## 1. INTRODUCTION

The purpose of these computer lab exercises is to provide exposure to data analysis using a modern microcomputer system, including especially the use of graphics.

In the lab, you are provided access to a computer network containing the necessary programs, especially JMP IN, the student version of JMP from the SAS institute. JMP is one of the most versatile and easiest to use statistical programs and is widely used in academic, government and corporate settings. Although a number of features have been included in this package of programs that are beyond the scope of most introductory biostatistics courses, this package is easy to use and designed to introduce novice users to statistical analysis. The program is designed to emphasise the graphical and exploratory requirements of statistics.

The package of programs is entirely menu driven and runs in Windows and Macintosh environments. The program is installed on all the computers in the Biostatistics lab in room 4329, as well as on the computers in Zoolab, the undergraduate computer lab on the second floor of the Biosciences building. The program is relatively inexpensive and can be purchased in the Bookstore (check the computer system requirements before you hand over any money).

This manual will provide some instructions on working with JMP IN. The best way to learn the program, however, is to try different strategies yourselves. The computer won't blow up if you accidentally push the wrong key or make a bad menu selection, so don't hesitate to try out its capabilities. JMP IN is capable of much more than we require in Biology 300, but don't hesitate to explore when time allows.

**Using The Program In Class:  General Start-up Instructions**

Our computer network and server require passwords to allow you access. You will be assigned a **password** and **user id** during your first lab. The user-id will be valid for the duration of the course and will allow access to the network, the Internet, assorted applications and a home directory where you can store several megabytes of files. The password you will be given will be temporary. You should change it at once to protect you from hackers, etc. Follow the instructions you will be given in class to change your password using the telnet program. This is the only way that you can change your password. Write your password and id down in a secure location. You will need them for the rest of term to access the system.

To access the system, type your user-id and password into the windows networking dialog box that will be displayed on the screen of your computer. [If a further dialog box appears asking if you want to use this password for windows, hit cancel.] Once Windows has booted up, click on the **START** button in the bottom left corner of the screen.  Use the mouse to move to the **PROGRAMS** option, then to **JMP IN**.

**Data Entry and Editing**

Data must be put into the computer's memory before you can use any of the statistics programs. Data may be entered directly from the keyboard or it may be stored in a file from a previous session. When you first open JMP IN, you will see the JMPIN Starter, which will be on the File tab. Click "New Data Table" to begin. A window should open with a table labelled **Untitled 1**. The

table is currently blank, with 1 column and 0 rows. On the left of the table is a column with three bars labelled **Untitled 1**, **Columns**, and **Rows**.

To enter data you will need to add some rows. Clicking on the red "▼" symbol on the **Rows** bar in the left column, and selecting "Add Rows", is one way to do this. Another is to double-click directly on the chart at any point to add rows down to the cell in which you have moved the mouse cursor. Columns may be added to the table in a similar way. A small dot will appear in any new cell that you have created in this way. Rows may be deleted by holding down the first button on the mouse and dragging the mouse over the rows you wish to remove. Then let go of the first mouse button and press the second. Select "Delete Rows". Columns may be removed in the same way. Try adding some rows and columns to the table and then deleting them again. Editing values is as simple as selecting and changing them. Click any cell and replace the value by typing in a new one.

In general, each column on the screen represents a single variable. A variable is simply the trait of interest. Each cell on the screen represents a single data point.

**Problems**

1. Ten randomly chosen sections of a river showed the following number of spawning coho salmon: 22, 18, 40, 16, 12, 17, 23, 41, 29, 33.

   a) What is a "variable"? How many variables are in this data set?

   b) Enter these data and save them in a file named salmon.

   c) Change the third value to 19 and the eighth value to 27.

   d) Insert a value of 16 after the second record.

   e) Delete the fourth and fifth values.

   f) Add the following values to the data set: 17, 15, 11, 21, 23, 26. Your data set should now include the following values: 22, 18, 16, 12, 17, 23, 27, 29, 33, 17, 15, 11, 21, 23, 26.