ods rtf file='frogSAS.rtf';

proc import datafile='frog1.csv' out=frog1;

run;

proc sgplot data=frog1;

vbox count / group=year;

title 'Boxplots of counts';

run;

proc means mean std stderr clm data=frog1;

class year;

var count;

title 'Summary statistics for each year';

run;

proc ttest data=frog1;

class year;

var count;

title 'T test, with normal QQ plots, comparing years';

run;

proc npar1way wilcoxon data=frog1;

class year;

var count;

title 'Wilcoxon rank sum test comparing years';

run;

proc import datafile='frog2.csv' out=frog2;

run;

proc ttest data=frog2;

paired n2012\*n2017;

title 'Paired t-test, with normal QQ plot';

run;

ods rtf close;



| **Analysis Variable : count** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **year** | **N Obs** | **Mean** | **Std Dev** | **Std Error** | **Lower 95% CL for Mean** | **Upper 95% CL for Mean** |
| 2012 | 15 | 339.6000000 | 81.3184217 | 20.9963262 | 294.5673591 | 384.6326409 |
| 2017 | 15 | 227.6666667 | 62.5764295 | 16.1571646 | 193.0129951 | 262.3203382 |

| **year** | **N** | **Mean** | **Std Dev** | **Std Err** | **Minimum** | **Maximum** |
| --- | --- | --- | --- | --- | --- | --- |
| **2012** | 15 | 339.6 | 81.3184 | 20.9963 | 233.0 | 556.0 |
| **2017** | 15 | 227.7 | 62.5764 | 16.1572 | 147.0 | 413.0 |
| **Diff (1-2)** |  | 111.9 | 72.5551 | 26.4934 |  |  |

| **year** | **Method** | **Mean** | **95% CL Mean** | | **Std Dev** | **95% CL Std Dev** | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **2012** |  | 339.6 | 294.6 | 384.6 | 81.3184 | 59.5354 | 128.2 |
| **2017** |  | 227.7 | 193.0 | 262.3 | 62.5764 | 45.8139 | 98.6892 |
| **Diff (1-2)** | **Pooled** | 111.9 | 57.6641 | 166.2 | 72.5551 | 57.5783 | 98.1273 |
| **Diff (1-2)** | **Satterthwaite** | 111.9 | 57.5032 | 166.4 |  |  |  |

| **Method** | **Variances** | **DF** | **t Value** | **Pr > |t|** |
| --- | --- | --- | --- | --- |
| **Pooled** | Equal | 28 | 4.22 | 0.0002 |
| **Satterthwaite** | Unequal | 26.276 | 4.22 | 0.0003 |

| **Equality of Variances** | | | | |
| --- | --- | --- | --- | --- |
| **Method** | **Num DF** | **Den DF** | **F Value** | **Pr > F** |
| **Folded F** | 14 | 14 | 1.69 | 0.3383 |



| **Wilcoxon Scores (Rank Sums) for Variable count Classified by Variable year** | | | | | |
| --- | --- | --- | --- | --- | --- |
| **year** | **N** | **Sum of Scores** | **Expected Under H0** | **Std Dev Under H0** | **Mean Score** |
| **2012** | 15 | 321.0 | 232.50 | 24.109127 | 21.40 |
| **2017** | 15 | 144.0 | 232.50 | 24.109127 | 9.60 |

| **Wilcoxon Two-Sample Test** | |
| --- | --- |
| **Statistic** | 321.0000 |
|  |  |
| **Normal Approximation** |  |
| **Z** | 3.6501 |
| **One-Sided Pr > Z** | 0.0001 |
| **Two-Sided Pr > |Z|** | 0.0003 |
|  |  |
| **t Approximation** |  |
| **One-Sided Pr > Z** | 0.0005 |
| **Two-Sided Pr > |Z|** | 0.0010 |
| **Z includes a continuity correction of 0.5.** | |

| **Kruskal-Wallis Test** | |
| --- | --- |
| **Chi-Square** | 13.4748 |
| **DF** | 1 |
| **Pr > Chi-Square** | 0.0002 |

| **N** | **Mean** | **Std Dev** | **Std Err** | **Minimum** | **Maximum** |
| --- | --- | --- | --- | --- | --- |
| 15 | 111.9 | 29.4533 | 7.6048 | 60.0000 | 152.0 |

| **Mean** | **95% CL Mean** | | **Std Dev** | **95% CL Std Dev** | |
| --- | --- | --- | --- | --- | --- |
| 111.9 | 95.6227 | 128.2 | 29.4533 | 21.5635 | 46.4507 |

| **DF** | **t Value** | **Pr > |t|** |
| --- | --- | --- |
| 14 | 14.72 | <.0001 |

