Premedical course
Solution to MINITAB practical 1

Question 1.   The first illustration shows the MINITAB system after the data have been entered – the haemoglobins for males in column 1 and those for females in column 2 – and the **Help** menu has been invoked to find out how to produce stem-and-leaf plots. The windows have been arranged for maximum legibility; you should make a habit of this. (By using the 'print screen' key the screen may be copied to the notepad and pasted in to a word-processing document. Practicals should be written up in this way, though not necessarily as extensively as is done here.)

Although the exact form of the stem-leaf plot may be controlled by the user, we have only used the defaults (which are satisfactory in this instance) and the output to the **Session** window is shown in the next illustration. The column of figures to the left of the graph contains a cumulative count of the observations from either end of the distribution. The number in parentheses is the frequency count for the interval containing the median. We may easily read the male median as 16.4 and the female median as 13.9 mg/100ml. Notice that names have been given to the variables in the **Data** window to make the output more understandable. Make sure that you can do this.

```
MINITAB - Untitled Worksheet
File  Edit  Manip  Calc  Stat  Window  Graph  Editor  Help

Session
MTB > Stem-and-Leaf  'males' 'females'

Stem-and-leaf of males      N  = 36
Leaf Unit = 0.10

      2    14 59
      3    15 1
      9    15 778889
   (10)    16 0002334444
     17    16 555667779
      8    17 1134
      4    17 59
      2    18 12


Stem-and-leaf of females    N  = 35
Leaf Unit = 0.10

      1    11 3
      1    11
      1    12
      3    12 79
      7    13 0444
   (11)    13 56677777999
     17    14 00022224
      9    14 55678
      4    15 03
      2    15 9
```

	C1	C2	C3
→	males	females	
1	15.7	14.2	
2	15.1	14.0	
3	16.7	13.7	
4	16.3	16.0	
5	16.0	14.5	
6	16.5	13.7	
7	16.0	13.6	
8	16.4	13.6	
9	16.0	13.9	
10	18.1	14.2	
11	16.5	14.8	
12	15.8	14.2	
13	16.7	14.5	
14	16.3	12.9	
15	17.1	12.7	
16	16.6	14.6	
17	17.3	15.3	
18	16.6	13.4	

The next illustration shows how the **Help** system is invoked to enquire about basic statistics.


```
MINITAB - Untitled Worksheet
File  Edit  Manip  Calc  Stat  Window  Graph  Editor  Help

MINITAB
File  Edit  Bookmark  Help

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```
Search

Type a word, or select one from the list.       [ Close ]
Then choose Show Topics.
                                                [ Show Topics ]
Basic Statistics

Basic Statistics
Batch Minitab
BATCH session command
BBDESIGN session command
Bernoulli Distribution
Best Subsets

Select a topic, then choose Go To.              [ Go To ]

1-Sample t
1-Sample Z
2-Sample t
Basic Statistics
Correlation
Covariance
Descriptive Statistics
```
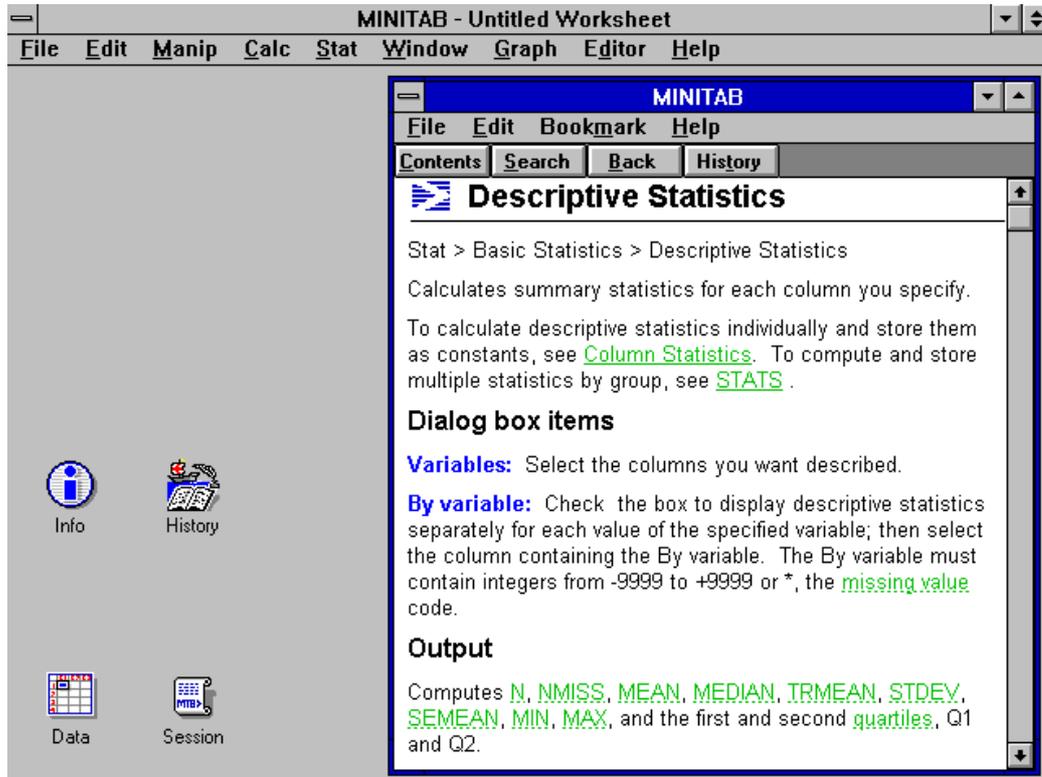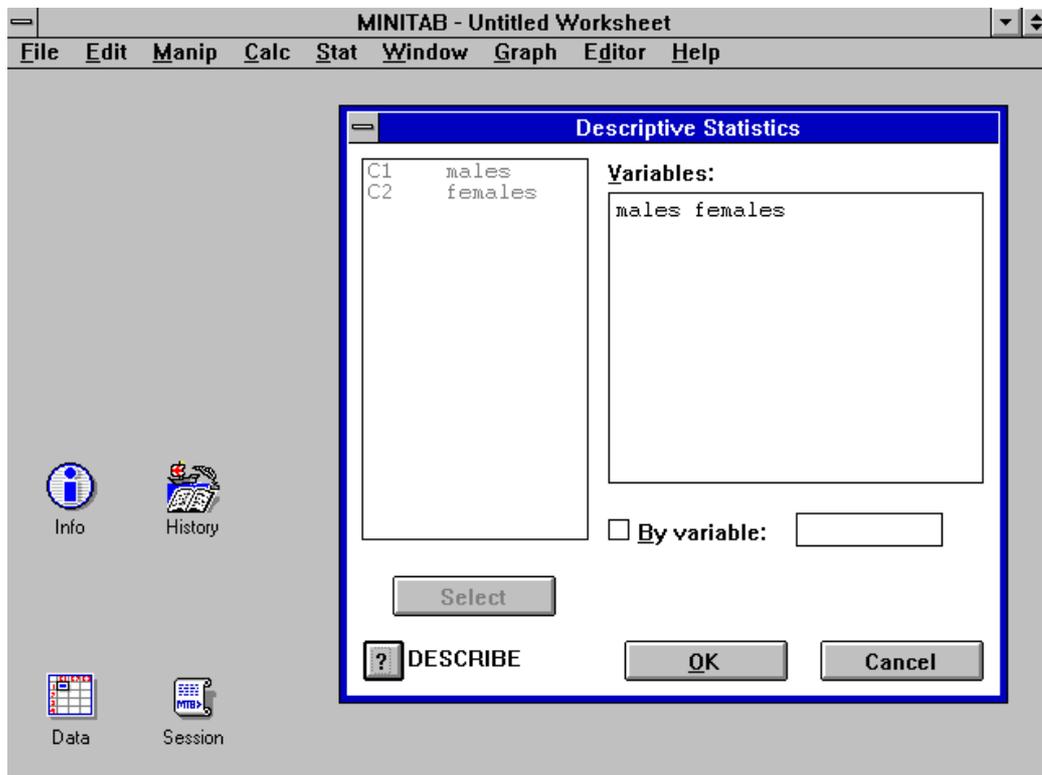
And this one shows the result. The other windows have been minimised (symbol at the top right) for convenience.

The following window is typical of one way of using MINITAB; sometimes it is easier to type the commands direcly into the **Session** window.

Here we see the command which has been produced, the route through the menus to produce it, and the output. When you write down the relevant numbers for the five-point summaries only use the appropriate number of decimals; here one is enough.

```
MINITAB - Untitled Worksheet
File   Edit   Manip   Calc   Stat   Window   Graph   Editor   Help
                        √ Fit Intercept
                        Basic Statistics      Descriptive Statistics...
                        Regression
                        ANOVA                 1-Sample Z...
                        DOE                   1-Sample t...
                        Control Charts        2-Sample t...
                        SPC
                        Multivariate          Correlation...
                        Time Series    ▶      Covariance...
                        Tables         ▶
                        Nonparametrics ▶
                        EDA            ▶
```

```
                              Session

MTB > Describe 'males' 'females'.

                    N      MEAN    MEDIAN    TRMEAN     STDEV    SEMEAN
males              36    16.442    16.400    16.444     0.817     0.136
females            35    13.986    13.900    13.987     0.873     0.148


                  MIN       MAX        Q1        Q3
males          14.500    18.200    15.925    16.850
females        11.300    16.000    13.600    14.500

MTB > |
```

```
MINITAB - Untitled Worksheet
File   Edit   Manip   Calc   Stat   Window   Graph   Editor   Help

Boxplot 'males' 'females';        Boxplot 'males' 'females';
```

Info   History

```
                              Session

MTB > Boxplot 'males' 'females';
SUBC>    Box;
SUBC>    Symbol;
SUBC>       Outlier.
MTB >
```

Data

By arranging the windows you can compare male and female boxplots, but it is preferable if they both use the same scale. To achieve this you must put all of the haemoglobins in one column and indicate in another to which group (male or female) they belong. In general this will be a better way to store data. You should make sure that you can use the **Manip** and **Calc** menus to do this. Sometimes it may also be convenient to select data items using the mouse and copy them to other parts of the spreadsheet.

It is essential to be able to label the graphs so that anyone may subsequently know what they represent; here the identification of the sexes has been added as a footnote.
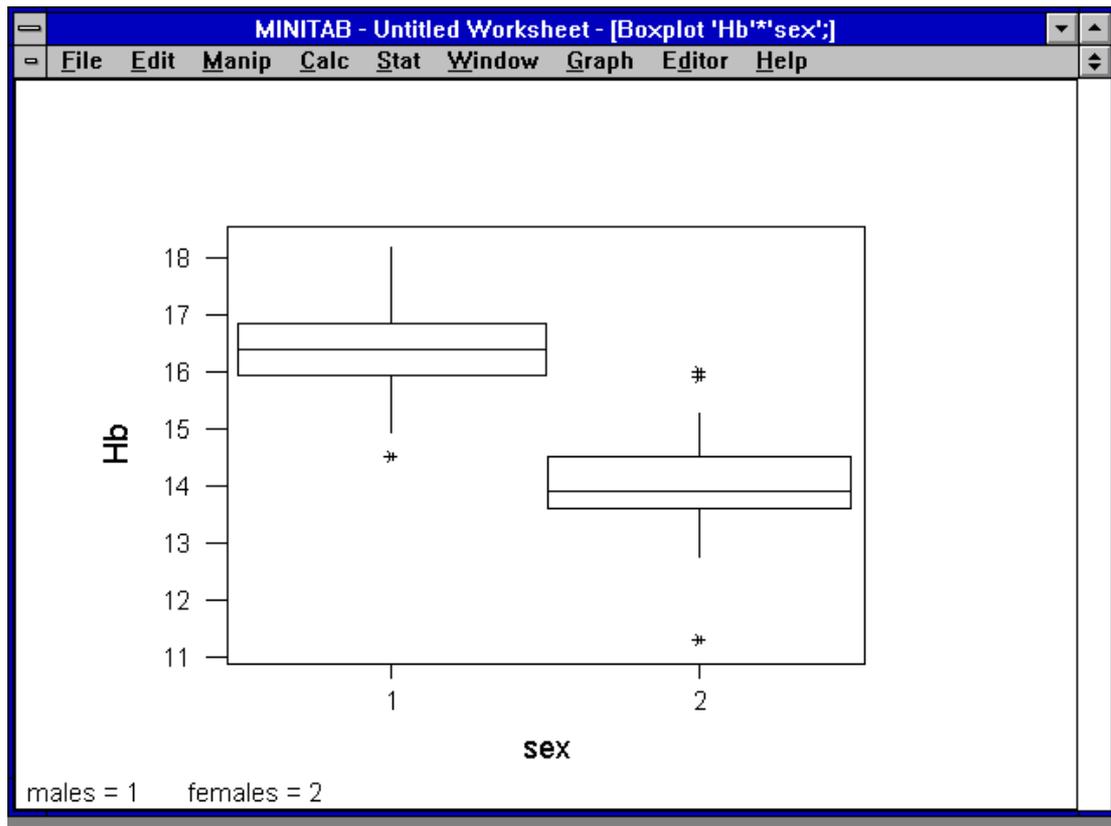
You should look at the **?** button on the boxplot menu so that you are sure what the "whiskers" represent. The values are Q1-1.5(Q3-Q1) and Q3+1.5(Q3-Q1). For a Normal distribution these are equivalent to the mean ± 2.7 standard deviations.