Bringing LAMBDA to Excel

Jack Williams - Microsoft Research

aka.ms/CalcIntel

Date	Name	Symbol
04/06/2023	Flight out	✈
05/06/2023	LAMBDA Days	λ
06/06/2023	LAMBDA Days	λ
07/06/2023	Flight back	✈
25/12/2023	Christmas	🎄

Excel Labs

Grid   Names   Modules   ☰

💾   Sheet1 › C27   ⊣

1

ExcelApi 1.17 (PC/16.0.16505.20000)

Project Yellow
Excel as a Programming Language

	B	C	D	E	F	G	H	I	J
	The quick brown fox jumps over the lazy dog								

Announcing LAMBDA: Turn Excel formulas into custom functions

By Brian Jones (OFFICE)

Published Dec 03 2020 08:00 AM   👁 416K Views

```
=LET(
    twice, LAMBDA(f, LAMBDA(x, f(f(x)))),
    plusOne, LAMBDA(x, x + 1),
    plusFour, twice(twice(plusOne)),
    MAP(SEQUENCE(5), plusFour)
)
```

5
6
7
8
9
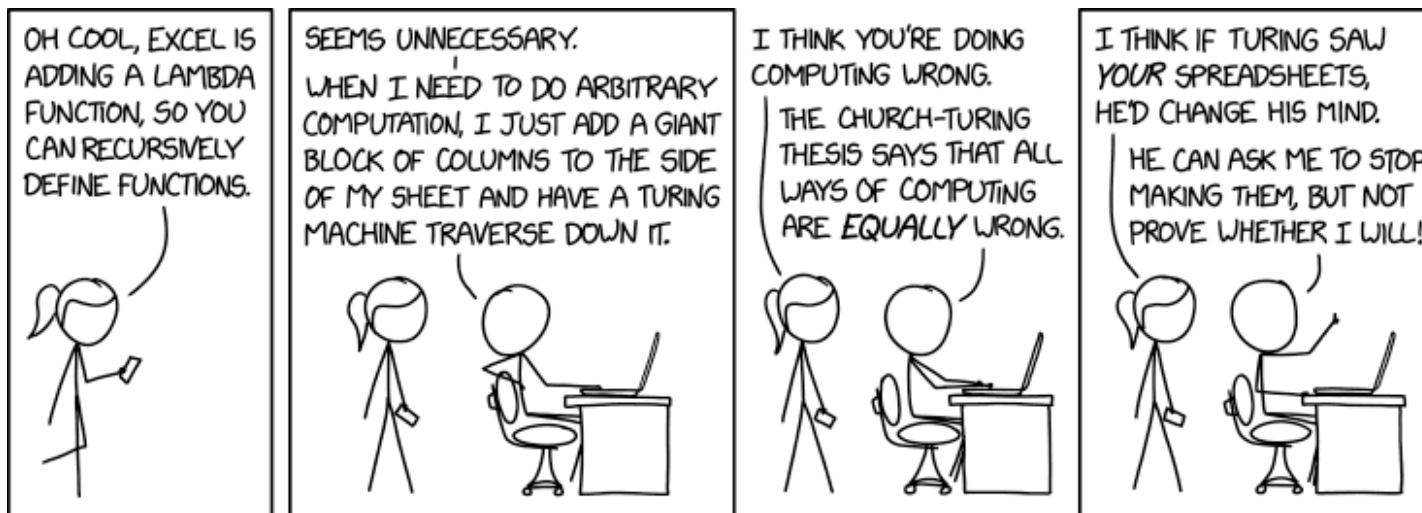
"[…] In the hands of Excel cowboys, this can become another foot gun."

"I don't think name manager cuts it, they'll need a formula manager. Comments between coding lines and tooltips are going to be necessary. Sharing, vital […]"

End-user encounters with lambda abstraction in spreadsheets: Apollo's bow or Achilles' heel? (VL/HCC 2022)

Announcing LAMBDAs to Production and Advanced Formula Environment, A Microsoft Garage Project

Subscribe   ...

By   Chris Gross

Published Feb 08 2022 08:55 AM   48.1K Views

The Microsoft Garage @MSFTGarage · 8 Mar 2022

Learn more about a supercharged way to author LAMBDA functions in Excel with support for sharing and more, with Advanced Formula Environment, a @MSFTGarage project aka.ms/GarageAFEBlog

#Excel #productivity

custom functions without code

(x, y, x+y) ⟶ 4
Input names   Calculation   =myLambda (1, 3)

Λλ
=LAMBDA
+
χ‡
Advanced Formula Environment

a new way to author LAMBDAs

Excel Labs

Grid **Names** Modules ☰

💾 ☁️

Function name

GROUPBY

Description

Groups `tbl` by `key_col` and applies `agg` to each group

Arguments

(tbl) (key_col) (agg)

Function definition

```
=LET(
    positions_for_key, LAMBDA(key,
        FILTER(SEQUENCE(ROWS(key_col)), key_col = key)
    ),
    keys, UNIQUE(key_col),
    reduce_group, LAMBDA(key,
        agg(CHOOSEROWS(tbl, positions_for_key(key)))
    ),
    HSTACK(keys, BYROW(keys, reduce_group))
)
```

Done   **Cancel**

ExcelApi 1.17 (PC/16.0.16505.20000)

💾 Sheet4 > G2

```
1  =GROUPBY(Table2[Sales], Table2[Product], LAMBDA(x, SUM(x)))
```

	A	B	C	D	E	F	G	H
1	Year	Category	Product	Sales	Rating			
2	2017	Components	Chains	£ 20,000	75%		Chains	45100
3	2015	Clothing	Socks	£ 3,700	22%		Socks	9700
4	2017	Clothing	Bib-Shorts	£ 4,000	22%		Bib-Shorts	7600
5	2015	Clothing	Shorts	£ 13,300	56%		Shorts	48300
6	2017	Clothing	Tights	£ 36,000	100%		Tights	61400
7	2015	Components	Handlebars	£ 2,300	35%		Handlebars	10600
8	2016	Clothing	Socks	£ 2,300	28%		Brakes	11100
9	2016	Components	Brakes	£ 3,400	36%		Mountain Bikes	17900
10	2016	Bikes	Mountain Bikes	£ 6,300	40%		Helmets	59300

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Grid Names **Modules**

💾 ☁ ▦

📊 Workbook **calendar** GENAI ＋ New

```
1    days = {"Mon", "Tue", "Wed", "Thur", "Fri", "Sat", "Sun"};
2
3    /** Returns a row vector with the month name in the first position, and blanks for
4    monthHeader = LAMBDA(serial, HSTACK(TEXT(serial, "mmm"), MAKEARRAY(1, 6, LAMBDA(_i,
5
6    /**
7     * Create a calendar for the month containing the input
8     * day serial.
9     */
10   monthCalendar = LAMBDA(serial, dates, [fmt],
11       LET(
12           fmt, IF(ISOMITTED(fmt), "d", fmt),
13           daysInMonth, EOMONTH(serial, 0) - EOMONTH(serial, -1),
14           foMonth, DATE(YEAR(serial), MONTH(serial), 1),
15           dayPadding, WEEKDAY(foMonth, 2) - 1,
16           calendarRows, ROUNDUP((dayPadding + daysInMonth) / 7, 0),
17           // i, j is the position in the calendar array
18           builder, LAMBDA(i, j,
19               LET(
20                   seqNum, ((i - 1) * 7 + j) - dayPadding,
21                   currentDate, DATE(YEAR(serial), MONTH(serial), seqNum),
22                   matches, FILTER(dates, CHOOSECOLS(dates, 1) = currentDate),
23                   matchedContent, CHOOSECOLS(matches, 3),
24                   content, IFERROR(ARRAYTOTEXT(FILTER(matchedContent, matchedContent
25                   IFS(
26                       // The days before the start of the month
27                       seqNum <= 0,
28                       "",
29                       seqNum <= daysInMonth,
```

```
1    =calendar.monthCalendar
        [⟨⟩] days
        ◈ monthCalendar
        ◈ monthHeader
```

GitHub Gist   Search...   All gists   Back to GitHub

jack-williams / **calendar**   Secret   ✎ Edit
Last active 2 minutes ago

⟨⟩ Code   ⊶ Revisions 7

⟨⟩ calendar

```
1    days = {"Mon", "Tue", "Wed", "Thur", "Fri", "Sat", "Sun"};
2
3    /** Returns a row vector with the month name in the first position, and blanks for the rest */
4    monthHeader = LAMBDA(serial, HSTACK(TEXT(serial, "mmm"), MAKEARRAY(1, 6, LAMBDA(_i, _j, ""))));
5
6    /**
```

	B	C	D	E	F	G	H	I	J
1									
2		01/12/2023							
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23									

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Grid   Names   Modules

Functions   Ranges   Formulas   Modules

Functions defined in the name manager will appear here. Use the + button to define a new named function.

	A	B	C	D	E	F	G
1							
2		**Fruit**	**Quantity**	**Remove Fruit**	**Remove Paren**	**Cost**	**Amount**
3		Apples (0.7)	4	0.7)	0.7	£ 0.70	£ 2.80
4		Pears (0.9)	2	0.9)	0.9	£ 0.90	£ 1.80
5		Oranges (1.1)	6	1.1)	1.1	£ 1.10	£ 6.60
6							
7				=TEXTAFTER(B3, "(")	=TEXTBEFORE(D3, ")")	=VALUE(E3)	=C3*F3
8							

	B	C	D	E	F	G
1						
2	**Fruit**	**Quantity**	**Remove Fruit**	**Remove Paren**	**Cost**	**Amount**
3	Apples (0.7)	4	0.7)	0.7	£ 0.70	£ 2.80
4	Pears (0.9)	2	0.9)	0.9	£ 0.90	£ 1.80

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Import from grid ✕

Extract formulas from the grid into a function, by pulling out a calculation split into steps across several cells into a reusable function. The input cells will become parameters to the function.

Range containing the calculation

B3:G3

Cells to treat as parameters

B3:C3

Output cell

G3

Cancel | Preview →

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Grid   Names   **Modules**   ☰

Import from grid ✕

Function name

Amount

Refers to

```
=LAMBDA(Fruit, Quantity,
    LET(
        Remove_Fruit, TEXTAFTER(Fruit, "("),
        Remove_Paren, TEXTBEFORE(Remove_Fruit, ")"),
        Cost, VALUE(Remove_Paren),
        Quantity * Cost
    )
)
```

← Back | Create

A User-Centred Approach to Functions in Excel

30th June 2003

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MrExcel.com
140K subscribers

https://www.youtube.com/watch?v=_9EXERguX90

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Advanced Formula Environment is becoming Excel Labs, a Microsoft Garage Project!

🔔 Subscribe   ⋯

By   👤 [Petra Ronald](#)

Published Apr 11 2023 10:45 AM   👁 16.8K Views   🎧 **Listen**

Experimentation is key to unlocking innovation in any field. It's how we learn and grow, and it's what helps us continue to create features that help you do more.

So today, we are thrilled to announce our continued investment in experimentation through the release of **Excel Labs,** a **[Microsoft Garage project.](#)** Excel Labs is an add-in that allows us to release experimental ideas for you to try, and to give us feedback that helps us evolve Excel to be most useful for you.

Introducing ChatGPT

We've trained a model called ChatGPT which interacts in a conversational way. The dialogue format makes it possible for ChatGPT to answer followup questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests.

Introducing ChatGPT (openai.com)

=LABS.GENERATIVEAI("What is Lambda days?")

Lambda Days is an annual conference focused on functional programming that takes place in Krakow, Poland. It brings together experts and enthusiasts from academia and industry to share their knowledge and experience in the field of functional programming.

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💾   ☁️   ⊞↓
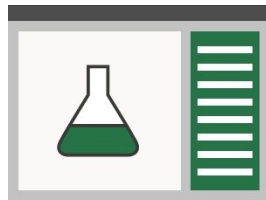
📊 Workbook   calendar   **GENAI**   + New

```
 1  /**
 2   * Given a list of categories and an item, return the category that best matches.
 3   */
 4  CLASSIFY = LAMBDA(categories, item,
 5      LABS.GENERATIVEAI(
 6          "Given this list of potential categories: " & TEXTJOIN(", ", TRUE, categories) &
 7              ", which category best applies to the following item: " & item &
 8              ". Your response should be one of the categories (matching exact spelling and case) and nothing else.",
 9          0
10      )
11  );
12
13  /**
14   * Standardize the representation of `value` using the described `type`.
15   */
16  STANDARDIZE = LAMBDA(type, value,
17      LABS.GENERATIVEAI(
18          "Given a type and value, standarize the representation of the value using the provided type description." &
19              "The type is: " & type & ". The value is: " & value &
20              ". Return the result exactly. The standardized value is: "
21      )
22  );
23
```

Travel
Holiday
Conference

Date	Name	Symbol	Type
04/06/2023	Flight out	✈	
05/06/2023	LAMBDA Days	λ	
06/06/2023	LAMBDA Days	λ	
07/06/2023	Flight back	✈	
25/12/2023	Christmas	🎄	

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