THE UNIVERSITY COLLEGE OF THE CARIBOO

COMPUTING 100

Assignment 2 – ***Numeric Processing***

Due Date: Monday, March 31, 2003 (by 5:00 PM)
(Team Project)

Introduction

Unlike most application programs that have very specific uses (word-processors, graph/charting programs, and web browsers), *electronic spreadsheets* are the "Swiss Army knives" of the computing field. From accounting to zoology, these programs can manipulate data from any source for almost any purpose.

In the four (4) parts below, you will consider a diverse collection of data, from the sciences (physics and chemistry) to mathematics (graphing equations and statistics). Each part is separate and independent of the others, so it does not matter in which order you complete them.

Conclusion (Submission)

As an individual, or team of two (2), compile the necessary prints from the parts below (see the particular requirements of each).

Attach all to a *proper title page* and a *table of contents* (manually prepared, of course) that describes the accompanying documents (if necessary, number each pages by hand.

Submit the completed assignment on or before the due date.

Part 1 – Statistics

Enter the data set below into a new worksheet. Format the worksheet along with labels for: author(s), date, a title for the worksheet, and necessary titles.

For the worksheet, you must,

use proper formulas to calculate the *minimum, maximum, average,* and *standard. deviation* of the Age of Subject and Gummi Bears Eaten

prepare an *XY-scatter* chart with titles for the *X-axis, Y-axis,* and *main title* (a legend is necessary for the trend line); add the chart as a new sheet

add a *trend line* (Chart->Add Trend Line); try a few different regression fits, but the best is probably linear; also, include a text box on the chart stating any observations of the data

Print: The completed and formatted worksheet, and the formatted chart

The data set:

Age of Subject	Gummi Bears Eaten
72	1
65	2
45	4
27	9
23	11
35	10
12	23
5	4.5
19	18
10	22
22	8

Part 2 – Physics

Enter the data set below into a new worksheet. Format the worksheet along with placing labels below the table for: author(s), date, a title for the worksheet, and necessary titles.

For the worksheet, you must,

- complete the formulas in cell **[C7]** to calculate the new weight of the person on Mercury based on the "relative gravity" (ratio) in cell **[B7]** and the person's standard mass in cell **[C4]**; copy the formula down for the rest of the planets
  - hint: either name the cell [C4], or use absolute referencing
- calculate the *minimum* and *maximum* new weights
- use the **=IF( )** function in a formula for cell **[D7]** to display if a new weight is "Less" or "More" than the weight on Earth (cell **[C4]**); for cell **[D9]**, simply enter the label "Equal."

Print: The completed and formatted worksheet, with an additional print of showing cell formulas

The original worksheet,

	A	B	C	D
1				
2	**Gravity on the Planets**			
3				
4	What is your Weight on Earth?			
5				
6	***Planet***	***Ratio***	***New Weight***	***Less or More***
7	Mercury	0.378		
8	Venus	0.906		
9	Earth	1.000		
10	Moon	0.166		
11	Mars	0.379		
12	Jupiter	2.533		
13	Saturn	1.006		
14	Uranus	0.905		
15	Neptune	1.133		
16	Pluto	0.067		
17				
18		*Maximum:*		
19		*Minimum:*		

Part 3 – Graphing Equations

Though not the best tool for graphing equations (Maple, Mathematica, or MathCAD are much better), Excel can be used to generate very clean and understandable graphs of equations.

The only problem is, *every plotted point must be calculated!*

From the **H:\COMP100** folder, open **c100OrigTrig.xls** and save it on your drive as **c100TrigChart.xls**

For this worksheet, you must,

- examine the formula in cell **[C5]**, determine how the absolute references ($) are used the "mathematical" formula is **f(x,y) = sin(x) + sin(y)**
- copy the formula from cell **[C5]** to the range **[C5:Z28]**

Each time a new formula is copied to the rest of the cells, the chart automatically changes to reflect the new values.

Print: Do not print the worksheet (it is too big), but graph and print each of the following formulas,

1) **f(x,y) = sin(x)+cos(y)**, 2) **f(x,y) = sin(x)*cos(y)**, 3) and a formula you create

Do not forget to the change the title of the chart before printing, according to the equation it represents (3 charts).

Part 4 – Chemistry: Charting an Acid-Base Titration Trial

One of the standard, and sometimes tedious, activities for chemistry students is a *titration*. Although a spreadsheet cannot eliminate the physical task, it can help in the concluding observations.

Into a new worksheet, enter the data from a titration of **Acetic Acid (CH_3C00H)** with **NaOH**.

Format the worksheet along with labels for: author(s), date, a title for the worksheet, and necessary titles.

From the worksheet,

- enter the data as a single table of 2-columns
- produce an *XY-scatter (with line)* chart of the data set (on a new sheet)
- label the chart: "Titraition Curve of NaOH with 25.00 ml of Acetic Acid (all values included)"
- using the mouse, manually determine the *NaOH equivalence point*, the point the solution goes from *acid* to *base* (the steepest part of the **S** curve). At this point, what is the pH of the solution and volume of NaOH? Include your observations with a textbox and a drawn arrow
- create another chart, with only the volumes 16.00 ml to 18.60 ml. Label the chart, "Titration Curve of NaOH with 25.00 ml of Acetic Acid (expanded titre & pH scale)". Again, approximate the equivalence point, and include a similar textbox with observations and a drawn arrow

Print: The completed and formatted worksheet, and the two (2) charts

The original data,

Vol. NaOH	pH	Vol. NaOH	PH	Vol. NaOH	pH
0.00	3.50	15.50	5.95	17.60	10.03
5.00	4.52	16.00	6.13	17.70	10.18
8.00	4.85	16.20	6.22	17.80	10.33
10.00	5.06	16.40	6.35	18.10	10.56
12.00	5.29	16.60	6.49	18.40	10.80
13.00	5.43	16.80	6.67	18.60	10.88
13.50	5.51	17.00	7.07	18.80	10.96
14.00	5.59	17.20	7.54	19.00	11.01
14.50	5.69	17.40	9.52	19.50	11.16
15.00	5.82	17.50	9.80	20.00	11.26