

Problem Set 03: Histograms & Descriptive Statistics

New Learning Objectives under Evaluation

08.00 Compute basic descriptive statistics of values stored in arrays using appropriate commands

Learning Objective	Evidence
08.00 Compute basic descriptive statistics of values stored in arrays using appropriate commands	<p>Compute the minimum using the <code>min</code> command with the correct input</p> <pre>row_vector_min = min(array_data)</pre> <p>Compute the maximum using the <code>max</code> command with the correct input</p> <pre>row_vector_max = max(array_data)</pre> <p>Compute the range correctly using the <code>range</code> command (or <code>min</code> and <code>max</code>) with the correct input</p> <pre>row_vector_range = range(array_data)</pre> <p>Compute the mean using the <code>mean</code> command with the correct input</p> <pre>row_vector_mean = mean(array_data)</pre> <p>Compute the median using the <code>median</code> command with the correct input</p> <pre>row_vector_mode = mode(array_data)</pre> <p>Compute the mode using the <code>mode</code> command with the correct input</p> <pre>row_vector_median = median(array_data)</pre> <p>Compute the variance using the <code>var</code> command with the correct input</p> <pre>row_vector_var = var(array_data)</pre> <p>Compute the standard deviation using the <code>std</code> command with the correct input</p> <pre>row_vector_dev = std(array_data)</pre> <p>Recognize that when the input to a built-in MATLAB statistics function is a matrix, the output is a row vector with the statistic calculated for each column</p>

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New Learning Objectives under Evaluation

09.00 Create and interpret histograms

Learning Objective	Evidence
09.01 Create a histogram with an appropriate number of bins and managed bin edges	<p>Correct syntax of <code>histogram</code> command (or <code>histogramRight</code> command if creating companion cumulative distribution plot):</p> <ul style="list-style-type: none"> <code>h = histogram(data)</code> uses MATLAB's binning algorithm, OR <code>h = histogram(data, N)</code> sets number of bins, OR <code>h = histogram(data, bin_edges)</code> sets the bin edges <p>Correct data variable to create the histogram</p> <p>Specification of the number of bins OR number of bin edge values that is appropriate to the problem</p> <p>Specification of bin edge values that are appropriate to the problem (evenly spaced, integer or reasonable decimals, etc.)</p>
09.03 Identify bin edges and bin frequency values	<p>Identify bin edges from a histogram plot</p> <p>Identify bin frequencies from a histogram plot</p> <p>Extract bin edges from a histogram structure</p> <ul style="list-style-type: none"> <code>edges_vector = h.BinEdges</code> <p>Extract bin frequencies</p> <ul style="list-style-type: none"> <code>frequencies_vector = h.Values</code>
09.04 Format histograms for technical presentation	<p>Correct syntax for <code>title</code></p> <p>Correct syntax for <code>xlabel</code></p> <p>Correct syntax for <code>ylabel</code></p> <p>Descriptive title that references the problem context and the independent (x) variable</p> <p>Clear x-axis label with units</p> <p>Clear y-axis label that indicates frequency, number of ____, or count of ____</p> <p>Gridlines</p>
09.05 Describe the distribution of data displayed in a histogram	<p>Identify the shape of the distribution (unimodal, bimodal, normal, etc)</p> <p>Justify shape identification</p> <p>Identify the skew of the distribution (positive, negative, undefined, etc)</p> <p>Justify skew identification based on tail direction</p>
09.06 Compare the distributions of two data sets displayed in histograms	<p>Compare the distribution shapes of two histograms</p> <p>Compare the skew of the distributions of two histograms</p>