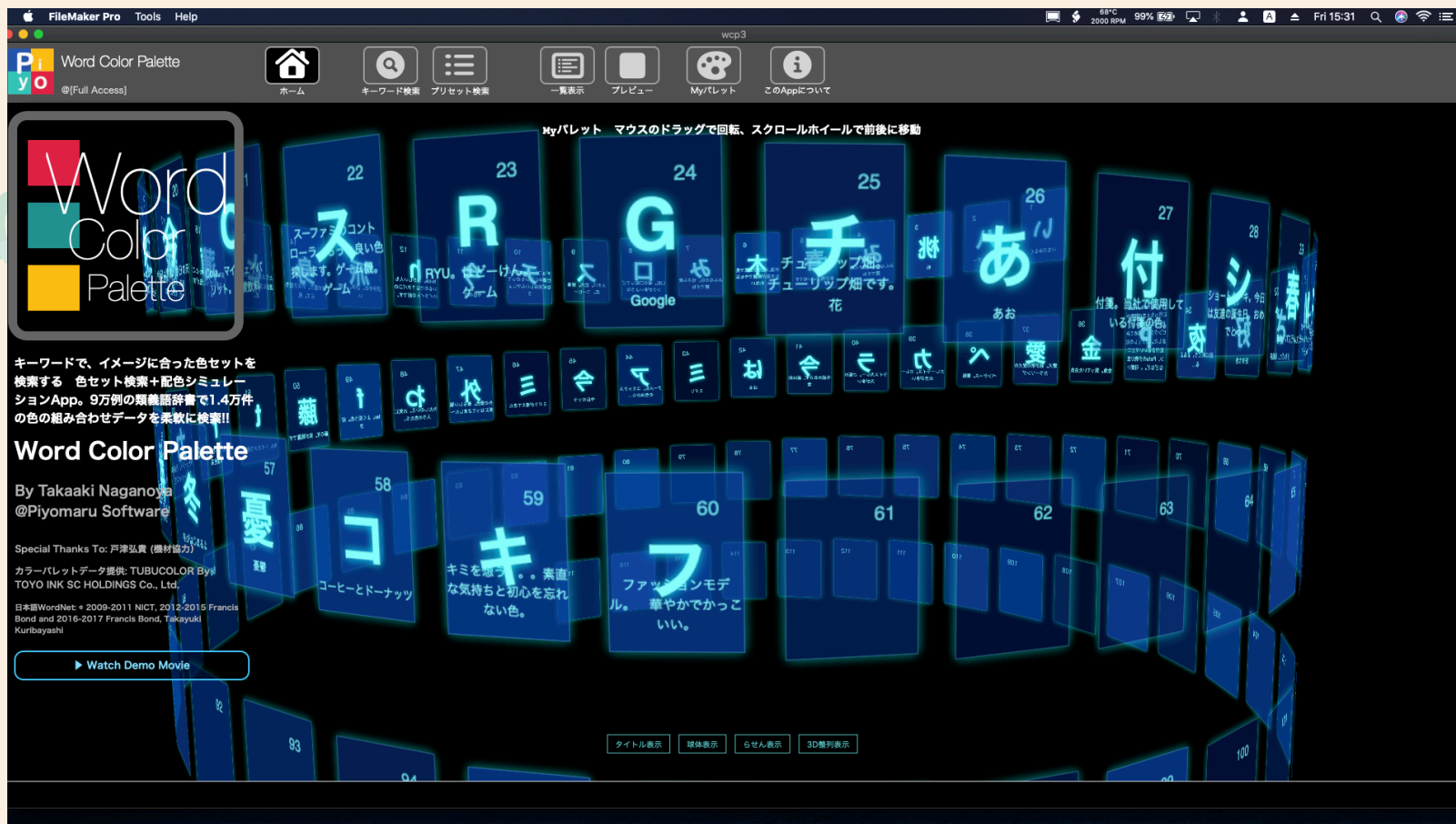
Masayuki Nii, February 3rd, 2021



# Author's Postscript

I'm a solution developer who combines Apple products to provide solutions. Above all, I use AppleScript to build the system. The latest AppleScript is an environment where you can write powerful programs by combining local applications, Cocoa API, and REST API on the Web. I develop a number of applications with AppleScript and sell them on the Mac App Store.

The other day, a **FileMaker Pro program contest was held in Japan**, and after a long time I installed FileMaker Pro and tried to make a contest entry work. WebViewer, CoreML....I was surprised at how easy it was to use incredibly flashy technology.



This is FileMaker Pro v19 with 3 dimensional rotate menu. This menu displays users color-text set bookmarks. This menu uses three.js JavaScript Library on CDN.

This DB's search function uses thesaurus database converted to FileMaker Pro format and its entry words pairs are over 90 thousands. Thesaurus search function works with AppleScript.



Watch Demo Movie  
on YouTube

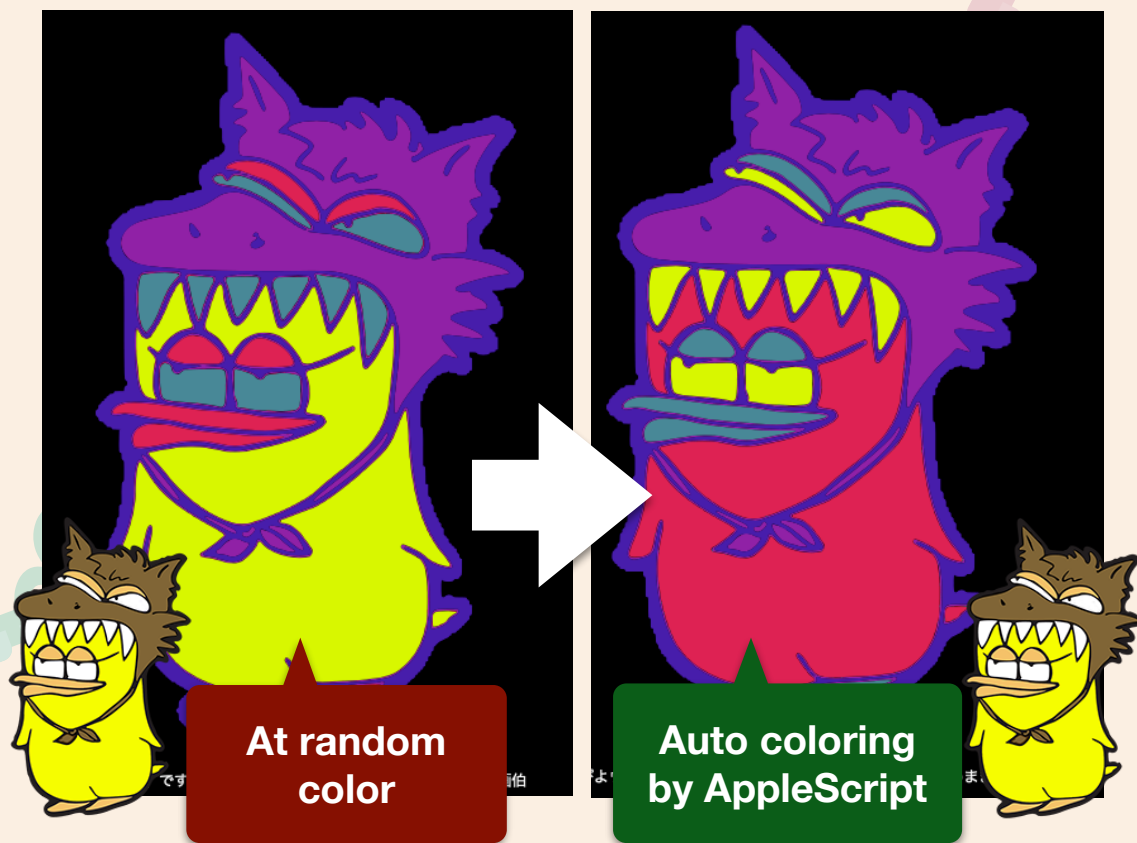




This DB has 14 thousands of color set & keyword pairs. Users can search by favorite keywords.

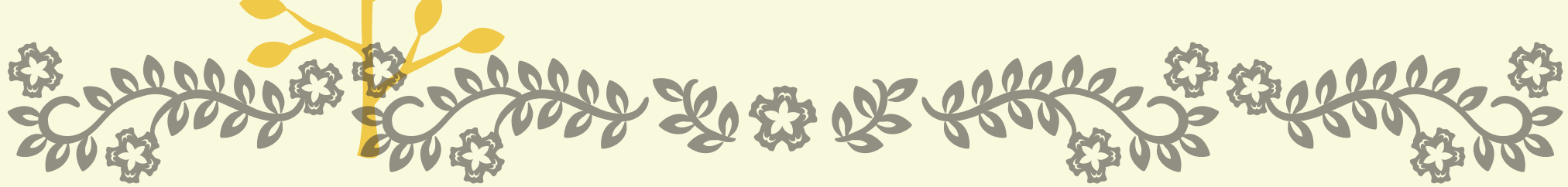
It has color preview function which use SVG data to preview color set and has auto color scheming function by calculating color brightness data and fit color set's data to SVG template considering original graphic's color characteristic. This auto color scheming function is **full written in AppleScript**.

Though I omitted from the contest entries, I also created the Adobe Swatch Exchange file export function with AppleScript. So, this database enables that users search and examine color sets by favorite keyword, apply color set to SVG template and export it as Adobe Illustrator's palette immediately.



Technical supervisor Dr. Masayuki Nii is a very well-known IT architect in Japan and uses FileMaker Pro products for various usage. He gave me valuable advices about latest FileMaker product information.

I want to give this word with gratitude, **"This is it! My contest entry work is the "things they never thought possible".**



## macOS Script-able application guide book series①

### “FileMaker Pro Scripting Book with AppleScript” English Edition

---

Publish date: Feb. 8th, 2021      First Edition

Author: Takaaki Naganoya@Piyomaru Software (Twitter: @Piyomaru)

Technical Supervisor: Masayuki Nii

Discussion: Akiyasu Takamori

Translator: Takaaki Naganoya

Designer: Takaaki Naganoya

Publisher: Piyomaru Software

Email about this book: maro@piyocast.com

Authoring application: Keynote v10.1, Double PDF v2.0

Hex figs making app: Kamenoko v1.1

Used AppleScript: "PDF with TOC generator from Keynote document v3.6",  
"English text item on Keynote ratio calculator", "Font replacer for Keynote v2"  
"AppleScript RTF exporter", "Keynote Font Replacer", "Keynote Font Finder",  
"Keynote slide title gatherer", "Keynote Font explacer v2 with table interface"

#### Support Page:

<http://piyocast.com/as/asinyaye/books/>

#### Author's Blog

<http://piyocast.com/as/>

#### Piyomaru Software Book Store

<https://piyomarushoft.booth.pm>

#### Author's YouTube Channel:

[https://www.youtube.com/channel/UCxeYR7OkI3dn6nKnu1\\_5oPA](https://www.youtube.com/channel/UCxeYR7OkI3dn6nKnu1_5oPA)

