

How algorithm can entertain your daily life and enrich your work skills.

(Build your personal digital assistant on SAS studio)

Hui Liu : MSD China R & D Center
PhUSE 2018 Shanghai: Single Day Event

"The Analytical Engine weaves algebraic patterns, just as the Jacquard loom weaves flowers and leaves." - Ada Lovelace

A gifted mathematician, Ada Lovelace is considered to have written instructions for the first computer program in the mid-1800s.





Nowadays, it is just a few clicks away for us to be able to use the powerful engine in the cloud by using our favorite language-SAS to entertain ourselves and sharpen our working technical skills.

SAS® Studio

Visual Programmer Sign Out

Server Files and Folders



odaws02-prod-sg

Folder Shortcuts

Files (Home)

my_content

my_courses

sasuser.v94

sudoku

core.txt

dilbert.sas

mygif.zip

PrintMtrx.sas

PrintMtrxEx.sas

sudoku.sas

Tasks and Utilities

Snippets

Libraries

sudoku.sas x dilbert.sas x PrintMtrxEx.sas x PrintMtrx.sas x



CODE

LOG

RESULTS



```
1 proc printto;
2 run;
3
4
5 data _null_;
6
7     call symput('ahuigefromtime',put(time(),time8.));
8
9 run;
10
11
12 options nomprint;
13
14 %let columns=9,3,5,7,8,6,4,2,1;
15
16 %let rows=2,3,4,7,8,9,5,6,1;
17
18 %macro printMtrx(dsn);/*print matrix*/
19     data null :
```

/home/ahuige0/sudoku.sas

UTF-8

Messages

User: ahuige0



Benefits of using SAS Studio

- It is free and in the cloud. You do not need to install.
- It is system independent even available on MacBook and iPad.
- It is Unix based and the power overweighs your own machine like a Car vs Car model.
- New PROCs are up-to-date and available. All it requires is just your creativity.

Are all jargons in the tech world created for the purpose of puzzling us?

- HTML; JAVASCRIPT; Web crawling;
- REGULAR EXPRESSION;
- DATA STRUCTURE LIKE 'STACK' (LAST IN FIRST OUT)

These things look in a long distance we intend to ignore. Do we really need them and how can they help us in reality? What if I know little about them?

**“What you can do or think you can do, begin it.
For boldness has magic, power, and genius in
it.”**

–Goethe

Story I: How to **consume** Web content from internet?

【鲁达坐下道：“奉着经略相公钧旨：要十斤精肉，切作臊子，不要见半点肥的在上面。”。郑屠道：“使得”。鲁达道：“送甚么！且住，再要十斤都是肥的，不要见些精的在上面，也要切做臊子。”。。。“再要十斤寸金软骨，也要细细地剁做臊子，不要见些肉在上面。”
】



When you want to consume something from internet, make sure it is within your reach.

- Grab all.
- Discard some.
- Reassemble best parts.

Tech behind of Actions

- Grab all (**Crawl** webpages from internet in loop)
- Discard some (Pattern match with **RegExp**)
- Reassemble the best parts (From **HTML** to HTML)

Cases of web crawling usage

1. Aggregate clinical trials' information from competitors: retrieve PD-1 trial details from Pfizer, Novartis, MSD public websites.
2. Filter useful information from FDA or other agencies: Search Policy/guidance/news by Keywords of particular Drug or Company.
3. Grab text files/pictures by crawling websites and email to you or push to kindle.

BLADDER CANCER

Keynote 057

A PHASE II, UNBLINDED OPEN-LABEL, CLINICAL TRIAL TO STUDY THE EFFICACY AND SAFETY OF PEMBROLIZUMAB (MK-3475) IN SUBJECTS WITH HIGH RISK NON-MUSCLE INVASIVE BLADDER CANCER (NMIBC) UNRESPONSIVE TO BCG/ CALMETTE-GUERIN (BCG) THERAPY (MK-3475 057)

ESOPHAGEAL CANCER

Keynote 181

A PHASE III RANDOMIZED OPEN-LABEL STUDY OF SINGLE AGENT PEMBROLIZUMAB VS. PHYSICIANS' CHOICE OF SINGLE AGENT DOCE TAXEL

UROTHELIAL CANCER

A Study Of Avelumab In Patients With Locally Advanced Or Metastatic Urothelial Cancer (JAVELIN Bladder 100)

NCT02603432

Recruiting

ALL GENDERS

18+ YEARS

MULTIPLE SITES

ADVANCED CANCER

A Study Of Avelumab In Combination With Other Cancer Immunotherapies In Advanced Malignancies (JAVELIN Medley)

NCT02554812

Recruiting

ALL GENDERS

18+ YEARS

MULTIPLE SITES

NON-SMALL CELL LUNG CANCER, UROTHELIAL CANCER

A Study Of Avelumab Plus Chemotherapy With Or Without Other Anti-Cancer Immunotherapy Agents In Patients With Advanced Malignancies

NCT02317406

Recruiting

PDR001

spartalizumab

Metastatic Melanoma

Oncology

Phase II

ADMINISTRATION Search FDA

[Home](#) [Food](#) [Drugs](#) [Medical Devices](#) [Radiation-Emitting Products](#) [Vaccines, Blood & Biologics](#) [Animal & Veterinary](#) [Cosmetics](#)



Advancing toward the goal of global approval for generic drugs
FDA proposes critical first steps to harmonize global standards for generic drugs

1 2 3

[Recalls & Alerts](#) [Approvals & Clearances](#) [Report a Problem](#)

- Recalls
- Enforcement Report
- Warning Letters

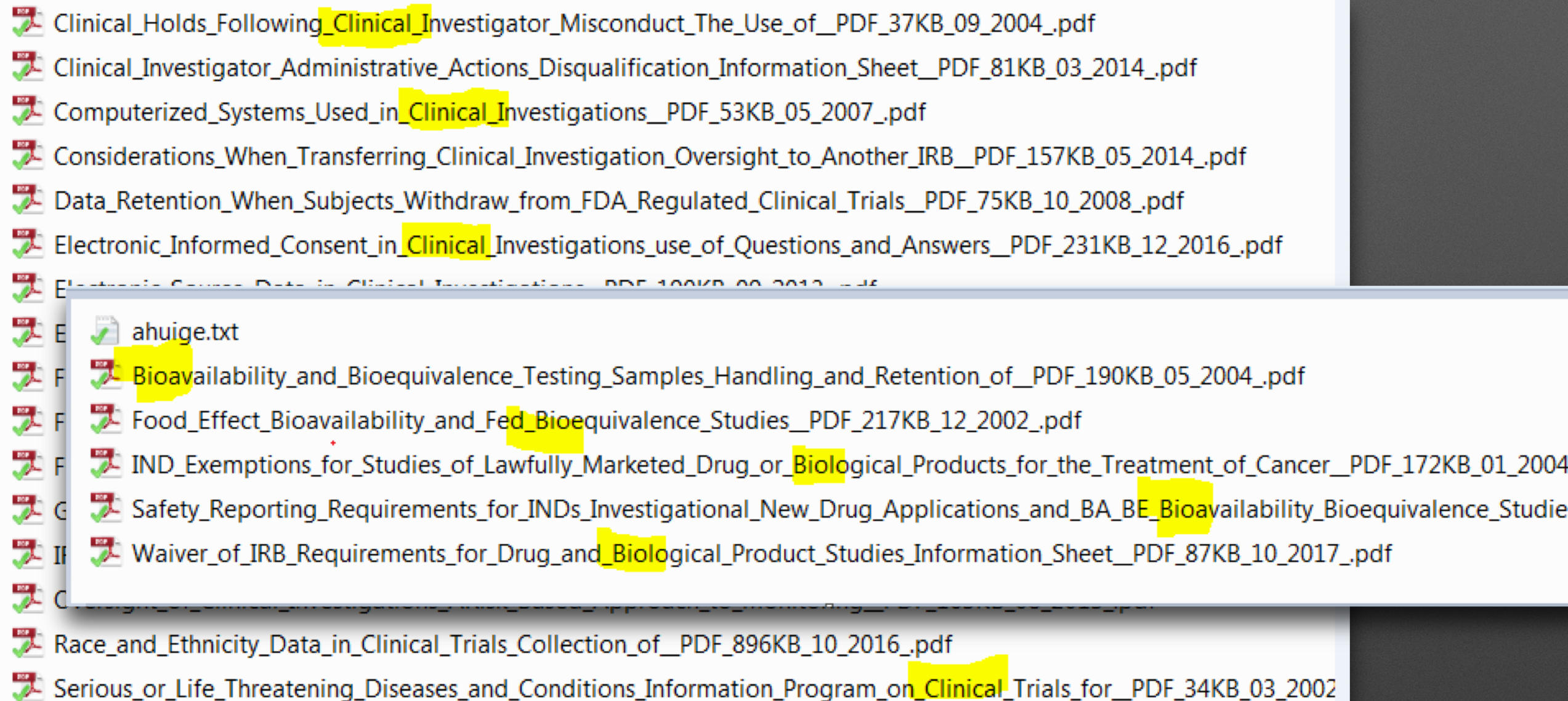
For Consumers
Updates and information on products that are safe, effective, and healthy

For Patients
Learn about other drug/device approvals and more

For Health Professionals
Medical product safety, adverse event/professional information and more

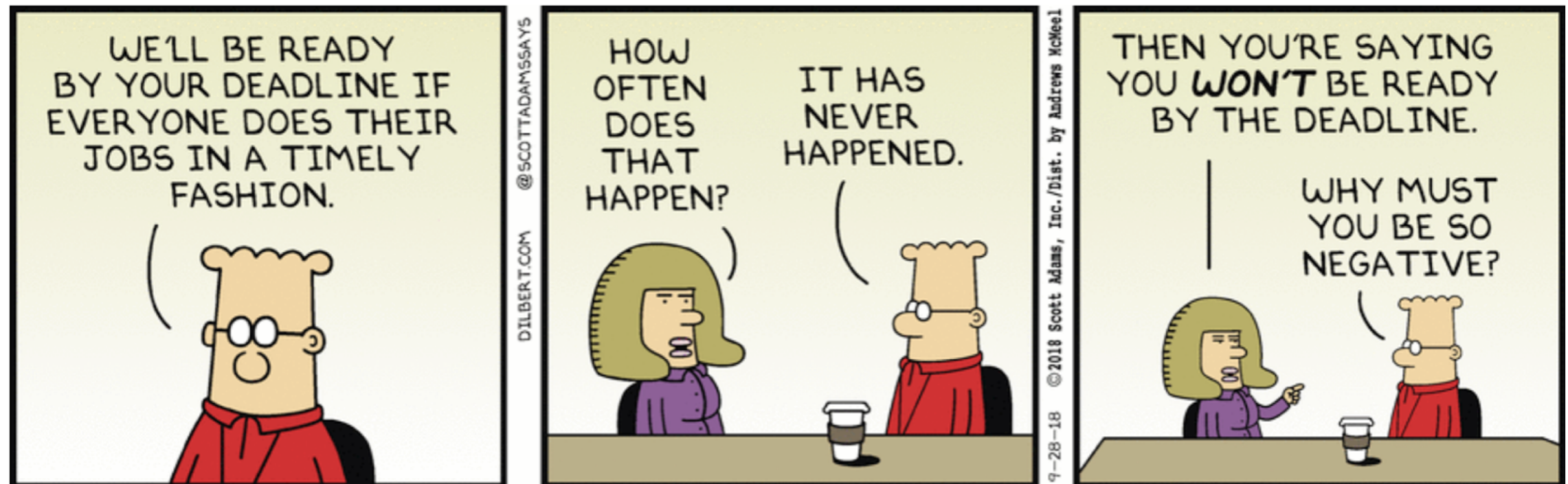
For Scientists & Researchers
NCTR, pediatrics, Path Initiative, food and drug medicine research

FDA is a place where you are chasing all the updates. You don't want to miss anything concerning you.



When apply Crawling/Regular expression wisely
you can download multiple files by keywords
for Guidance/News/Policies

Friday September 28, 2018 *Everyone Does Their Job*



COMMENTS
0

BUY

Video Demo of Crawling files

▼ Server Files and Folders



odaws03-prod-us

▶ Folder Shortcuts

Files (Home)

▶  my_content

▶ my_courses

► Tasks and Utilities

► Snippets

► Libraries

► File Shortcuts

 *getiframe.sas *dilbert.sas

*Program 1

CODE

LOG

RESULTS



```
1 %include "/home/ahuige0/ahg.txt";
2 OPTION NOMPRINT NOSOURCE NOSOURCE2;
3
4 %macro url(url,file);
5 FILENAME urlout "&file";
6
7 PROC HTTP URL="&url"
8 METHOD="GET"
9 OUT=urlout;
10
```

```
/home/ahuige0/dilbert.sas
```

Line 117, Column 1

UTF-8

 Messages: 2

00:00

结束录制



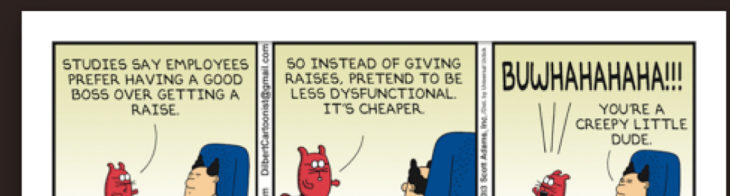
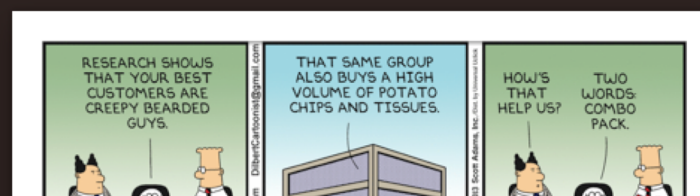
2013-01-02.gif



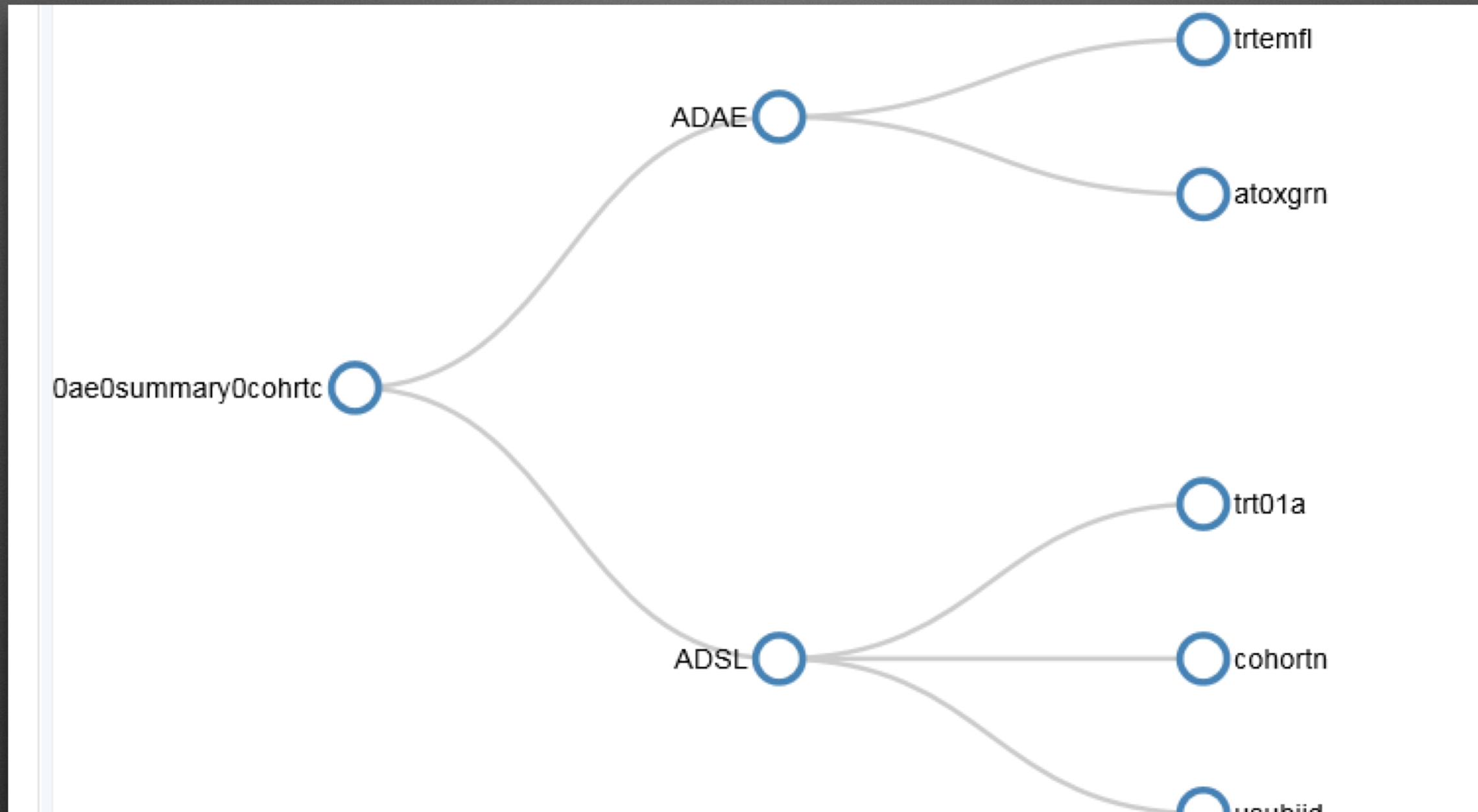
2013-01-03.gif



2013-01-04.gif



When it is done. All cartoons are downloaded.
you can handle them at will.

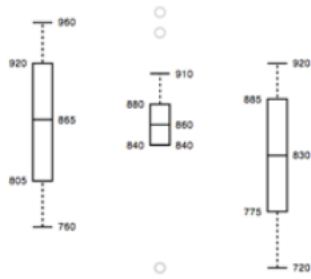


Story II: How to make your data more **presentable**?
— Leveraging HTML/JAVASCRIPT

Why do not we present everything visually within SAS?

- Not a single system is a solution for all. Visualizing data in more popular standard (like html,json) can make your code more portable and easy to migrate or cooperate with other technologies.
- SAS is a tech lacking example/code resource on internet. But there are plenty of other technologies available.

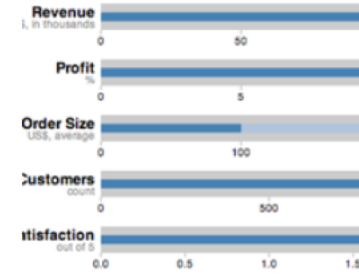
Box Plots



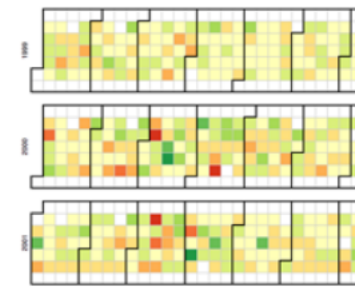
Bubble Chart



Bullet Charts



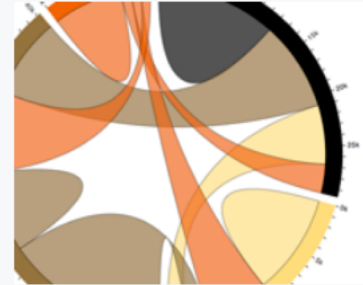
Calendar View



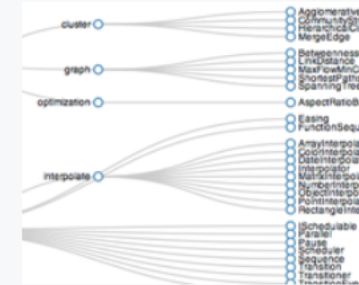
Non-contiguous Cartogram



Chord Diagram



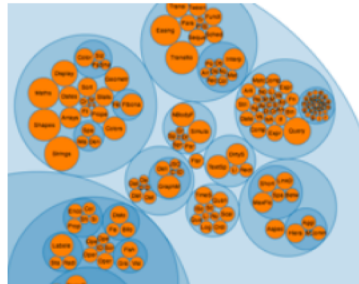
Dendrogram



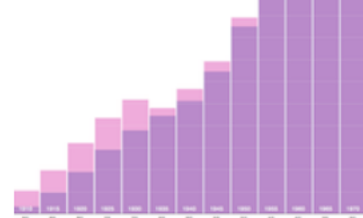
Force-Directed Graph



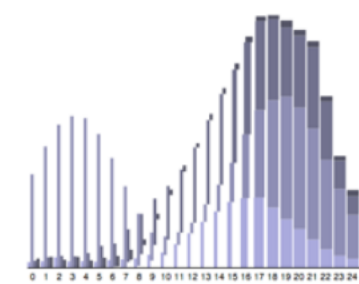
Circle Packing



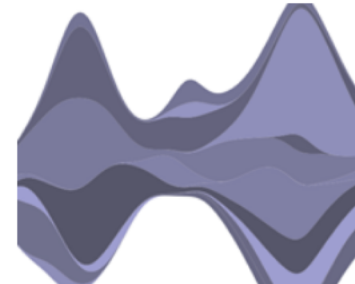
Population Pyramid 2000



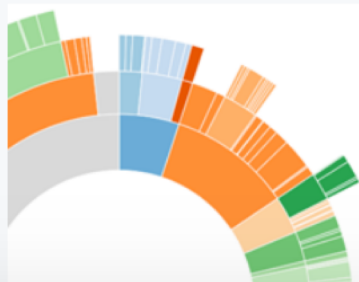
Stacked Bars



Streamgraph



Sunburst



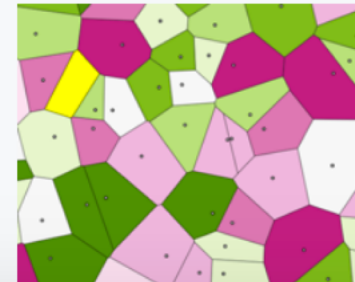
Node-Link Tree



Treemap



Voronoi Diagram



Steps for presentable HTML

Prepare your data and tailor it in SAS to the format which HTML/Javascript is able to use.

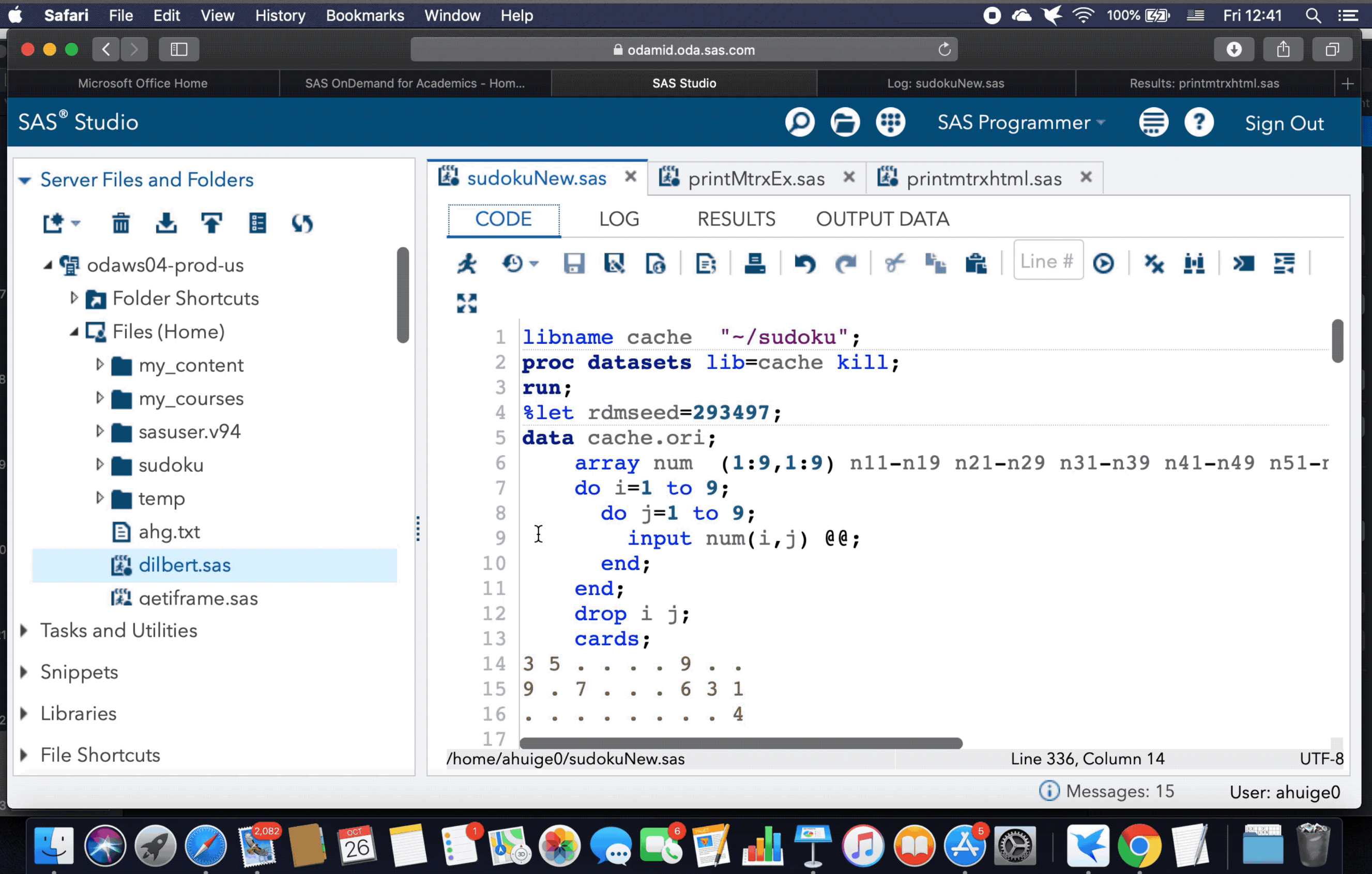
Leverage open source Javascript framework or sometimes just using the basic feature of visualization in HTML is enough.

5	3			7				
6			1	9	5			
	9	8					6	
8				6				3
4			8		3			1
7				2				6
	6					2	8	
			4	1	9			5
				8			7	9

Let's begin with something seems irrelevant
Sudoku



The arithmetic part



step by step illustration

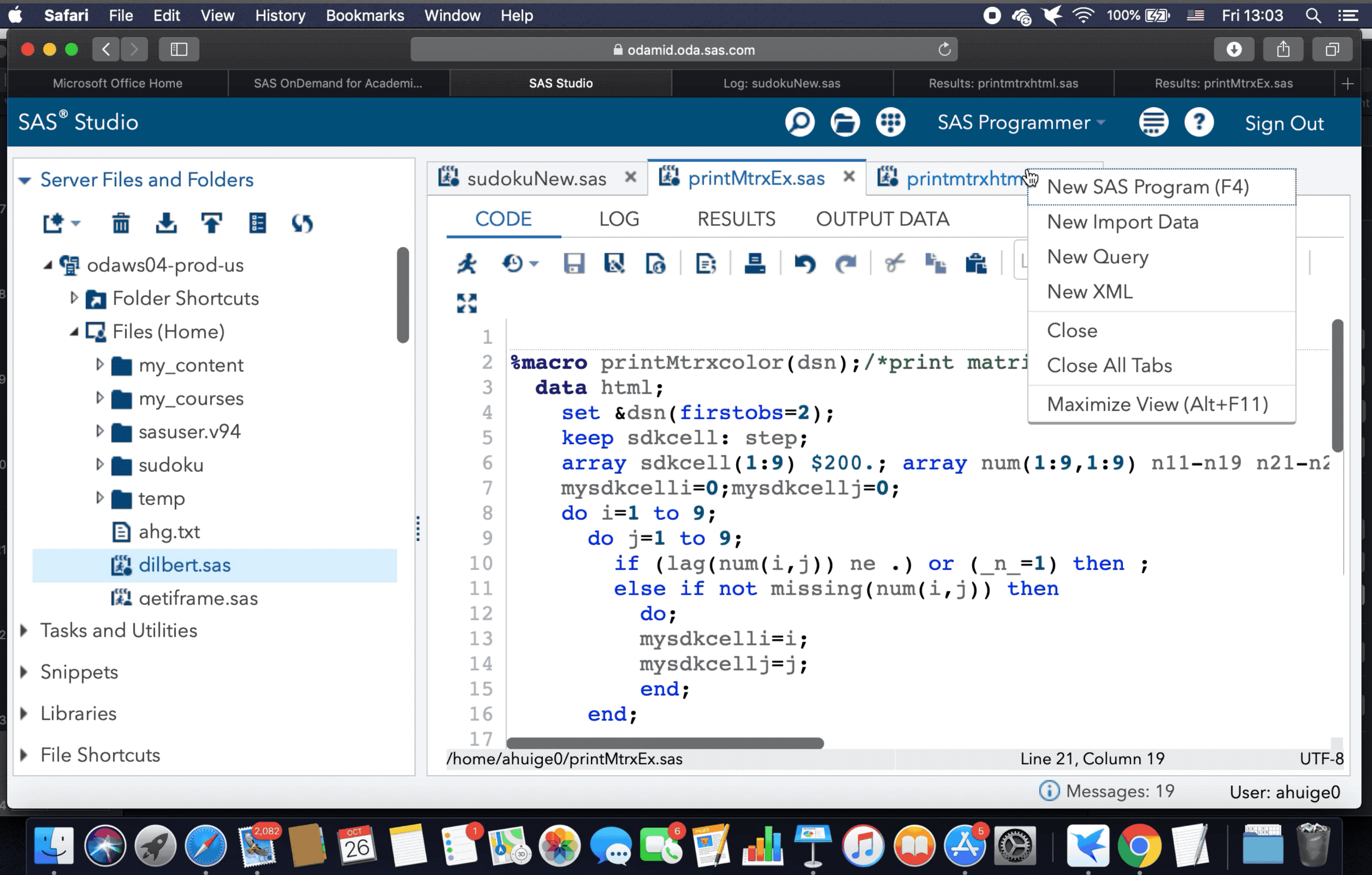


illustration with Hints

What the sudoku game teaches us

“选择就是放弃；自由就是枷锁；”

THE END