DIY automation

Efficiency gains through small-scale automation

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How to make work easier, by getting computers to do the repetitive parts

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Has this ever happened to you?

to you?

“There’s too much data to deal with! This will take forever!”

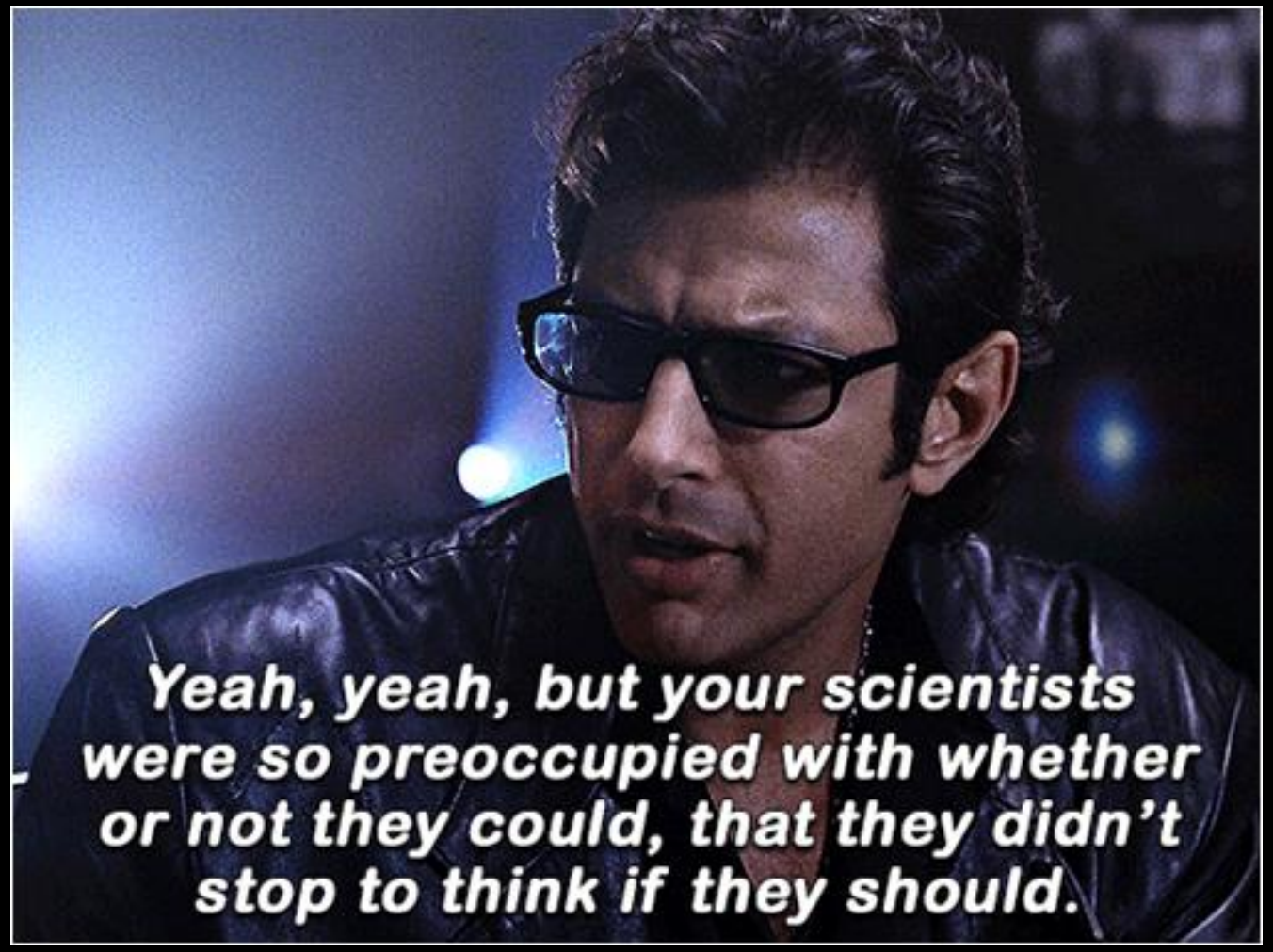
There has got to be a better way!

Many infomercial products are created to address the needs of disabled people.
Market forces don’t support R+D for a small target audience, so products also marketed to the average consumer, leading to the seemingly unrealistic or excessive use cases depicted here.

Automation

- Use of software to perform tasks with minimal human intervention
- Budget and staffing issues challenge us to do more with less
  - (This is not to say these issues should remain unaddressed!)
- Automation can
  - free up staff for work where human judgement is essential
  - reduce tedium / burnout
  - reduce human error
    - transcription, off-by-one, distraction, *et cetera*

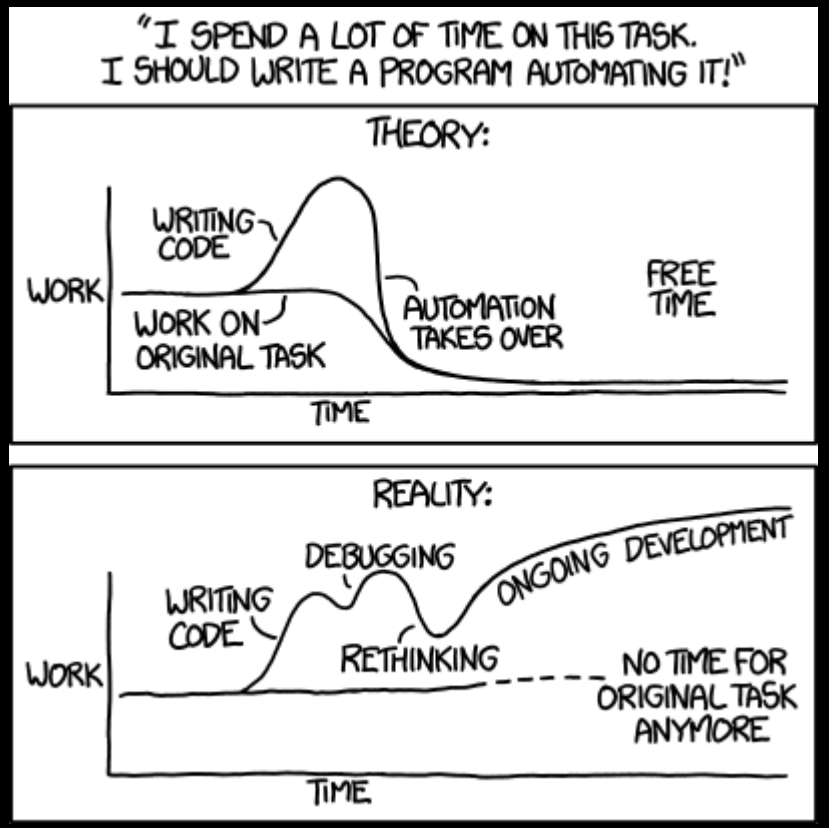
Should I automate this?



Spielberg, S. (1993). *Jurassic Park*. Universal Pictures.

Should I automate this? - Practicality

- Time spent automating vs time saved
- Who is your target group?
  - “Don’t invent the future” – fill a real need
  - What software can they access?
  - What output can they work with?
  - Can they use the tool? SOP/manual
  - Can they *maintain* the tool? Without you?
- Documentation
  - How does the tool work?
- GDPR – use minimal data!



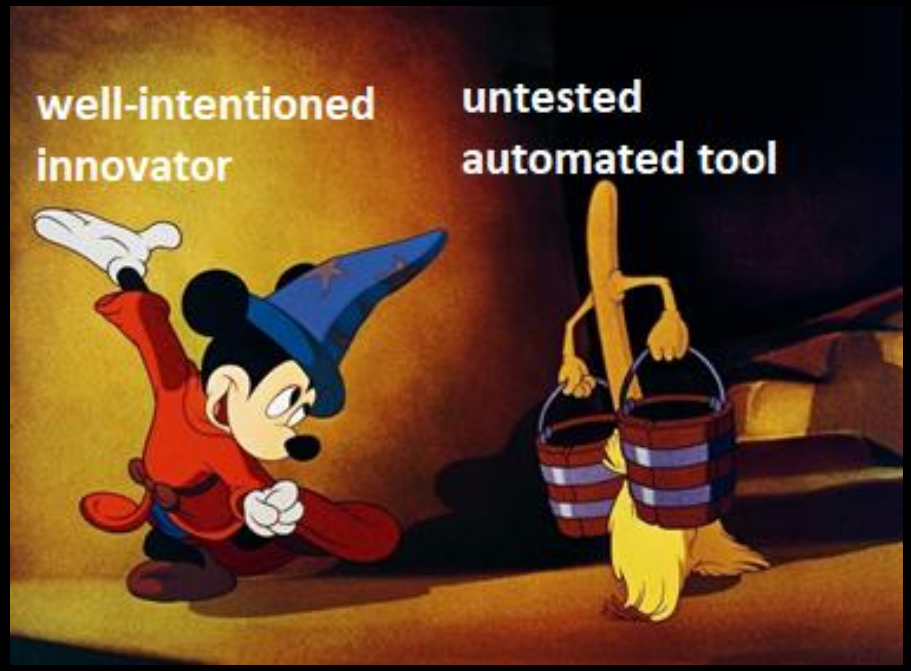
Munroe, R. (n.d.) *Automation*. XKCD.
Retrieved February 18, 2026, from https://xkcd.com/1319/

Should I automate this? - Safety

- Assess risk
  - Malfunction, Unavailability
- Plan sanity checks
  - Look at real-world examples
  - Define expected values, value ranges
    - NHS number format, date of birth, ref ranges, sexes, genders, *etc.*
- Plan how to validate your tool
  - Use dummy data with known output
  - Use “bad” data to test sanity checks
- Avoid unneeded, dangerous abilities

Should I automate this? - Safety

- Fail early
  - Check data/scripts at startup
  - Check state before committing to next step
- Fail safely
  - Sanity check data, stop/alert if wrong
  - Ask for user confirmation
  - Include a documented emergency stop
- Fail **loudly**
  - Alert user (sound, speech synth, popup)
  - Log errors



Armstong, S. (Director). (1940). *Fantasia* [Film]. Disney.

Now, a warning

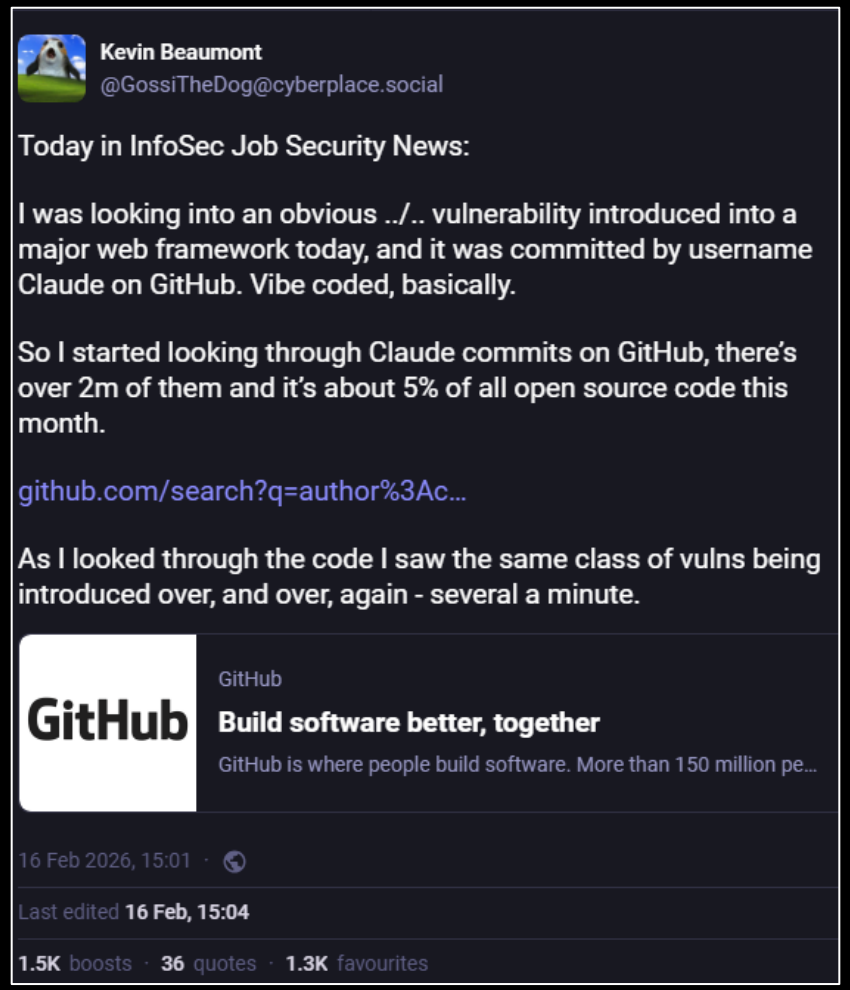
Zemeckis, R. (Director). (1992). *Death Becomes Her* [Film]. Universal Pictures.

Should I automate this? – LLM-generated code ("Vibe coding")

- Current "AI" products (Copilot, ChatGPT, *etc.*) are based on Large Language Model (LLM) technology
- "*LLMs operate by predicting the next word in a sequence based on statistical correlations identified in large datasets.*
  However, while these models are effective at producing text that appears coherent and contextually appropriate, they do so without a genuine understanding of meaning or context."
  (Bélisle-Pipon, 2024; emphasis mine)
- "Vibe coding" is the practice of having a LLMs generate source code

Risks of “vibe coding”

- “Vibe code” reproduces errors present in training data, including
  - Vulnerabilities
  - Malicious code
- Generating code via LLMs atrophies development of your own coding skills
- If you cannot explain the code, you will struggle to test, adjust, or evaluate it.

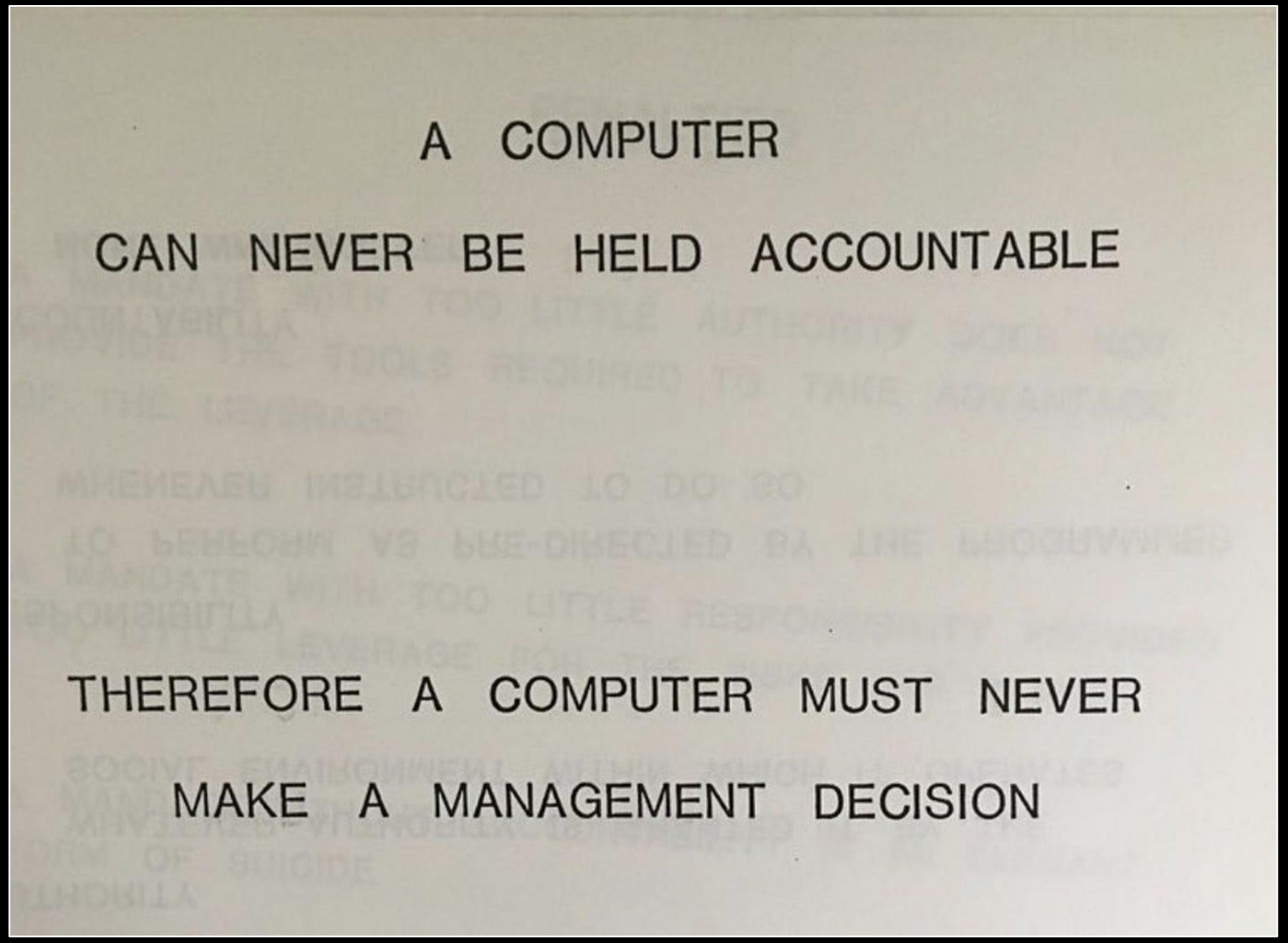


Cyberplace.Social post. Beaumont, K. (2025). https://cyberplace.social/@GossiTheDog/116080909947754833 Retrieved 16-Feb-2026

IMPORTANT DISCLOSURES & WARNINGS

- Copilot may include advertising.
- Copilot may include both automated and manual (human) processing of data. You shouldn't share any information with Copilot that you don't want us to review.
- We plan to continue to develop and improve Copilot, but we make no guarantees or promises about how Copilot will operate or that it will operate as intended.
- Sometimes, we may offer certain features or services as part of "Copilot Labs." These features and services are highly experimental and may not always work as intended. We may add, modify, or remove features or services from Copilot Labs at any time for any reason.
- We may limit the speed or performance of Copilot as we think necessary.
- When you request that Copilot take Actions on your behalf, you are solely responsible for those Actions and any results or consequences.
- **Copilot is for entertainment purposes only. It can make mistakes, and it may not work as intended. Don't rely on Copilot for important advice. Use Copilot at your own risk.**

Copilot - Terms of Use. (2025). https://www.microsoft.com/en-us/microsoft-copilot/for-individuals/termsofuse
Retrieved 27-April-2026



Unknown author. (1979). *IBM Training Manual*. IBM.

Derrickson, S. (Director). (2016). *Doctor Strange* [Film]. Marvel Studios.

Projects Showcase

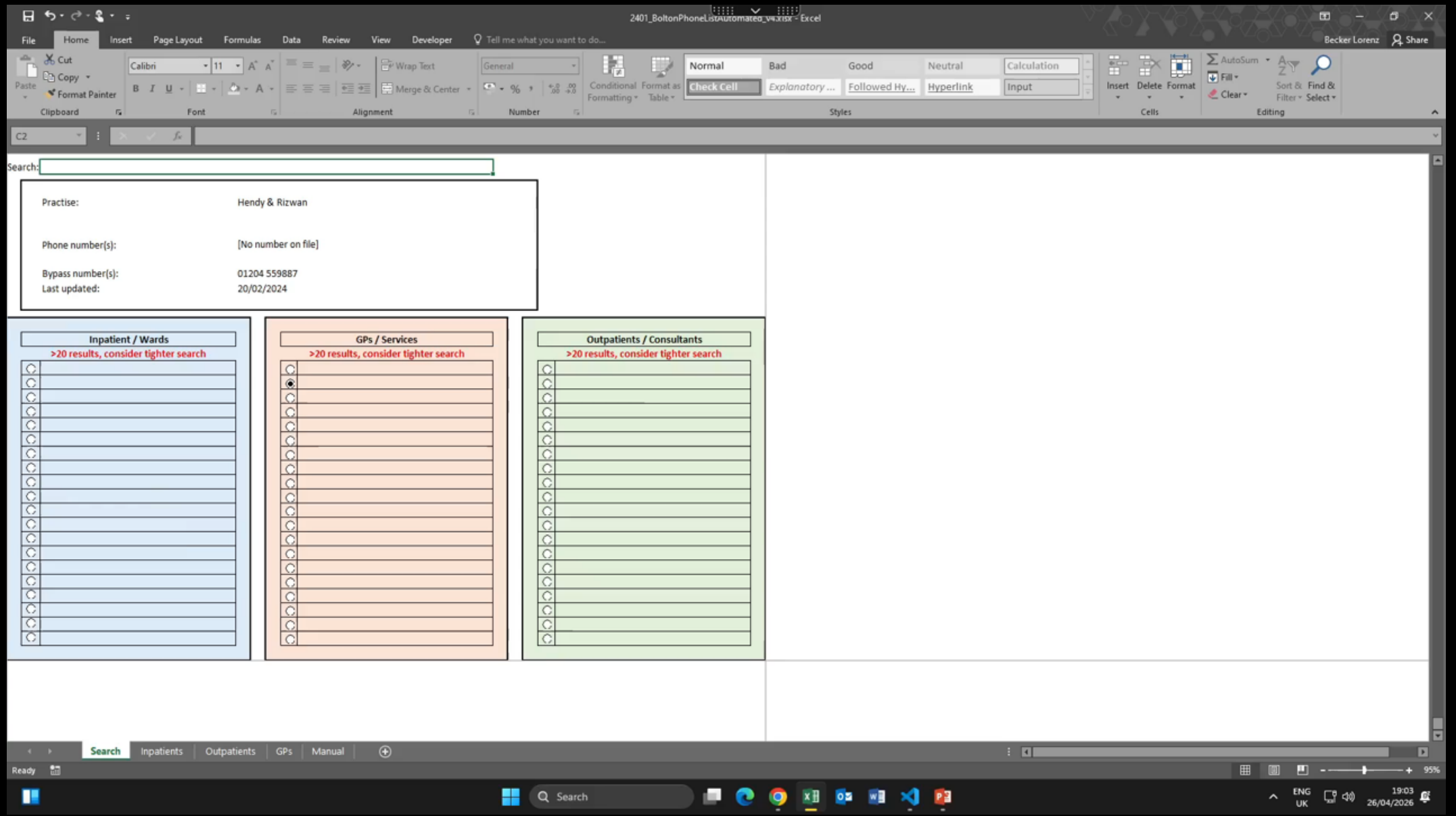
Automations large and small

Problem #1 – GP phone and bypass numbers

- Many results are phoned out each day
- The correct phone numbers let staff succeed on the first try

- NHS Service Finder is often not accessible to lab staff
- In-houses numbers may change - Ward moves etc
- LIMS software does not often have built-in or up-to-date phone numbers

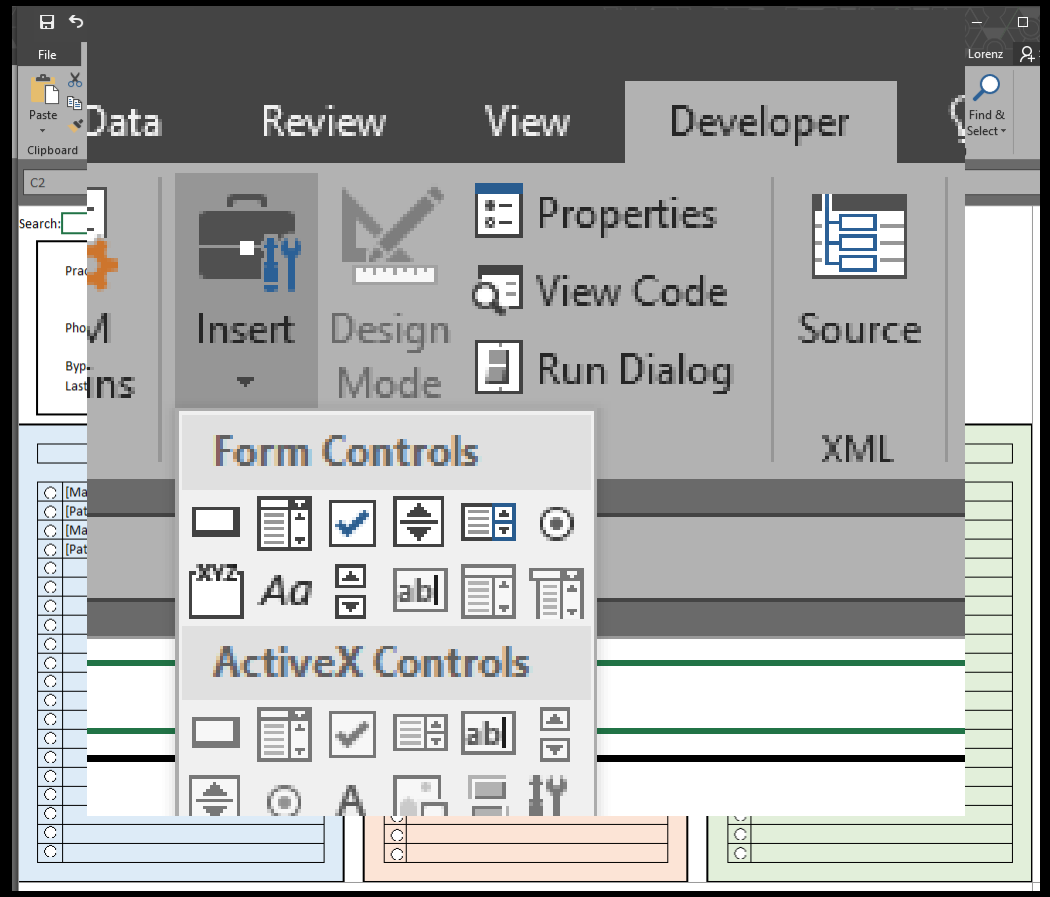
<u>How can we efficiently list and share phone numbers?</u>


2401_BoltonPhoneListAutomated_v4.xlsx - Excel
Search:
Practise: Hendy & Rizwan
Phone number(s): [No number on file]
Bypass number(s): 01204 559887
Last updated: 20/02/2024
Inpatient / Wards
>20 results, consider tighter search
GPs / Services
>20 results, consider tighter search
Outpatients / Consultants
>20 results, consider tighter search
Search
Inpatients
Outpatients
GPs
Manual
Ready

Automation for Problem #1: Excel

- Excel includes automation tools
  - Macros (VisualBasic)
  - PowerQuery (for limited automation)

- Excel has other ‘hidden’ abilities
  - Developer tab (enable in options)
  - Deploy radio buttons (Developer tab: Insert > Form Controls)
  - Link controls to a cell: Cell value changes when button(s) clicked



Automation for Problem #1: Excel

- Consolidate data
  - Paper records of phone numbers - wards, secretaries, GPs
  - Bypass numbers from NHS Service Finder
- Add keywords, e.g. `On call Paed Dr;oncall;paediatrics;baby;BLEEP`
- Excel formulae search for keyword match, then Rank() the hit

	Departmen	Abbr	Name/Title	Number(s)	Last Updated	SearchKeywords	RoughSearch	Offset	Rank_Inpatient	DisplayName
34	Maternity	ANC	Antenatal Clinic	X143758 / x5574 / x141565	10/12/2024	ANC;antenatal	2.6	2.804819277	1	[Maternity] (ANC) Antenatal Clinic
35	Maternity	ANDU	Antenatal Day Unit	143758 / x5028 / x3758	12/11/2024	Antenatal Day Unit;ANDU	23	23.21084337	3	[Maternity] (ANDU) Antenatal Day Unit
36	Maternity	CDS	Central Delivery Suite / PAMU	x5579	13/05/2025	Central Delivery Suite;CDS;PAMU				[Maternity] (CDS) Central Delivery Suite / PAMU

Column	Formula	Purpose
RoughSearch	=IFERROR(LEN([@SearchKeywords])/FIND(LOWER(Search!C2), LOWER([@SearchKeywords])), "")	Where in SearchKeywords are the contents of the Search box found? (fraction of total length). If error (no match), return "".
Offset	=IFERROR([@RoughSearch]+(ROW()/COUNTA([SearchKeywords])), "")	Add unique offset (row number divided by number of rows) to tie-break equal search results. If error, return "".
Rank_ Inpatient	=IFERROR(RANK.EQ([@Offset], [Offset], 1), "")	Rank offsets, i.e. turn into unique index, from 1 to X. If error, return blank ("").

Learning points (Problem #1: Phone numbers)

- Tools you're already familiar with can be used to automate
- Small improvements can make a large cumulative impact

- Excel form controls + formulae can create an interface without macros
- Hide calculations, lock non-input cells

- Supply multiple relevant keywords (former names, common abbreviations)
- Use version control to ensure tool is up to date, e.g. Q-Pulse
  - Avoid proliferation of personal copies!

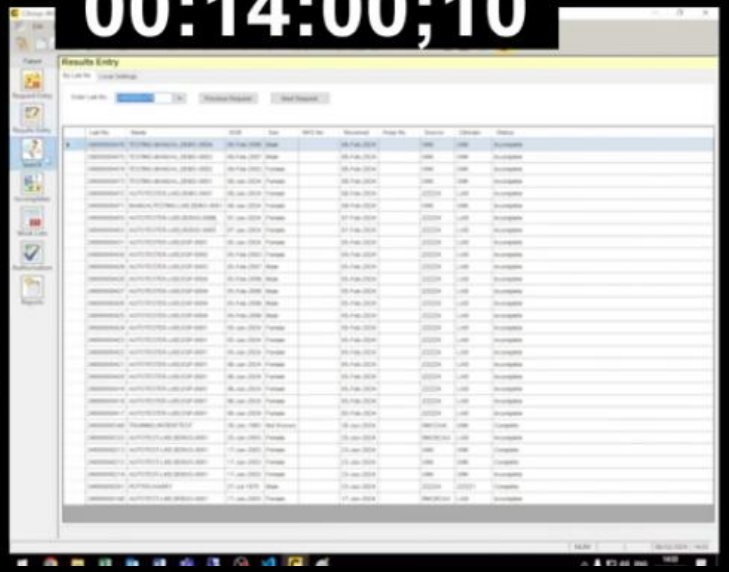
Problem #2 – LIMS testing

- Bolton switch LIMS in August 2025, requiring complete validation
  - 100s of simulated patients and samples for specific scenarios
  - Documentation (screenshots) of testing
- Large volume of highly repetitive work

<u>How can we efficiently validate the many tests in our new LIMS?</u>

Automatic

Manual



autoTester

Automated versus manual data entry, 4 simulations

	Time(min:sec)	
Step	Automated	Manual
Sim 1	00:02:07	00:04:45
Sim 2	00:03:36	00:07:58
Sim 3	00:05:07	00:11:45
Sim 4	00:06:39	
Documentation	00:07:04	
Total	00:07:04	

Automation for Problem #2: PowerShell/C#

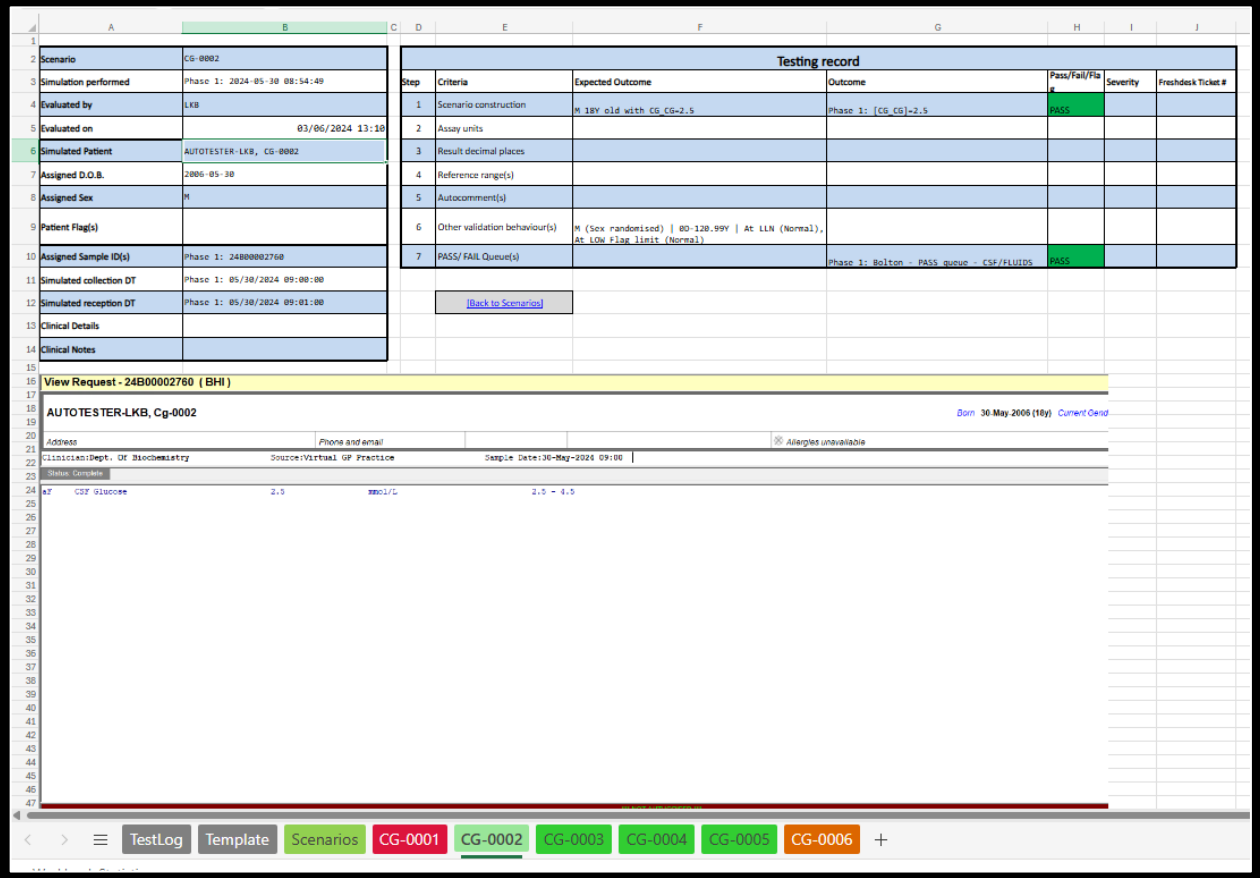
- Simulate keys presses / mouse clicks (using C# code)
- Can take screenshots
  - Compare to pictures from file (“computer vision”)
    - check if box is ticked
    - check if message appears
  - Save screenshot as documentation
- Fail-safe checked in each function
  - Check cursor position
    - If in corner of screen, terminate self

```
1234 public static void KeyPress(ushort VKKeyCode, string Direction="down", int msSleepDuration = 25){
1235     //TODO: collect number of successful presses, return true if equal to number sent.
1236     uint KeyDirection = Direction=="down" ? (uint)KBKEYEVENTF.KEYDOWN : (uint)KBKEYEVENTF.KEYUP;
1237     //ushort tmpScancode = MapVirtualKeyA(VKKeyCode, MAPVK.VK_TO_VSC);
1238     //Debug.WriteLine("TypewriteString(): Character '"+c+"' -> VK Code '"+tmpVkCode+"' (0x"+
1239     //    tmpVkCode.ToString("X4")+"), Scan code '"+tmpScancode+"' (0x"+tmpScancode.ToString("X4")+
1240     //    "). Shift bit:"+shiftBit+".");
1241     INPUT[] shift = new INPUT[1];
1242     shift[0].type = InputType.INPUT_KEYBOARD;
1243     shift[0].U.ki.wVk = (ushort)VirtualKeyShort.SHIFT;
1244 
1245     bool shiftBit = (VKKeyCode & (1 << 8)) != 0;
1246     if (shiftBit){
1247         shift[0].U.ki.dwFlags = KeyDirection;
1248         VirtualKeyboard.SendInput(1, shift, Marshal.SizeOf(shift[0]));
1249     }
1250 
1251     INPUT[] input = new INPUT[1];
1252     input[0].type = InputType.INPUT_KEYBOARD;
1253     input[0].U.ki.wVk = VKKeyCode;
1254     //input[0].U.ki.wScan = tmpScancode;
1255     input[0].U.ki.dwFlags = KeyDirection;
1256 
1257     bool extendedBit = ((VKKeyCode >= 0x25) & (VKKeyCode <= 0x28));
1258     if (extendedBit){
1259         input[0].U.ki.dwFlags |= (uint)KBKEYEVENTF.EXTENDEDKEY;
1260     }
1261     VirtualKeyboard.SendInput(1, input, Marshal.SizeOf(input[0]));
1262     Task.Delay(TimeSpan.FromMilliseconds(msSleepDuration)).Wait();
1263 
1264     VirtualMouse.ProcessFailsafe();
1265 }
```

```
1264        VirtualMouse.ProcessFailsafe();
```

Automation for Problem #2: PowerShell/C#

- Helper macro turns screenshots + log files into one sheet of documentation per simulated sample
- Output evaluated by humans
  - Pass / Fail / Flag
- Copies licensed to Blackpool, Northern Care Alliance to support their LIMS go-live



Scenario	CG-0002
Simulation performed	Phase 1: 2024-05-30 08:54:49
Evaluated by	LKB
Evaluated on	03/06/2024 13:10
Simulated Patient	AUTOTESTER-LKB, CG-0002
Assigned D.O.B.	2006-05-30
Assigned Sex	M
Patient Flag(s)	
Assigned Sample ID(s)	Phase 1: 24B00002760
Simulated collection DT	Phase 1: 05/30/2024 09:00:00
Simulated reception DT	Phase 1: 05/30/2024 09:01:00
Clinical Details	
Clinical Notes	

Testing record

Step	Criteria	Expected Outcome	Outcome	Pass/Fail/Flag	Severity	Freshdesk Ticket #
1	Scenario construction	M 18Y old with CG_CG=2.5	Phase 1: [CG_CG]=2.5	PASS		
2	Assay units					
3	Result decimal places					
4	Reference range(s)					
5	Autocomment(s)					
6	Other validation behaviour(s)	M (Sex randomised) | 80-120.99Y | At LLN (Normal), At LOW Flag limit (Normal)				
7	PASS/ FAIL Queue(s)		Phase 1: Bolton - PASS queue - CSF/FLUIDS	PASS		

[Back to Scenarios]

View Request - 24B00002760 (BHI)

AUTOTESTER-LKB, Cg-0002

Born 30-May-2006 (18y) Current Gend

Address | Phone and email | Allergies unavailable

Clinician:Dept. Of Biochemistry Source:Virtual GP Practice Sample Date:30-May-2024 09:00

Status: Complete

aF	CSF Glucose	2.5	mmol/L	2.5 - 4.5

TestLog | Template | Scenarios | CG-0001 | CG-0002 | CG-0003 | CG-0004 | CG-0005 | CG-0006

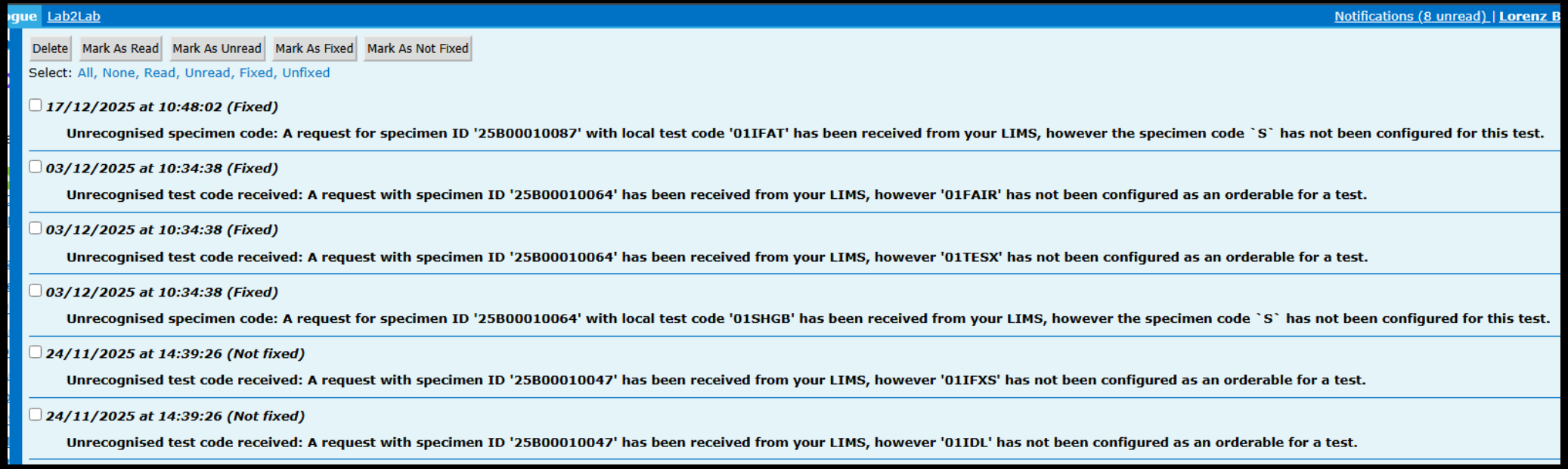
Learning points (Problem #2: LIMS testing)

- Using code (PowerShell / python '`pyautogui`') or software (AutoIT, Auto Hotkey, *etc.*) you can automate complex KB + mouse tasks
  - Include a fail-safe (e.g. mouse in corner of screen), sanity checks!

- Keyboard shortcuts preferable to clicks (independent of screen size)
  - Hold ALT; ALT + (underlined letters on screen) = hotkey

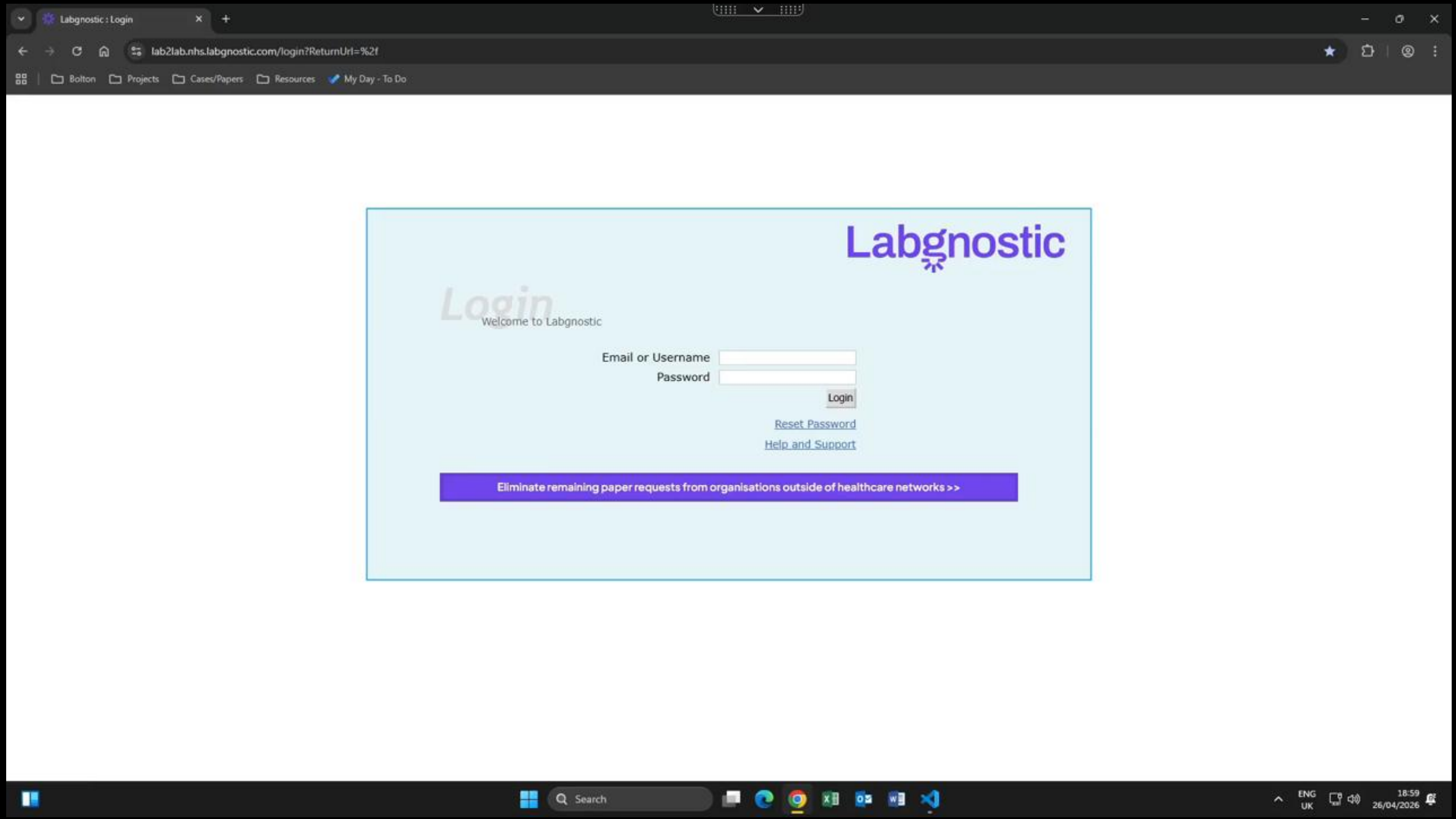
- Computer + account(s) unavailable whilst KB/M automation runs
  - Get virtual machine, prepare test accounts
  - Use speech synthesis for updates, e.g. if only one screen

Problem #3 – NPEx notifications



- NPEx website shows a max of 100 notifications, even if >100 notifications available
- Important and less important notifications are mixed
  - Unmapped reportable, blocking result transmission – Important
  - “Order has been restored” – less important

<u>How can I find the important notifications among all of these?</u>


Labgnostic : Login
lab2lab.nhs.labgnostic.com/login?ReturnUrl=%2f
Bolton
Projects
Cases/Papers
Resources
My Day - To Do
Labgnostic
Login
Welcome to Labgnostic
Email or Username
Password
Login
Reset Password
Help and Support
Eliminate remaining paper requests from organisations outside of healthcare networks >>
Search
ENG
UK
18:59
26/04/2026

Automation for Problem #3: Python

- Interpreted scripting language
  - Can compile to (large) exe
- Many free online tutorials
- Many libraries available to add functionality
  - `tkinter` to create GUIs
  - `requests` for interaction with websites
  - `pyautogui` or `pyautohotkey` for mouse/keyboard automation

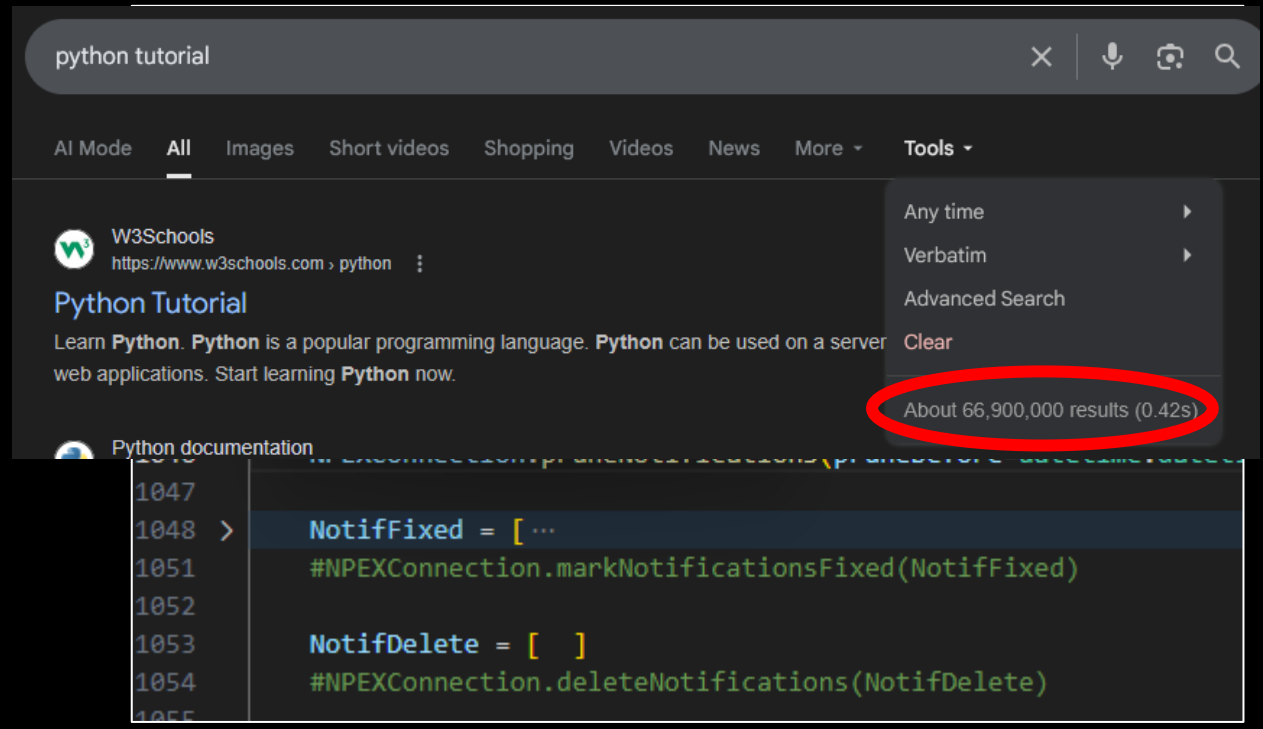
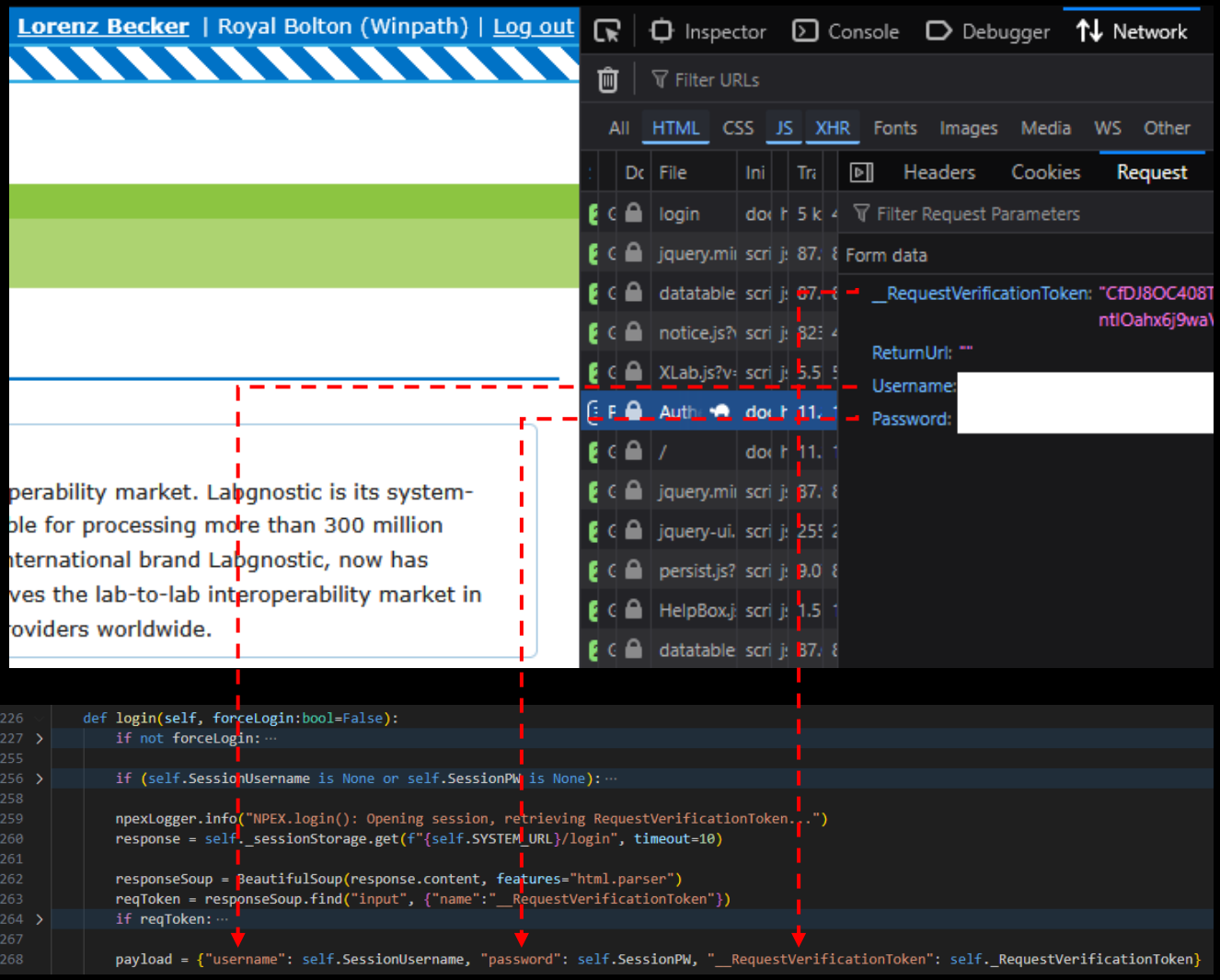


Fig. X – Graphical user interface (GUI), built using python module ‘tkinter’

Be cautious installing external libraries. They can include malicious code.

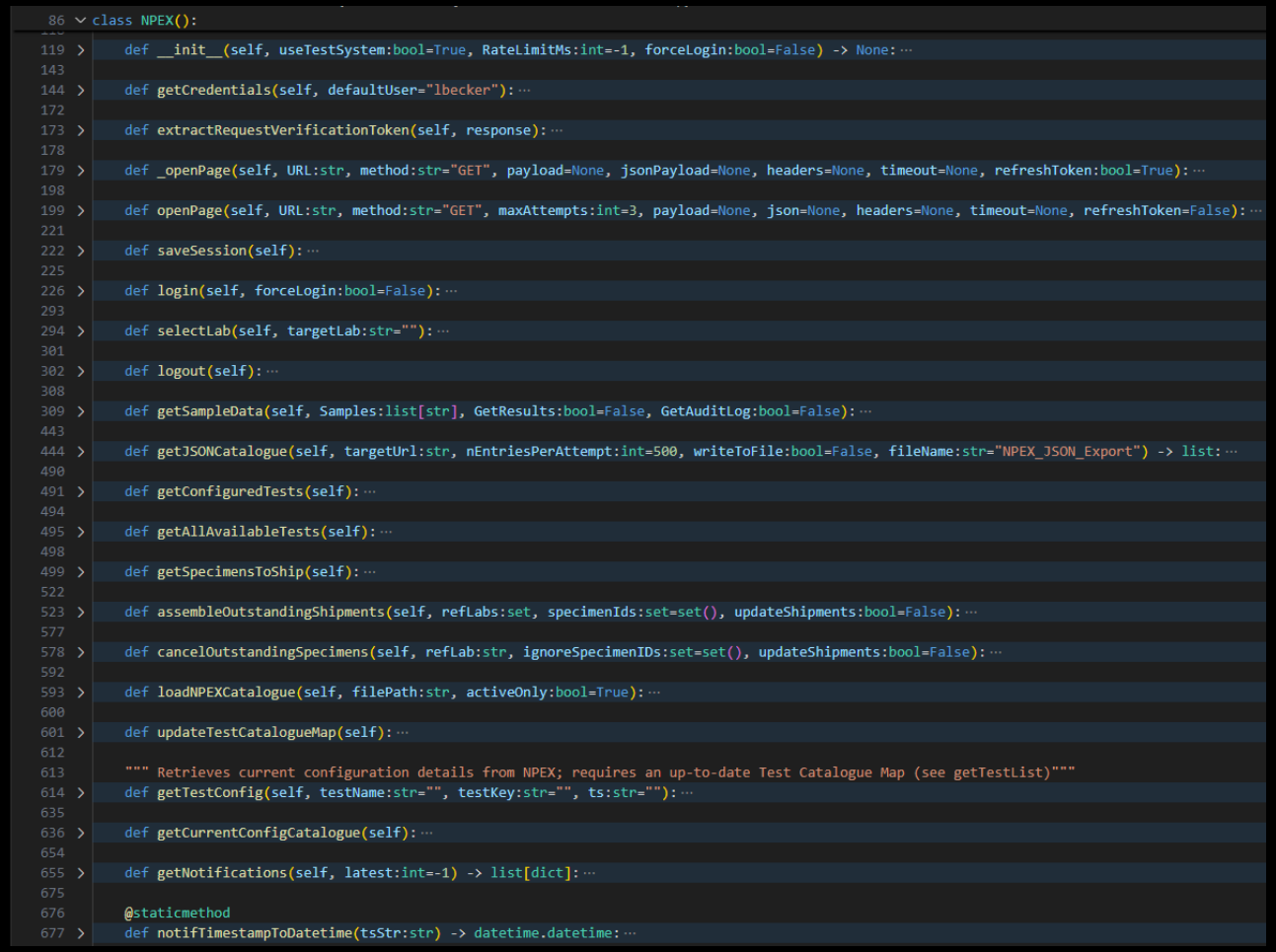
Automation for Problem #3: Python

- Most browsers have “dev tools” (try pressing F11/F12)
- Use dev tools “Network” tab to examine traffic between local terminal and website
- Use library “`requests`” to emulate talking to server
- Use library “`Beautiful Soup`” to parse HTML responses from server, and extract data



Automation for Problem #3: Python

- With python, you can:
  - Extract + tidy all error messages
  - Mark messages as “Fixed” *en masse*
    - instead of individual clicks
    - Marking applies to <u>all</u> users!
  - Resend test results for a list of specimen IDs
    - instead of copy, paste, click, wait, …
  - Extract configuration backup
  - Mass-download results
    - instead of checking one by one



Learning points (Problem #3: NPEx)

- You can automate working with websites
- HTML responses are easy checkpoints
- Do not hardcode passwords into your tools
- Implement rate limits / rate limit checks
- Exercise caution when working with live systems!

Problem #4 – Minimum retest intervals

- Minimum retest intervals (MRIs) are common cost-saving measures
- Cost per reportable and request volumes differ per test
- Simulation of the impact of MRIs can inform implementation
  - Implementation of MRIs is *always* balanced with clinical need!

Which minimum retest interval(s) will likely generate savings?

2505_MRI_Dashboard_Shiny - master - RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function | Addins | 2505_MRI_Dashboard_Shiny

app.r

Run App

```
367         min = 1,
368         max = nPatients,
369         message="Processing Minimum Retest Interval..."
370       )
371       nRemovedSamples <- samples[ViolatedMRI == TRUE, .N] #nolint
372       output$nRemoved <- renderText({ nRemovedSamples })
373       potentialSavings <- nRemovedSamples * costPerTest()
374       output$nSavings <- renderText({ sprintf("£%.2f", potentialSavings) })
375
376       if (!is.na(rrType)) {
377           rrType <- c("Inside", "Outside", "Over", "Under")[rrType]
378       }
379
380
381
382       mriDays <- input$mriDays
383       if (input$switchNeverRepeat) { mriDays <- NA }
384
385       attempts <<- rbindlist(list(attempts, list(input$selectAnalyte, mriDays, rrType, rr1, rr2,
386                                   input$switchNeverRepeat, nonNumStr, input$switchLessThan, input$switchMoreThan,
387                                   nRemovedSamples, potentialSavings)) #DEBUG rrType is wrong?
388                           )
389       as.data.frame(attempts)
390     }) %>%
391       bindEvent(input$updateMRIData, ignoreInit=TRUE)
392
393     output$dtMRIData <- renderTable((removedSamples()))
394   }
395
396   shinyApp(ui, server)
```

248:7 server(input, output, session) R Script

Console Terminal Background Jobs

R 4.4.1 · E:/Users/User/Downloads/bolton_projects/2505_MRI_Dashboard_Shiny/

```
> runApp()
```

Environment History Connections Git

Diff Commit Pull Push History More New Branch master

Staged	Status	Path
		.lintr
		250512_Roche_Costs_Consumables.xlsx
		2505_MRI_Dashboard_Shiny.Rproj
		MRI_Dashboard_Shiny.r
		MRIchecks.R
		app.r
		data/
		data_prep.r
		dmp/
		reactive_plot_example.R
		runApp.r
		testUI.R

Files Plots Packages Help Viewer Presentation

R: Search Results · Find in Topic

Search Results

No results found

ENG 18:43 26/04/2026

Automation for Problem #4: R + shiny

- Obtain + process cost-per-orderable data, requesting patterns

- Use R library “shiny” to create an interactive website for processing
  - `ui()`: Control elements to specify test, reference range, MRI parameters
    - Visual elements to show output
    - What controls do users need?

  - `server()`: Background functions
    - apply MRI on a per-patient basis
    - Plot data, output
    - Change UI when user clicks things

Learning points (Problem #4: Retest Intervals)

- Complex data processing can be automated in R, and made visual with libraries like `shiny`
- Humans are visually-oriented creatures
  - A well-designed interface makes tools accessible
  - Graphical representation can make data easier to assess
- Consider how your tool is deployed
  - `shiny` apps need either R installed or to be run on a server

Summary of automation projects

Project	Time to build + test	Saves	Notes
Phone List (Excel)	5 days	5+ min / workday	Staff favourite
autoTester (C#/PowerShell)	2 months (recreating Pyautogui) 1 month (build, test autoTester)	100+ hours	Project previously built in python, but python was not available at the time. Management favourite
NPEx Interface (Python)	2 weeks	~ 30 min / week	
MRI simulator (R / shiny)	2 weeks	~15 min / simulation	

Lightning round

Minor projects, showing other automation technologies (and their drawbacks)

iQC review - pretty borders macro

- 33 line Visual Basic macro
- Did value in column x change?
- If yes, draw borders from last value change to here

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Test	Instrument	QC	Lot	T X	T SD	N	C X	C SD	SDI	%SD	CV	IAB
2	A1AT	C8K Line 1 - MU1-c702-1-1	Multi 4181	604251	0.93	0.02	126	0.92	0.02	-0.50	0	2.15	-
3	A1AT	C8K Line 1 - MU1-c702-1-1	Multi 4182	604252	1.21	0.02	125	1.2	0.02	-0.50	0	1.94	-
4	A1AT	C8K Line 1 - MU1-c702-1-1	Multi 4183	604253	1.59	0.03	125	1.62	0.04	1.00	33.33	2.21	-
5	ALB	C8K Line 1 - MU1-c702-1-1	Multi 4181	604251	32.18	0.80	171	32.52	0.78	0.43	-2.5	2.4	0.08
6	ALB	C8K Line 2 - MU1-c702-1-	Multi 4181	604251	32.18	0.80	164	32.4	0.69	0.27	-13.75	2.13	-0.08
7	ALB	C8K Line 1 - MU1-c702-1-1	Multi 4182	604252	42.20	0.94	171	41.92	0.70	-0.30	-25.53	1.68	0.24
8	ALB	C8K Line 2 - MU1-c702-1-	Multi 4182	604252	42.20	0.94	168	41.47	0.71	-0.78	-24.47	1.72	-0.24
9	ALB	C8K Line 1 - MU1-c702-1-1	Multi 4183	604253	55.00	1.00	170	55.22	0.82	0.22	-18	1.48	0.35
10	ALB	C8K Line 2 - MU1-c702-1-	Multi 4183	604253	55.00	1.00	168	54.52	0.74	-0.48	-26	1.36	-0.35
11	ALC	C8K Line 1 - MU1-c702-1-2	Multi 4181	604251	352.60	13.00	125	355.26	12.03	0.20	-7.46	3.39	-0.11
12	ALC	C8K Line 2 - MU1-c702-1-	Multi 4181	604251	352.60	13.00	117	357.92	14.48	0.41	11.38	4.05	0.10
13	ALC	C8K Line 1 - MU1-c702-1-2	Multi 4182	604252	700.00	20.00	125	707.95	16.57	0.40	-17.15	2.34	-0.14
14	ALC	C8K Line 2 - MU1-c702-1-	Multi 4182	604252	700.00	20.00	120	713.51	18.15	0.68	-9.25	2.54	0.14
15	ALC	C8K Line 1 - MU1-c702-1-2	Multi 4183	604253	######	46.00	125	2168.4	39.86	-0.69	-13.35	1.84	-0.33
16	ALC	C8K Line 2 - MU1-c702-1-	Multi 4183	604253	######	46.00	117	2198.7	36.80	-0.03	-20	1.67	0.33

```
Option Explicit

Sub DrawQCBorders()
    'Get FinalRow from Sheet2

    Dim rowCounter, curAssayStart, EndRow, EndColumn As Integer
    Dim lastAssay, currentAssay As String
    Dim Sheet2, currentAssayRange As Range

    Set Sheet2 = ThisWorkbook.Worksheets("Sheet2")
    'EndColumn = Sheet2.Cells(1, 1).Parent.Cells(1, 10000).End(xlToLeft).Column
    EndColumn = 20
    EndRow = Sheet2.Cells(1, 1).Parent.Cells(10000, 1).End(xlUp).Row
    lastAssay = Sheet2.Cells(2, 1).Value
    curAssayStart = 2

    'Remove all current borders
    Set currentAssayRange = Sheet2.Range(Sheet2.Cells(1, 1), Sheet2.Cells(EndRow, EndColumn))
    currentAssayRange.Borders.LineStyle = xlNone

    For rowCounter = 3 To EndRow
        currentAssay = Sheet2.Cells(rowCounter, 1).Value
        If StrComp(currentAssay, lastAssay, vbTextCompare) <> 0 Then
            'currentAssay != lastAssay
            Set currentAssayRange = Sheet2.Range(Sheet2.Cells(curAssayStart, 1), Sheet2.Cells(rowCounter - 1, EndColumn))
            currentAssayRange.BorderAround ColorIndex:=1, Weight:=xlThin
            curAssayStart = rowCounter
            lastAssay = currentAssay
        End If
    Next rowCounter
    Set currentAssayRange = Sheet2.Range(Sheet2.Cells(curAssayStart, 1), Sheet2.Cells(rowCounter - 1, EndColumn))
    currentAssayRange.BorderAround ColorIndex:=1, Weight:=xlThin
End Sub
```

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Test	Instrument	QC	Lot	T X	T SD	N	C X	C SD	SDI	%SD	CV	IAB
2	A1AT	C8K Line 1 - MU1-c702-1-1	Multi 4181	604251	0.93	0.02	126	0.92	0.02	-0.50	0	2.15	-
3	A1AT	C8K Line 1 - MU1-c702-1-1	Multi 4182	604252	1.21	0.02	125	1.2	0.02	-0.50	0	1.94	-
4	A1AT	C8K Line 1 - MU1-c702-1-1	Multi 4183	604253	1.59	0.03	125	1.62	0.04	1.00	33.33	2.21	-
5	ALB	C8K Line 1 - MU1-c702-1-1	Multi 4181	604251	32.18	0.80	171	32.52	0.78	0.43	-2.5	2.4	0.08
6	ALB	C8K Line 2 - MU1-c702-1-	Multi 4181	604251	32.18	0.80	164	32.4	0.69	0.27	-13.75	2.13	-0.08
7	ALB	C8K Line 1 - MU1-c702-1-1	Multi 4182	604252	42.20	0.94	171	41.92	0.70	-0.30	-25.53	1.68	0.24
8	ALB	C8K Line 2 - MU1-c702-1-	Multi 4182	604252	42.20	0.94	168	41.47	0.71	-0.78	-24.47	1.72	-0.24
9	ALB	C8K Line 1 - MU1-c702-1-1	Multi 4183	604253	55.00	1.00	170	55.22	0.82	0.22	-18	1.48	0.35
10	ALB	C8K Line 2 - MU1-c702-1-	Multi 4183	604253	55.00	1.00	168	54.52	0.74	-0.48	-26	1.36	-0.35
11	ALC	C8K Line 1 - MU1-c702-1-2	Multi 4181	604251	352.60	13.00	125	355.26	12.03	0.20	-7.46	3.39	-0.11
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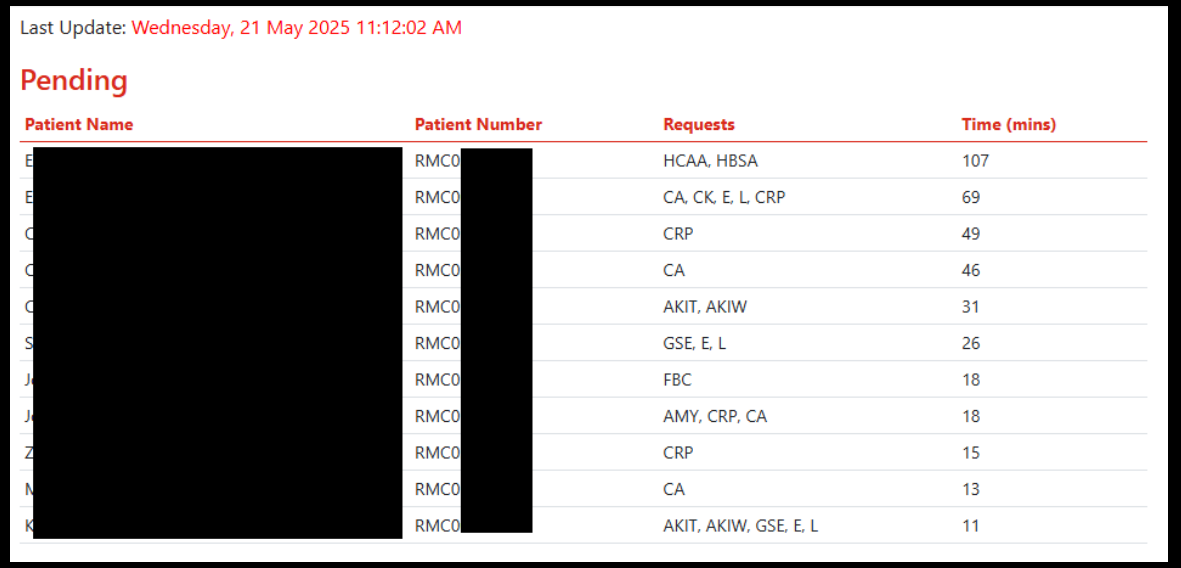
15	ALC	C8K Line 1 - MU1-c702-1-2	Multi 4183	604253	######	46.00	125	2168.4	39.86	-0.69	-13.35	1.84	-0.33
16	ALC	C8K Line 2 - MU1-c702-1-	Multi 4183	604253	######	46.00	117	2198.7	36.80	-0.03	-20	1.67	0.33

Project Scylla dashboards

- Custom web server (C#/.NET/HTML/JS)
- Produces HTML dashboards for LIMS
  - Recent add-on requests
  - Recent A&E results released

+ Purpose-built for lab, A+E needs
+ Could significantly improve TATs
- Not approved yet (security concerns)
- In-house software development comes with audit responsibilities



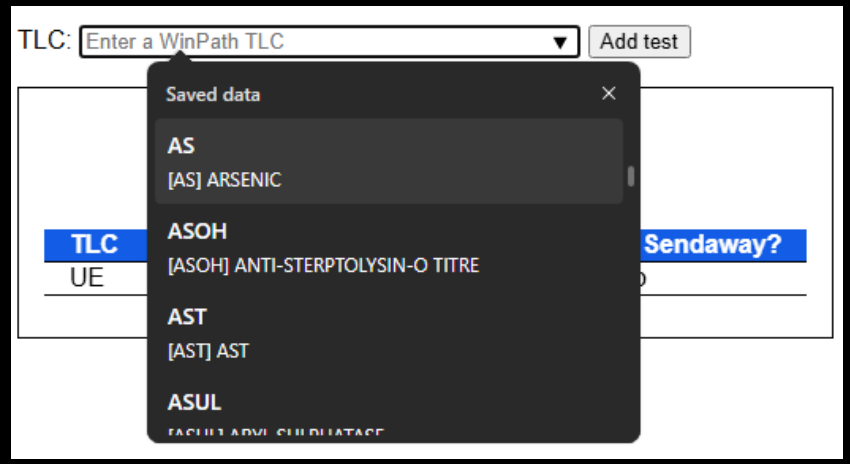
Last Update: Wednesday, 21 May 2025 11:12:02 AM

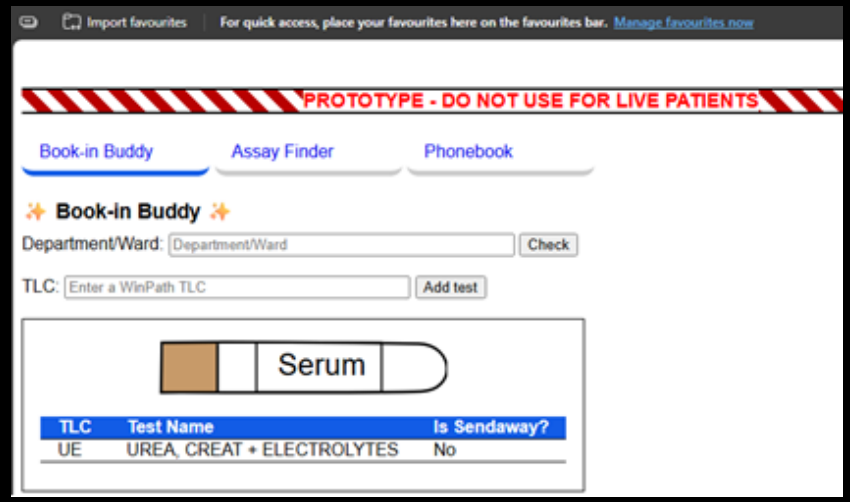
Pending

Patient Name	Patient Number	Requests	Time (mins)
[redacted]	RMC0[redacted]	HCAA, HBSA	107
	RMC0	CA, CK, E, L, CRP	69
	RMC0	CRP	49
	RMC0	CA	46
	RMC0	AKIT, AKIW	31
	RMC0	GSE, E, L	26
	RMC0	FBC	18
	RMC0	AMY, CRP, CA	18
	RMC0	CRP	15
	RMC0	CA	13
	RMC0	AKIT, AKIW, GSE, E, L	11

Bolton Book-in Buddy

- HTML/JavaScript/CSS, in single file
- Helps staff find LIMS codes, identify sendaways, check sample containers
+ Easy to use
+ Single file for storage on Q-Pulse
+ Runs in any web browser
- Impossible to maintain without web dev skills
- Raw SVG vector data and JSON data structures, all in one file
- Limited search function



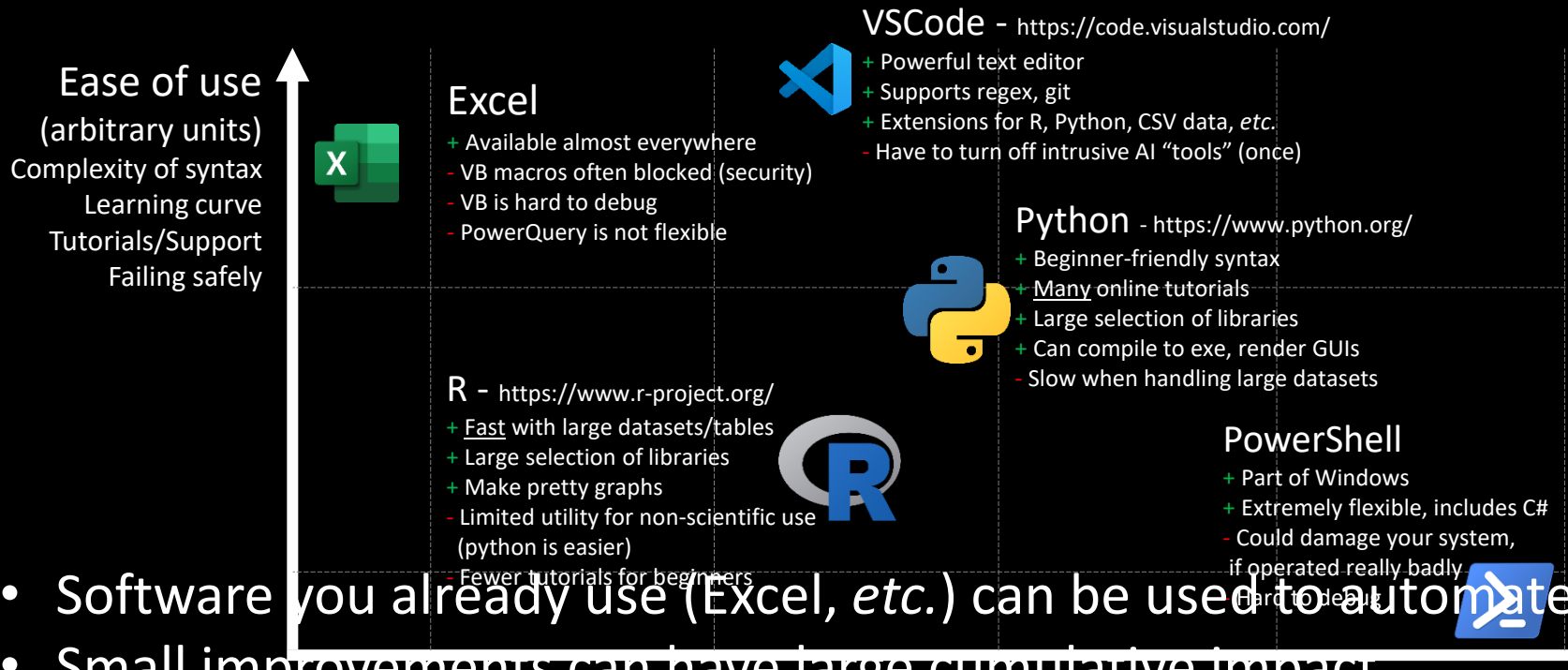


VSCode / Regex

- VSCode is a free, flexible code editor
  - Programming language syntax highlighting (R, Python, etc)
  - Processing comma-separated data (via extension “Rainbow CSV”)
  - Can comparing two (text) files and highlight differences (and full git support)
  - Support regular expressions

- Regular expressions (“regex”) are used to flexibly search/replace data
  - “Find every line that start with ‘26B’ and exactly six numbers, then put a newline/tab before that”
    - Find ‘^(26B\d{6})’ and replace with ‘$1\n’
  - Powerful, but tricky at first
  - Many online tutorials – http://regex101.com, https://www.regular-expressions.info/

Summary – How can I start automating?



- Software you already use (Excel, *etc.*) can be used to automate
- Small improvements can have large cumulative impact
- Find a real need, and fulfil it
- Consider patient safety and user needs at all stages
- Test, validate, and document your tools

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Reasonable consultancy rates

For other projects, see https://github.com/lkbecker