

# A Practical Introduction to the Lout Document Formatting System

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## A simple input file

```
@SysInclude { doc }  
@Doc @Text @Begin  
Hello, world  
@End @Text
```

## How to format it

```
lout filename > out.ps  
ghostview out.ps  
mpr out.ps
```

Hello, world

## Headings and paragraphs

```
@SysInclude { doc }
```

```
@Doc @Text @Begin
```

```
@Heading { Introduction }
```

```
@PP
```

The design of the Lout formatting system was undertaken with the needs of the @I { ordinary user } very much in mind.

```
@End @Text
```

## **Introduction**

The design of the Lout formatting system was undertaken with the needs of the *ordinary user* very much in mind.

## Displays

You certainly don't want to return to his office and report:

```
@IndentedDisplay @I {  
  'I can't find an efficient algorithm, I  
  guess I'm just too dumb.'  
}
```

To avoid serious damage to your position in the company, it would be better if ...

You certainly don't want to return to his office and report:

*'I can't find an efficient algorithm, I guess I'm just too dumb.'*

To avoid serious damage to your position in the company, it would be better if ...

## Paragraph breaking styles

You certainly don't want to return to his office and report:

```
@ID { ragged nohyphen } @Break @I {  
'I can't find an efficient algorithm, I  
guess I'm just too dumb.'  
}
```

To avoid serious damage to your position in the company, it would be better if ...

You certainly don't want to return to his office and report:

*'I can't find an efficient algorithm, I guess I'm just too dumb.'*

To avoid serious damage to your position in the company, it would be better if ...

## Lists

```
@Heading { Operating Instructions }  
@NumberedList  
@ListItem { Press small green lever. }  
@ListItem { Wait approximately 10 seconds  
until red light flashes. }  
@ListItem { If smoke emerges from rear of unit,  
call Service Department. }  
@EndList
```

## **Operating Instructions**

1. Press small green lever.
2. Wait approximately 10 seconds until red light flashes.
3. If smoke emerges from rear of unit, call Service Department.

## Technical reports

@SysInclude { report }

@Report

  @Title { ... }

  @Author { ... }

  @Institution { ... }

  @DateLine { ... }

//

@Abstract { ... }

@Section { ... }

@Section { ... }

@Section { ... }

@Appendix { ... }

@Appendix { ... }

## Sections

@Section

  @Tag { dfs }

  @Title { Depth-first search }

@Begin

@PP

We turn now to our first algorithm  
on general graphs ...

@End @Section

## **10.6. Depth-first search**

We turn now to our first algorithm on general graphs ...

## Cross references

For further information, consult  
Section @NumberOf dfs on page  
@PageOf { dfs }.

For further information, consult  
Section 10.6 on page 245.

## References

@Database @Reference { myrefs }

...

For the details, consult the User's  
Guide @Cite { \$kingston1995lout.user }.

For the details, consult the User's Guide [1].

...

## References

1. Jeffrey H. Kingston. *A User's Guide to the Lout Document Formatting System (Version 3)*. Basser Department of Computer Science, University of Sydney, 1995.
2. ...

## Database file myrefs.ld

```
{ @Reference
  @Tag { kingston1995lout.user }
  @Type { Book }
  @Author { Jeffrey H. Kingston }
  @Title { A User's Guide to the Lout
Document Formatting System (Version 3) }
  @Institution { Basser Department of
Computer Science }
  @Address { University of Sydney
2006, Australia }
  @Year { 1994 }
}
```

## **Books (and theses)**

- Title page, preface, introduction
- Automatic table of contents
- Prefatory pages numbered in Roman numerals
- Chapters, sections, subsections, appendices
- References at end of chapters or book
- Running page headers
- Odd-even page formats
- Sorted index

## Making a sorted index

@PP

There are several possible ways to implement the  
@I Partition procedure,

partition @Index { @I Partition (in {@I Quicksort}) }  
but the following seems to be the best. Starting ...

## Index

...

partial order, 227

*Partition* (in *Quicksort*), 189

postorder traversal

    of binary tree, 19

    topological ordering, 229

...

## Equation formatting

`@SysInclude { eq }`

...

Since `@Eq {  $T(n-i) = T(0) = 0$  }` we have

`@IndentedDisplay @Eq {`

`$T(n) = \text{big sum from } i=0 \text{ to } n-1 \ 2^{\sup i} = 2^{\sup n - 1}$`   
`}`

for the number of disk moves made by the Towers of Hanoi algorithm, given `@Eq {  $n$  }` disks.

Since  $T(n - i) = T(0) = 0$  we have

$$T(n) = \sum_{i=0}^{n-1} 2^i = 2^n - 1$$

for the number of disk moves made by the Towers of Hanoi algorithm, given  $n$  disks.

## Another equation

```
@CenteredDisplay @Eq {  
  big int supp 1 on 0 '  
  dx over sqrt { 1 - x sup 2 }  
  = pi over 2  
}
```

$$\int_0^1 \frac{dx}{\sqrt{1-x^2}} = \frac{\pi}{2}$$

## Tables

```
@SysInclude { tab }  
...  
@Tab  
  @Fmta { @Col @I A ! @Col B }  
{  
  @Rowa  
    A { Fortran }  
    B { The first ... language }  
  @Rowa  
    A { Algol-60 }  
    B { Said to be ... successors }  
  @Rowa  
    A { Pascal }  
    B { The famous ... successors }  
}
```

<i>Fortran</i>	The first high-level programming language
<i>Algol-60</i>	Said to be a better language than most of its successors
<i>Pascal</i>	The most famous of Algol-60's successors

## Another table

@Tab

hmargin { 0.4c }

vmargin { 0.3v }

side { single }

@Fmta { @Col @B @CC X @Over A,B,C }

@Fmtb { @Col @I A ! @Col B !! @Col C }

{

@Rowa above { single }

X { Value of mathematical ... dollars) }

@Rowb above { double }

A { Quadratic formula }

B { @Eq {  $x = \{ \dots \} \text{ over } 2a$  } }

C {  $3^{.5}$  }

@Rowb below { single }

A { Binomial theorem }

B { @Eq {  $(a + b)^n = \dots b^{n-k}$  } }

C {  $12^{\wedge}$  }

}

Value of mathematical formulae (millions of dollars)		
Quadratic formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	3.5
Binomial theorem	$(a + b)^n = \sum_{k=0}^{\infty} \binom{n}{k} a^k b^{n-k}$	12

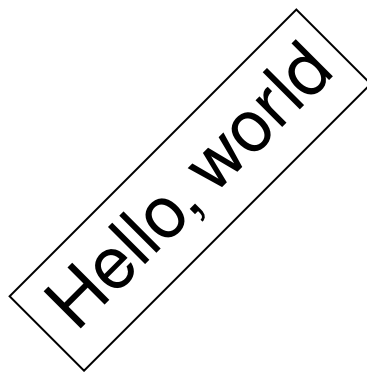
## Pascal programs

```
@SysInclude { pas }  
...  
@ID @Pas {  
  procedure DoPriAbstract(root: PriEntry);  
  begin  
    if root^.leftchild <> nil then begin  
      DoPriAbstract(root^.leftchild);  
      write(', ');  
    end;  
    PriKeyAbstract(root^.key);  
    write(':');  
    PriValueAbstract(root^.value);  
    if root^.rightchild <> nil then begin  
      write(', ');  
      DoPriAbstract(root^.rightchild);  
    end;  
  end;  
end;  
}
```

```
procedure DoPriAbstract(root: PriEntry);  
begin  
  if root↑.leftchild ≠ nil then begin  
    DoPriAbstract(root↑.leftchild);  
    write(' ', ' ');  
  end;  
  PriKeyAbstract(root↑.key);  
  write(':');  
  PriValueAbstract(root↑.value);  
  if root↑.rightchild ≠ nil then begin  
    write(' ', ' ');  
    DoPriAbstract(root↑.rightchild);  
  end;  
end;
```

## Basic graphics

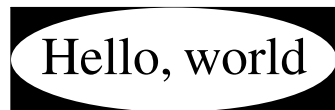
```
45d @Rotate 1.5 @Scale @Box {  
    Hello, world  
}
```



Hello, world

## Advanced graphics

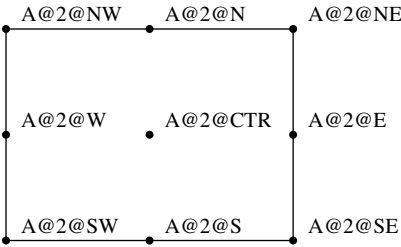
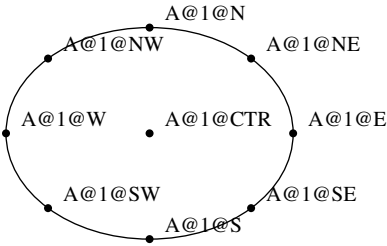
```
@SysInclude { fig }  
...  
@Fig {  
  @Box  
    margin { 0c }  
    paint { black }  
  @Ellipse  
    linestyle { noline }  
    paint { white }  
  { Hello, world }  
}
```



Hello, world

## Point labelling

```
@Fig {  
A::  
{  
  1:: @Ellipse { 3c @Wide 2c @High }  
  //3c  
  2:: @Box { 3c @Wide 2c @High }  
}  
@ShowLabels  
}
```



## Graphs

@Graph

abovecaption { New South Wales road deaths  
(per 100 million vehicle km) }

{

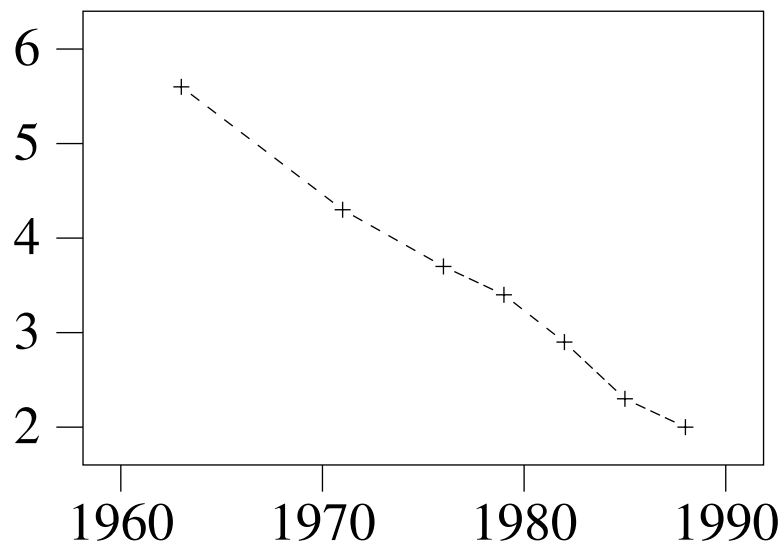
@Data points { plus } pairs { dashed }

{ 1963 5.6 1971 4.3 1976 3.7 1979 3.4

1982 2.9 1985 2.3 1988 2.0 }

}

### New South Wales road deaths (per 100 million vehicle km)



```

-2p @Font @Graph
  style { axes }
  xorigin { 0 } yorigin { 0 }
  xticks { 10@ 50@ 100@ 200@ 500@ }
  objects { @NE at { 300 2 } @I { Exponential }
    @SE at { ... } @I { Uniform } }
  belowcaption { @I n }
{
  @Data points { filledcircle } { ... }
  @Data points { filledcircle } { ... }

  @Data pairs { dashed }
  { 10 2 500 2 }

  @Data pairs { dashed }
  {
    xloop from { 10 } to { 500 } by { 20 } do
    {
      x sqrt { pi*x / 4 } + 1
    }
  }
}

```

