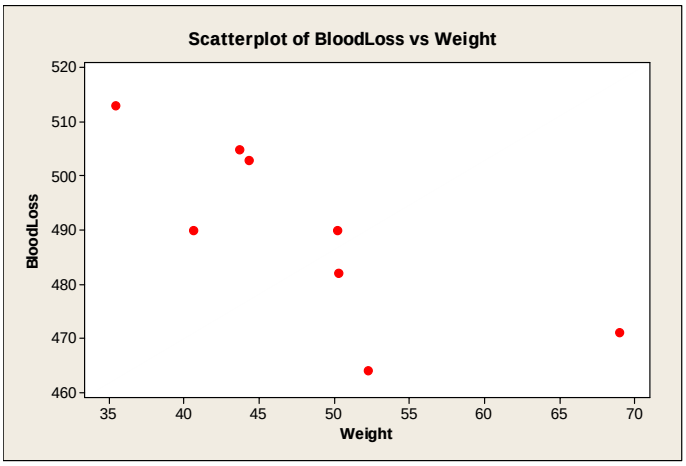
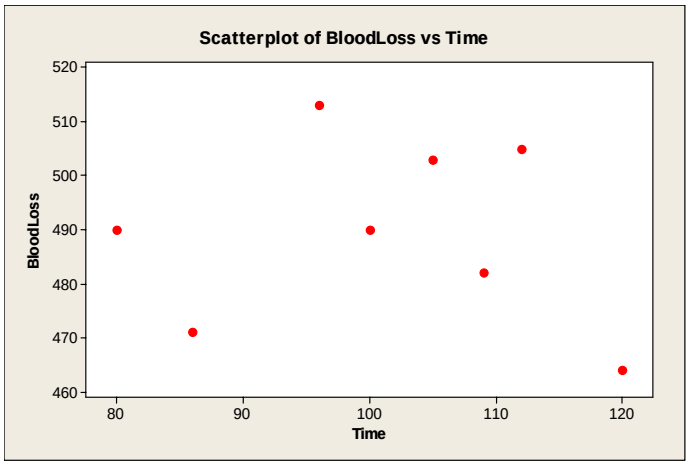
Blood Loss Analysis

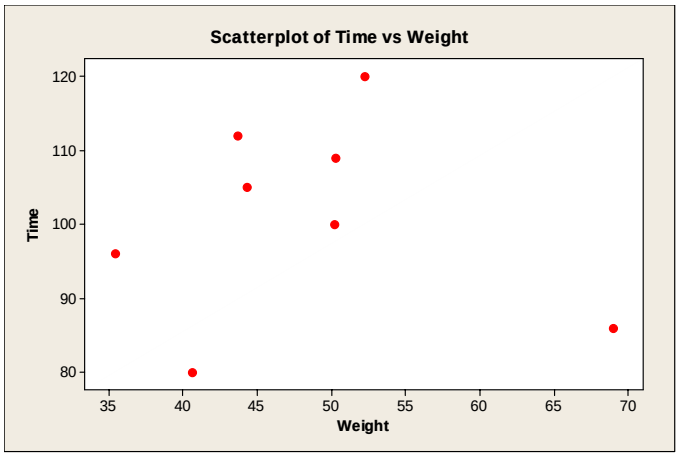
Data Display

Row	Weight	Time	BloodLoss
1	44.3	105	503
2	40.6	80	490
3	69.0	86	471
4	43.7	112	505
5	50.3	109	482
6	50.2	100	490
7	35.4	96	513
8	52.2	120	464

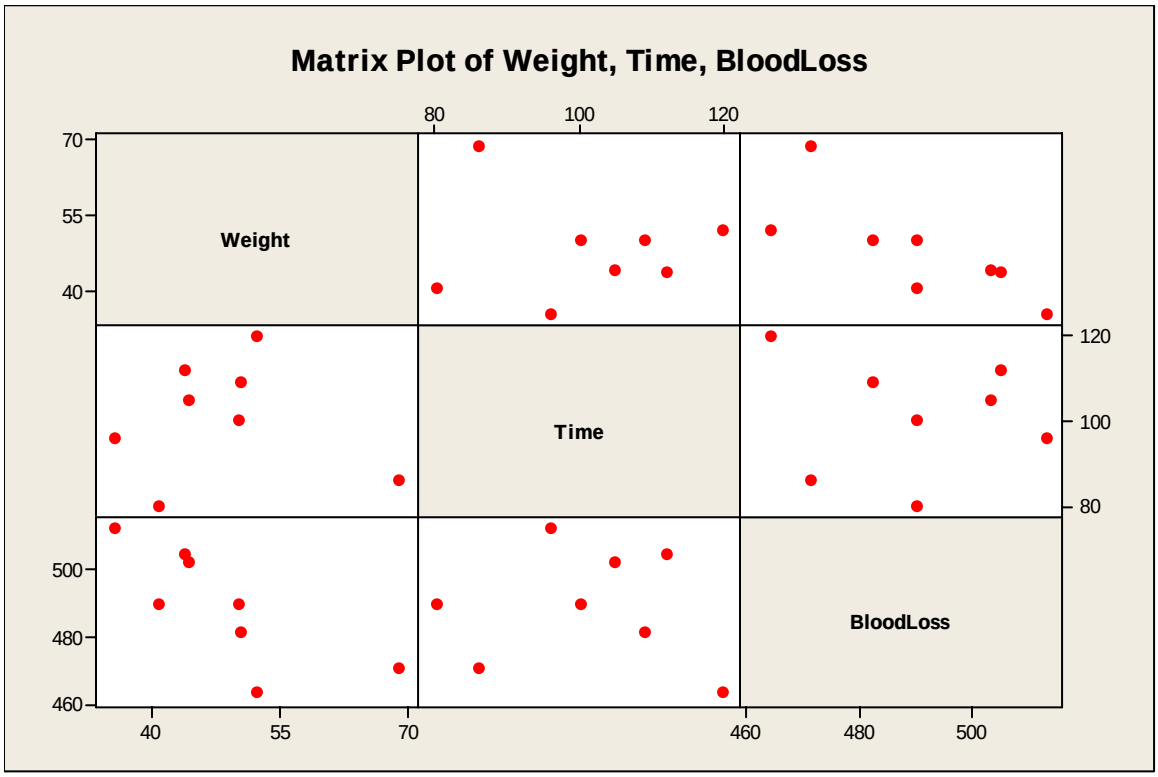
Scatter Plots: Follow the menu path `Graph > Scatterplot > Simple` and enter the Y (vertical) and X (horizontal) variables. You can enter several at once.







An efficient way to generate a lot of these plots at once is `Graph > Matrix Plot > Simple` and then enter all the variables to plot. It generates all possible X and Y pairs. The matrix plot has less resolution but compactly presents all these graphs.



Correlations: To get the Pearson (product-moment) correlatons r, follow the menu path `Stat > Basic Statistics > Correlation`, then enter the group of variables for which you want pairwise correlations.

Correlations: Weight, Time, BloodLoss

```
               Weight       Time
Time           -0.066
                0.876

BloodLoss      -0.772     -0.107
                0.025      0.800


Cell Contents: Pearson correlation
               P-Value
```

Spearman Correlations: Minitab's recommended way to compute these is to compute ranks for each variable and then to compute Pearson correlations on the ranks (there is another round-about method in Tables, but Minitab's recommendation is best). They do not provide a direct method using the above path. The menu path `Data > Rank` opens a box where you enter the variable to rank and the destination. I named the variables containing ranks as follows:

Data Display

Row	Weight	Time	BloodLoss	RWeight	Rtime	RLoss
1	44.3	105	503	4	5	6.0
2	40.6	80	490	2	1	4.5
3	69.0	86	471	8	2	2.0
4	43.7	112	505	3	7	7.0
5	50.3	109	482	6	6	3.0
6	50.2	100	490	5	4	4.5
7	35.4	96	513	1	3	8.0
8	52.2	120	464	7	8	1.0

Correlations: RWeight, Rtime, RLoss

```
          RWeight    Rtime
Rtime       0.286
            0.493

RLoss      -0.874   -0.156
            0.005    0.713


Cell Contents: Pearson correlation
               P-Value
```

Minitab does warn you in their help files, and strictly speaking they are correct, that the p-values printed for the Spearman correlations calculated in this way are not correct. This is also what JMP-IN does. I did go to the mega-package R, and calculated exact p-values and they were very close to these. Use these descriptively, but if you want to publish a value get the exact p-value from something like R.

There are tools available in Minitab that will allow you to calculate other measures of correlation, but nothing is direct.

Least Squares Regression: In order to predict Blood Loss from Weight, follow the menu path `Stat > Regression > Regression`. In the following, I asked for just about everything so we could discuss what it all means.

Regression Analysis: BloodLoss versus Weight

```
The regression equation is
BloodLoss = 552 - 1.30 Weight


Predictor     Coef  SE Coef      T      P
Constant    552.44    21.44  25.77  0.000
Weight     -1.3003   0.4364  -2.98  0.025


S = 11.6623   R-Sq = 59.7%   R-Sq(adj) = 52.9%


Analysis of Variance

Source          DF      SS      MS     F      P
Regression       1  1207.5  1207.5  8.88  0.025
Residual Error   6   816.0   136.0
Total            7  2023.5


Obs  Weight  BloodLoss     Fit  SE Fit  Residual  St Resid
  1    44.3     503.00  494.84    4.46      8.16      0.76
  2    40.6     490.00  499.65    5.30     -9.65     -0.93
  3    69.0     471.00  462.72    9.97      8.28      1.37
  4    43.7     505.00  495.62    4.57      9.38      0.87
  5    50.3     482.00  487.04    4.22     -5.04     -0.46
  6    50.2     490.00  487.17    4.21      2.83      0.26
  7    35.4     513.00  506.41    6.95      6.59      0.70
  8    52.2     464.00  484.56    4.48    -20.56     -1.91


Predicted Values for New Observations

New
Obs     Fit  SE Fit       95% CI            95% PI
  1  494.84    4.46  (483.92, 505.76)  (464.28, 525.39)
  2  499.65    5.30  (486.69, 512.61)  (468.31, 530.99)
  3  462.72    9.97  (438.34, 487.10)  (425.18, 500.25)
  4  495.62    4.57  (484.44, 506.80)  (464.97, 526.27)
  5  487.04    4.22  (476.70, 497.37)  (456.69, 517.39)
  6  487.17    4.21  (476.86, 497.48)  (456.82, 517.51)
  7  506.41    6.95  (489.41, 523.41)  (473.19, 539.63)
  8  484.56    4.48  (473.61, 495.52)  (454.00, 515.13)


Values of Predictors for New Observations

New
Obs  Weight
  1    44.3
  2    40.6
  3    69.0
  4    43.7
  5    50.3
```

```
6    50.2
7    35.4
8    52.2
```

Data Display

Row	Weight	BloodLoss	COOK1
1	44.3	503	0.04923
2	40.6	490	0.11196
3	69.0	471	2.52679
4	43.7	505	0.06933
5	50.3	482	0.01619
6	50.2	490	0.00510
7	35.4	513	0.13612
8	52.2	464	0.31487