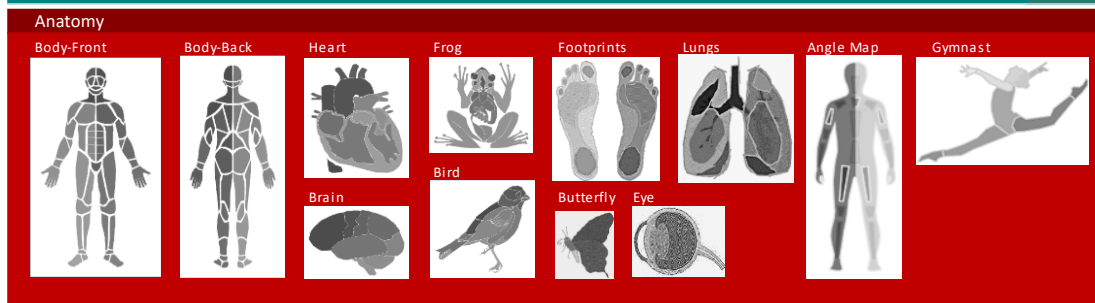
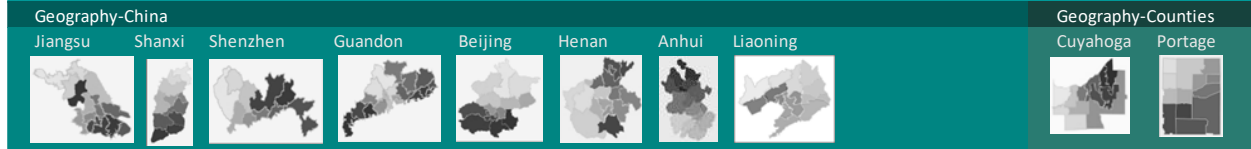
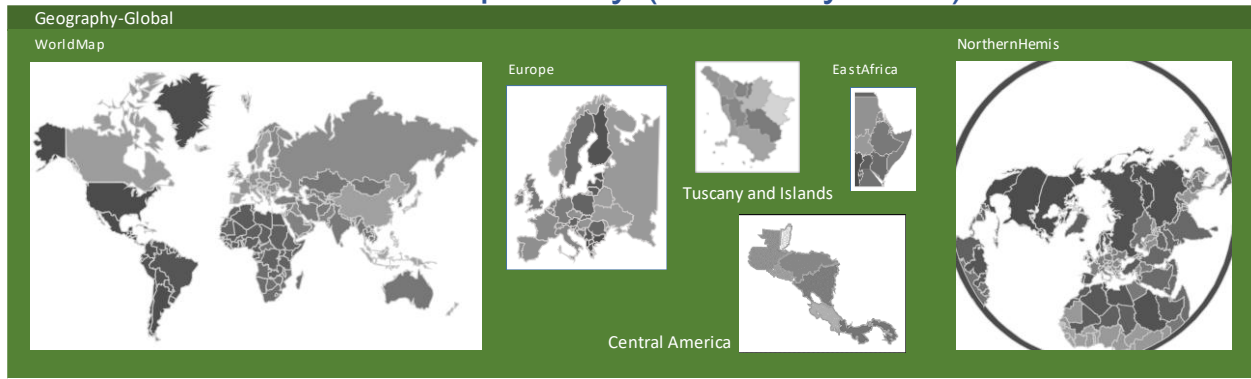
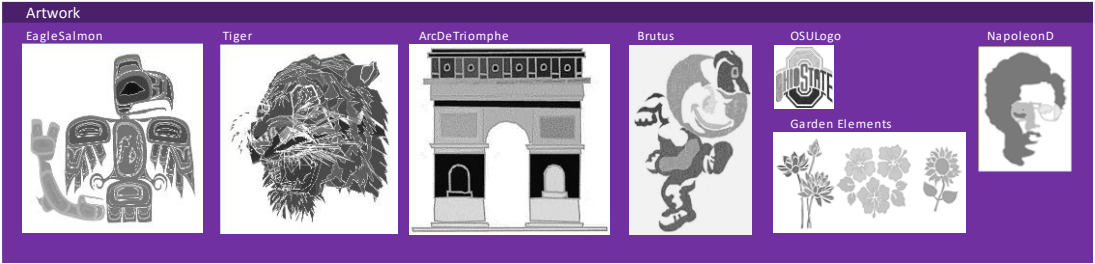
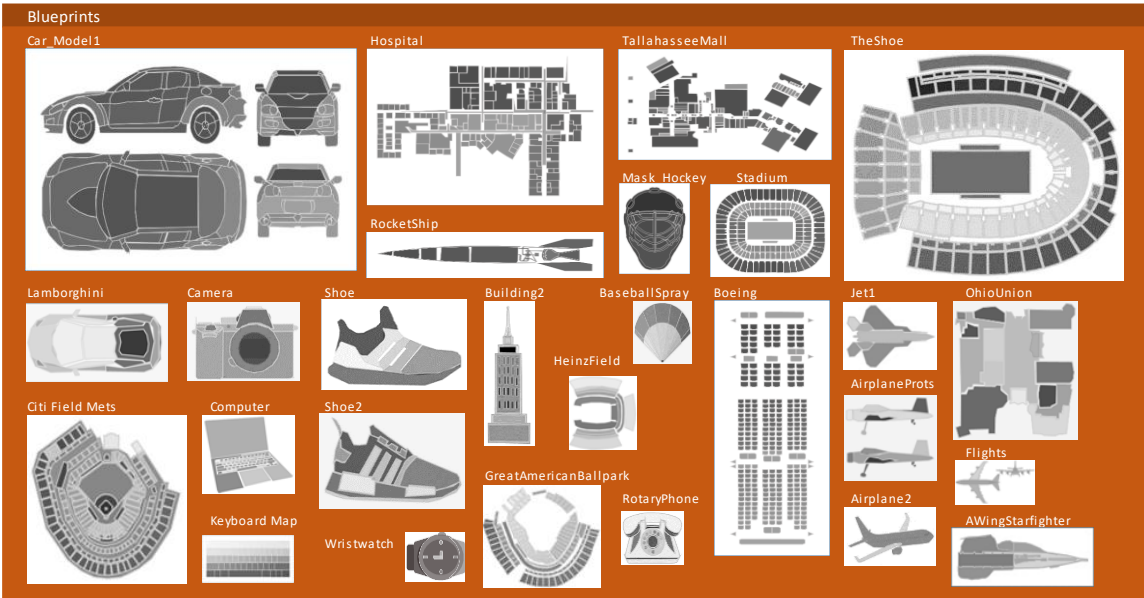
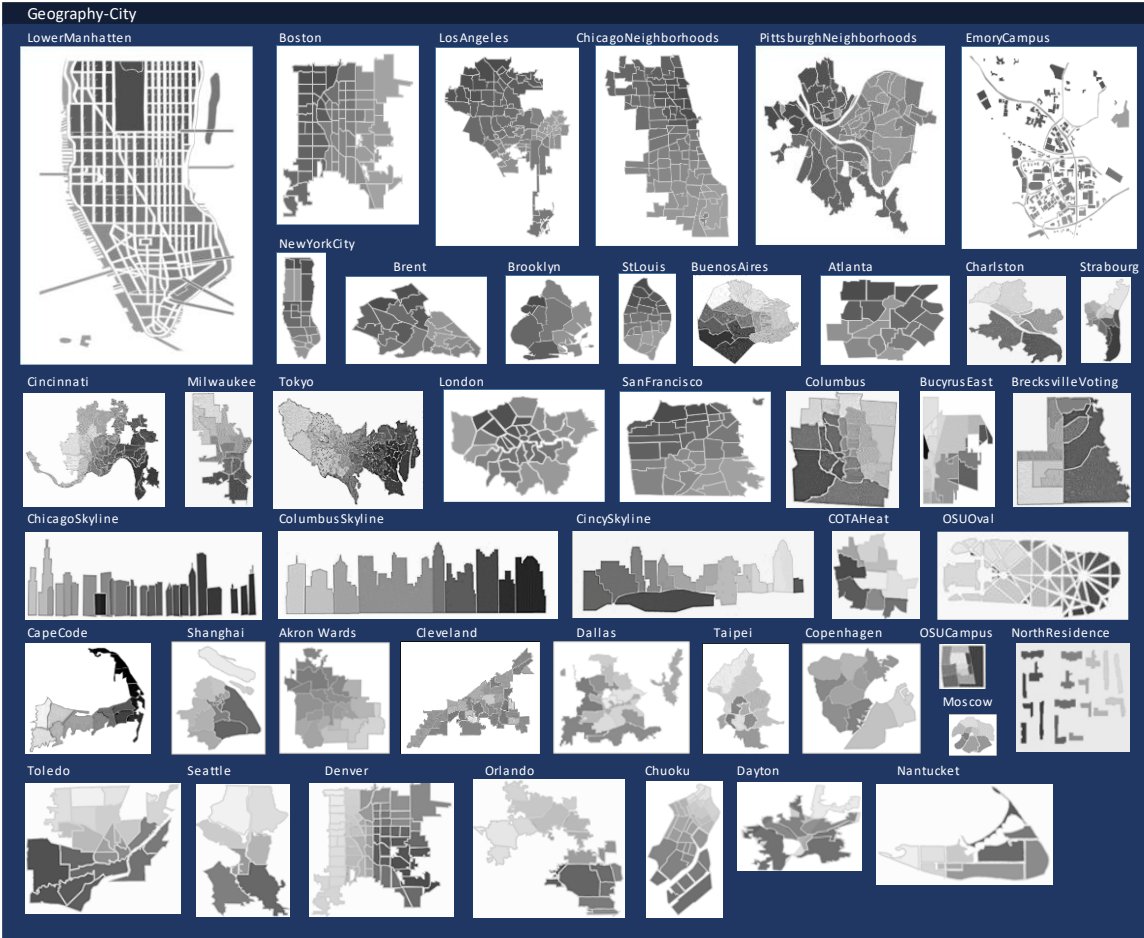























# Blackbelt Ribbon heatmap library (as of May 2025)













## Blackbelt Ribbon Add-in Functions

TEXT and REFERENCE FUNCTIONS			
	<b>ExtractURL</b>	<See Chapter 3>	E.g. =ExtractURL(G5) Parameters: • Range of cell in which hyperlink exists
	<b>HFilters</b>	<New 2022>	E.g. =Hfilters("2010", D5:D34, 0, 4, 3) Parameters: • Filtering criteria; Rows beginning with this content will be returned in detail • Source range of data to be filtered • Member of a comma delimited list of column indices to be returned (1st index=0) • [Optional] Additional members of the above defined list
	<b>VFilters</b>	<New 2022>	E.g. =Vfilters("e", D5:D34, 0, 4, 3) Parameters: • Filtering criteria; Rows beginning with this content will be returned in detail • Source range of data to be filtered • Member of a comma delimited list of column indices to be returned (1st index=0) • [Optional] Additional members of the above defined list
	<b>AlphaNums</b>	<New 2022>	E.g. =AlphaNums(G5,1) Parameters: • Full string containing numbers, letters and other characters • [Optional] 0=Both Numbers and Letters, 1=Just Letters, -1=Just Numbers
	<b>TermCount</b>	<New 2024>	E.g. =TermCount(B2:B100,"") Parameters: • Full array of cells with one or more delimited (separated) terms per cell • The term delimiter, such as a space, comma, or semicolon, etc. (e.g., ";")
	<b>TermFreq</b>	<New 2024>	E.g. =TermFreq(B2:F100, "Free",0) Parameters: • Cells with one or more terms for examination • Term of interest for search • [Optional] 1=Number of cells, 0=Total appearances
	<b>FindRight</b>	<New 2025>	E.g. =FindRight("dog", "my dog is a great dog, it's true") would return 19 Parameters: • Substring to find • Larger string to look within • [Optional] Starting character counting from the right to the left
GRAPHICAL FUNCTIONS			
	<b>AdjustColors</b>	<See Chapter 5>	E.g. =AdjustColors(A1,Rand(),"Auto-updating") Parameters: • Upper left cell of associated HeatMapper data series • Either a fixed value, reference or Rand() depending on updating preferences • What content/notes this cell should present to the user")
	<b>PathLength</b>	<See Chapter 3>	E.g. =PathLength(P2:R21, TRUE) Parameters: • Your full data range of observations without headers • TRUE if individual records are in each row, and dimensions are by column
	<b>PolyPtsExtract</b>	<See Chapter 3>	E.g. =PolyPtsExtract("Shape4", "P1") Parameters: • The name of the drawn polygon for extract • Name of the destination cell for later text box transfer
	<b>PolyPtsBuild</b>	<See Chapter 3>	E.g. =PolyPtsBuild("P1",0.5) Parameters: • Name of the upper left cell in the paired data set • Relative size of the polygon to be drawn; 1 = Original
	<b>AdjustTreemap</b>	<New 2025>	E.g. =AdjustrTreemap("Chart 1", m8, n8, Rand(),FALSE) Parameters: • Name of the Treemap chart to be recolored • Header of data labels (fill color is the low end of color gradient) • Header of data values (fill color is high end of color gradient) • Whether the Treemap legend should be shown (T/F) • Either a fixed value, reference or Rand() depending on updating preference • [Optional] Power value to draw emphasis to either low or high values in map

	<b>AdjustSankey</b>	<New 2025>	E.g. =AdjustSankey(M34:O45,""TestSet"", ""Chart 1"",1,0.1,0.3,7)
	Updates existing Sankey diagrams, built using the Blackbelt Ribbon Sankey building tool, adjusting to new data, path and start/end point colors, start and degree of curvature in connecting paths.		Parameters: <ul style="list-style-type: none"> <li>• Table of input labels, output labels and percentage flows</li> <li>• Sheet name</li> <li>• Chart name</li> <li>• Whether the inputs need resorting for like-grouping (1,0)</li> <li>• Level of separation between flows (0 to 0.4)</li> <li>• Point at which curvature starts (0.1 to 0.4)</li> <li>• Degree of curvature (1 to 10)</li> </ul>
<b>MATH and STATISTICAL FUNCTIONS</b>			
	<b>PoissonInvBB</b>	<See Chapter 4>	E.g. =PoissonInvBB(4)
	Generates a Poisson distributed random number, given a mean. Optional input for percentage, or random.		Parameters: <ul style="list-style-type: none"> <li>• Mean value of the Poisson distribution</li> <li>• [Optional] Percentile of value desired from distribution</li> </ul>
	<b>HistoricalInvBB</b>	<See Chapter 4>	E.g. =HistoricalInvBB(c2:c8,d2:d8)
	Generates a historically distributed random number, given an array of events and their probabilities.		Parameters: <ul style="list-style-type: none"> <li>• Range of events for which you have probability data</li> <li>• Range of probabilities for these events (summing to 1)</li> <li>• [Optional] Percentile of value desired from distribution"</li> </ul>
	<b>TriangInvBB</b>	<New 2024>	E.g. = TriangInvBB(120,160,200,0.75)
	Generates a Triangular distributed random number, given a lower bound, a peak location, and an upper bound.		Parameters: <ul style="list-style-type: none"> <li>• Lower bound of distribution</li> <li>• X-location of peak of distribution</li> <li>• Upper bound of distribution</li> <li>• [Optional] Percentile of value desired from distribution</li> </ul>
	<b>Stdevif</b>	<See Chapter 5>	E.g. =Stdevif(j4:j25,"Low",m4:m25)
	Delivers the standard deviation of a set of cells subject to a criteria, consistent with AverageIF. As of 2022, allows the final parameter to be a multicolumn range.		Parameters: <ul style="list-style-type: none"> <li>• Vertical Range of data that will be examined by criteria</li> <li>• Criteria to be checked against for data use</li> <li>• Range of cells that might contain values to include in calculation of standard deviation</li> </ul>
	<b>Percentileif</b>	<See Chapter 5>	E.g. =Percentileif(j4:j25,"Low",m4:m25,0.25)
	Delivers the value at the percentile of a set of cell, subject to a criteria, consistent with AverageIF. As of 2022, allows the final parameter to be a multicolumn range for analysis.		Parameters: <ul style="list-style-type: none"> <li>• Vertical Range of data that will be examined by criteria</li> <li>• Criteria to be checked against for data use</li> <li>• Range that might contain values to include in extraction of percentile value</li> <li>• The percentile level sought for the value to be returned; e.g. 0 = Min, 1 = Max, 0.5 = Median</li> </ul>
	<b>MultiAvgif</b>	<New 2022>	E.g. = MultiAvgif(C12:C120, "Operations", D12:F120)
	Delivers the average of a set of cells subject to a criteria. Consistent with AverageIF, but allowing multicolumn range as a final range for averaging.		Parameters: <ul style="list-style-type: none"> <li>• Your full data range of observations without headers</li> <li>• Criteria to be checked against for data use</li> <li>• Range of cells that might contain values to include in calculation of average</li> </ul>
	<b>SumProductIf</b>	<New 2025>	E.g. =SumProductIf(A\$1:J\$1,A2:B2,R\$1:S\$1,R\$2:S\$2)
	Performs a conditional SumProduct on subsets of numerical arrays based on matched content among nominal (labelling) arrays		Parameters: <ul style="list-style-type: none"> <li>• First array of nominal label values</li> <li>• Corresponding first array of numerical values</li> <li>• Second array of nominal label values</li> <li>• Corresponding second array of numerical values</li> <li>• Criteria to be checked against for data use</li> </ul>
	<b>SpearmanBB</b>	<New 2024>	E.g. = SpearmanBB(A2:A201,C2:C201)
	Calculates the Spearman rank correlation given two equally sized arrays of values		Parameters: <ul style="list-style-type: none"> <li>• First array of values</li> <li>• Second array of values</li> </ul>
	<b>Linreg</b>	<Updated 2025>	E.g. = Linreg(F48:F73,B48:E73,1,B47:E47)
	Provides linear regression results as per LINEST, but with original arrangement of X-variables, labels and t-tests of significance of coefficients. Also provides the option to select a subset of X-variables to include in model.		Parameters: <ul style="list-style-type: none"> <li>• Your full data range of Y-values, without headers</li> <li>• Your full range of X-values, without headers</li> <li>• Binary [0,1] specification of whether an intercept is to be estimated</li> <li>• [Optional] Array of X-variable names (headers)</li> <li>• [Optional] Array of X-variable boolean (T/F) selections</li> </ul>
	<b>StepwiseByAIC</b>	<New 2023>	E.g. = StepwiseByOLS(G2:G376,A2:F376,1,A1:F1)
	Provides stepwise results for the inclusion of predictor variables in OLS regression, based on AIC contributions (strongest contributors listed on top).		Parameters: <ul style="list-style-type: none"> <li>• Your full data range of Y-values, without headers</li> <li>• Your full range of X-values, without headers</li> <li>• Your range of X-variable names (headers)</li> </ul>
	<b>Bivariate</b>	<See Chapter 5>	E.g. =Bivariate(0.5,0.5,X12,X13,Y12,Y13,-0.2)
	Delivers the bivariate distribution frequency at a coordinate pair, given both means, stdevs and correlation.		Parameters: <ul style="list-style-type: none"> <li>• X coordinate</li> <li>• Y coordinate</li> <li>• X Mean</li> <li>• Y Mean</li> <li>• X Standard Deviation</li> <li>• Y Standard Deviation</li> <li>• X-Y Correlation</li> </ul>
	<b>SimpleMA</b>	<New 2024>	E.g. = SimpleMA(B2:B201,-1, 3)
	Provides fits statistics for a Moving Average estimation, and estimates optimal n, if input parameter <1		Parameters: <ul style="list-style-type: none"> <li>• Y-values, without headers</li> <li>• n</li> <li>• [Optional] ObjectiveType (1: MAE, 2: RMSE, 3: MAPE)</li> </ul> <b>NOTE: Components of Output string --&gt; MAE ; RMSE ; MAPE ; n</b>

	<b>SimpleES</b> <New 2024>	E.g. = SimpleES(B2:B201,0.412)
	Provides fits statistics for a Simple Exponential Smoothing estimation, estimates optimal alpha, if input <1	Parameters: <ul style="list-style-type: none"> <li>• Y-values, without headers</li> <li>• alpha</li> <li>• [Optional] ObjectiveType (1: MAE, 2: RMSE, 3: MAPE)</li> </ul> <b>NOTE: Components of Output string --&gt; MAE ; RMSE ; MAPE ; alpha</b>
	<b>HoltsDES</b> <New 2024>	E.g. = HoltsDES(B2:B201,-1,0.5, 3)
	Provides fits statistics for a Holts estimation, and estimates optimal parameters (e.g. alpha) if input <0	Parameters: <ul style="list-style-type: none"> <li>• Y-values, without headers</li> <li>• alpha</li> <li>• beta</li> <li>• [Optional] ObjectiveType (1: MAE, 2: RMSE, 3: MAPE)</li> </ul> <b>NOTE: Components of Output string --&gt; MAE ; RMSE ; MAPE ; alpha ; beta</b>
	<b>WintersTES</b> <New 2024>	E.g. = WintersTES(B2:B201,0.1,0.3,-1,4,0,3)
	Provides fits statistics for a Winters estimation, and estimates optimal parameters (e.g. gamma) if input <0	Parameters: <ul style="list-style-type: none"> <li>• Y-values, without headers</li> <li>• alpha</li> <li>• beta</li> <li>• gamma</li> <li>• Seasonal degree (M)</li> <li>• [Optional] Additive (vs. Multiplicative)</li> <li>• [Optional] ObjectiveType (1: MAE, 2: RMSE, 3: MAPE)</li> </ul> <b>NOTE: Output string --&gt; MAE ; RMSE ; MAPE ; alpha ; beta ; gamma</b>
<b>COMPUTATIONAL FUNCTIONS</b>		
	<b>CompSearch_TSP</b> <See Chapter 6>	E.g. =CompSearch_TSP(D\$4:E13)
	Comprehensively examines all N! sequences of N X-Y points, and provides best, worst and the option to view all other sequences encountered.	Parameters: <ul style="list-style-type: none"> <li>• Range of X-Y coordinate pairs</li> <li>• [Optional] Output cell for transfer of all sequences from textbox to spreadsheet</li> <li>• [Optional] Whether the textbox is equipped with an auto-extract macro</li> </ul>
	<b>NearestNext_TSP</b> <See Chapter 6>	E.g. =NearestNext_TSP(D\$4:E13, Z1, TRUE)
	Applies the Nearest-Next heuristic to examine $N*(N+1)/2$ sequences of N X-Y points, and provides best and worst encountered, and the option to view all other sequences encountered.	Parameters: <ul style="list-style-type: none"> <li>• Range of X-Y coordinate pairs</li> <li>• [Optional] Output cell for transfer of all sequences from textbox to spreadsheet</li> <li>• [Optional] Whether the textbox is equipped with an auto-extract macro</li> </ul>
	<b>FurthestNext_TSP</b> <See Chapter 6>	E.g. =FurthestNext_TSP(D\$4:E13, Z1, TRUE)
	Applies the Furthest-Next heuristic (opposite of Nearest-Next) to examine $N*(N+1)/2$ sequences of N X-Y points, and provides best and worst encountered, and the option to view all other sequences encountered.	Parameters: <ul style="list-style-type: none"> <li>• Range of X-Y coordinate pairs</li> <li>• [Optional] Output cell for transfer of all sequences from textbox to spreadsheet</li> <li>• [Optional] Whether the textbox is equipped with an auto-extract macro</li> </ul>

## ZipTranslate Add-in Functions

	<b>FindZip</b> <ZipTranslate Add-in 2022>	E.g. = FindZip(B4), where B4 contains 43210
	Takes a given US Zip Code and returns the city, county and state associated.	Parameters: <ul style="list-style-type: none"> <li>• The Zip Code of interest</li> </ul>
	<b>FindIPaddress</b> <ZipTranslate Add-in 2022>	E.g. = FindIPaddress("149.142.201.252")
	Takes a given IP Address and returns the Zip Code (or other district code), city, region, country and latitude/longitude.	Parameters: <ul style="list-style-type: none"> <li>• The IP Address of interest (<i>as text</i>)</li> </ul> {* Note that limits exist on the number of IP Address translations per day}