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Pie Chart

A very effective way to display information is to use a pie chart. Most readers will already be very Mmiliar with this form of presentation. A circular area is divided into a number of segments or slices, just as you would divide a real pie when sharing it among the family. The slices of a pie chart are usually of different colours and each is named to show what it represents. Pie charts are the ideal way of representing sharing. Ifyou are shown a pie chart dealing with the expenditure of your local Council, for example, you can instantly see what share of it is spent on each of the various services. Many people find it hard to take in the meaning oftables offigures, but anyone can clearly see from a pie chart that the Council is spending a third of its budget on Education, for example, a quarter on Leisure Services, while it spends only a twentieth on street cleaning. We do not really want to know the exact figures - but just the way the money is shared . Then we can ascertain that each service is obtaining what we think is its fair share of the money.

Pie charts are useful in many other fields. Use them to display geographical, economic, demographic, or many other kinds of numeric data. tJse them to demonstrate information relating to sales, production and company finances. Use them to analyse your daily diet, showing what shares of it are made up by carbohydrates, fats, proteins and fibre.

Using the program

The program gives you the opportunity to save details of pie charts on tape, so that you can have one or more sets of them ready for a display or demonstration. The first question that the computer asks is 'Keying in new charts OR, loading from tape?'. If you are keying in newcharts, key'N' (for 'new'). If you are loading from tape, key 'T' (for 'tape') and

follow the instructions given in the next section but one, Loading from tape.

If you key ' N' you will then be asked ' How many charts?' Key in a number between 1 and 10, then press RETURN. You are now asked to key in the details of each of the charts, one chart at a time. You are first asked its name. Key in a name by which you can identify the chart later. Next, you are asked ' How many slices?' A pie cannot be cut into fewer than two slices, and in this program the greatest number of slices allowed is ten. If a chart has more than ten slices, many of the thinner ones are displayed rather poorly. In any event, a chart with lots of small slices is relatively difficult to interpret - one might just as well be looking at a table of figures. The essence of a pie chart is that it is boldly drawn with most of the slices fairly Iarge. If your data has more than ten headings, decide at this stage which items can be added together and displayed under one heading.

You will then be asked to key in the data for each slice. The two questions asked are ' Label?' and ' Value?' For the Label, key in the heading itself (Education, Protein, Exports, etc.). There is not much room on the display for the Labels, particularly if the chart is to have many slices. It is therefore better if Labels have only six or seven letters at the most. You can use shortened forms, such as ' Educ' , instead of longer words.

For the Value, it does not matter what units the values are expressed in, provided that all slices of the same chart have the same units. For example, if the figure for a slice is ' 12' and this represents twelve thousand pounds, then all figures entered for the other slices of that pie chart must represent thousands of pounds. Similarly, if the figure you enter for the protein in your diet is the number of grams you eat in a day, then all figures for that chart must be ' number of grams per day' . You cannot have different units in the same chart. For example, you cannot show in one chart the number of grams of food materials and the number of calories they contain.

If your data is available as percentages, you can enter these as values. In fact, the program converts all kinds of data into percentages when it is working out how to plot the charts. Any slices that occupy less than 1% of the pie are not displayed on the chart.

After you have keyed in all the Labels and Values for a chart, you are asked ' All OK?' If you have entered something wrongly, key ' N' and you can then enter everything again.

If you key ' Y' you key in the details of the next chart, repeating this process until details of all charts have been entered.

Viewing the charts

The screen then clears and the first chart is displayed. Its number and name appear at the top of the screen. The chart is plotted in the centre of the screen, in up to six colours. The program ensures that adjacent segments are always of different colour. As the plotting of each slice is completed, its Label and Value are displayed in a table below the chart. The Label and Value are displayed in the same colour as the slice, so that it is easy to relate the Label and Value to the appropriate slice. If there are more than six slices, some will have the same colours and their Labels and Values will have the same colour as some other Labels and Values. This is not a serious problem. The segments are drawn in clockwise order, starting at the top, and the Labels and Values are always displayed in order in two columns, so it is easy to see which label refers to which slice.

When the plotting is complete, the computer waits for you to examine the chart. When you have finished, press the space-bar, or any other key except ' M' or ' S'. The screen clears and the next chart is plotted. When all charts have been examined, pressing the spacebar (or other key, except ' M' or ' S') returns you to the first chart again. You can run round the whole set of charts as many times as you require.

Pressing ' M' or ' S' takes you to one of two other routines. ' M' stands for ' more'. This key takes you to a routine which allows you to add more charts. You will see the message ' How many charts?' . The number referred to is the total number of charts. If you have already keyed in three charts, for example, you will now be invited to increase that number to anything between four and ten. If you want to add just one more chart, making the total up to four, key ' 4'. You are then asked to enter details of the new chart or charts, in turn. The routine for this is exactly the same as before. After this is complete, the extended set of charts may be viewed, one after the other. As before, it may be repeated as many times as you wish.

If you want to save the charts to tape, key ' S' after viewing any chart. The first question is ' Filename?' Key in a name by which to identify the set of charts. Then press RETURN. The name should not have more than seven letters. If you key in more, only the first seven letters will be used. The message ' RECORD then RETURN' appears. You can now rewind or fast-forward the tape to its correct position, ready for saving the chart details. After this, press RECORD and

PLAY on the recorder, then press RETURN on the Electron. Saving takes only about half a minute, less if you have few charts. You are then asked if you wish for a backup copy. If so, key ' Y' and repeat the procedure described above. If not, key ' N' , and the program ends.

Loading from tape

If you already have chart details saved on tape and want to view these charts, or perhaps add other charts to the set, place the tape in the recorder. After you have keyed ' T' as described earlier, you are asked ' Filename?' . Type in the file name for the set of charts, then press RETURN. You can now rewind or fast-forward the tape to find the place where the file is recorded. Then press the PLAY button on the recorder. No ' Searching' message appears, but in a few tens of seconds, loading will be complete.

As soon as loading is finished, the screen clears and the first chart is automatically displayed. You can then view this and any other of the charts, add more charts to the set, if you wish, or save the extended set, as described in the section Viewing the charts, above.

Keying in

The variable in line 670 is PI, the Electron' s built-in variable having the value 3.14159265. Do not key ' P1' by mistake.

Program design

20-50   Initialising.
60-120   New charts or tape?
130   How many charts?
140-330   Collecting details of charts.
340-430   Calculating percentages for each slice of each chart.
440-540   Loading from tape.
550-770   Displaying a chart.
780-800   Getting key-press for next stage.
810-940   Saving to tape.
950-1000   PROCno to find out how many charts.
1010-1040   PRGcol to determine colour of each slice.

The program

```
   10 REM ** PIE CHART **
   20 MODE 4
   30 DIM VS(10,10),LS$(10,10),PS%(10,10
)
   40 DIM NA$(10),S%(10)
   50 SJ=1:P%=0:X=640:Y=850
   60 CLS:PRINT' TAB(15)"PIE CHART":PRIN
T TAB(15)"---------"
   70 REPEAT
   80 PRINT TAB(0,5)"Keying in new chart
s"
   90 PRINT'"OR, loading from tape? (N/T
) ";
  100 KEY$=GET$
  110 UNTIL KEY$="T" OR KEY$="N"
  120 IF KEY$="T" THEN 440
  130 PROCno
  140 J=SJ:REPEAT
  150 REPEAT
  160 CLS:PRINT'"PIE CHART NO.";J
  170 INPUT''"Chart name?  "NA$(J)
  180 REPEAT
  190 INPUT TAB(0,5) "How many slices? (
2-10)  "S$
  200 S%(J)=VAL(S$)
  210 UNTIL S%(J)>1 AND S%(J)<11
  220 FOR K=1 TO S%(J)
  230 INPUT TAB(0,K*2+6)"Label?  "LS$
  240 LS$(J,K)=LEFT$(LS$,6)
  250 REPEAT
  260 INPUT TAB(25,K*2+6)"Value?  "VS(J,
K)
  270 UNTIL VS(J,K)>0
  280 NEXT
  290 PRINT'' "ALL OK? (Y/N)";
  300 KEY$=GET$
  310 UNTIL KEY$="Y"
  320 J=J+1
  330 UNTIL J=P%+1
  340 FOR J=1 TO P%
  350 TV=0:MP%=0:TP%=0:PS%(J,0)=100
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```
   360 FOR K=1 TO S%(J):TV=TV+VS(J,K):NEX
T
   370 FOR K=1 TO S%(J):PS%(J,K)=INT(VS(J
,K)/TV*100+.5)
   380 TP%=TP%+PS%(J,K)
   390 IF PS%(J,K)>MP% THEN MP%=PS%(J,K):
M%=K
   400 NEXT
   410 PS%(J,M%)=PS%(J,M%)+100-TP%
   420 NEXT
   430 GOTO550
   440 REPEAT
   450 INPUT''"File name?  "NF$
   460 NF$=LEFT$(NF$,7)
   470 UNTIL NF$<>"PIE"
   480 Z=OPENIN NF$
   490 INPUT#Z,P%
   500 FOR J=1 TO P%
   510 INPUT#Z,NA$(J),S%(J)
   520 FOR K=1 TO S%(J):INPUT#Z,VS(J,K),P
S%(J,K),LS$(J,K):NEXT
   530 NEXT
   540 CLOSE#Z
   550 MODE 2
   560 J=1
   570 REPEAT
   580 CLS:IF J=P%+1 THEN J=1
   590 PRINT'"PIE CHART NO.";J;": ":PRINT
 NA$(J)
   600 VDU 31,0,27
   610 A=0
   620 FOR K=1 TO S%(J)
   630 IFPS%(J,K)=0 THEN PROCcol:GOTO 730
   640 FOR L=1 TO PS%(J,K)
   650 MOVE 640,550
   660 MOVE X,Y
   670 A=A+PI/50:NX=340*SIN(A)+640:NY=300
*COS(A)+550
   680 PROCcol
   690 GCOL 0,COL
   700 PLOT 85,NX,NY
   710 X=NX:Y=NY
   720 NEXT
   730 COLOUR COL
```

```
  740 XX=10*((K-1) MOD 2)
  750 PRINT TAB(XX)LS$(J,K);" "VS(J,K);
  760 NEXT
  770 J=J+1:COLOUR 7
  780 KEY$=GET$
  790 UNTIL KEY$="M" AND P%<10 OR KEY$="
S"
  800 IF KEY$="M" THEN MODE 4:PROCno:GOT
O140
  810 MODE 6
  820 INPUT''"File name?  "NF$
  830 NF$=LEFT$(NF$,7)
  840 Z=OPENOUT NF$
  850 PRINT#Z,P%
  860 FOR J=1 TO P%
  870 PRINT#Z,NA$(J),S%(J)
  880 FOR K=1 TO S%(J):PRINT#Z,VS(J,K),P
S%(J,K),LS$(J,K):NEXT
  890 NEXT
  900 CLOSE#Z
  910 INPUT''"Backup?  "A$
  920 IF A$="Y" THEN 840
  930 PRINT'"Pie Chart finished"
  940 END
  950 DEF PROCno
  960 REPEAT
  970 PRINT TAB(0,9)"How many charts? ("
;P%+1;:INPUT"-10)  "P$
  980 UNTIL VAL(P$)>P% AND VAL(P$)<11
  990 SJ=P%+1:P%=VAL(P$)
 1000 ENDPROC
 1010 DEF PROCcol
 1020 COL=(K MOD 6)+1
 1030 IF K=7 COL=5
 1040 ENDPROC
```