Mastering SEQUENCE

Excel's most amazing function with more than 200 examples

Meni Porat

www.bpbonline.com

Copyright © 2023 BPB Online

All rights reserved. No part of this book may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, without the prior written permission of the publisher, except in the case of brief quotations embedded in critical articles or reviews.

Every effort has been made in the preparation of this book to ensure the accuracy of the information presented. However, the information contained in this book is sold without warranty, either express or implied. Neither the author, nor BPB Online or its dealers and distributors, will be held liable for any damages caused or alleged to have been caused directly or indirectly by this book.

BPB Online has endeavored to provide trademark information about all of the companies and products mentioned in this book by the appropriate use of capitals. However, BPB Online cannot guarantee the accuracy of this information.

First published: 2023

Published by BPB Online
WeWork
119 Marylebone Road
London NW1 5PU

UK | UAE | INDIA | SINGAPORE

ISBN 978-93-55518-545

www.bpbonline.com

Kup książkę

Dedicated to

My beloved daughters

Noga

&

Gili

Who have patiently borne with me

In the last year

Kup książkę

About the Author

Meni Porat has been working in the software industry for more than 20 years. He has played central roles in numerous projects as a systems analyst and project manager. He worked for various financial institutions: banks, credit card companies and insurance companies. Currently, he is a self-employed consultant and Excel & VBA instructor. The author is also very active on social media channels, especially Facebook and LinkedIn. On the latter, he has published during the last year more than 150 posts and articles which have been read by more than 400,000 people. During that period he also featured in four YouTube international webinars on Excel. As a tribute to his contributions to the international Excel community, the author has been awarded with the Most Valuable Professional (MVP) by Microsoft.

Kup książkę

About the Reviewer

Cristiano Galvao is a Microsoft MVP from Brazil with over 2 decades of working experience with Microsoft Excel. He has been a guest speaker on the major Excel conferences abroad, and is the organizer of the Excel Weekend, the most important Excel conference in South America. Cristiano is the technical reviewer of many Excel books translated to Portuguese, including authors such as Bill Jelen, John Walkenbach, Paul McFedries, Ron Person, Joseph Schmuller, and more.

Kup książkę

Acknowledgement

I would like to express my gratitude to my daughters for their support and understanding while their father was seized in a fit of writing momentum, leaving them only a small amount of patience and leisure.

I am extremely grateful to my dear friend, Dr. Isaac Gottlieb. Without his unwavering support and invaluable advice, this book would not have been written.

I wish to express my obligation to BPB Publications for their unstinted aid. I am indebted to the publisher who saw the potential in the book's subject, took the risk and made this book come true. The long enterprise has reached its successful goal.

Finally, a special thanks to many of my Linkedin friends who read my numerous posts and responded enthusiastically. Their feedback greatly motivated me.

Kup książkę

Preface

Excel is a ubiquitous sophisticated software. With the introduction of the new Dynamic Array Functions (DAF) in Excel 365, using Excel has become much simpler and extremely fast.

This book presents the crème de la crème of these new functions: SEQUENCE. This function is explained thoroughly in more than 200 examples accompanied by almost 300 pictures.

The book is designed to provide the most comprehensive guide to that function. You will be able to find examples of how to implement SEQUNECE (usually with collaboration with other functions) in almost any field imaginable: from text and numbers to finance and mathematics.

The vast number of practical examples is intended to guide the reader on how to implement this function cleverly in building solutions to challenges in Excel.

Throughout the book, the reader will encounter well-designed answers to problems in various levels of complexity. It is not necessary to the read the book's chapters sequentially. Just pick randomly the chapters that interest you or those that are most relevant to your problems.

With this book, you will gain the knowledge and skills to become a proficient and efficient problem solver in Excel. We do believe that you will find this book informative, useful, and inspiring.

Chapter 1: A Short Introduction to Dynamic Array Functions in Excel 365 – Explains the new features in Excel 365. This is nothing short of a revolution in Excel: instead of a formula that returns a single-cell result, we now have an array of results in multiple cells. This introductory chapter illustrates the use of these functions in 30 examples. Some of the DAF were published only a few months ago.

Chapter 2: SEQUENCE in Text Operations – Every analyst (data/business/financial…) needs some very common text manipulation in order to clean his/her data and prepare it for analysis. This chapter supplies more than 60 examples of how to do it.

Kup książkę

Chapter 3: Using SEQUENCE with Numbers – Easy-to-apply methods for creating a sequence of numbers (ascending or descending, positive or negative), duplicating a number (or a sequence of numbers), extracting numbers from a mixed string, etc. are showcased in this chapter.

Chapter 4: SEQUENCE in Arrays – As the name implies, Dynamic Array Functions are meant to deal with arrays of data, both in input and output. This chapter will show you several ways to build dynamic arrays, flip them vertically and horizontally, transpose arrays, fetch multiple results for a search value and more.

Chapter 5: SEQUENCE in Date and Time Operations - Dates and times calculations are very common in Excel. The SEQUENCE function will show you neat tricks to generate sequence of dates, create various dynamic monthly and yearly calendars, generate automatic schedules, produce lists of dates (for example: last day of each month of the year), calculate net workdays in a given period (with/without holidays) and many more.

Chapter 6: Financial Operations with SEQUENCE – This chapter will be of great interest for readers whose expertise is in finance: accountants, economists, financial analysts, CFOs etc. The chapter supplies a new approach to old solutions for financial functions: PMT, DB, NPV, PDURATION, RATE, IRR etc.

Chapter 7: SEQUENCE - The Ancilla of Math – Whether you are a mathematics teacher or not, here, you will find some fresh ideas of how to harness new approaches (sometimes with dynamic Excel charts to better illustrate the concept) to mathematical challenges in algebra, trigonometry and the number theory.

Chapter 8: SEQUENCE and Other Animals – Last but not least, this chapter is dedicated to some more complex examples. It demonstrates the powerful symbiosis and cooperation of SEQUENCE and other advanced functions. Several examples with the new versatile LAMBDA function are also given.

Kup książkę

Coloured Images

Please follow the link to download the
Coloured Images of the book:

https://rebrand.ly/21ud2u7

We have code bundles from our rich catalogue of books and videos available at **https://github.com/bpbpublications**. Check them out!

Errata

We take immense pride in our work at BPB Publications and follow best practices to ensure the accuracy of our content to provide with an indulging reading experience to our subscribers. Our readers are our mirrors, and we use their inputs to reflect and improve upon human errors, if any, that may have occurred during the publishing processes involved. To let us maintain the quality and help us reach out to any readers who might be having difficulties due to any unforeseen errors, please write to us at :

errata@bpbonline.com

Your support, suggestions and feedbacks are highly appreciated by the BPB Publications' Family.

Did you know that BPB offers eBook versions of every book published, with PDF and ePub files available? You can upgrade to the eBook version at www.bpbonline.com and as a print book customer, you are entitled to a discount on the eBook copy. Get in touch with us at :

business@bpbonline.com for more details.

At **www.bpbonline.com**, you can also read a collection of free technical articles, sign up for a range of free newsletters, and receive exclusive discounts and offers on BPB books and eBooks.

Kup książkę

Piracy

If you come across any illegal copies of our works in any form on the internet, we would be grateful if you would provide us with the location address or website name. Please contact us at **business@bpbonline.com** with a link to the material.

If you are interested in becoming an author

If there is a topic that you have expertise in, and you are interested in either writing or contributing to a book, please visit **www.bpbonline.com**. We have worked with thousands of developers and tech professionals, just like you, to help them share their insights with the global tech community. You can make a general application, apply for a specific hot topic that we are recruiting an author for, or submit your own idea.

Reviews

Please leave a review. Once you have read and used this book, why not leave a review on the site that you purchased it from? Potential readers can then see and use your unbiased opinion to make purchase decisions. We at BPB can understand what you think about our products, and our authors can see your feedback on their book. Thank you!

For more information about BPB, please visit **www.bpbonline.com**.

Join our book's Discord space

Join the book's Discord Workspace for Latest updates, Offers, Tech happenings around the world, New Release and Sessions with the Authors:

https://discord.bpbonline.com

Kup książkę

Table of Contents

1. A Short Introduction to Dynamic Array Functions in Excel 365 1

Introduction 1

Structure 1

Objectives 3

Introducing Dynamic Array functions 3

Examples of the new DAF 3

UNIQUE function 4

FILTER function 4

SORT function 5

SORTBY function 6

RANDARRAY function 6

SEQUENCE function 7

TEXTSPLIT function 7

TOCOL function 8

TOROW function 9

VSTACK function 9

VSTACK versus TOCOL 10

HSTACK function 10

EXPAND function 11

ARRAYTOTEXT function 11

TEXTBEFORE function 12

TEXTAFTER function 12

CHOOSECOLS function 13

CHOOSEROWS function 14

WRAPROWS function 14

WRAPCOLS function 15

XLOOKUP function 15

XMATCH function 17

Kup książkę

TAKE function 17
DROP function 18
VALUETOTEXT function 18
Conclusion 19
Points to Remember 19

2. SEQUENCE in Text Operations 21
Introduction 21
Structure 21
Objectives 24
Examples of SEQUENCE with text 24
Finding the names of the 10 highest-paid employees 24
How many words are there in the cell (version 1) 25
How many words are there in the cell (version 2) 25
How many times does a string appear in the cell
Method 1 of 5 26
Method 2 of 5 26
Method 3 of 5 27
Method 4 of 5 27
Method 5 of 5 28
Extract all characters - Horizontally 28
Extract all characters – Vertically 29
All uppercase English in one column 29
All uppercase English in one cell 30
Duplicate a sequence of characters 30
Duplicate a cell by a duplication factor 31
Method 1 31
Method 2 32
Creating English uppercase letters without knowing how many letters there are 32
Transpose without TRANSPOSE 33
Extract only first three letter of weekday names 33
Extract only digits from a string 34

Kup książkę

Method 1 of 3 34
Method 2 of 3 34
Method 3 of 3 35
Extract only unique Alphabetic characters from a string 35
Split numbers and text 36
Remove unwanted characters from string (2 named ranges as parameters) ... 36
Remove unwanted characters from string (Formula) 37
How many times does a string appear in a range 37
Is it a Palindrome? 38
Add vendor to list (the table) 38
Add vendor to list (the formula) 39
Remove all digits from the string 39
Move first name from end of cell to the beginning 40
Reverse String 40
Method 1 40
Method 2 41
Sort Text in alphabetical order 41
How many words are there in the cell without the separator (SEQUENCE) . 42
How many words are there in the cell without the separator (TEXTSPLIT) . 42
Off with their heads 43
Extract only digits and add a separator 43
How many lower-case letters are there in the cell 44
Method 1 44
Method 2 44
All Greek letters in one formula 45
Find last word in cell
Method 1 of 3 45
Method 2 of 3 46
Method 3 of 3 46
Number of characters in cell (without the separator) 47
Number of non-empty cells in a column 47
Strip leading and trailing digits 48

Kup książkę

Method 1 of 2 48
Method 2 of 2 48
Increasing Text from end to start 49
Increasing Text from start to end 49
Hebrew Gematria (Formula) 50
Hebrew Gematria (Gtable – Translation table) 50
Extract only Country Names 51
How many occurrences of a String starting from a certain position 52
Remove Diacritics from Hebrew words 52
Is it a Palindrome (Arabic) 53
Convert Hebrew letters into English letters 53
Fetch description of Nth item of a non-sorted Key 54
Extract letters only from a chosen language (Formula) 55
Extract letters only from a chosen language (Validation list) 55
Gematria in English 56
Method 1 56
Method 2 56
How many Words are there in a Range? 57
Extract only non-digits from String 58
Find Unicode value for any character in the string, no matter which language 58
Conclusion 59
Points to remember 59

3. Using SEQUENCE with Numbers 61
Introduction 61
Structure 61
Objectives 63
Examples of SEQUENCE with numbers 63
Five methods to generate 12 positive integers 63
Method 1 63
Method 2 64

Kup książkę

Method 3.....64
Method 4.....65
Method 5.....65
Five methods to generate 12 negative integers.....66
Method 1.....66
Method 2.....66
Method 3.....67
Method 4.....68
Method 5.....68
Descending SEQUENCE – Two methods.....68
Method 1.....69
Method 2.....69
Duplicate cell horizontally.....70
Duplicate cell vertically.....70
Duplicate numbers.....71
Creating a vertical SEQUENCE of numbers – Two methods.....71
Find missing numbers in a list.....73
Reverse a Number.....73
Reverse a horizontal ascending array.....74
Reverse a horizontal descending array.....74
SEQUENCE of odd and even numbers.....75
Sum all digits in a cell which has only digits.....76
Sum all digits in a cell which has digits and text.....76
Sum every Nth row.....77
Sum the largest N numbers.....77
Sum the smallest N numbers.....78
Two tricks with SEQUENCE (ROW()).....78
Create a SEQUENCE of n Rows starting from Row(n).....78
SUM a virtual array created by SEQUENCE (ROW()).....79
SUM SEQUENCE (virtual array).....79
Alternate 1s and 0s.....80

Kup książkę

Dynamic SEQUENCE 81
Two methods to extract a number from the string's end 81
Method 1 81
Method 2 82
Two methods to extract a number from the string's start 82
Method 1 82
Method 2 83
Find N largest numbers (Ascending) 84
Find N largest numbers (Descending) 84
How many columns in a sheet 85
How many digits 85
Reverse numbers horizontally by a parameter 86
Reverse order of a SEQUENCE of numbers 87
Subject with the highest score 87
SEQUENCE based on number of unique values 88
Dynamic frequency based on dynamic bins 89
SEQUENCE column 90
SEQUENCE and COLUMNS 90
Building a chessboard in three steps 91
Chessboard - Step 1 91
Chessboard - Step 2 92
Chessboard - Step 3 92
Creating N-digit number with the same digit repeated N times 93
Conclusion 94
Points to remember 94

4. SEQUENCE in Arrays 95
Introduction 95
Structure 95
Objectives 96
Examples of SEQUENCE with arrays 96

Kup książkę

Creating an array of identical numbers - Two methods *97*
Creating an array of ascending numbers – three methods *97*
From one cell to a vertical array *98*
How many active months *99*
Build a dynamic array - horizontal or vertical *100*
Flip columns horizontally *100*
Method 1 ..... *100*
Method 2 ..... *101*
Flip vertical array (with and without SEQUENCE) *102*
Flip part of vertical array using a parameter *102*
Create a two-dimensional array using four parameters *103*
Flexible LARGE *104*
MMULT with static ranges and with dynamic Arrays *104*
Four useful tricks with VLOOKUP *105*
VLOOKUP - Fetch all columns of an item searched *105*
VLOOKUP - Fetch all data per lookup key in reverse order *105*
VLOOKUP - Fetch last two columns for a search key *106*
VLOOKUP - Fetch the first and third data items per lookup key *107*
From vertical to horizontal – Two Methods *107*
Method 1 ..... *107*
Method 2 ..... *108*
Four two-dimensional arrays generated by two parameters *109*
Select columns by parameters *110*
Transpose a vertical array without knowing its size beforehand *110*
Fetching multiple results for a search value *111*
Vertical to horizontal without TRANSPOSE *112*
Conclusion 112
Points to remember 112

5. SEQUENCE in Date and Time Operations 113
Introduction 113
Structure 113

Kup książkę

Objectives 115
Examples of SEQUENCE with date and time 115
12 months with each month's first day *115*
The year's months with the last day of each month - three methods *116*
Display the last date of each month of the year – method 1 ..... *116*
Display the last date of each month of the year – method 2 ..... *116*
Display the last date of each month of the year – method 3 ..... *117*
N consecutive dates starting from today (two methods) *118*
Method 1 ..... *118*
Method 2 ..... *119*
Display month names without a specific date *119*
Two methods to display the weekday names *120*
Adding minutes to time *121*
Adding seconds to time *121*
Sequence of days in a given month *122*
A SEQUENCE of dates (between start and end dates) *122*
Extract only time –four traditional methods *123*
Extract only time – a new method *124*
Presence in class by month *125*
How many Mondays are there in a given month *125*
How many Saturdays between two dates? *126*
Method 1 ..... *126*
Method 2 ..... *127*
Display only dates of Wednesdays in 2020 ..... *128*
How many Wednesdays are there in 2020? *128*
Sequence of the month's last date for each month (two methods) *129*
Method 1 ..... *129*
Method 2 ..... *130*
A horizontal SEQUENCE of descending dates - First of each month *130*
A substitute for NETWORKDAYS.INTL (for a certain month) *131*
The MonCal Named Range *132*

Kup książkę

A substitute for the NETWORKDAYS.INTL (any period) 133
A substitute for NETWORKDAYS.INTL - with/without weekends 133
The Definition of MonCal 134
How many working days are there in each month of a given period? 134
How many eligibility days? 135
The doctor's schedule (two versions) 136
The doctor's schedule (version 1) 136
The doctor's schedule (version 2) 137
Monthly calendar – classic versus non-classic 137
Monthly calendar - classic 137
Monthly calendar – non-classic 139
Monthly calendar in 20 languages 139
Monthly calendar in 20 languages – list of languages and formats 140
Monthly calendar in 20 languages – list of month numbers 141
Two methods for creating a list of the month's days 142
Monthly calendar – a bad attitude 142
Monthly calendar – a good attitude 142
Yearly calendar – good versus bad 143
Dynamic yearly calendar – in one formula 144
Dynamic yearly calendar – Conditional Formatting 144
Dynamic yearly calendar - by month 145
Dynamic yearly calendar - by week 145
Yearly Horizontal calendar with highlighted weekday (two examples) 146
Yearly horizontal calendar 147
Example 1 (weekday chosen: Sunday) 147
Example 2 (weekday chosen: Saturday) 147
Yearly horizontal calendar - Conditional Formatting - calendar 148
Yearly horizontal calendar - Conditional Formatting - weekday names 148
Yearly vertical calendar with highlighted weekday (2 examples) 149
Yearly vertical calendar – example 1 150
Yearly vertical calendar – example 2 150

Kup książkę

Yearly vertical calendar – Conditional Formatting - calendar.....151
Yearly vertical calendar – Conditional Formatting – weekday names.....151
Yearly calendar: one formula with Conditional Formatting.....152
Conditional Formatting – each weekday is formatted differently.....153
Conclusion.....154
Points to remember.....154

6. Financial Operations with SEQUENCE.....155
Introduction.....155
Structure.....155
Objectives.....156
Examples of SEQUENCE with financial functions.....156
Loan return by payments per period.....156
PMT - Periodic payment of a loan – traditional method.....157
Periodic payment of a loan – a more flexible method.....160
The Depreciation function in Excel – DB.....162
Equally divide a sum of money over a period of time.....163
One formula - How varying loan amounts impact the loan's installments..163
NPV – No need for a data table.....167
PDURATION - Multiple results.....168
The RATE function – multiple results.....170
RRI - calculate the average annual interest rate of an investment.....171
SEQUENCE and SUM.....173
Conclusion.....174
Points to remember.....175

7. SEQUENCE - The Ancilla of Math.....177
Introduction.....177
Structure.....177
Objectives.....178
Examples of SEQUENCE in math operations.....178
A number to the power of.....179

Kup książkę

Two methods to create a sequence of square roots *180*
Two methods to generate a sequence of fractions *181*
Creating a sequence of alternate 1's and 0's *182*
Dynamic quadratic equation *182*
SUM - a virtual Array *183*
How many candles *184*
Raising the number 2 to the power of 10 using bit operation *184*
Simplest OR *185*
Dynamic Sine with two Spin buttons *185*
Exponential Growth example *187*
Dynamic multiplication table *188*
BIN2DEC – MMULT and SEQUENCE *188*
BIN2DEC - SUM (or SUMPRODUCT) with SEQUENCE *189*
Filling the missing values in a geometric series *190*
Trigonometry with SEQUENCE *190*
An array of duplicate numbers generated by bit operations *191*
Using MMULT and SEQUENCE to track wins, losses, and ties in each quarter *192*
Digital root *192*
First n odd numbers squared (A simple solution) *193*
First N odd numbers squared (A complex solution) *194*
Find first divisor of a number (divisor found) *194*
Find first divisor of a number (divisor not found) *195*
Conclusion 196
Points to remember 197

8. SEQUENCE and Other Animals 199
Introduction 199
Structure 199
Objectives 200
Examples of SEQUENCE with other animals 200
Better than nested IF *200*

Kup książkę

Traditional solution – nested IF 200
XLOOKUP and SEQUENCE instead of nested IF (example 1) 201
XLOOKUP and SEQUENCE instead of nested IF (example 2) 202
XLOOKUP and SEQUENCE instead of nested IF (example 3) 203
Fetch the first and last digits from a string 203
Data validation – only Hebrew letters 204
Data validation – only uppercase English letters 206
Splitting cell by chunk size and separator (two examples) 207
Remove all digits from string 208
Remove names and split numbers to separate cells 209
Removing "A", "B" and "C" from string – two methods 209
Method 1 210
Method 2 210
INDEX-SQRT instead of FILTER 211
Remove all uppercase or lowercase letters from string 212
Verifying the validity of a check digit with the Luhn algorithm 213
Conclusion 215
Points to remember 215

Index 217-223

Kup książkę

Chapter 1

A Short Introduction to Dynamic Array Functions in Excel 365

Introduction

The latest version of Excel (Excel 365) is nothing short of a revolution. The new formula engine of Excel allows you to reference an array in one formula and get multiple results. This was not the case until a few years ago. However, the most revolutionary aspect of this new version is that Microsoft has added some new functions, which operate on arrays and enhance their flexibility and ease of use.

This chapter will briefly introduce some of these powerful functions and demonstrate their utility and efficiency.

This introduction demonstrates only a small fraction of these functions' power. Also, only in few cases will we exemplify the combination of two or more of these functions. Such co-operation of two or more DAF can have endless applications for problems in Excel that could not have been solved earlier with formulae.

Structure

This chapter will discuss the functions in the bulleted list below. Each function will be briefly explained and elucidated in a picture/pictures which will show the function in action.

Kup książkę

In this chapter, we will discuss the following topics:

- Introducing Dynamic Array Functions
- Examples of the new DAF
    - UNIQUE - returns a list of unique values in a range.
    - FILTER - selects data according to condition/s.
    - SORT - sorts a range, ascending/descending.
    - SORTBY - sorts a range by another range/array.
    - RANDARRAY - generates a bounded array of random numbers.
    - SEQUENCE - generates a sequence of numbers/characters.
    - TEXTSPLIT - splits text across columns/rows by a specified delimiter.
    - TOCOL - converts a horizontal/bi-dimensional array to a vertical one.
    - TOROW - converts a vertical/bi-dimensional array to a horizontal one.
    - VSTACK - stacks one or more arrays vertically, upon the other.
    - HSTACK - stacks one or more arrays horizontally, one after the other.
    - EXPAND - expands/pads an array by specified dimensions.
    - ARRAYTOTEXT - converts an array/range to a single-cell text string.
    - TEXTBEFORE - returns the text before a delimiter/substring.
    - TEXTAFTER - returns the text after a delimiter/substring.
    - CHOOSECOLS - returns data by specified column number/s.
    - CHOOSEROWS - returns data by specified row number/s.
    - WRAPROWS - wraps a row/column after a specified number.
    - WRAPCOLS - wraps a row/column after a specified number.
    - XLOOKUP - searches a range/array and returns first found item.
    - XMATCH - searches an item in a range/array and returns its position.
    - TAKE - returns part of an array according to rows/columns specified.
    - DROP - drops rows and/or columns from an array.
    - VALUETOTEXT - converts non-text to text, text left intact or wrapped in quotes.

Kup książkę