PstChart

Business charts in (LA)TEX + PostScript with PSTricks
User's Guide and Reference Manual

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August 5, 1998 — Version 0.22 Beta
Documentation revised August 5, 1998

Abstract: **PstChart** is a program to generate business charts (bar, line and pie) in (LA)TEX + PostScript with PSTricks. It creates the PSTricks code for direct insertion in a (LA)TEX document of the charts generated. It use small data files which describe the aspects, labels and values for the charts to realize, but you can have only a raw data file and use all the default options. And you can always modify the generated PSTricks code for more personal and sophisticated result. You can use this script without knowledge of PostScript (nor of PSTricks if you don't want specific results).

The main goals of **PstChart** are **power**, **flexibility**, **quality**, **ease of use** and ability to generate results **automatically** from data files generated themselves automatically by other scripts from databases, accounting reports, etc.

For examples of more sophisticated usage of **PstChart** and of it integration into other pieces of document, see the **PstChartDemos** associated file[1].

The **PstChart** Web page is on `http://www.tug.org/applications/PSTricks/PstChart`

1 Presentation

PstChart is a script (SHELL and AWK program) to generate business charts in (LA)TEX + PostScript with the splendid PSTricks package of Timothy VAN ZANDT `<tvz@Princeton.EDU>` ([van Zandt 94] — see also [Girou 94] and [LGC 97]. The PSTricks Web page is on `http://www.tug.org/applications/PSTricks`).

It realize hight quality, greatly customizable, grayscaled or colored[2] bar, line and pie charts in PostScript. The bars may be horizontal or vertical, in 2D or 3D. The lines may be filled or not, in 2D or 3D. The bar and lines may be stacked or not. The bar and lines (in fill mode) can be filled by set of lines, colors or arbitrary patterns. Several kinds of charts may be mixed inside the same graphics (for instance `vbar` and `hlines`, or `vlinesfill` and `vlines`, etc.) The axis of the values may be in `log` mode. The pie slices may be detached or not.

It creates the PSTricks code for direct insertion in a (LA)TEX document of the charts generated. It use small data files which describe the aspects, labels and values for the charts to realize, but you can have only a raw data file and use all the default options. And you can always modify the generated PSTricks code for more personal and sophisticated result. You can use this script without knowledge of PostScript (nor of PSTricks if you don't want specific results).

It exist few other tentatives to offer these kind of charts in the (LA)TEX world, but all that I know offer only few possibilities apart MetaGraph and are limited by the intrinsic limitations of (LA)TEX, because none use PostScript. Nevertheless, you can also consider the [bar], [fastpictex], [histogr], (Al)DraTEX [Gurari 94] or MetaGraph [Hobby 94, LGC 97] packages.

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[1] Available on the **PstChart** Web page. But you are encouraged to contribute with your own *real* examples to illustrate other aspects not already emphasized in my documents.

[2] This documentation is clearly color oriented. It'll be less beautiful if you can't see or print it in color...

It's clear that we can't have all the possibilities of huge products as the graphics modules included in some well-known commercial packages in the Mac or PC world, but, nevertheless, **PstChart** offer a lot of possibilities (including 3D pie, line and unidimentional bar charts) and generate very high quality results (see the examples below!)

Portability:

Portability is expected great, at least on Unix systems. But you must have the so-called *new* version of the `awk` program. Sometimes it's simply renamed to `awk`, other times it's called `nawk`. If you don't have it, you must install for instance `gawk` from GNU[3]. The script automatically search for `nawk` and `gawk` and try `awk` if it doesn't found one of them. But you can force the version used by exporting the environment variable `AWK` (for instance: `export AWK=awk`).

I test it on an RS 6000 under AIX 4.1.5, both with IBM `awk` and `gawk` 3.0.3.

I receive reports of installation on OS/2, MS/DOS (in this case with both `Shell` and `AWK` versions from GNU) and Windows NT systems (with the *Bash* shell).

For tests:

You can use the file `pstc-tol.tex` to perform a test in LaTeX mode, and the file `pstc-tot.tex` to perform a test in *plain* TeX mode, by using a command like:

```
pstchart.sh vbar 3d <file1.dat >chart.tmp ; latex pstc-tol
```

Remarks:

- It require the **PSTricks 97** distribution.
- The unit used is **centimeter**. But it's easy to change. For example, add the line `\psset{unit=2.54}` before to insert **PstChart** graphics if you want to have the unit in **inch**.
- Default dimensions are **5** units (with 1cm for default unit), in both directions. But don't forget that you can always **scale** a graphic with one of the scaling macro of PSTricks or `graphics` / `graphicx` packages.
- By default, minimum and maximum values are computed automatically.
- Default mode is LaTeX (use the PLAIN option if you want to generate a `plain` TeX code).
- For huge graphics, take care to the rather small memory of TeX (even with some so-called BigTeX). If you run out of memory and if you have several consecutive graphics, try first to specify explicitely the break pages (by `\clearpage` or `\newpage` commands). Otherwise TeX will analyse in the same event all the consecutive graphics to see if they will fit on the same page.
- Today, you are strongly encourage to use the standard `'color'` package of the graphics tool (available both for LaTeX and *plain* TeX) rather than the PSTricks color mechanism.
- The appearance of title, graduations, labels and legend will be better if you use some PostScript resident fonts, because by default all the text characters are scaled (you can avoid it).
- To draw pie charts of ellipse form, you must use the `'pst-addc'` extension package included in the **PstChart** distribution, which define some additional PSTricks macros required for this kind of charts.
- Yes! Today, it appear that it would be better to have a Perl script that this mixture of Shell and AWK. But I wrote the first version, with the major functionnalities, in spring/summer 1993, and Perl had not at this time the same status as today... Nevertheless, I plan to rewrite **PstChart** at the end of 1998...
- To report bugs, don't forget to put the word "`PstChart`" and the version number (you get it by the command: `pstchart.sh -V`) in the subject of the message).

Known problems: See the PROBLEMS file.

Changes: See the CHANGES file.

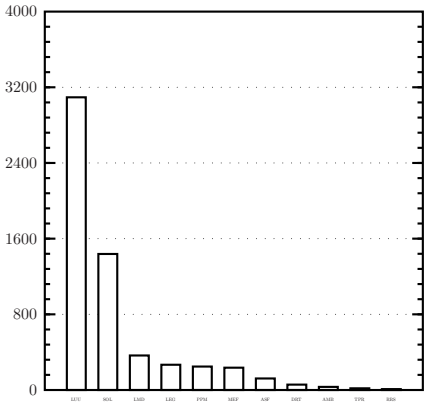
Copyright: See the COPYRIGHT file.

[3]The main server is `prep.ai.mit.edu` in the `/pub/gnu` directory.

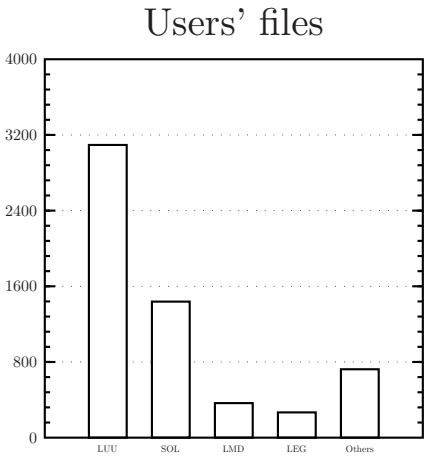
Send comments, suggestions and bug reports (with version number and the keyword "**PstChart**" in the subject of the message) to <Denis.Girou@idris.fr>

2 Examples

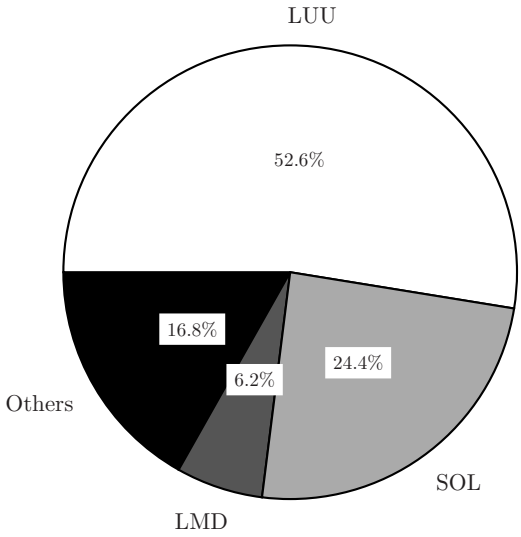
Here are a lot of examples to demonstrate the various possibilities...



Ex. 1: `pstchart.sh vbar <users.dat`

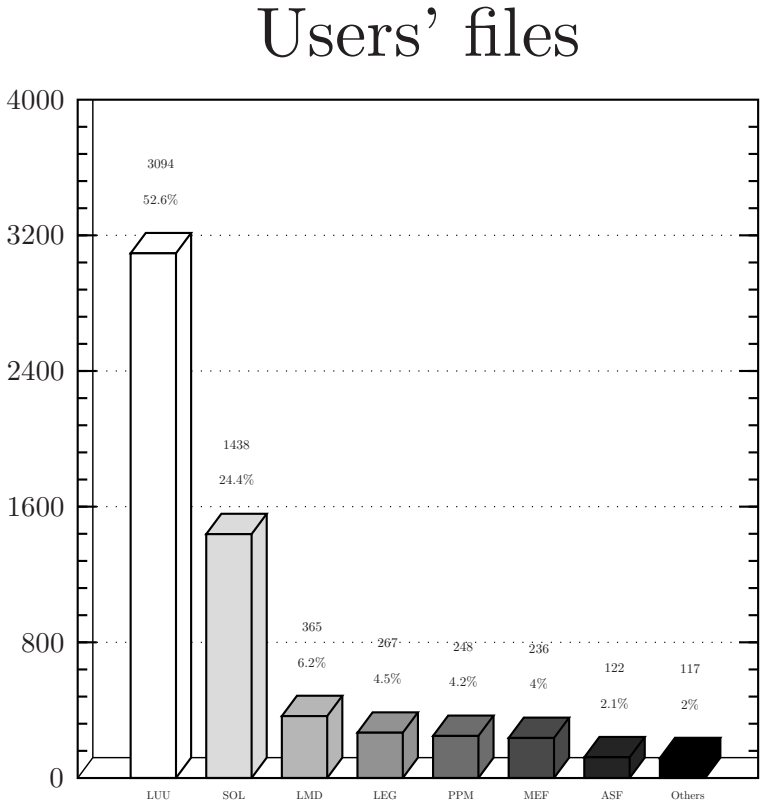


Ex. 2: `pstchart.sh vbar nb-values=5 title="Users' files" <users.dat`



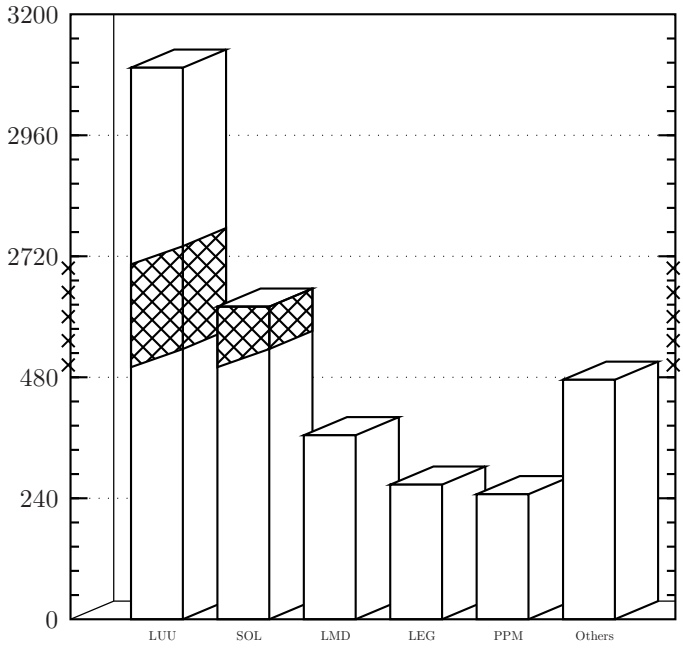
Ex. 3:

```
pstchart.sh pie dim=6 nb-values=4 print-percentages \
             grayscale=white-black data-change-colors center <users.dat
```



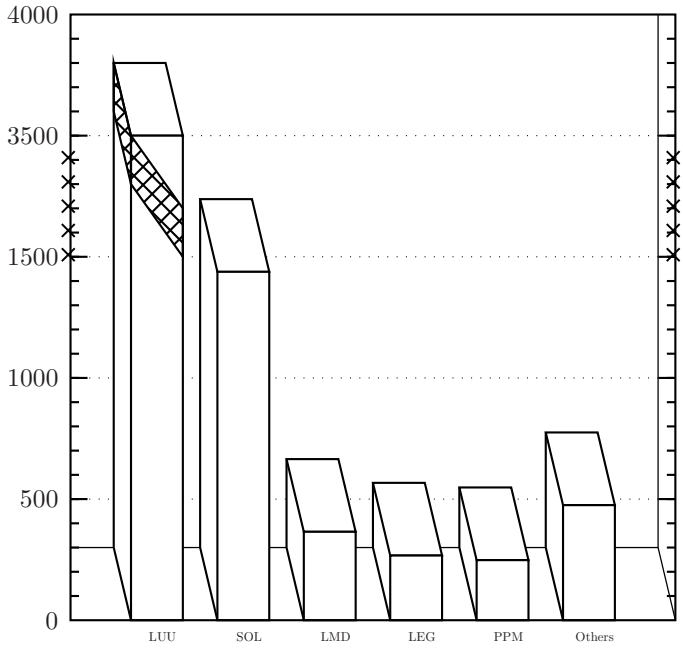
Ex. 4:

```
pstchart.sh vbar dim=9 3d nb-values=8 print-percentages print-values \
            grayscale=white-black data-change-colors title="Users' files" \
            center <users.dat
```



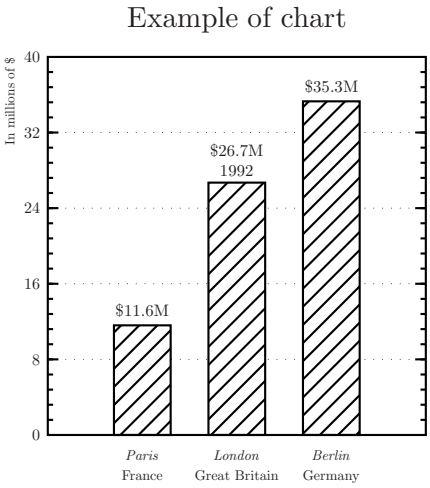
Ex. 5:

```
pstchart.sh vbar dim=8 3d coef-3d-x=2.5 nb-values=6 \
            max=3200 cut-min=500 cut-max=2500 <users.dat
```

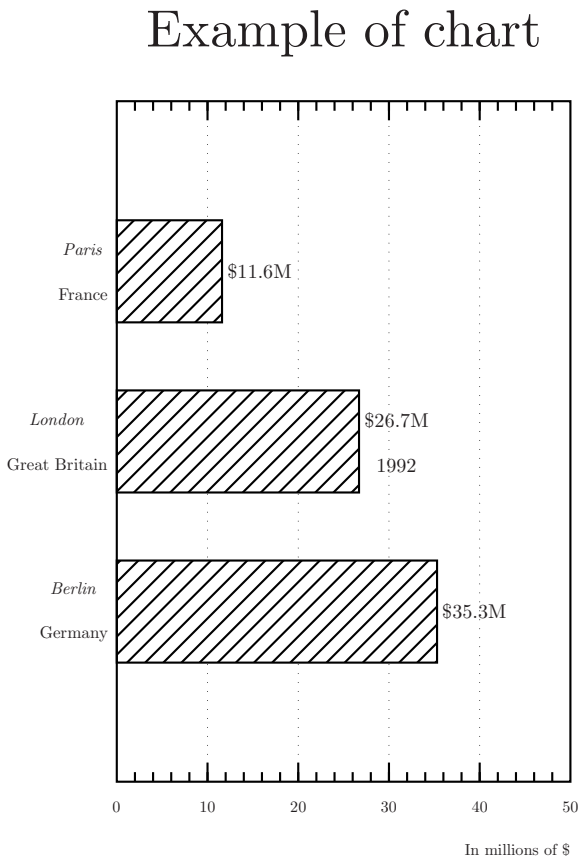


Ex. 6:

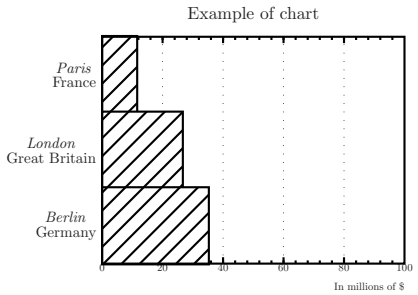
```
pstchart.sh vbar dim=8 3d coef-3d-x=-1 coef-3d-y=4 \
            nb-values=6 cut-min=1500 cut-max=3000 <users.dat
```



Ex. 7: `pstchart.sh vbar <file1.dat`

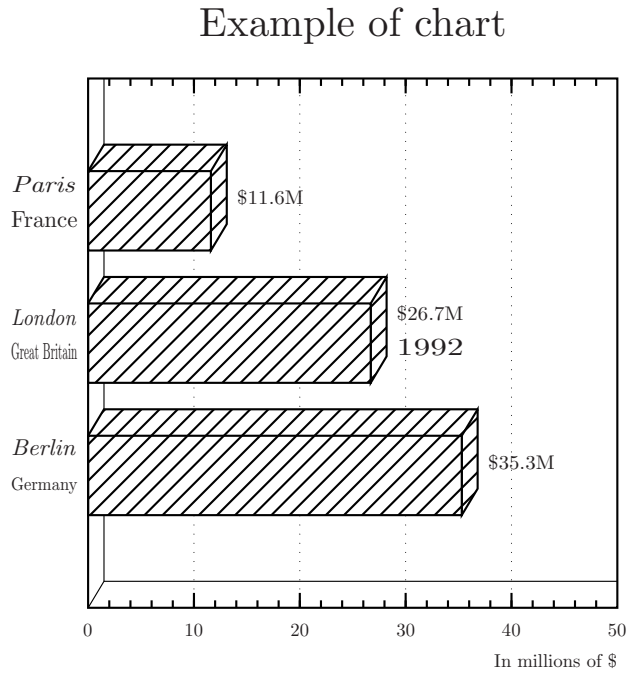


Ex. 8: `pstchart.sh hbar dim-x=6 dim-y=9 max=50 center <file1.dat`

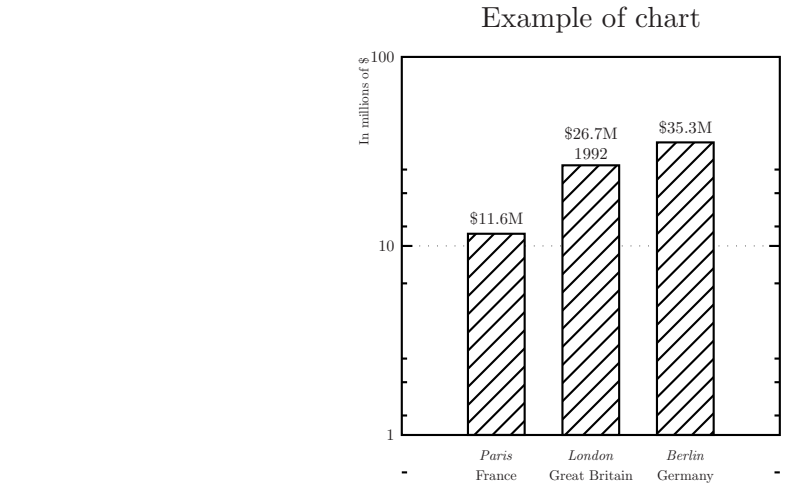


Ex. 9:

```
pstchart.sh hbar dim-x=4 dim-y=3 max=100 coef-bar-size=1.7 \
            data-gap=-0.5 no-print-top-labels <file1.dat
```



Ex. 10: `pstchart.sh hbar dim=7 max=50 3d center <file1bis.dat`



Ex. 11: `pstchart.sh vbar max=100 log nb-major-ticks=2 center <file1.dat`

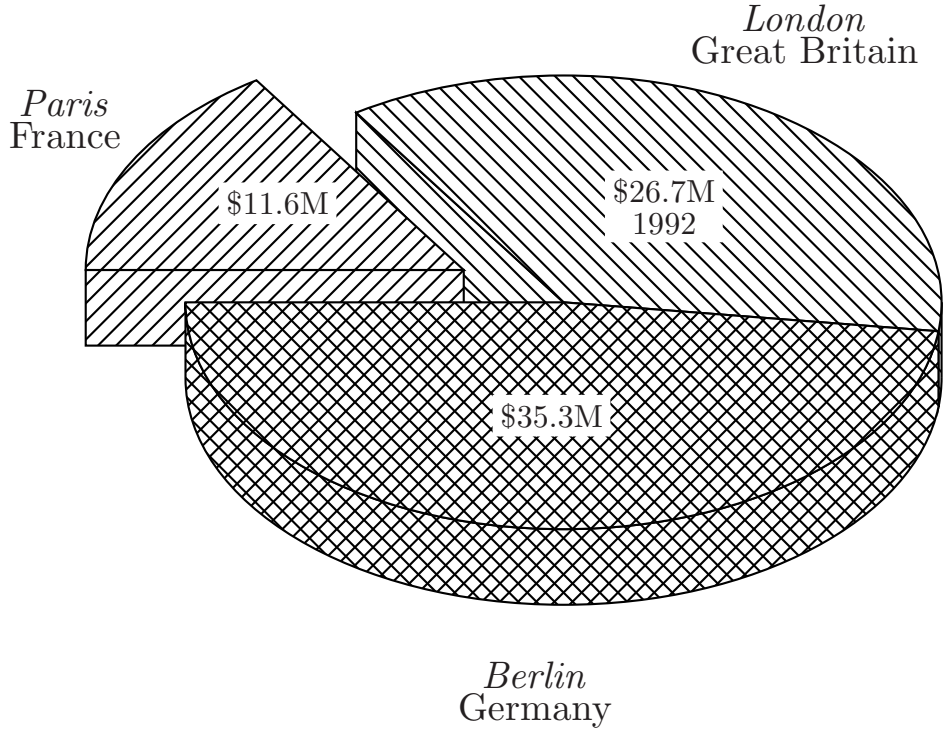
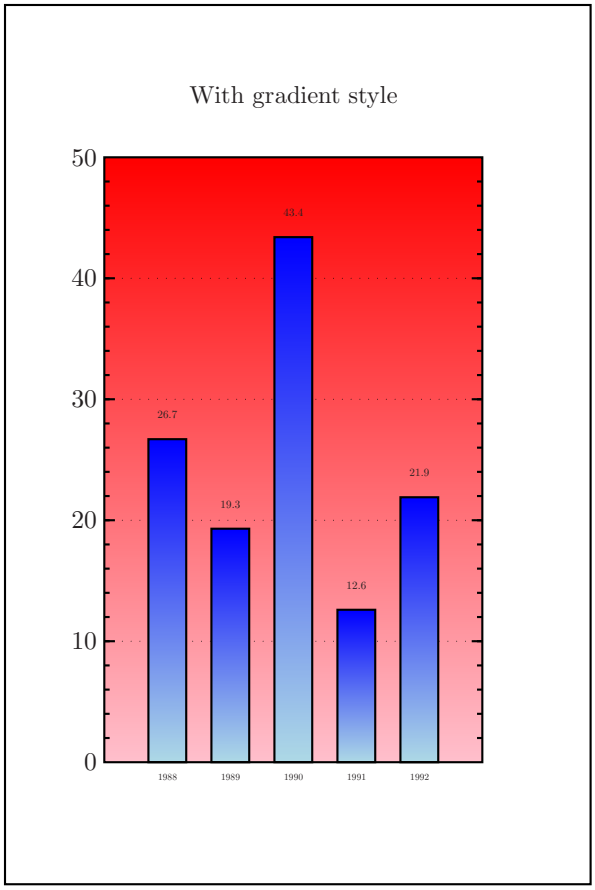


Figure 1: An example of chart

Ex. 12:

```
pstchart.sh pie 3d dim-x=10 dim-y=6 coef-vspace-bottom=5 center figure \
            <file1.dat
```



Ex. 13: `pstchart.sh vbar dim-y=8 print-values center boxit  <file2.dat`

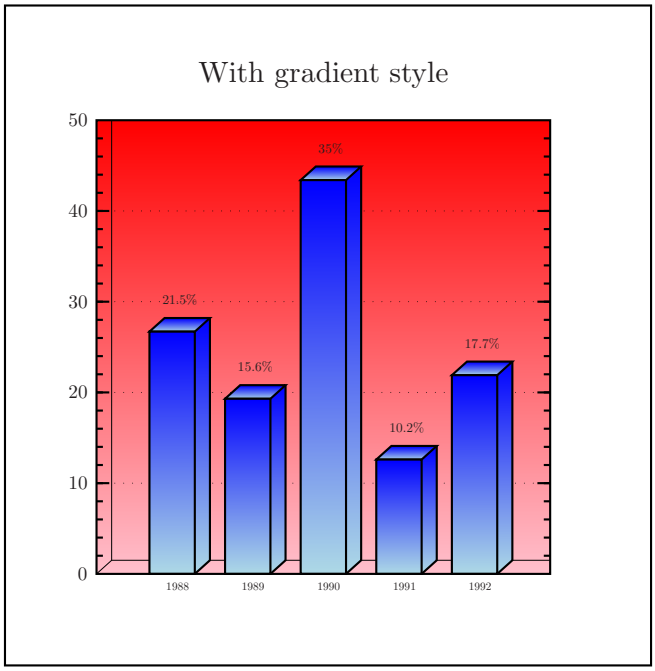


Figure 2: Another example

Ex. 14: `pstchart.sh vbar dim=6 3d print-percentages boxit center figure <file2.dat`

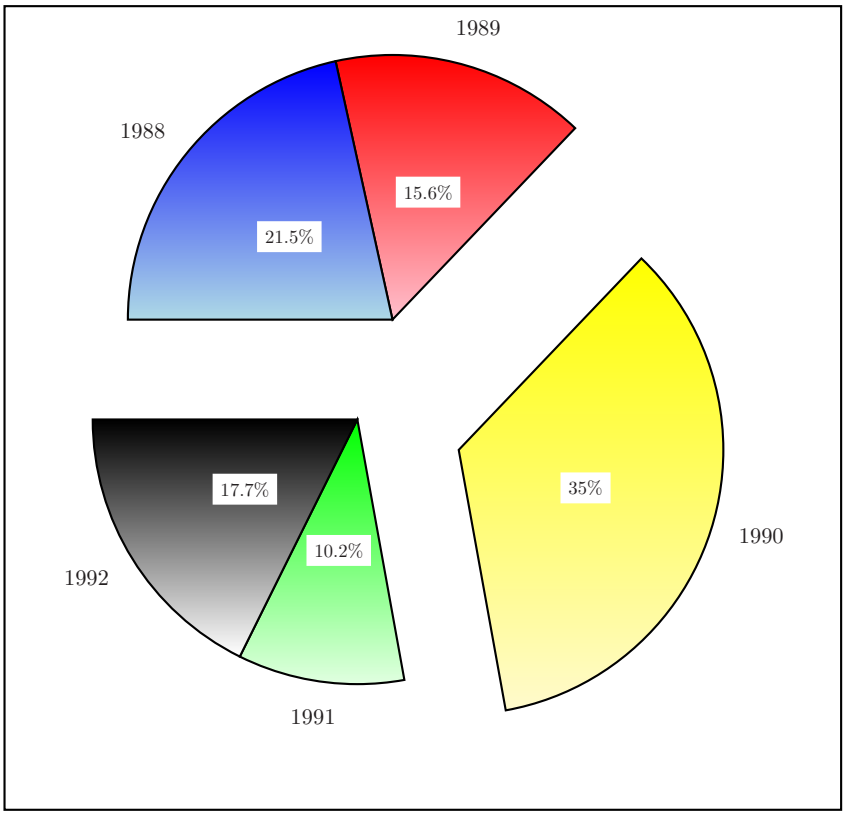
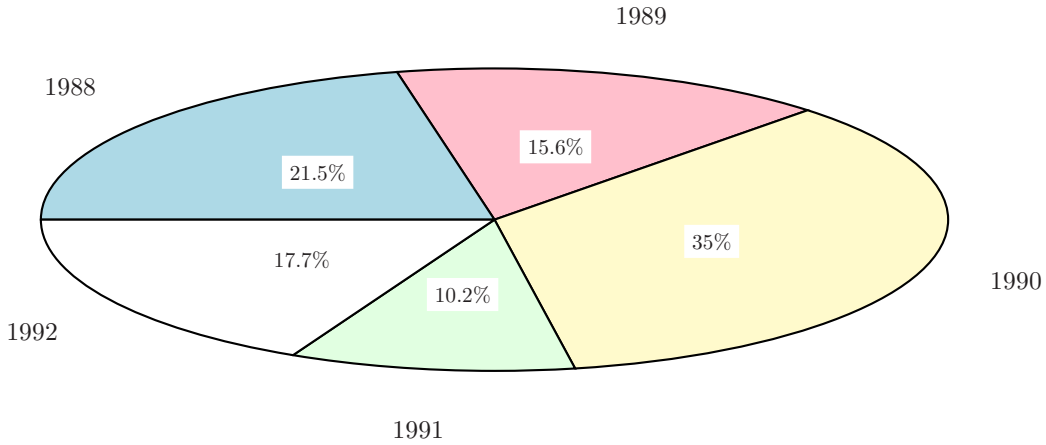


Figure 3: Another example

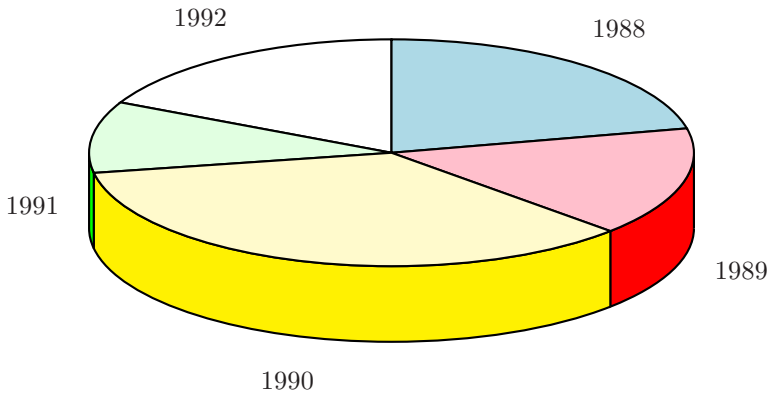
Ex. 15:

```
pstchart.sh pie dim=7 print-percentages coef-hspace-right=1.7 \
            boxit center figure <file2.dat
```



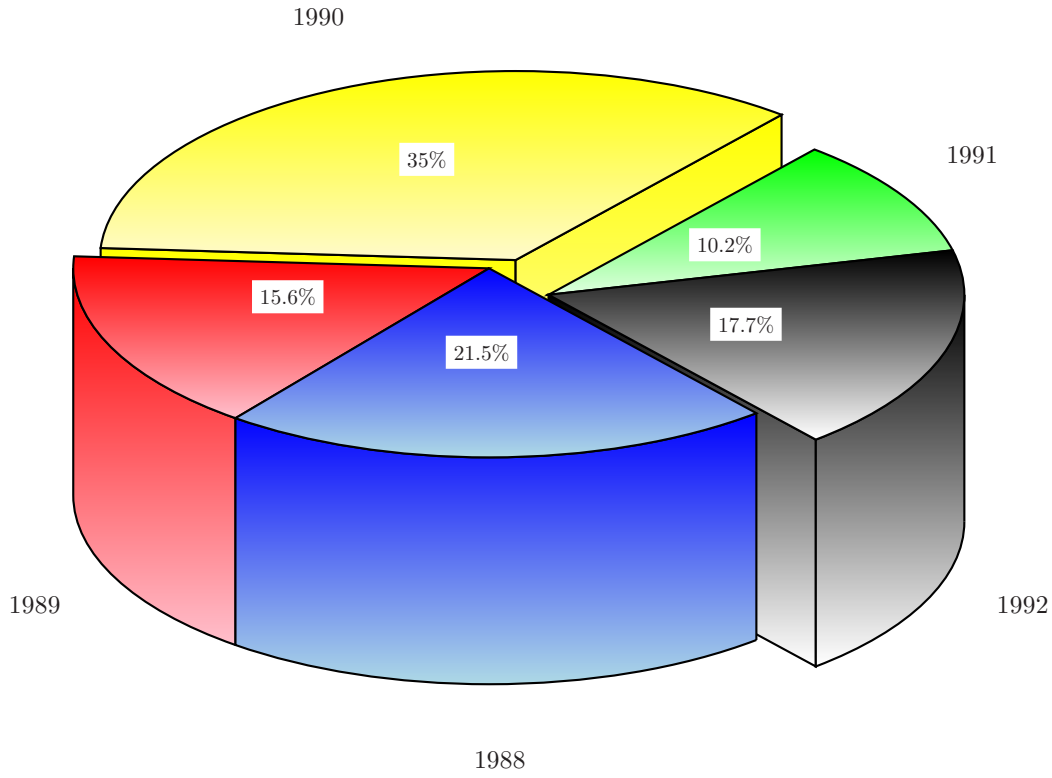
Ex. 16:

```
pstchart.sh pie dim-x=12 dim-y=4 no-gradient no-detached-slices \
            print-percentages center <file2.dat
```



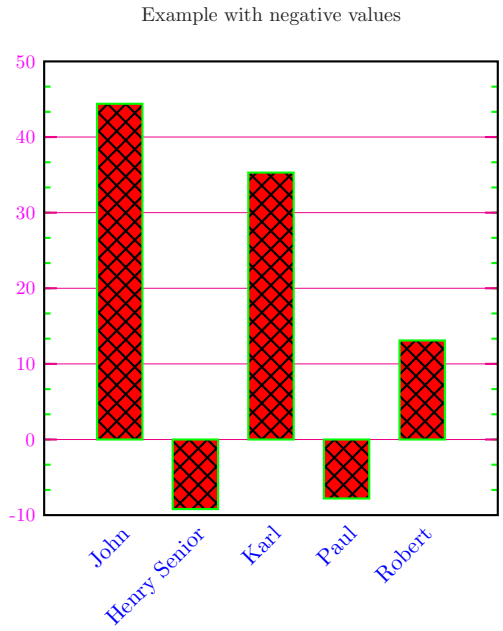
Ex. 17:

```
pstchart.sh pie 3d dim-x=8 dim-y=3 no-gradient no-detached-slices \
            pie-chart-start-position=90 coef-bottom-labels=1.5 center <file2.dat
```

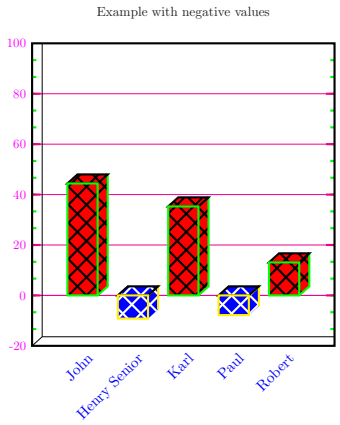


Ex. 18:

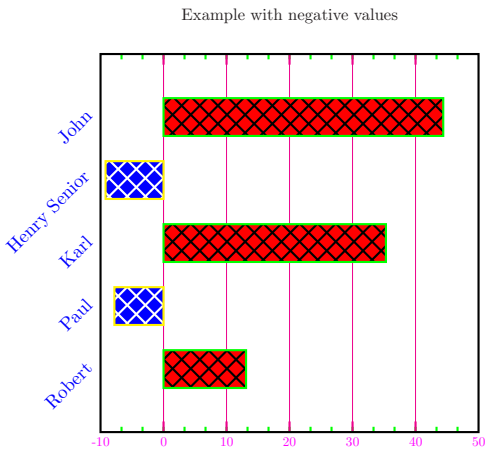
```
pstchart.sh pie 3d dim-x=11 dim-y=5 print-percentages \
            pie-chart-start-position=230 coef-height-pie-chart=3 center <file2.dat
```



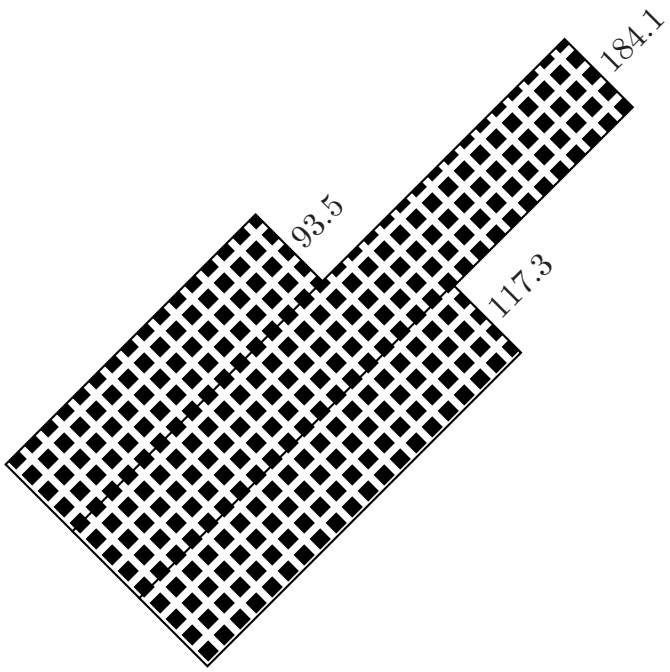
Ex. 19: `pstchart.sh vbar dim=6 <file3.dat`



Ex. 20: `pstchart.sh vbar dim=4 min=-20 max=100 3d data-change-colors <file3.dat`

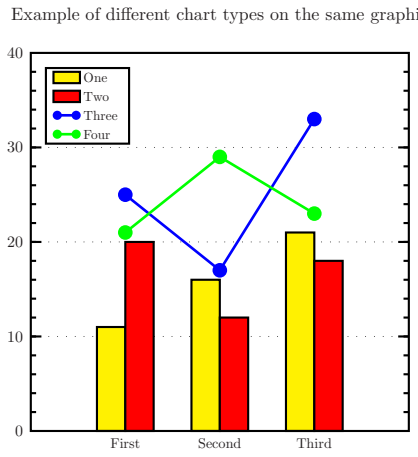


Ex. 21: `pstchart.sh hbar data-change-colors <file3.dat`

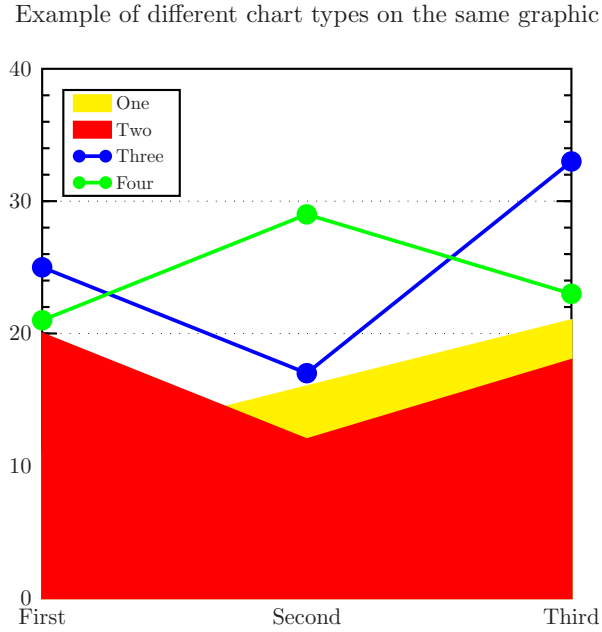


Ex. 22:

```
pstchart.sh hbar dim-x=10 coef-bar-size=1.7 frame=false no-ticks print-values \
            <file4.dat
```

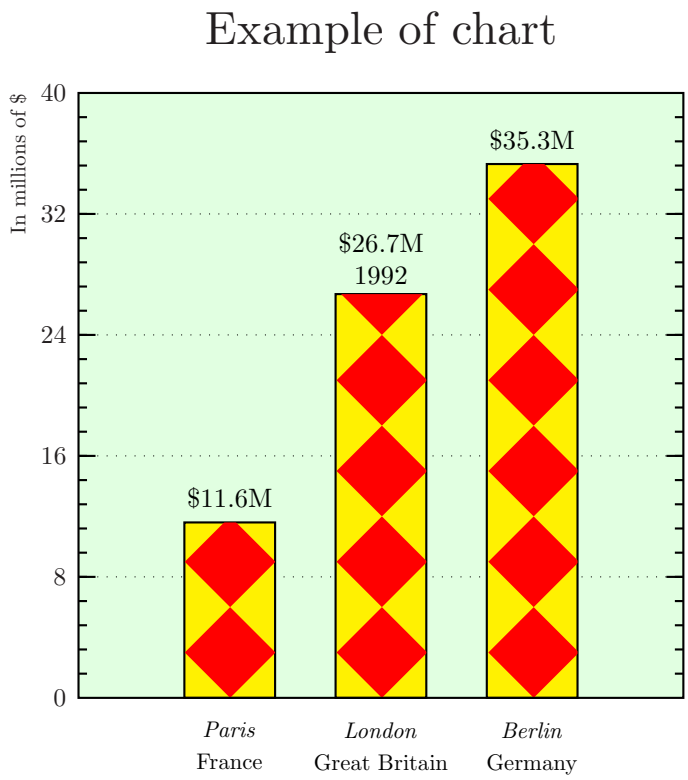


Ex. 23: `pstchart.sh vbar interval-major-ticks=10 <file5.dat`

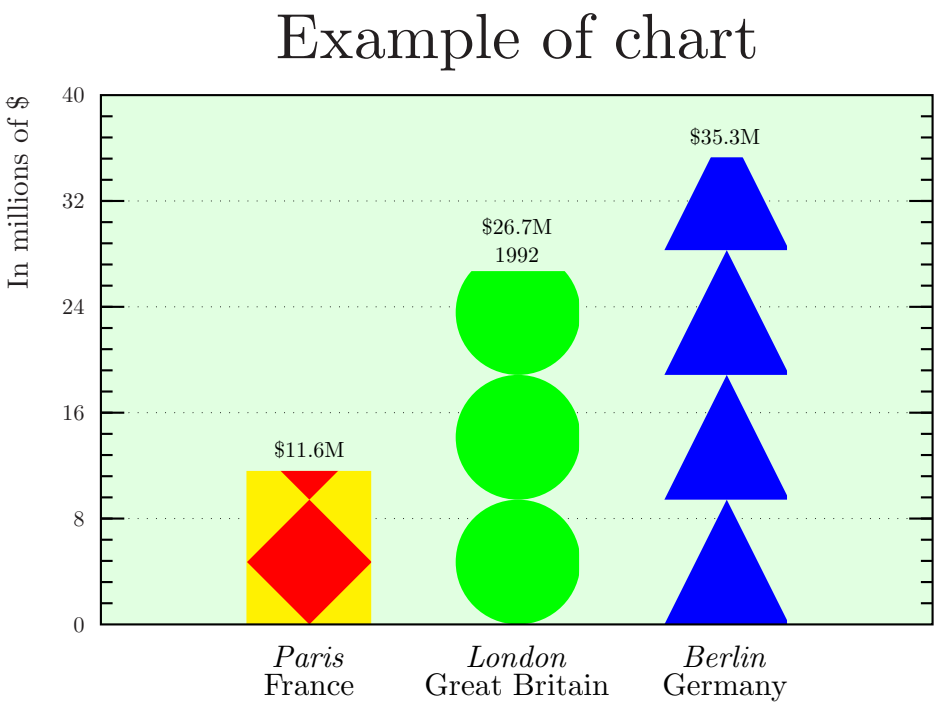


Ex. 24:

```
pstchart.sh hlinesfill dim=7 frame=first interval-major-ticks=10 center \
            <file5.dat
```

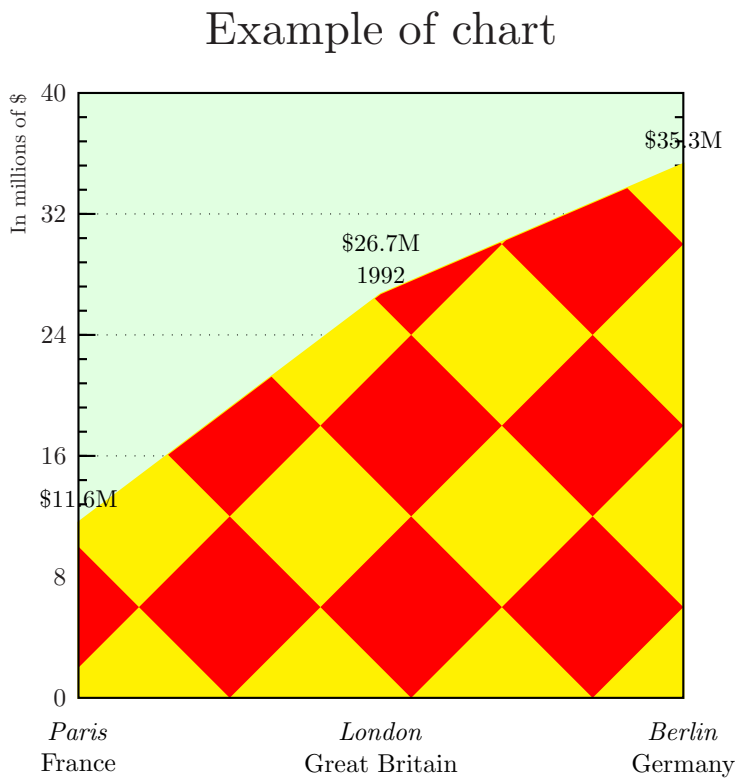


Ex. 25: `pstchart.sh vbar dim=8 <file6.dat`



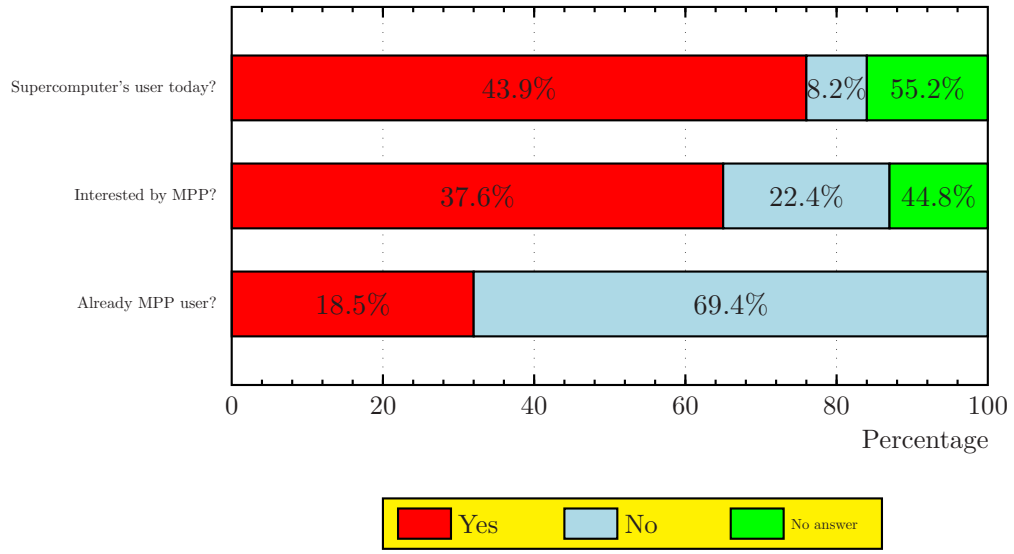
Ex. 26:

```
pstchart.sh vbar dim-x=11 dim-y=7 coef-linewidth=0 data-change-colors \
            coef-top-labels=0.6 <file6.dat
```



Ex. 27:

```
pstchart.sh hlinesfill dim=8 coef-linewidth=0 data-change-colors \
            coef-top-labels=0.8 <file6.dat
```



Ex. 28:

```
pstchart.sh hbar dim-x=10 print-percentages data-gap=-0.25 \
            stack coef-bottom-labels=0.5 center <quest.dat
```

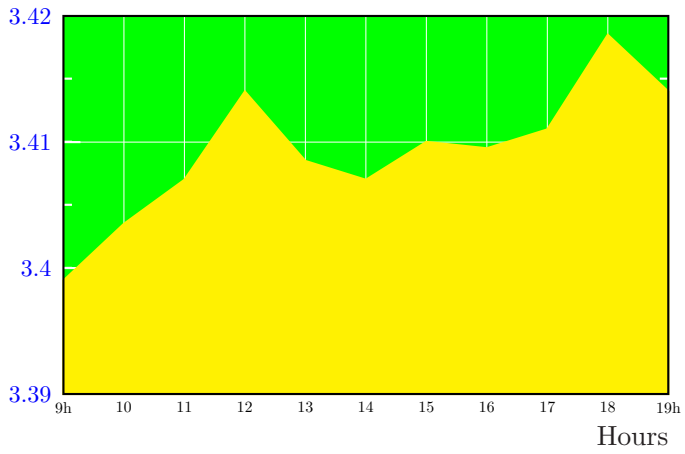


Figure 4: Rate of mark for one french franc the 07/12/93

Ex. 29:

```
pstchart.sh hlinesfill dim-x=8 min=3.39 max=3.42 interval-major-ticks=0.01 \
            coef-bottom-labels=2 center figure <mark.dat
```

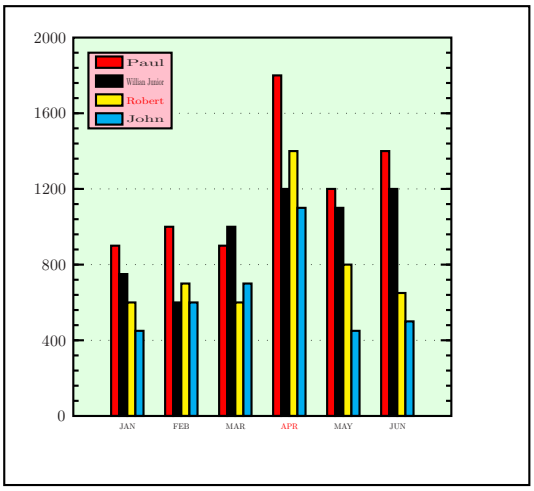


Figure 5: Multi sets example

Ex. 30: `pstchart.sh vbar boxit center figure <multsets.dat`

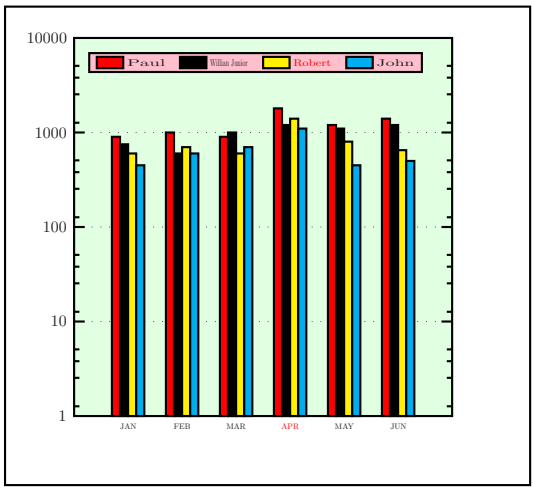
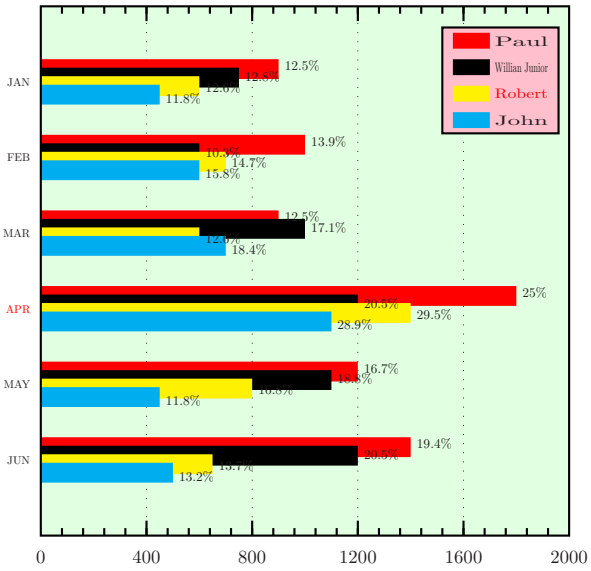


Figure 6: Multi sets example

Ex. 31:

```
pstchart.sh vbar max=10000 log legend-nb-horiz=4 nb-major-ticks=4 \
            boxit figure <multsets.dat
```



Ex. 32:

```
pstchart.sh hbar dim=7 coef-linewidth=0 print-percentages \
            coef-bar-overlay=0.25 <multsets.dat
```

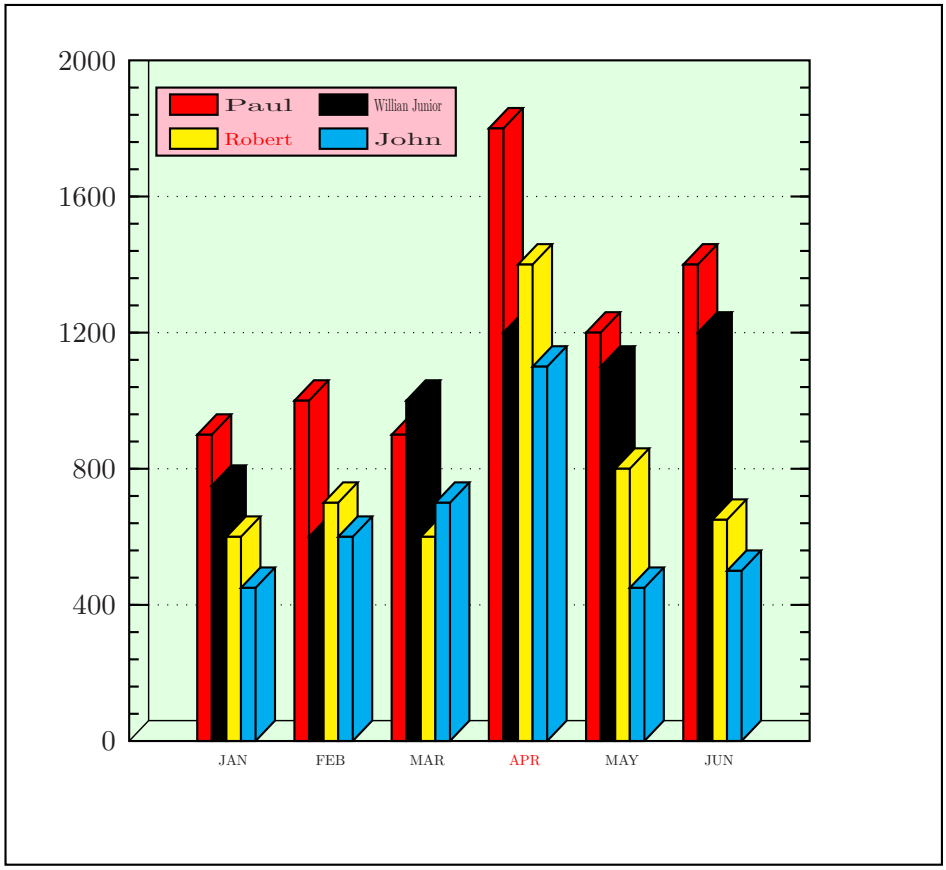
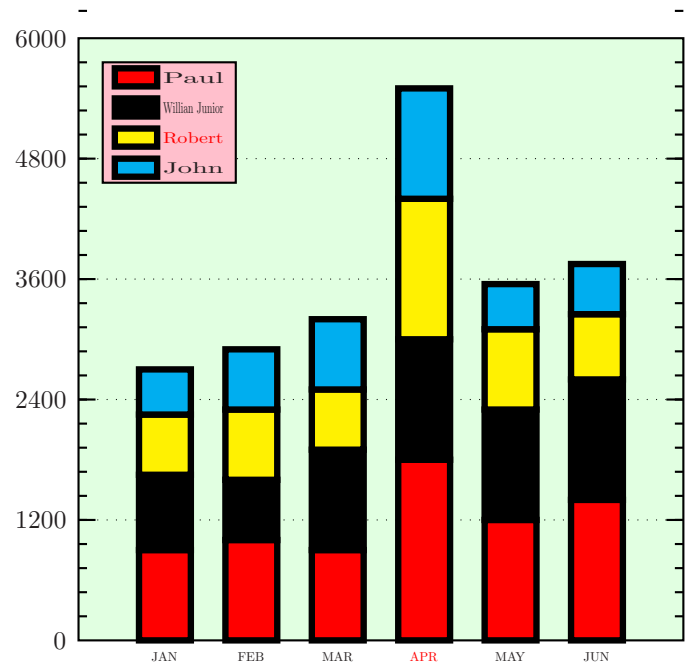
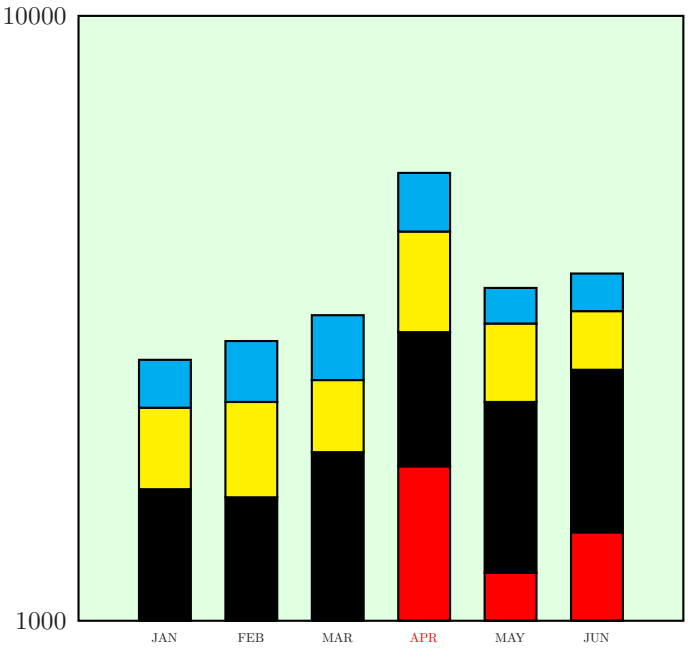


Figure 7: Multi sets example

Ex. 33: `pstchart.sh vbar dim=9 3d legend-nb-horiz=2 boxit center figure <multsets.dat`

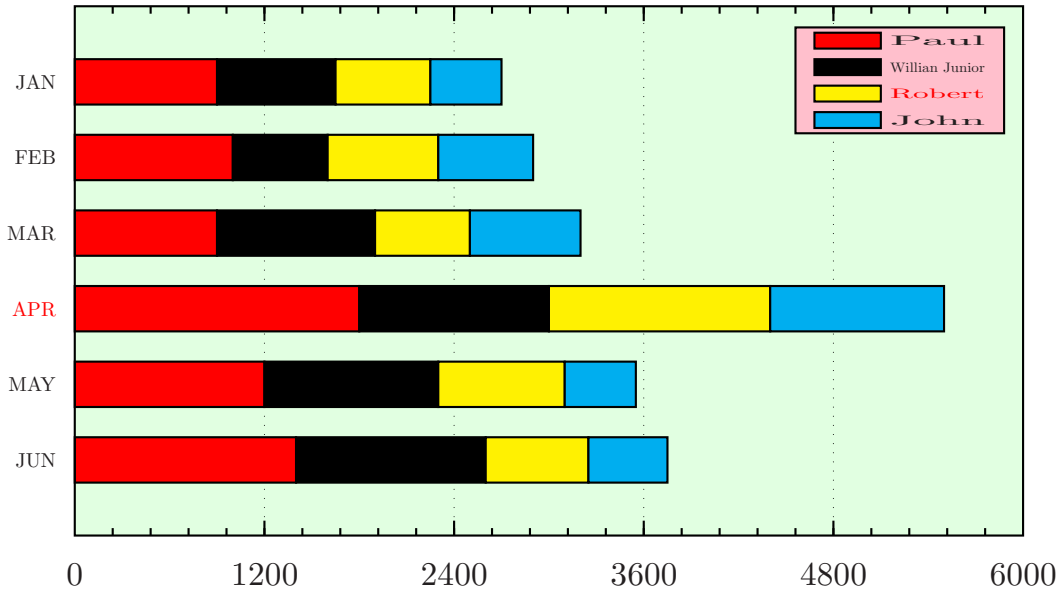


Ex. 34: `pstchart.sh vbar dim=8 coef-linewidth=3 stack <multsets.dat`

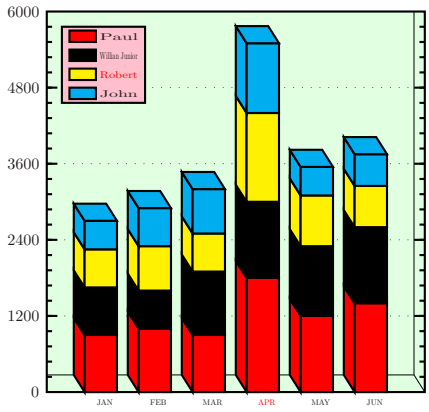


Ex. 35:

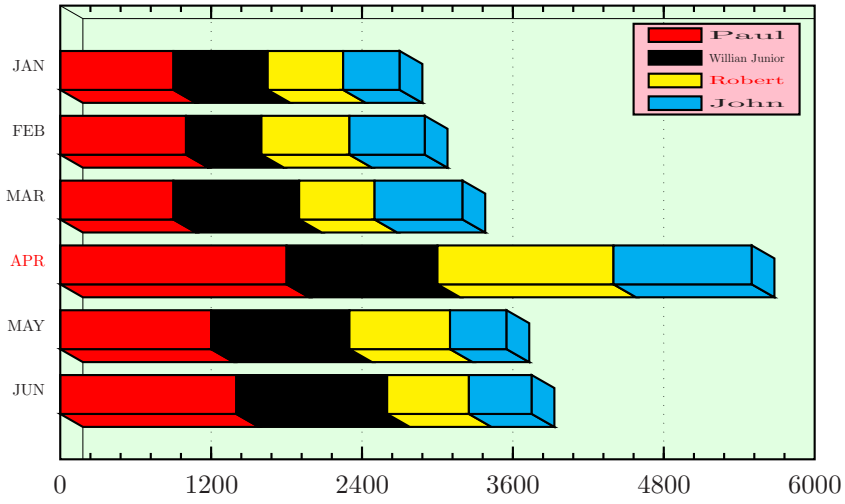
```
pstchart.sh vbar dim=8 max=10000 min=1000 log no-legend nb-major-ticks=1 stack \
            <multsets.dat
```



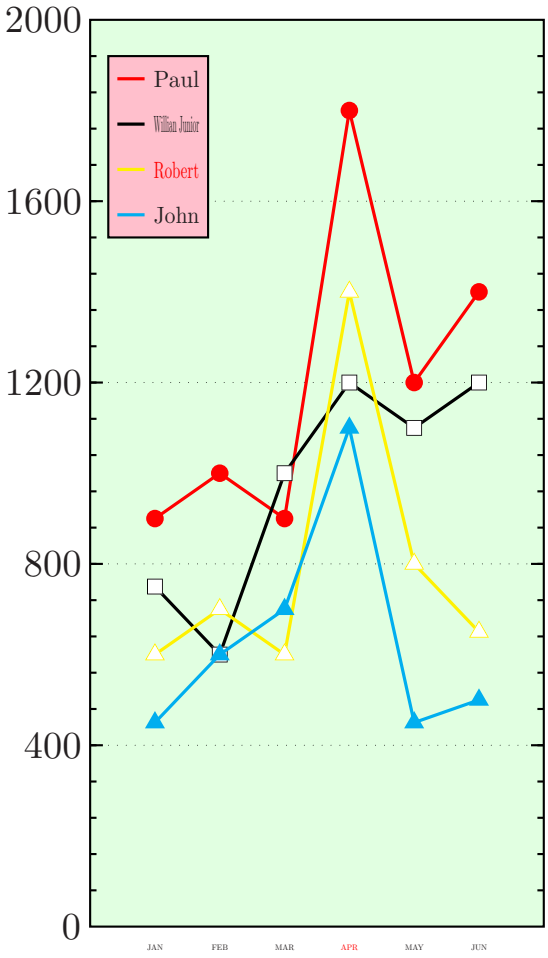
Ex. 36: `pstchart.sh hbar dim-x=12.5 dim-y=7 stack <multsets.dat`



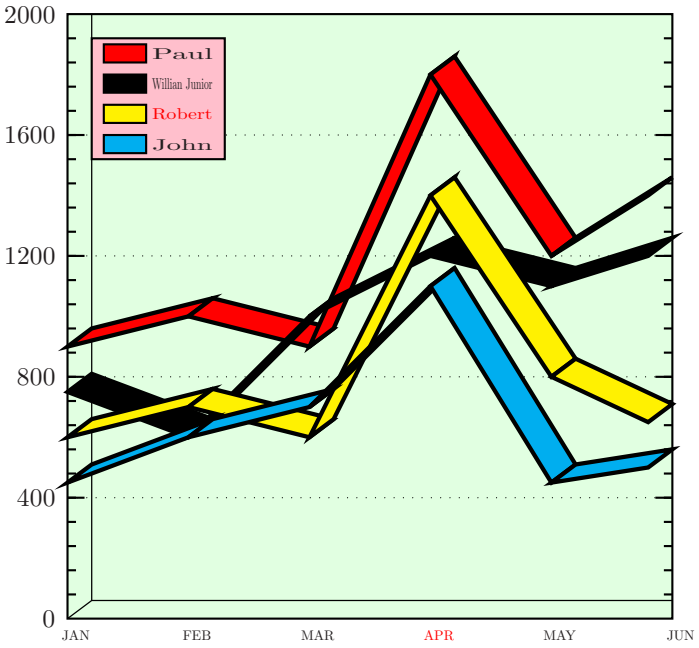
Ex. 37: `pstchart.sh vbar 3d stack coef-3d-x=-1 coef-3d-y=1.5 center <multsets.dat`



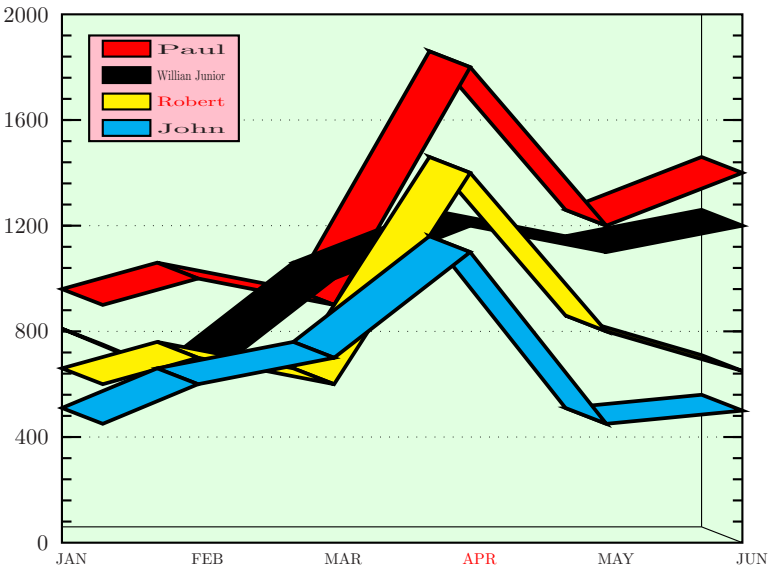
Ex. 38: `pstchart.sh hbar dim-x=10 dim-y=6 3d stack coef-3d-x=-1 <multsets.dat`



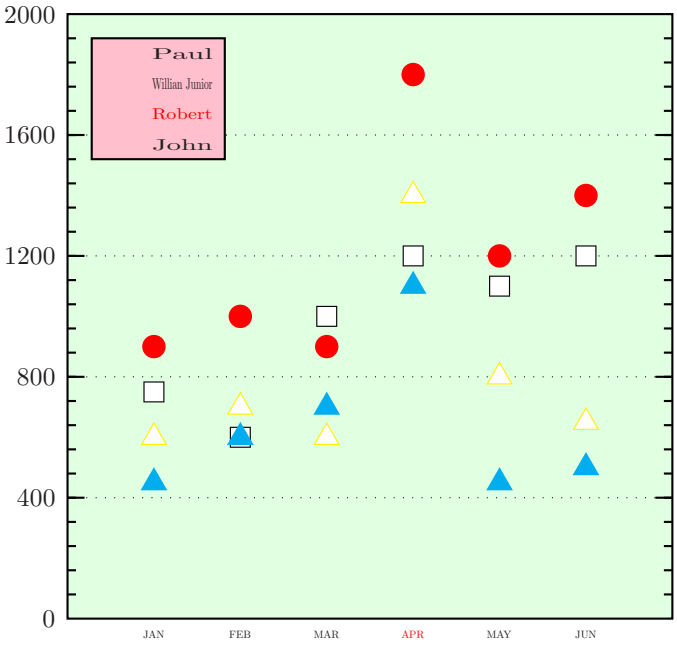
Ex. 39: `pstchart.sh hlines dim-x=6 dim-y=12 data-gap=0 <multsets.dat`



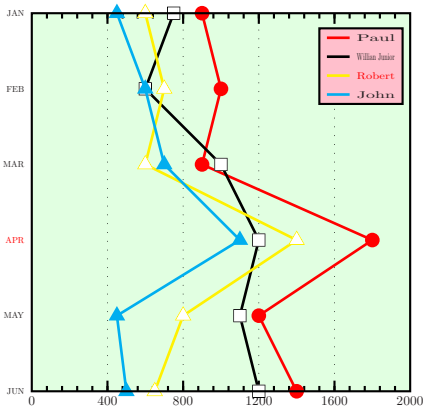
Ex. 40: `pstchart.sh hlines dim=8 3d <multsets.dat`



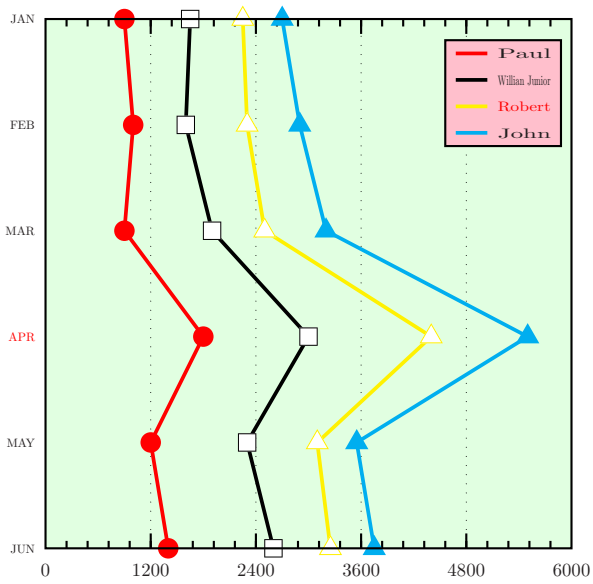
Ex. 41: `pstchart.sh hlines dim-x=9 dim-y=7 3d coef-3d-x=-1.5 <multsets.dat`



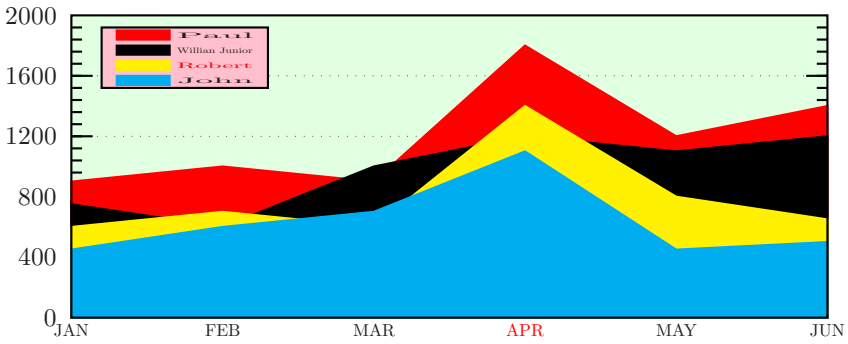
Ex. 42: `pstchart.sh hlines dim=8 coef-linewidth=0 data-gap=0 <multsets.dat`



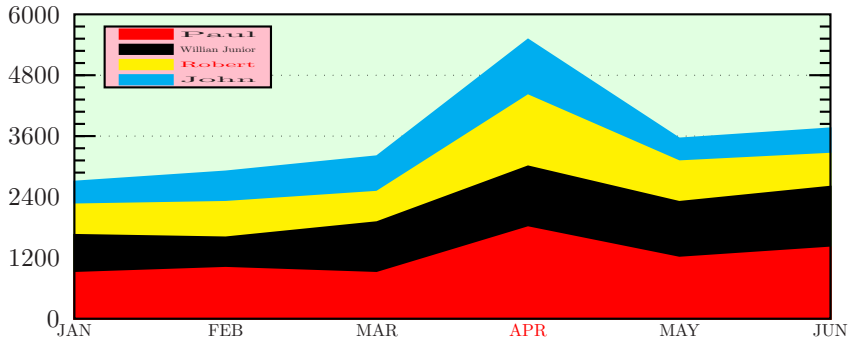
Ex. 43: `pstchart.sh vlines <multsets.dat`



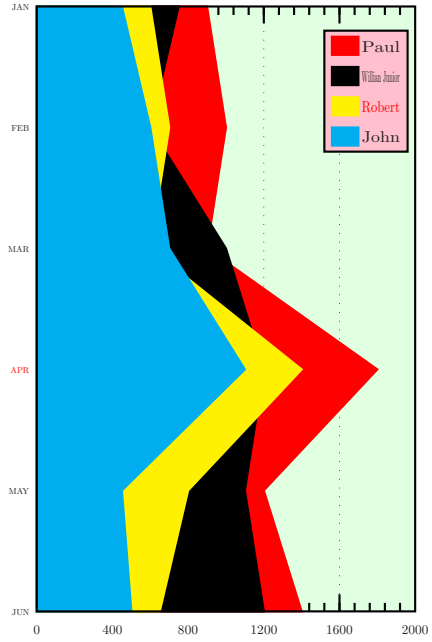
Ex. 44: `pstchart.sh vlines dim=7 stack <multsets.dat`



Ex. 45: `pstchart.sh hlinesfill dim-x=10 dim-y=4 coef-graduations=2 <multsets.dat`



Ex. 46: `pstchart.sh hlinesfill dim-x=10 dim-y=4 stack coef-graduations=2 <multsets.dat`



Ex. 47: `pstchart.sh vlinesfill dim-x=5 dim-y=8 <multsets.dat`

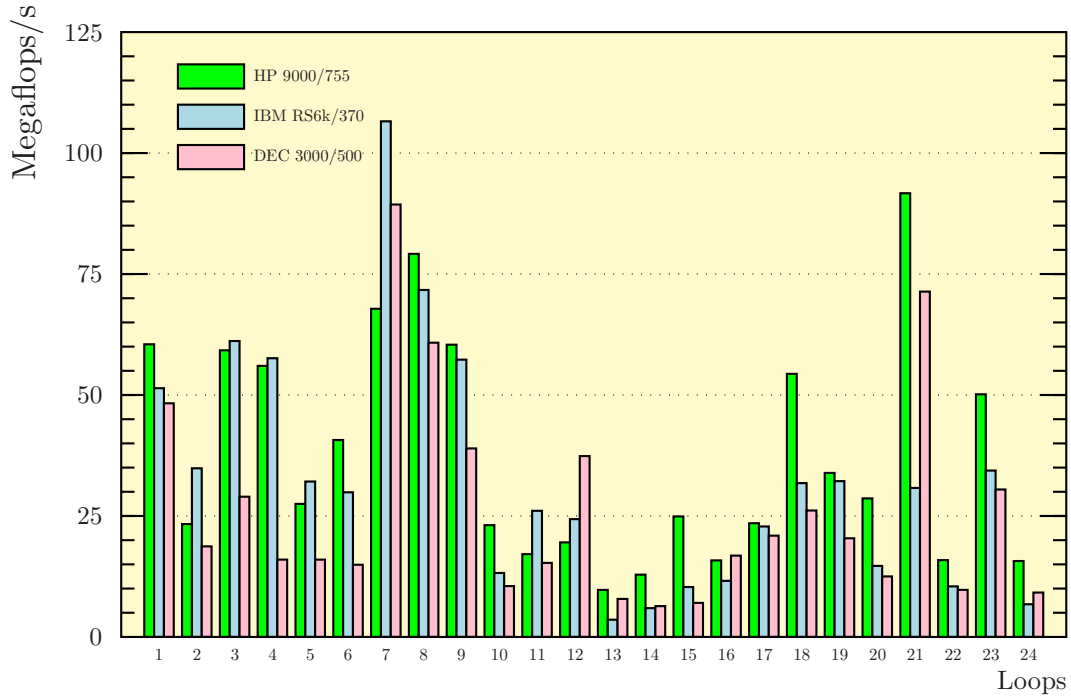
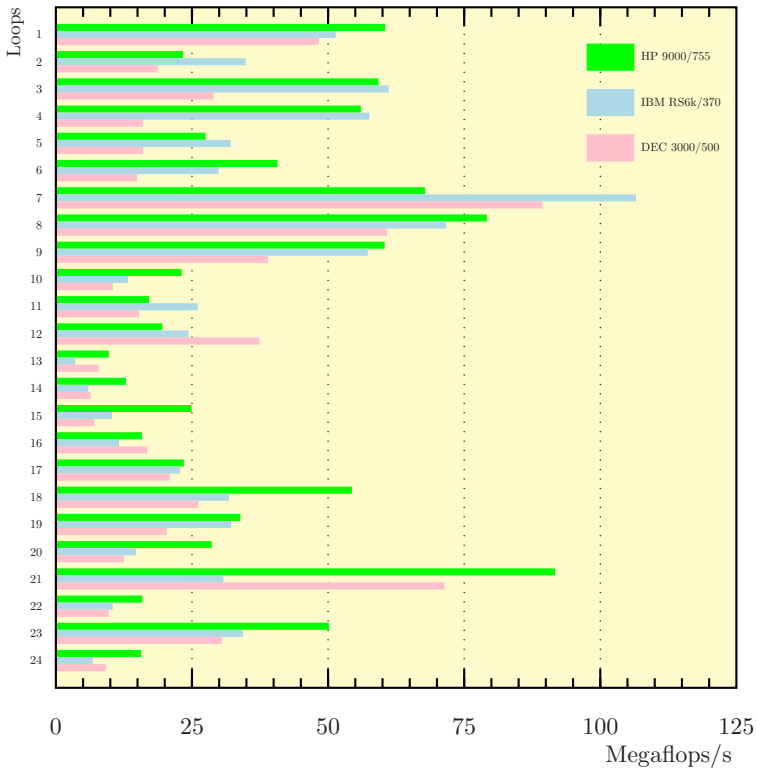


Figure 8: Livermore loops (long vectors)

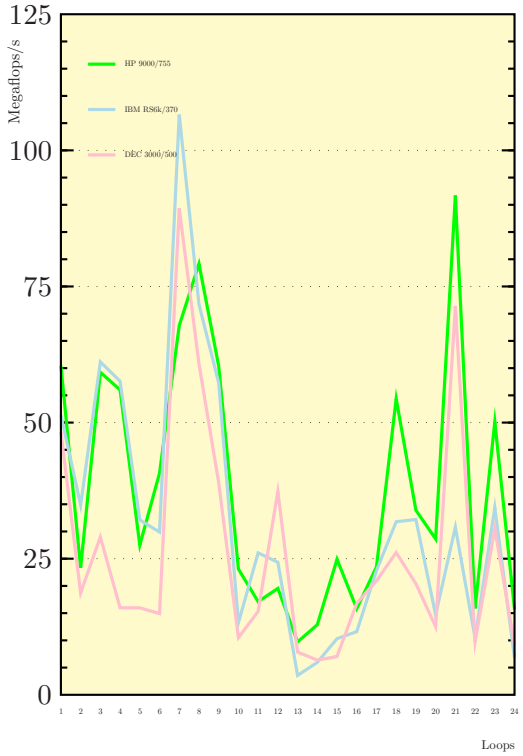
Ex. 48:

```
pstchart.sh vbar dim-x=12.5 dim-y=8 max=125 coef-bar-size=1.3 \
            coef-bottom-labels=3 center figure <livermor.dat
```



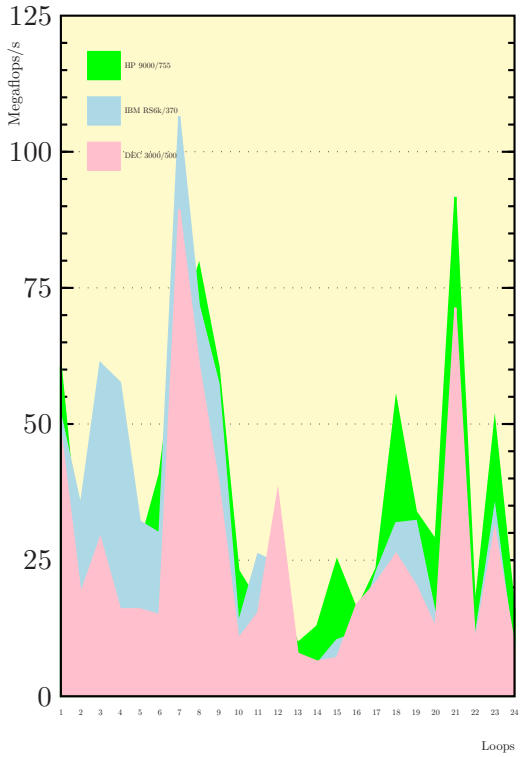
Ex. 49:

```
pstchart.sh hbar dim=9 max=125 coef-bar-size=1.3 coef-linewidth=0 \
            coef-bottom-labels=3 <livermor.dat
```



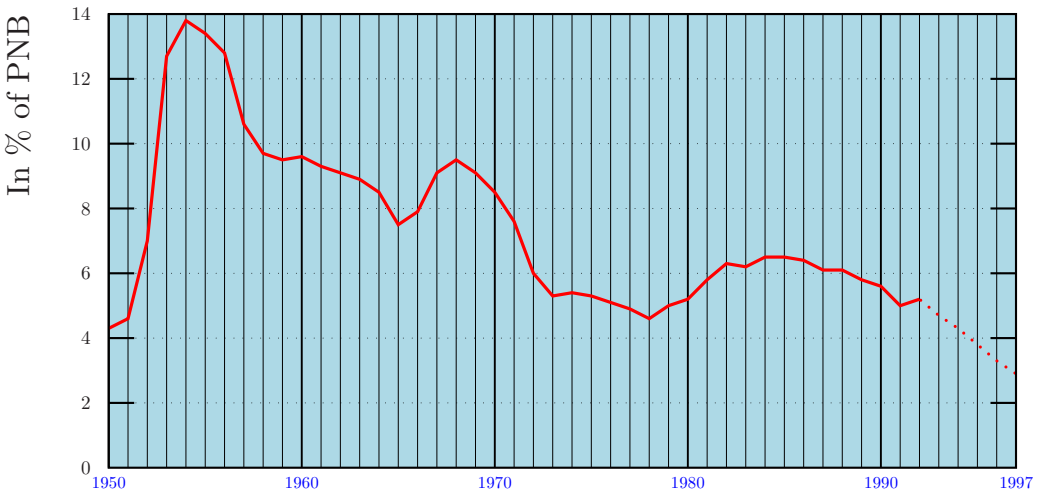
Ex. 50:

```
pstchart.sh hlines dim-x=6 dim-y=9 max=125 no-showpoints center \
            coef-bottom-labels=3 <livermor.dat
```



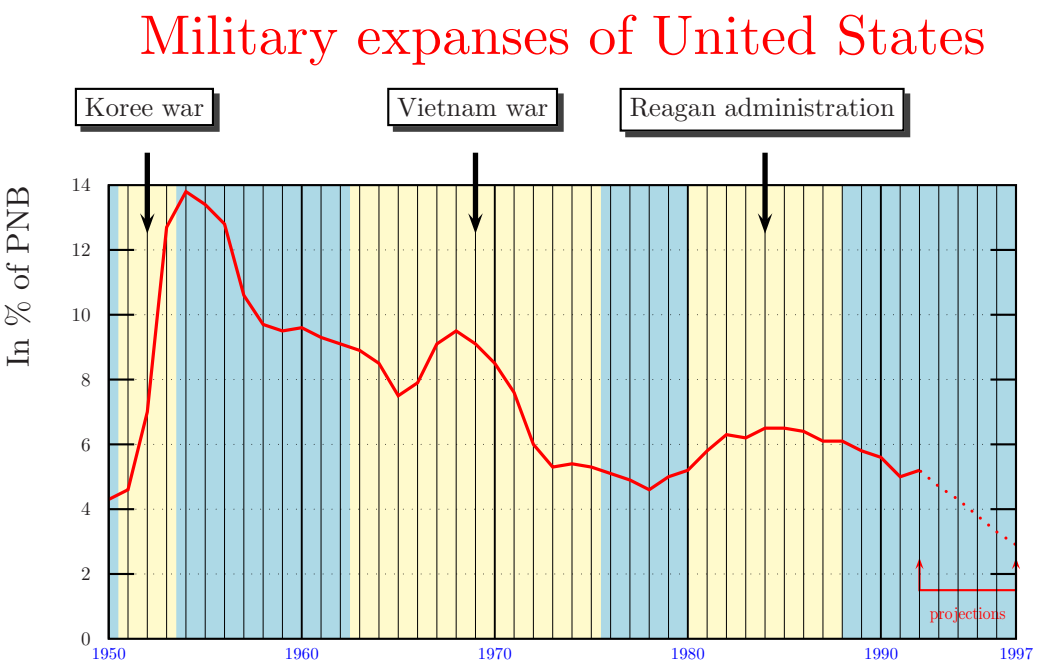
Ex. 51:

```
pstchart.sh hlinesfill dim-x=6 dim-y=9 max=125 center coef-bottom-labels=3 \
            <livermor.dat
```



Source: Department of Defense of USA (1992)

Ex. 51: `pstchart.sh hlines dim-x=12 dim-y=6 max=14 no-showpoints <dod.dat`



Source: Department of Defense of USA (1992)

Ex. 52:

```
pstchart.sh hlines dim-x=12 dim-y=6 max=14 no-showpoints input-begin=dod.add \
            <dod.dat
```

3 Usage

3.1 Description

`pstchart.sh` use a data file which contains both some optional parameters for the representation (title, background, aspects, etc.) and the data themselves.

If you want to use all the default options, you may defined a raw file with only the data values (and possibly the associated labels, separated from the data by the special `|` character[4]).

Here is an example (file `users.dat`):

```
3094 | LUU
1438 | SOL
 365 | LMD
 267 | LEG
 248 | PPM
 236 | MEF
 122 | ASF
  57 | DRT
  33 | AMB
  18 | TPR
   9 | RRS
```

If you use:

```
pstchart.sh vbar <users.dat
```

you'll obtain the vertical bar chart of the example 1.

You can used a lot of options to have specific results (see example 4):

```
pstchart.sh vbar dim=9 3d nb-values=8 print-percentages print-values \
            grayscale=white-black data-change-colors \
            title="Users' files" center <users.dat
```

[4]This kind of file can be created by another program to automatically generate a chart from these data – see below.

Another possibility is to generate *automatically* a chart from external data. Here is an example of how to obtain a graphical representation of the CPU usage for a multi users system[5]:

```
#! /bin/sh

# cpu.sh --- Simple example to obtain a vertical 3d bar chart
#            of the CPU usage for running processes

# Author        : Denis GIROU (CNRS/IDRIS - France) <Denis.Girou@idris.fr>
# Created the   : Fri Jul 30 18:14:12 1993
# Last mod. by  : Denis GIROU (CNRS/IDRIS - France) <Denis.Girou@idris.fr>
# Last mod. the : Thu Mar  6 19:48:36 1997

# Note: The output depend of the flags accepted my your ps command
#       and of the format returned. So, you may have to adapt this script.
#       It has been tested on an RS 6000 under AIX

# 1 - We require the list of all the processes
#     (we print only the names and the CPU time, in format hh:mm:ss)
# 2 - We sort them by users
# 3 - We sum by users the CPU used by all the processes
#     and we print all these sums and names
# 4 - We sort the result by reverse sums
# 5 - We use pstchart.sh on it, to have the 3d bar chart...

ps -edf -F runame,time | \
 sort +0 -1 | \
 awk '$1 != "RUSER" \
  {CPU[$1]+=substr($2,1,2)*1440 + substr($2,4,2)*60 + substr($2,7,2)}
  END{for (NAME in CPU) print CPU[NAME] " | " NAME}' | \
 sort -nr +0 -1 | \
 pstchart.sh vbar dim=8 3d center nb-values=5 print-percentages \
             grayscale=black-white data-change-colors \
             title="CPU usage the `date`"
```

But if you want a full control of the different aspects of the chart, you can define yourself all his characteristics.

3.2 Syntax of the data files

There are two parts in the data files: *parameters* part, and *data* part. The *parameters* lines begin with a keyword.

The comment lines (beginning with the special `#` character) are ignored. Nevertheless the lines beginning with **two consecutive #** are **not** comments: these special lines are attempted to be (LA)TEX or PSTricks commands and are written in the result file like that (of course, without the `##`), at the beginning of it if they are in the *parameters* part and at the end if they are in the *data* part. You can use this possibility for special effects, like rotations or projections in the 3D space (see the file `file4.dat` and example 22 and the examples 25, 26 and 27).

The blank lines are ignored in the *parameters* part.

There are eight types of *parameters* (typed indifferently in upper or lower case)[6]: `VERSION`, `TITLE`, `AXISLABELS`, `BACKGROUND`, `GRADUATIONS`, `TICKS`, `LEGEND` and `ASPECT`, with only zero or one occurrence of the seven first, and possibly several of ASPECT type.

3.2.1 General remarks

- The order of appearance of the parameters has no importance, except the `VERSION` one, which must appear first.
- The keyword is always the first field of the line.
- The separator of fields is everywhere the `|` character, **so you can't use it in the labels**.
- All the fields are optional, except the keyword itself.
- The leading and trailing blanks are removed.

[5] The script is possibly to adapt according to the `ps` command, which can required other flags than those used here, and to have an output formatted differently...

[6] All are optional if you want to use the default options.

- You can use all the (LA)TEX and PSTricks commands to change the aspect of the labels (colors, fonts, sizes, etc.).
- You can have the labels (for title, axis, bottom or top – but **not** for the legend box) on two lines, separated by the relevant separator (`'\\'` in LATEX and `'\cr␣'`[7] in plain TEX). But if there are special commands (colors, fonts, etc.), you must repeat them on the two parts of the labels. You must also take care to quote the special characters: `\$`, `\%`, etc.

  In the parameters, the colors are attributes and must be defined without the `\` character (`red`, etc.), but in labels they are commands and must be preceded by `\` (`\red`, etc.) if you use the PSTricks color commands (use the `\textcolor` command with the standard color package).
- The valid line styles are: `none`, `solid`, `dashed` and `dotted` (look at the PSTricks manual for the description of them).
- The valid dot styles (for LINES charts) are[8]: `*` (*default*), `o`, `+`, `x`, `asterisk`, `oplus`, `otimes`, `square`, `square*`, `diamond`, `diamond*`, `triangle`, `triangle*`, `pentagon` and `pentagon*` (look at the PSTricks manual for the description of them).
- The valid fill styles are: `none`, `solid`, `gradient`, `vlines`, `vlines*`, `hlines`, `hlines*`, `crosshatch`, `crosshatch*` and `pattern`[9] (look at the PSTricks documentation for the description of them).
- You can use other PSTricks parameters to specify different characteristics for the various styles. For instance `hatchangle=0,hatchwidth=0.5mm, hatchsep=2mm` for a fill style (see example 22). Another example is for line style, where you can say something like `solid,linewidth=0.5mm` or `dashed,dash=5mm 2mm`. Look at the PSTricks manual for details about all the accessible parameters.
- When you use a gradient style, the first color is the beginning one and the second the ending one. When you use one of the three `*` fill style forms, the first color is use for filling and the second one for the lines (defined as `hatchcolor` in PSTricks).
- If the scale factor for the title, labels or graduations is equal to the special keyword `UNSCALED`, we use the "natural" character size of the font, without any scaling.
- If the scale factor for the title or labels is equal to the special keyword `FIXED`, we use the `\scaleboxto` macro to draw them, so all the characters of the labels will have the same size. Otherwise, we use the `\scalebox` macro. See the effect of this coefficient for instance in examples 8 and 10.
- You can also use other PSTricks macros to change globaly the presentation of the graphics generated (as the `\pstilt` or `\ThreeDput` macros).

3.2.2 Description of the parameter lines

- **VERSION** (for future use – there is no reason to use it today):
  1. the keyword `VERSION`,
  2. the version number, defined to possibly support later different syntax of data files. I hope to have never to do that! – (*Default: 1*).
- **TITLE**:
  1. the keyword `TITLE`,
  2. the title of the chart, which can also been specified (or redefined) in the command line,
  3. the scale factor for it – (*Default: 1*),
  4. the vertical shift factor for it, if you want to put it upper or lower (see example 52) – (*Default: 1*),
  5. the title for the figure environment (used only in LATEX mode),

[7] Don't forget the blank!

[8] As it's already used as field separator, the `|` character is not autorized, although it's defined in PSTricks.

[9] With `pattern`, you can use arbitrary patterns to fill the background and bar and filled line data, and if a color is defined, the patterns will be drawn above this background color – see examples 25, 26 and 27 and the **PstChartDemos** file.

6. the title for the table of figures (used only in LaTeX mode),
7. the label of the figure (used only in LaTeX mode),
8. the position of the figure, mainly useful to specify the `H` option when using the `float` package of Anselm Lingnau (used only in LaTeX mode) – (*Default: !htbp*),

- **AXISLABELS**:

1. the keyword `AXISLABELS`,
2. the label for the X axis. You can also use it for another type of indication (see example 52).
3. the scale factor for it (see an example in the file `livermor.dat`) – (*Default: 1*),
4. the rotation factor for it (in degrees) – (*Default: 0*),
5. the position of it (in vertical mode 0 means at left, 1 at right, and in horizontal mode respectively at bottom and top). If it's 0 or 1, the label is push on left or right, otherwise it's centered – (*Default: 1*),
6. the vertical shift factor for it (if you want to put it upper or lower) (see an example in the file `livermor.dat`) – (*Default: 1*),
7. the label for the Y axis,
8. the scale factor for it – (*Default: 1*),
9. the rotation factor for it (in degrees) – (*Default: 90*),
10. the position of it (in vertical mode 0 means at bottom, 1 at top, and in horizontal mode respectively at left and right). If it's 0 or 1, the label is push on bottom or top, otherwise it's centered (see an example in the file `livermor.dat`) – (*Default: 1*),
11. the horizontal shift factor for it, if you want to put it upper or lower – (*Default: 1*).

- **BACKGROUND**:

1. the keyword `BACKGROUND`,
2. the line style for the framebox – (*Default: solid*),
3. the line color for the framebox – (*Default: black*),
4. the style for the background – (*Default: none*),
5. the first color for the background – (*Default: white*),
6. the second color for the background (if the `gradient` style is used, this second color is used for the `gradend` color ; if a `*` style is defined, it is used for the `hatchcolor`) (see an example in the file `file2.dat`) – (*Default: not defined: we use the default* ***`gradend`*** *or* ***`hatchcolor`*** *color*),
7. the pattern to used to fill the background, if the defined style chosen is `pattern`.

- **GRADUATIONS**:

1. the keyword `GRADUATIONS`,
2. the scale factor for graduation numbers (see example 29) – (*Default: 1*),
3. the color of them – (*Default: black*),
4. the style for the major graduations lines from X axis (they are defined by a bottom (or left) label associated to them – see examples 29 and 51) – (*Default: none*),
5. the color of them – (*Default: black*),
6. the coefficient applied to the default width of the lines for them – (*Default: 1*),
7. the style for the minor graduations lines from X axis (they are defined by a bottom (or left) label **non** associated to them – see example 51) – (*Default: none*),
8. the color of them – (*Default: black*),
9. the coefficient applied to the default width of the lines for them – (*Default: 1*),
10. the style for the major graduations lines from Y axis (those which have a graduation number – also called *lines from major ticks*) – (*Default: dotted*),
11. the color of them – (*Default: black*),

12. the coefficient applied to the default width of the lines for them – (*Default: 1*),
13. the style for the minor graduations lines from Y axis (also called *lines from minor ticks*) – (*Default: none*),
14. the color of them – (*Default: black*),
15. the coefficient applied to the default width of the lines for them – (*Default: 1*).

- **TICKS**:

1. the keyword `TICKS`,
2. the number of major ticks, which can also been specified (or redefined) in the command line – in fact, it's the number of intervals used... (see an example in the file `file2.dat`) (if equal to 0 there are no axis and graduations printed) – (*Default: 5*),
3. the value of the interval between major ticks – obviously, you can't specify both this value and the number of major ticks marks (see an example in the file `dod.dat`) – (*Default: computed according the minimum and maximum of data values, and the number of major ticks marks*),
4. the color of major ticks – (*Default: black*),
5. the number of minor ticks – in fact, it's the number of intervals used... – (*Default: 5*),
6. the style for the ticks of the X axis – (*Default: none*).
7. the color of minor ticks – (*Default: black*).
8. the coefficient applied to the lenght of these ticks – (*Default: 1*).

- **LEGEND**[10]:

1. the keyword `LEGEND`,
2. the X left coefficient for position coordinate, where left is 0 and right 1 (can be less than 0 or greater than 1 if you want to put the legend box outside the chart) – (*Default: 0.04 in vertical mode and 0.76 in horizontal mode*),
3. the Y top coefficient for position coordinate, where bottom is 0 and top 1 (can be less than 0 or greater than 1 if you want to put the legend box outside the chart – see the file `quest.dat` and example 28) – (*Default: 0.96*),
4. the style of the background – (*Default: solid*),
5. the first color of it – (*Default: white*),
6. the second color of it (if the `gradient` style is used, this second color is used for the `gradend` color ; if a `*` style is defined, it is used for the `hatchcolor`) – (*Default: not defined: we use the default* ***`gradend`*** *or* ***`hatchcolor`*** *color*),
7. the coefficient applied to the horizontal length – (*Default: 1*),
8. the coefficient applied to the vertical length (see example 28) – (*Default: 1*),
9. the number of labels to put by lines, which can also been specified (or redefined) in the command line – (*Default: 1*).

- **ASPECT**:

1. the keyword `ASPECT`,
2. the style for the representation of the data – (*Default: solid*),
3. the first color of it – (*Default: white*),
4. the second color of it (if the `gradient` style is used, this second color is used for the `gradend` color ; if a `*` style is defined, it is used for the `hatchcolor`). For 3D pie charts, it's the color for the cylinder parts and, if there are some detached slices, for the visible parts of the polygons, unless a gradient style is used (see examples in the files `file2.dat` and `file3.dat`) – (*Default: not defined: we use the default* ***`gradend`*** *or* ***`hatchcolor`*** *color*),
5. the color of the border lines used for PIE and BAR charts – also related to the `data-change-colors` command option (see an example in the file `file3.dat`) – (*Default: black*),

[10] Used only for multi sets of data – no meaning for PIE charts.

6. the style of the dots (used only for HLINES and VLINES charts) – (*Default:* `*`),
7. the label to put in the legend box (if it's the special `false` value, this entry will not be printed in the legend box),
8. the scale factor applied to this label. If it is equal to the special keyword `FIXED`, we use the `\scaleboxto` macro to draw them, so all the characters of the labels will have the same size. Otherwise, we use the `\scalebox` macro (see examples 28 and 30) – (*Default: 1*),
9. the pattern to used to fill the background, if the defined style chosen is `pattern`,
10. the chart type for the corresponding data values, if we want to have it drawn using another chart type than the default one (as `vbar` with `hlines`, `vlines` with `hbar`, `hlinesfill` with `hlines`, etc.).

3.2.3 Description of the data lines

The data lines always begin by a value. Otherwise, you can only use in this part comment lines or blank lines. But blank lines **have a meaning here** and separate the sets of data in case of several sets (see an example in the file `multsets.dat`).

But if you want to analyse only a part of all the data sets, you can use the **END** keyword to stop reading of data values.

1. the value (a number or the special value `UNDEFINED` – in lower or upper case – with a possible *repetition factor*, as `3*12.5` or `8*undefined`, without blanks after the `*` character: see an example in the file `dod.dat`. The `UNDEFINED` value permit to have values which are missing or not used, as to define one curve with several aspects: see the file `dod.dat` and the example 51),
2. the first label[11], outside for pie charts, at bottom for vertical charts and at left for horizontal charts,
3. the scale factor for it – (*Default: 1*),
4. the rotation for it (in degrees, between -90 and 90) – (*Default: 0*),
5. the position of it, as a coefficient to apply to his "natural" position just above the value (so a number greater than 1 will increase the gap between the graphic representation for the value and the label, and a number less than 1 will put the label nearer or below the graphic representation for the value) – (*Default: 1*),
6. the second label, inside for pie charts, at top for vertical charts and at right for horizontal charts,
7. the scale factor for it – (*Default: 1*),
8. the rotation for it, in degrees, between -90 and 90 (see an example in the file `file3.dat`) – (*Default: 0*),
9. the position of it, as a coefficient to apply to his "natural" position just above the value (so a number greater than 1 will increase the gap between the graphic representation for the value and the label, and a number less than 1 will put the label nearer or below the graphic representation for the value) – (*Default: 1*),
10. the `detached` coefficient to used (which will be multiply by the size of the chart) for detached slices of pie charts (used only for PIE charts – see an example in the file `file1.dat` and example 12),
11. the number of consecutive detached slices to define, beginning with this one – (*Default: 1 if the* `detached` *coefficient is defined*).

[11] These values and the scales and rotations associated to these labels are only read for the **first** set, in case of a multi sets data file.

3.3 Syntax of the command

The general syntax of the command is:

```
pstchart.sh -V
pstchart.sh -help
pstchart.sh pie | vbar | hbar | hlines | vlines \
                | hlinesfill | vlinesfill \
            [3d] [boxit] [center] \
            [coef-3d-x=number] [coef-3d-y=number] \
            [coef-bar-overlay=number] [coef-bar-size=number] \
            [coef-bottom-labels=number] \
            [coef-dotsize=number] \
            [coef-graduations=number] \
            [coef-height-pie-chart=number] \
            [coef-hspace-left=number] \
            [coef-hspace-right=number] \
            [coef-linewidth=number] \
            [coef-top-labels=number] \
            [coef-top-labels-shift=number] \
            [coef-vspace-bottom=number] \
            [coef-vspace-top=number] \
            [cut-extremes] \
            [cut-max=value-cut-max] [cut-min=value-cut-min] \
            [data-change-colors] [data-gap=number] \
            [debug] \
            [dim=value-dim-x-and-y] \
            [dim-x=value-dim-x] [dim-y=value-dim-y] \
            [figure] [frame=false | first] \
            [grayscale=black-white | white-black] \
            [input-begin=file] [input-end=file] \
            [interval-major-ticks=number] \
            [label-others=string] [latex-color-package] \
            [legend-nb-horiz=number] [log] \
            [max=value-max] [min=value-min] \
            [nb-major-ticks=number] [nb-values=number] \
            [no-detached-slices] [no-gradient] \
            [no-legend] [no-multido-graduations] \
            [no-print-top-labels] [no-showpoints] [no-ticks] \
            [pie-chart-start-position=number] [plain] \
            [print-percentages] \
            [print-values] [print-values-decimal-digits] \
            [reverse-overlay-order] [stack] [title=sentence] \
            [top-labels-colored] \
            <data-file >output-file
```

Only the type of the chart and the data file are required.
The parameters of the command line have the following meaning:

`-V` : to print the version number of `pstchart.sh`.

`-help` : to print the syntax of the command.

`3d` : to generate a 3d effect – only for BAR and LINE charts (see examples 4, 33, etc.) – (*Default: false*).

`boxit` : to draw a frame box around the chart (multiple examples) – (*Default: false*).

`center` : to center the chart (multiple examples) – (*Default: false*).

`coef-3d-x=number` : the coefficient to applied to increase horizontally the 3D effect for bar charts, which can be negative (see examples 5 and 37) – (*Default: 1*).

`coef-3d-y=number` : the coefficient to applied to increase vertically the 3D effect for bar charts (see example 6) – (*Default: 1*).

`coef-bar-overlay=number` : the default coefficient applied to compute the position of the bars for multi-sets – only for BAR charts (see example 32) – (*Default: 1*).

`coef-bar-size=number` : the default coefficient applied to compute the size of the bars, greater than 0 – only for BAR charts (see examples 9 and 48) – (*Default: 1*).

`coef-bottom-labels=number` : the coefficient applied to the bottom (outside for pie charts) labels (see example 48) – (*Default: 1*).

`coef-dotsize=number` : the coefficient applied to the size of the dots – only for LINES charts – (*Default: 1*).

`coef-graduations=number` : the coefficient applied to the graduation numbers (see example 45) – (*Default: 1*).

`coef-height-pie-chart=number` : the coefficient applied to the height of 3D pie charts (see example 18) – (*Default: false*).

`coef-hspace-left=number` : the coefficient to applied to increase the space at the left of the graphic, typically for pie charts labels (*Default: 1*).

`coef-hspace-right=number` : the coefficient to applied to increase the space at the right of the graphic, typically for pie charts labels (see example 15) – (*Default: 1*).

`coef-linewidth=number` : the coefficient applied to the width of the lines (the lines themselves for LINES charts and the border lines for PIE and BAR charts) – this value can be equal to 0 (see the examples 32, 34, 40) – (*Default: 1*).

`coef-top-labels=number` : the coefficient applied to the top (inside for pie charts) labels – (*Default: 1*).

`coef-top-labels-shift=number` : the coefficient applied to the position of the top labels (mainly useful for multi-sets data with the `print-values` or `print-percentages` option). Increase it to have highter spacing – (*Default: 1*).

`coef-vspace-bottom=number` : the coefficient to applied to increase the space after the graphic, typically before the caption if a figure environment is defined (some space is already reserved for the bottom labels, considering a standard size for them) (see example 12) – (*Default: 1*).

`coef-vspace-top=number` : the coefficient to applied to increase the space above the graphic (some space is already reserved if a title is defined, considering a standard size for it) – (*Default: 1*).

`cut-extremes` : this allow to "cut" some extra range values. It work in conjunction with the `min`, `cut-min` and `cut-max` parameters. If `cut-max` is use too, a special cross hached zone is shown to show that the value was cutted. The interest to use `cut-min`, which is to replace a value by a higher one, is to use it with the `min` parameter, to don't see some lower values. For instance `min=0 cut-extremes cut-min=0` will don't see negative values. For the moment work only for positive values and non stacked charts – (*Default: false*).

`cut-max=value-cut-max` : the maximum value to use to "cut" the values. For the moment work only for positive values and non stacked charts (see examples 5 and 6) – (*Default: not used*).

`cut-min=value-cut-min` : the minimum value to use to "cut" the values (specially useful when you have few very high values, which made the other one disappear – for instance for storms in series of raining measurements!). For the moment work only for positive values and non stacked charts (see examples 5 and 6) – (*Default: not used*).

`data-change-colors` : for HBAR, VBAR and PIE charts, to change the colors for each part (see examples 3, 4 and 20) – (*Default: false*).

`data-gap=number` : the coefficient for the space before the first value and after the last – without meaning for PIE charts (see examples 9 and 39) – (*Default: 0 for BAR charts and 1 for LINES charts*).

`debug` : to allow debugging and tracing of program – (*Default: false*).

`dim=value-dim-x-and-y` : the dimension of the chart, in **centimeters**, both for horizontal and vertical sizes, **without the title, graduations and external labels** – (*Default: 5*).

`dim-x=value-dim-x` : the horizontal dimension of the chart, in **centimeters**, **without the graduations and external labels** – (*Default: 5*).

`dim-y=value-dim-y` : the vertical dimension of the chart, in **centimeters**, **without the title and external labels** – (*Default: 5*).

`figure` : to generate a `figure` environment for the chart, only in LaTeX mode (multiple examples) – (*Default: false*).

`frame=false|first` : to suppress the frame normally generated (see example 22) or to draw it before the graphs, which allow the dots for extremum values for line charts to override it... – (*Default: true*).

`grayscale=black-white|white-black` : if the option `data-change-colors` is used, it generate one gray color by value used in the chart, equally spaced between black and white, or white and black (see examples 3 and 4) – (*Default: false*).

`input-begin=file` : to include a file after the definition of the `pspicture` environment and the drawing of the background. This file must contains (La)TeX and PSTricks commands (see example 52) – (*Default: no file*).

`input-end=file` : to include a file just before the end of definition of the `pspicture` environment – (*Default: no file*).

`interval-major-ticks=number` : the value of the interval between major ticks, which override the one possibly defined in the data file – often easier to specify than the number of major ticks marks, and specially useful if you fix the `MIN` and `MAX` values (see example 29) – (*Default: computed according the minimum and maximum of data values and the number of major ticks marks*).

`label-others=string` : in case of use of the `nb-values` option, to specified the label associated with the part which sum the last values (you must put it between `"` if there are several words) – (*Default: Others*).

`latex-color-package` : to be able to generate color commands compatible with the standard color package of LaTeX – (*Default: false*).

`legend-nb-horiz=number` : the number of horizontal labels to put by lines on the legend, which override the one possibly defined in the data file (see examples 31 and 33) – (*Default: 1*).

`log` : to have the axis of the values in LOG mode (see examples 11, 35, etc.) – (*Default: false*).

`max=value-max` : the maximum value to use to calculate the chart – (*Default: maximum of the data, top rounded*).

`min=value-min` : the minimum value to use to calculate the chart (no meaning for PIE charts) – (*Default: 0*).

`nb-major-ticks=number` : the number of major ticks, which override the one possibly defined in the data file (see examples 11 and 31) – (*Default: 5*).

`nb-values=number` : the number of values to really draw. There must be at least `nb-values` values in the file. But if there are not exactly `nb-values`, the first `nb-values - 1` are used, and the last one correspond to the sum of the rest, affected which the label defined by the `label-others` parameter – (*Default: draw all the values of the data file*).

`no-detached-slices` : to inhibit the possible detached coefficients for the slices – only for pie charts (see examples 16 and 17) – (*Default: false*).

`no-gradient` : to replace the gradient fill styles by solid ones (see example 17) – (*Default: false*).

`no-legend` : to suppress the legend normally generated for multi sets data – no meaning for PIE charts (see example 35) – (*Default: true for PIE charts, false otherwise*).

`no-multido-graduations` : to calculate the values of the graduations by `awk` and not by the `\multido` PSTricks macro (it's generate an overhead but it's sometimes necessary when the numerical precision isn't good with `\multido`) – not often useful – (*Default: false*).

`no-print-top-labels` : to suppress the printing of the top labels (see example 9) – (*Default: false*).

`no-showpoints` : to suppress the dots printed for each coordinate for LINES charts (see example 50) – (*Default: true for HLINES and VLINES charts, false otherwise*).

`no-ticks` : to suppress the ticks marks and the graduations normally generated (see example 22) – (*Default: true*).

`pie-chart-start-position=number` : the position where the first slice of the pie must start. It is a number between 0 and 360 (see example 17) – (*Default: 0, which is on left side and equal to 180 with PSTricks convention*).

`plain` : to generate plain TEX code – (*Default: false*).

`print-percentages` : to print the percentages, as top labels in vertical mode, right labels in horizontal mode, and inside labels for PIE charts (to use this option, it mustn't exist two lines top labels) – (*Default: false*).

`print-values` : to print the values, as top labels in vertical mode, right labels in horizontal mode, and inside labels for PIE charts (to use this option, it mustn't exist two lines top labels) – (*Default: false*).

`print-values-decimal-digits` : to specify the number of decimal digits to print, when using the `print-values` parameter – (*Default: undefined*).

`reverse-overlay-order` : to reverse the order of printing of bars for multisets when `coef-bar-overlay` is greater than 1 – (*Default: false*).

`stack` : to stacked the bar or lines charts (see examples 34, 36, 44, 46, etc.) – (*Default: false*).

`title=sentence` : the title and the title for the table of figures (this last one used only in LATEX mode), which override the one possibly defined in the data file (you must put it between `"` if there are several words) (see for instance example 2) – – (*Default: no title*).

`top-labels-colored` : to have top labels in the same color than data – (*Default: false*).

References

[bar] by Joachim Bleser, TH Darmstadt Hochschulrechenzentrum, Germany, available on `CTAN/macros/latex209/contrib/misc/bar.sty`

[fastpictex] by Harald Martin Strauss, Humboldt University, Berlin, Germany, available on `CTAN/systems/unix/linux`

[Girou 94] Denis Girou, "Présentation de PSTricks", *Cahiers GUTenberg*, No. 16, pp. 21–70, Février 1994, available on `http://www.univ-rennes1.fr/pub/GUTenberg/publications/publis.html`

[Gurari 94] Eitan M. Gurari, <gurari@cis.ohio-state.edu>, *TEX and LATEX: Drawing and Literate Programming*, McGraw-Hill, New-York, USA, 1994 (see also http://www.cis.ohio-state.edu/~gurari/systems.html).

[histogr] by Rainer Schöpf, Mainz University, Germany, available on CTAN/macros/latex/contrib/supported/histogr

[Hobby 94] John D. Hobby, *Drawing Graphs with MetaPost*, documentation available in PostScript format for instance on http://www.loria.fr/tex/prod-graph.html (see also http://cm.bell-labs.com/who/hobby/MetaPost.html).

[LGC 97] Michel Goossens, Sebastian Rahtz and Frank Mittelbach, *The LATEX Graphics Companion*, Addison-Wesley, Reading, Massachusetts, 1997.

[van Zandt 94] Timothy van Zandt, *PSTricks: PostScript Macros for Generic TEX — User's Guide.*, electronic distribution, 1994, documentation available in PostScript format for instance on http://www.loria.fr/tex/packages.html

Data files used for the examples:

```
3094 | LUU
1438 | SOL
 365 | LMD
 267 | LEG
 248 | PPM
 236 | MEF
 122 | ASF
  57 | DRT
  33 | AMB
  18 | TPR
   9 | RRS
```

File `users.dat`

```
# file1.dat: data file for the examples of charts

#     | Title            ||| Title of the figure
TITLE | Example of chart ||| An example of chart

#          |||||| Y axis label
AXISLABELS |||||| In millions of \$

# Aspects of the sets
#      | Style
ASPECT | hlines
ASPECT | vlines
ASPECT | crosshatch

# Value | First label                    |Sca|||Second label   ||||Detached
   11.6 | \textit{Paris}\\France         |   ||| \$11.6M       ||||0.3
   26.7 | \textit{London}\\Great Britain |   ||| \$26.7M\\1992 |
   35.3 | \textit{Berlin}\\Germany       |   ||| \$35.3M       |
```

File `file1.dat`

```
# file2.dat: data file for the examples of charts

#     | Title               ||| Title of figure | Table fig | Label
TITLE | With gradient style ||| Another example | Example 1 |

#          | Framebox style | F. color | Background style | B. colors
BACKGROUND |                |          | gradient         | Pink | red

# Aspects of the sets
#      | Style    | Color 1      | Color 2
ASPECT | gradient | LightBlue    | blue
ASPECT | gradient | Pink         | red
ASPECT | gradient | LemonChiffon | yellow
ASPECT | gradient | PaleGreen    | green
ASPECT | gradient | white        | black

# Value | Label |||||||| Detached coef. | Nb of slices
   26.7 | 1988  |||||||| 0.2            | 2
   19.3 | 1989
   43.4 | 1990  |||||||| 0.2
   12.6 | 1991
   21.9 | 1992
```

File `file2.dat`

```
# file3.dat: data file for the examples of charts

#     | Title
TITLE | Example with negative values

#           || Graduations color ||||||| Major Y lines style | Color
GRADUATIONS || magenta           ||||||| solid               | magenta

#     | Nb maj ticks || Maj ticks color | Nb min ticks | Min ticks color
TICKS | 6            || magenta         | 3            | green

# Aspects of the sets
#      | Style       | Color 1 | Color 2 | Border line color
ASPECT | crosshatch* | red     |         | green
ASPECT | crosshatch* | blue    | white   | yellow
ASPECT | crosshatch* | red     |         | green
ASPECT | crosshatch* | blue    | white   | yellow
ASPECT | crosshatch* | red     |         | green

# Value | Label                           | Scale | Angle
   44.4 | \textcolor{blue}{John}          | 2     | 45
   -9.2 | \textcolor{blue}{Henry Senior} | 2     | 45
   35.3 | \textcolor{blue}{Karl}          | 2     | 45
   -7.8 | \textcolor{blue}{Paul}          | 2     | 45
   13.1 | \textcolor{blue}{Robert}        | 2     | 45
```

File `file3.dat`

```
# file4.dat: data file for the examples of charts

##% To rotate all the chart by 45 degrees !
##\rput[l]{45}{%

# Aspect of the sets
ASPECT|crosshatch,hatchcolor=white,hatchangle=0,hatchwidth=1mm,hatchsep=2mm|black

# Value
   93.5
  184.1
  117.3

# Closing of the rotation command
##}
```

File `file4.dat`

```
# file5.dat: data file for the examples of charts

#     | Title                                                | Scale
TITLE | Example of different chart types on the same graphic | 2

# Aspects of the sets
#      || Color  |||| Legend | Scale || Local chart type
ASPECT || yellow |||| One    | 2
ASPECT || red    |||| Two    | 2
ASPECT || blue   |||| Three  | 2     || hlines
ASPECT || green  |||| Four   | 2     || hlines

# Value | First label
 11     | First
 16     | Second
 21     | Third

 20
 12
 18

 25
 17
 33

 21
 29
 23
```

File `file5.dat`

```
# file6.dat: data file for the examples of charts

##\providecommand{\MyCircle}[1]{%
##\begin{pspicture}(1,1)
##  \pscircle*[linecolor=#1](0.5,0.5){0.5}
##\end{pspicture}}
##
##\providecommand{\MyDiamond}[1]{%
##\begin{pspicture}(1,1)
##  \psdiamond*[linecolor=#1](0.5,0.5)(0.5,0.5)
##\end{pspicture}}
##
##\providecommand{\MyTriangle}[1]{%
##\begin{pspicture}(1,1)
##  \pstriangle*[linecolor=#1](0.5,0)(1,1)
##\end{pspicture}}
##

#     | Title            ||| Title of the figure
TITLE | Example of chart ||| An example of chart

#          |F. style|F. color| Background style | B. color
BACKGROUND |        |        | solid            | PaleGreen

#          |||||| Y axis label
AXISLABELS |||||| In millions of \$

# Aspects of the sets
#      | Style   | Color  |||||| Pattern
ASPECT | pattern | yellow |||||| \MyDiamond{red}
ASPECT | pattern |        |||||| \MyCircle{green}
ASPECT | pattern |        |||||| \MyTriangle{blue}

# Value | First label                    |Sca|||Second label   ||||Detached
   11.6 | \textit{Paris}\\France         |   ||| \$11.6M       ||||0.3
   26.7 | \textit{London}\\Great Britain |   ||| \$26.7M\\1992 |
   35.3 | \textit{Berlin}\\Germany       |   ||| \$35.3M       |
```

File `file6.dat`

```
# quest.dat: data file for the examples of charts

#          |||||| Y axis label |||| Shift coefficient
AXISLABELS |||||| Percentage   |||| 1.5

#      | X pos | Y pos | Legend style | Color  ||| Y scale | Nb horiz
LEGEND | 0.2   | -0.3  | solid        | yellow ||| 2       | 3

# Aspects of the sets
#      | Style | Color     |||| Legend    | Legend scale
ASPECT | solid | red       |||| Yes       | 2
ASPECT | solid | LightBlue |||| No        | 2
ASPECT | solid | green     |||| No answer | 1.1

# Values for all the sets

# Yes
# Val.| Outside label
   76 | Supercomputer's user today?
   65 | Interested by MPP?
   32 | Already MPP user?

# No
    8
   22
   68

# No answer
   16
   13
    0
```

File `quest.dat`

```
# mark.dat: data file for the examples of charts

#     |||| Title of the figure
TITLE |||| Rate of mark for one french franc the 07/12/93

#          | X axis label | Scale ||| Shift coefficient
AXISLABELS | Hours        | 1.3   ||| 2.2

#          | Framebox style | F. color | Background style | B. color
BACKGROUND |                |          | solid            | green

#           |Scale| Grad. | X lines | X lines ||||| Major Y     | Major Y
#           |     | color | style   | color   ||||| lines style | lines color
GRADUATIONS | 1.5 | blue  | solid   | white   ||||| solid       | white

#     ||| Maj ticks color | Nb min ticks | Min ticks color
TICKS ||| white           | 2            | white

# Aspects of the set
#      | Style  | Color
ASPECT | solid  | yellow

# Value| Label
3.399  |  9h
3.4035 | 10
3.407  | 11
3.414  | 12
3.4085 | 13
3.407  | 14
3.41   | 15
3.4095 | 16
3.411  | 17
3.4185 | 18
3.414  | 19h
```

File `mark.dat`

```
# multsets.dat: data file for the examples of charts

#     |||| Title of the figure
TITLE |||| Multi sets example

#          | Framebox style | F. color | Background style | B. color
BACKGROUND |                |          | solid            | PaleGreen

#      | X pos | Y pos | Legend style | Color
LEGEND |       |       | solid        | Pink

# Aspects of the sets
#      | Style   | Color  ||| Dot style | Legend                   | Scale
ASPECT | solid   | red    |||           | Paul                     | FIXED
ASPECT | solid   | black  ||| square    | Willian Junior           | FIXED
ASPECT | solid   | yellow ||| triangle  | \textcolor{red}{Robert} | FIXED
ASPECT | solid   | cyan   ||| triangle* | John                     | FIXED

# Values for all the sets

# Set 1
# Value | Bottom label
 900    | JAN
1000    | FEB
 900    | MAR
1800    | \textcolor{red}{APR}
1200    | MAY
1400    | JUN

# Set 2
 750
 600
1000
1200
1100
1200

# Set 3
 600
 700
 600
1400
 800
 650

# Set 4
 450
 600
 700
1100
 450
 500
```

File `multsets.dat`

```
# livermor.dat: data file for the examples of charts

#     |||| Title of the figure
TITLE |||| Livermore loops (long vectors)
#          | X label | Scale ||| Shift coef | Y axis label ||| Position
AXISLABELS | Loops   | 0.8   ||| 1.5        | Megaflops/s  ||| 0.9
#          | Framebox style | F. color | Background style | B. color
BACKGROUND |                |          | solid            | LemonChiffon
#       | X pos | Y pos | Legend style
LEGEND |       |       | false

# Aspects of the sets
#       | Style   | Color     |||| Legend
ASPECT | solid   | green     |||| HP 9000/755
ASPECT | solid   | LightBlue |||| IBM RS6k/370
ASPECT | solid   | Pink      |||| DEC 3000/500

# Values for all the sets
# Value  | Label
# Set 1 : HP 9000/755
 60.4798 |  1
 23.3277 |  2
 59.2402 |  3
 56.0158 |  4
 27.4948 |  5
 40.6982 |  6
 67.8191 |  7
 79.1646 |  8
 60.3950 |  9
 23.1046 | 10
 17.1111 | 11
 19.5405 | 12
  9.7179 | 13
 12.8727 | 14
 24.9059 | 15
 15.8215 | 16
 23.5049 | 17
 54.3715 | 18
 33.8956 | 19
 28.6335 | 20
 91.6996 | 21
 15.8750 | 22
 50.1488 | 23
 15.6887 | 24

# Set 2 : IBM 370
 51.4064
 34.8516
 61.1549
 57.6013
 32.1230
 29.8952
106.5600
 71.7077
 57.3077
 13.2251
 26.0656
 24.3483
  3.5670
  5.9538
 10.3165
 11.5997
 22.8314
 31.7907
 32.2007
 14.6826
 30.7973
 10.4479
 34.3899
  6.7580

# Set 3 : DEC 3000/500
 48.2873
 18.7194
 28.9793
 15.9842
 15.9788
 14.9191
 89.3702
 60.8094
 38.9593
 10.5085
 15.3047
 37.3772
  7.8533
  6.3675
  7.0411
 16.8087
 20.9314
 26.1331
 20.3918
 12.5091
 71.3701
  9.7279
 30.4753
  9.1757
```

File `livermor.dat`

```
# dod.dat: data file for the examples of charts

#     | Title                                              | Scale | Shift
TITLE | \textcolor{red}{Military expanses of United States} | 1.3   | 1.2

#          |X axis label                              |||Pos|Shift|Y axis label
AXISLABELS |Source: Department of Defense of USA (1992)|||0  |3    |In \% of PNB

#          | Framebox style | F. color | Background style | B. color
BACKGROUND |                |          | solid            | LightBlue

#           || Grad. | X "major"   || X "major"  | X "minor"
#           || color | lines style || lines coef | lines style
GRADUATIONS ||       | solid       || 2          | solid

#     || Interval between major ticks marks || Number of minor ticks marks
TICKS || 2                                  || 0

# Aspects of the sets
#      | Style  | Color |||| Legend label
ASPECT | solid  | red
ASPECT | dotted | red   |||| false

# Val| Label      | Scale factor for labels

# Set 1: known values
 4.3 | \textcolor{blue}{1950} | 6
 4.6
 7
12.7
13.8
13.4
12.8
10.6
 9.7
 9.5
 9.6 | \textcolor{blue}{1960} | 6
 9.3
 9.1
 8.9
 8.5
 7.5
 7.9
 9.1
 9.5
 9.1
 8.5 | \textcolor{blue}{1970} | 6
 7.6
 6
 5.3
 5.4
 5.3
 5.1
 4.9
 4.6
 5
 5.2 | \textcolor{blue}{1980} | 6
 5.8
 6.3
 6.2
 6.5
 6.5
 6.4
 6.1
 6.1
 5.8
 5.6 | \textcolor{blue}{1990} | 6
 5.0
 5.2
4*undefined
undefined | \textcolor{blue}{1997} | 6

# Set 2: previsions
42*undefined
 5.2
 4.7
 4.3
 3.8
 3.3
 2.9
```

File dod.dat

```
% dod.add: adjunct to the chart generated with dod.data

\def\Period#1#2#3#4{%
\psframe[linestyle=none,fillstyle=solid,fillcolor=LemonChiffon](#1,0)(#2,14)
\rput[t](#3,17){\psshadowbox{#4}}
\psline[arrows=->,linewidth=2pt](#3,15)(#3,12.5)}

% Periods
\Period{1.5}{4.5}{3}{Koree war}
\Period{13.5}{26.5}{20}{Vietnam war}
\Period{31}{39}{35}{Reagan administration}

% Others precisions
\psline[arrows=<->,linecolor=red](43,2.5)(43,1.5)(48,1.5)(48,2.5)
\rput[b](45.5,0.5){\scaleboxto(1,0.2){\textcolor{red}{projections}}}
```

File dod.add