CS599: PPMP + Project
Personal Software Process Project

PPMP Spreadsheet--Assignment 3S

PSSP Assignment & Exercise Details

Exercise Deliverables

• PSSP0.1 Project Plan Summary
• PIP forms, including a brief statement of lessons learned
• Time Recording Log
• Defect Recording Log
• Source Spreadsheet Listing
• Other Requested Material
  – Test Results - Spreadsheet 3S
  – Exercise (Report) R3
  – Stu1.XLS with data to date on diskette
PSSP Assignment & Exercise Details

Exercise Deliverables (cont.):

• "Source spreadsheet listing"
  – Development worksheet(s) (normal view)
  – Development worksheet(s) (formula view)
  – Test worksheet with data & results from one set of data
  – Test worksheet with dynamically incremented data & results
  – Test worksheets for all other provided data, with results

• Development worksheet(s)
  – Minimal number of lines/rows of excel needed to "solve" the smallest (number of data points) problem
    o 1\textsuperscript{st} row
    o 1\textsuperscript{st} repeating row
    o archetype for all other repeating rows
Assignment 3 Details

PSSP0.1 Exercise Reports – Exit Criteria

0. The following five items (SfA: per paragraphs one and three of C2.5)
   • Complete process data
   • Accurate and self-consistent data
   • Process Report in proper order and format
   • Neat and legible; need not be typed
   • NO cover sheets, binders, or written reports other than those requested

1. PSP0.1 Project Plan Summary (SfA: Table C25, page 666).
2. Time Recording Log (SfA: per Table C17, page 658).

3. Defect Recording Log (SfA: per Tables C19 and C20, pages 660-661).
4. Source Spreadsheet Listing (SfA above)
5. Required Spreadsheet tests
   • Test Results - Spreadsheet 3S (separate handout)
6. Other requested material
   • Exercise Report R3 (SfA: "Use the format in Tables D20, D21, and D22")
   • PSSPStu1.XLS with data to date thru Spreadsheet 3S
Assignment & Exercise Details (cont.)

3S. Prediction Interval + Correlation:
Expand linear regression.

   Enhance the linear regression spreadsheet to "remove" outliers from the calculation.
   Calculate the prediction interval using the selected data.
   Calculate the correlation of the two sets of data, both with and without the removal of outliers.

1. Spreadsheet 3S Prerequisites and References:
   DSE Appendix A8 and spreadsheet 1S
   DSE Appendix A3 & A4 and spreadsheet 3S.A

Assignment & Exercise Details (cont.)

2. Spreadsheet 3S Requirements
Write a spreadsheet to calculate an LOC estimate and the 90 percent and 70 percent prediction intervals for this estimate. The formula for calculating the prediction interval using absolute error is given in Appendix A8. Use the TINV built-in function to calculate the value of the t distribution. You may enhance spreadsheet 1S to develop this spreadsheet.

HINT: For outlier's, do not include their data in the calculations, BUT outliers must always have a "rationale".
Assignment & Exercise Details (cont.)

2. Spreadsheet 3S Requirements (cont.)
Display the +/-90% and +/-70% curves around the 3S.A regression line; also include a light vertical line at the "estimated" object LOC and light horizontal lines at the project value and both the sets of UPI and LPI values.

Calculate the correlation between the two series of numbers and determine the significance of this correlation. The formula for making the correlation calculation is given in Appendix A3, but you may use a built-in function for it, CORREL, and/or the t value, TINV.

Assignment & Exercise Details (cont.)

3. Spreadsheet 3S Testing
Thoroughly test the spreadsheet. As one test, use the data for estimated object LOC and actual new and change LOC in table D8 (p 756) and the β0 and β1 values found from testing spreadsheet 1S.B. Also assume an estimated object LOC value of 386. Under these conditions, the estimated LOC values and the parameter values obtained should be

<table>
<thead>
<tr>
<th>Linear Regression</th>
<th>Prediction Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>β0 = -22.54</td>
<td>t(70%) = 1.108</td>
</tr>
<tr>
<td>β1 = 1.7279</td>
<td>t(90%) = 1.860</td>
</tr>
<tr>
<td>σ = 197.8956</td>
<td>Range(70%) = 229.9715, UPI = 874.401, LPI = 414.4579</td>
</tr>
<tr>
<td>Projection = 644.429</td>
<td>Range(90%) = 38.0533, UPI= 1030.483, LPI = 258.3761</td>
</tr>
</tbody>
</table>

This example is worked out in Appendix A.8.2
Prediction Interval (cont.)

Prediction Interval Range

\[ \text{Range} = t(\alpha / 2, n - 2)\sigma \sqrt{1 + \frac{1}{n} + \frac{\sum (x_i - x_{\text{avg}})^2}{n}} \]

"t" stands for student t:
a "normal" distribution of probabilities
where population variance is estimated from a sample;
dispersion increases as sample size decreases

- where
  - \( n \) is the number of data points in the sample
  - \( \alpha \) is related to the desired probability
  - \( \sigma \) is the standard deviation of the data set

Size Estimating Regression Data

DSE Table D8: Size Estimating Regression Data

<table>
<thead>
<tr>
<th>Prog #</th>
<th>Estimated Object LOC</th>
<th>Estimated New &amp; Changed LOC</th>
<th>Actual N&amp;C LOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>130</td>
<td>163</td>
<td>186</td>
</tr>
<tr>
<td>2</td>
<td>650</td>
<td>765</td>
<td>699</td>
</tr>
<tr>
<td>3</td>
<td>99</td>
<td>141</td>
<td>132</td>
</tr>
<tr>
<td>4</td>
<td>150</td>
<td>166</td>
<td>272</td>
</tr>
<tr>
<td>5</td>
<td>128</td>
<td>137</td>
<td>291</td>
</tr>
<tr>
<td>6</td>
<td>302</td>
<td>355</td>
<td>331</td>
</tr>
<tr>
<td>7</td>
<td>95</td>
<td>136</td>
<td>199</td>
</tr>
<tr>
<td>8</td>
<td>945</td>
<td>1206</td>
<td>1890</td>
</tr>
<tr>
<td>9</td>
<td>368</td>
<td>433</td>
<td>788</td>
</tr>
<tr>
<td>10</td>
<td>961</td>
<td>1130</td>
<td>1601</td>
</tr>
<tr>
<td>Sum</td>
<td>3828</td>
<td>4632</td>
<td>6389</td>
</tr>
<tr>
<td>Ave</td>
<td>382.8</td>
<td>463.2</td>
<td>638.9</td>
</tr>
</tbody>
</table>
Assignment & Exercise Details (cont.)

3. Spreadsheet 3S Testing

Thoroughly test the spreadsheet. As one test, use the data in Table D12 (p 759). Here, the results for the correlation between x and y should be $r=0.9543158$, $t=9.0335$, with $2*(1-p) = 1.80*10^{-5}$. This is a significance of substantially better than (less than 0.005). This example is worked out in Appendix sections A3.2 and A4.1.
Assignment & Exercise Details

Assignment Kit #3

To Be provided