9.1 DATA INPUT AND OUTPUT

In high level BASIC, data may be input to a program using the interactive INPUT statement. For example:

10 INPUT "NUMBER OF NODE POINTS = "; N

The semi-colon before the variable ‘N’ causes the cursor to stay on the same line that the text between the quotation marks will be printed on. This helps to keep the input tidy and ‘user friendly’. Execution of the above statement will produce the following response on the monitor:

NUMBER OF NODE POINTS = ?

The cursor will then remain next to the question mark until such time that a numerical value for N has been entered and followed with a return/enter.

The same effect can be produced with the statements:

10 PRINT "NUMBER OF NODE POINTS = ";
20 INPUT N

An alternative procedure for data input is to use the non-interactive READ statement in conjunction with an appropriate DATA statement. For example:

10 READ N
   " " " "
   " " " "
   " " " "
120 DATA 24

Notice that the DATA statement can appear anywhere, but it is considered good practice to place all DATA statements just before the END of the program.
If the data has to be re-read at some point, then the RESTORE statement can be used to re-set the data pointer. On execution of a RESTORE statement, the next READ statement in the program will access the first item of data in the first DATA statement which appears in the program. For example:

```
10 READ A,B,C
20 RESTORE
30 READ D,E,F
40 DATA 25, 30, 60
50 PRINT A,B,C,D,E,F
RUN
    25  30  60  30  60
```

Any number of DATA statements can be used in a program. DATA statements may also be considered as one continuous list of items, irrespective of how many items are on the list. It should be remembered, however, that READ statements will always access the data in strict consecutive order.

Alpha-numeric data may be similarly handled. For example:

```
10 INPUT "ENTER TODAY'S DATE IN FORM (TUE/07/OCT/89) - "; A$
20 INPUT "ENTER TIME IN FORM (09:35 AM) - "; B$
30 INPUT " TEST NUMBER - "; TN
or non-interactively:
```

```
10 READ A$, B$, TN
    ------
    ------
    ------
90 DATA WED/02/FEB/89, 9:40 AM, 17
```

Output of data, to a monitor or a printer, is accomplished with the PRINT statement. For example:

```
10 X = 4.5
20 A = X + 2
30 B = X/3
40 C = X*X
50 PRINT X, A, B, C
RUN
    4.5  6.5  1.5  20.25
```

When the PRINT items are interspaced with commas, each numerical item is printed to the right-hand side of a field of characters. The default width of the field is ten characters. Alpha-numeric data is printed to the left-hand side of the ten character field.