Introduction to Scientific Working

Aart Middeldorp

Outline

1. **LaTeX**
2. **H Index**
3. **DBLP**
4. **TikZ**

Keywords

acknowledgement · awards · beamer · bibliography · CORE ranking · DBLP · conference · editorial board · generative AI · Google Scholar · h–index · impact factor · journal · LaTeX · LIPIcs · LNCS · open access · plagiarism · presentation · program committee · rebuttal · review · submission · TikZ · workshop · ···

Types of Scientific Works

- seminar report
- bachelor thesis
- master thesis
- PhD thesis
- habilitation thesis
- workshop paper
- conference paper
- journal article
- book chapter
- book

Outline

binary operation symbols

$\amalg$	\amalg	$\circ$	\circ	$\ominus$	\ominus	$\star$	\star
$*$	\ast	$\cup$	\cup	$\oplus$	\oplus	$\times$	\times
$\bigcirc$	\bigcirc	$\dagger$	\dagger	$\oslash$	\oslash	$\triangleleft$	\triangleleft
$\bigtriangledown$	\bigtriangledown	$\ddagger$	\ddagger	$\otimes$	\otimes	$\triangleright$	\triangleright
$\bigtriangleup$	\bigtriangleup	$\diamond$	\diamond	$\pm$	\pm	$\uplus$	\uplus
$\bullet$	\bullet	$\div$	\div	$\setminus$	\setminus	$\vee$	\vee
$\cap$	\cap	$\mp$	\mp	$\sqcap$	\sqcap	$\wedge$	\wedge
$\cdot$	\cdot	$\odot$	\odot	$\sqcup$	\sqcup	$\wr$	\wr

- binary operation symbols

$\amalg$	`\amalg`	$\circ$	`\circ`	$\ominus$	`\ominus`	$\star$	`\star`
$*$	`\ast`	$\cup$	`\cup`	$\oplus$	`\oplus`	$\times$	`\times`
$\bigcirc$	`\bigcirc`	$\dagger$	`\dagger`	$\oslash$	`\oslash`	$\triangleleft$	`\triangleleft`
$\bigtriangledown$	`\bigtriangledown`	$\ddagger$	`\ddagger`	$\otimes$	`\otimes`	$\triangleright$	`\triangleright`
$\bigtriangleup$	`\bigtriangleup`	$\diamond$	`\diamond`	$\pm$	`\pm`	$\uplus$	`\uplus`
$\bullet$	`\bullet`	$\div$	`\div`	$\setminus$	`\setminus`	$\vee$	`\vee`
$\cap$	`\cap`	$\mp$	`\mp`	$\sqcap$	`\sqcap`	$\wedge$	`\wedge`
$\cdot$	`\cdot`	$\odot$	`\odot`	$\sqcup$	`\sqcup`	$\wr$	`\wr`
$\unlhd$	`\unlhd`	$\unrhd$	`\unrhd`	$\rhd$	`\rhd`	$\lhd$	`\lhd`

- `latexsym` package provides additional operation symbols

- binary relation symbols

$\approx$	\approx	$\geq$	\geq	$\perp$	\perp	$\sqsupseteq$	\sqsupseteq
$\asymp$	\asymp	$\gg$	\gg	$\prec$	\prec	$\subset$	\subset
$\bowtie$	\bowtie	$\leq$	\leq	$\preceq$	\preceq	$\subseteq$	\subseteq
$\cong$	\cong	$\ll$	\ll	$\propto$	\propto	$\succ$	\succ
$\dashv$	\dashv	$\mid$	\mid	$\sim$	\sim	$\succeq$	\succeq
$\doteq$	\doteq	$\models$	\models	$\simeq$	\simeq	$\supset$	\supset
$\equiv$	\equiv	$\neq$	\neq	$\smile$	\smile	$\supseteq$	\supseteq
$\frown$	\frown	$\parallel$	\parallel	$\sqsubseteq$	\sqsubseteq	$\vdash$	\vdash

- binary relation symbols

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$\dashv$	`\dashv`	$\mid$	`\mid`	$\sim$	`\sim`	$\succeq$	`\succeq`
$\doteq$	`\doteq`	$\models$	`\models`	$\simeq$	`\simeq`	$\supset$	`\supset`
$\equiv$	`\equiv`	$\neq$	`\neq`	$\smile$	`\smile`	$\supseteq$	`\supseteq`
$\frown$	`\frown`	$\parallel$	`\parallel`	$\sqsubseteq$	`\sqsubseteq`	$\vdash$	`\vdash`
$\bowtie$	`\Join`	$\sqsubset$	`\sqsubset`	$\sqsupset$	`\sqsupset`		

- `latexsym` package provides additional relation symbols

▸ arrows

$\downarrow$	\downarrow	$\longleftarrow$	\longleftarrow	$\swarrow$	\swarrow
$\Downarrow$	\Downarrow	$\Longleftarrow$	\Longleftarrow	$\rightarrow$	\rightarrow
$\hookleftarrow$	\hookleftarrow	$\longleftrightarrow$	\longleftrightarrow	$\Rightarrow$	\Rightarrow
$\hookrightarrow$	\hookrightarrow	$\Longleftrightarrow$	\Longleftrightarrow	$\rightharpoondown$	\rightharpoondown
$\leftarrow$	\leftarrow	$\longmapsto$	\longmapsto	$\rightharpoonup$	\rightharpoonup
$\Leftarrow$	\Leftarrow	$\longrightarrow$	\longrightarrow	$\rightleftharpoons$	\rightleftharpoons
$\leftharpoondown$	\leftharpoondown	$\Longrightarrow$	\Longrightarrow	$\uparrow$	\uparrow
$\leftharpoonup$	\leftharpoonup	$\mapsto$	\mapsto	$\Uparrow$	\Uparrow
$\leftrightarrow$	\leftrightarrow	$\nwarrow$	\nwarrow	$\updownarrow$	\updownarrow
$\Leftrightarrow$	\Leftrightarrow	$\searrow$	\searrow	$\Updownarrow$	\Updownarrow

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$\leftharpoondown$	\leftharpoondown	$\Longrightarrow$	\Longrightarrow	$\uparrow$	\uparrow
$\leftharpoonup$	\leftharpoonup	$\mapsto$	\mapsto	$\Uparrow$	\Uparrow
$\leftrightarrow$	\leftrightarrow	$\nwarrow$	\nwarrow	$\updownarrow$	\updownarrow
$\Leftrightarrow$	\Leftrightarrow	$\searrow$	\searrow	$\Updownarrow$	\Updownarrow

$\rightsquigarrow$ \leadsto (latexsym package)

```
\documentclass{beamer}

\usetheme{AnnArbor}

\begin{document}

\title{Great Talk}
\subtitle{Really?}
\author{Aart Middeldorp}
\institute{University of Innsbruck
\date{7 May 2025}

\begin{frame}
\titlepage
\end{frame}

...

\end{document}
```

src

```
\documentclass{beamer}
\usetheme{AnnArbor}
\begin{document}
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- beamer document class for creating presentations

```
\documentclass{beamer}
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...
\end{document}
```

src

- `beamer` document class for creating presentations
- pre–designed themes change look

Presentation Themes

- AnnArbor
- Antibes
- Bergen
- Berkeley
- Berlin
- Boadilla
- boxes
- CambridgeUS
- Copenhagen
- Darmstadt
- default
- Dresden
- EastLansing
- Frankfurt
- Goettingen
- Hannover
- Ilmenau
- JuanLesPins
- Luebeck
- Madrid
- Malmoe
- Marburg
- Montpellier
- PaloAlto
- Pittsburgh
- Rochester
- Singapore
- Szeged
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UIBK Theme

`https://git.uibk.ac.at/uibklatex/beamer_letter/-/releases/v0.3.0`

```
\begin{frame}{Outline}
\tableofcontents
\end{frame}
```

```
\begin{frame}{Outline}
\tableofcontents
\end{frame}
\begin{frame}{Block Environments}
\begin{block}{Block}
\end{block}




\end{frame}
```

```
\begin{frame}{Outline}
\tableofcontents
\end{frame}
\begin{frame}{Block Environments}
\begin{block}{Block}
\end{block}
\begin{exampleblock}{Example Block}
\end{exampleblock}



\end{frame}
```

```
\begin{frame}{Outline}
\tableofcontents
\end{frame}
\begin{frame}{Block Environments}
\begin{block}{Block}
\end{block}
\begin{exampleblock}{Example Block}
\end{exampleblock}
\begin{alertblock}{Alert Block}
\end{alertblock}
\end{frame}
```

```
\begin{frame}{Outline}
\tableofcontents
\end{frame}
\begin{frame}{Block Environments}
\begin{block}{Block}
\end{block}
\begin{exampleblock}{Example Block}
\end{exampleblock}
\begin{alertblock}{Alert Block}
\end{alertblock}
\end{frame}
```

src

Outline

H Index

- metric that measures both productivity and citation impact of publications

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- maximum value h such that at least h publications have each at least h citations

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Computer Science (Selection)

- 253 Yoshua Bengio

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Computer Science (Selection)

- 253 Yoshua Bengio
- 125 Moshe Y. Vardi
- 123 Thomas A. Henzinger

H Index

- metric that measures both productivity and citation impact of publications
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- intially proposed by Jorge E. Hirsch
- i10 index counts publications that have at least 10 citations

Computer Science (Selection)

- 253 Yoshua Bengio
- 125 Moshe Y. Vardi
- 123 Thomas A. Henzinger

Google Scholar

H Index

- metric that measures both productivity and citation impact of publications
- maximum value h such that at least h publications have each at least h citations
- intially proposed by Jorge E. Hirsch
- i10 index counts publications that have at least 10 citations
- h5 index for journals

Computer Science (Selection)

- 253 Yoshua Bengio
- 125 Moshe Y. Vardi
- 123 Thomas A. Henzinger

Google Scholar

Outline


dblp
computer science bibliography

- online reference for bibliographic information on major computer science publications

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- more than 7 million publications by more than 3 million authors

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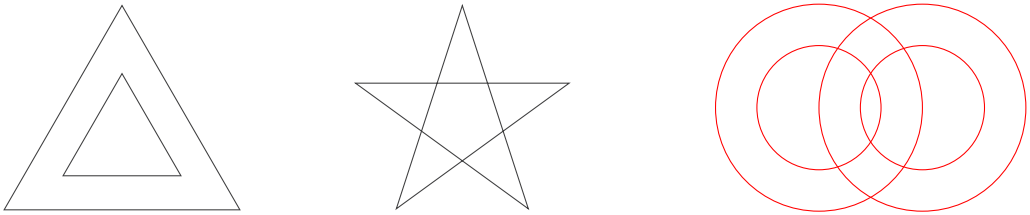
- created in 1993 by DataBase Systems and Logic Programming research group at University of Trier
- since 2018 operated and maintained by Schloss Dagstuhl – Leibniz Center for Informatics

Outline

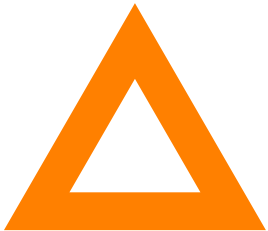
Paths and Filling

```
\usetikzlibrary{scopes}
\draw (90:2) -- (210:2) -- (330:2) -- cycle
      (90:1) -- (330:1) -- (210:1) -- cycle;
{ [shift={(5cm,3.5mm)}, scale=1.65]
  \draw (90:1) -- (234:1) -- (18:1) -- (162:1) -- (306:1) -- cycle; }
{ [shift={(11cm,5mm)}, scale=0.76]
  \draw (-1,0) circle (1.2) (-1,0) circle (2);
  \draw (1,0)  circle (1.2)  (1,0) circle (2); }
```



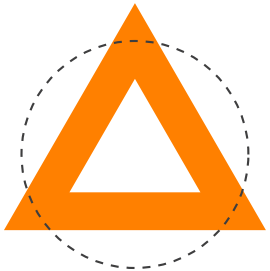
Clipping

```
\fill[orange]
  (90:2) -- (210:2) -- (330:2) -- cycle
  (90:1) -- (330:1) -- (210:1) -- cycle;
```



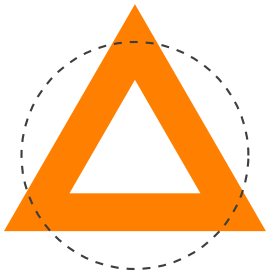
Clipping

```
\fill[orange]
  (90:2) -- (210:2) -- (330:2) -- cycle
  (90:1) -- (330:1) -- (210:1) -- cycle;
\draw[dashed,thick] (0,0) circle[radius=1.5];
```



Clipping

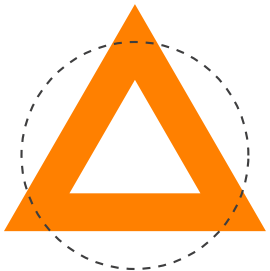
```
\clip (0,0) circle[radius=1.5];
\fill[orange]
  (90:2) -- (210:2) -- (330:2) -- cycle
  (90:1) -- (330:1) -- (210:1) -- cycle;
```

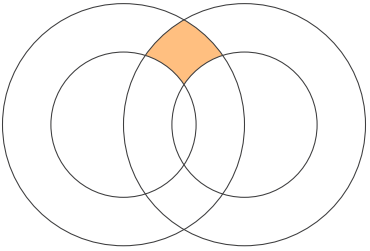


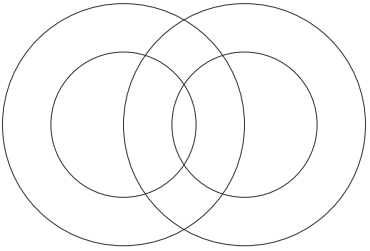
Clipping

```
\clip (0,0) circle[radius=1.5];
\fill[orange]
  (90:2) -- (210:2) -- (330:2) -- cycle
  (90:1) -- (330:1) -- (210:1) -- cycle;
```

src



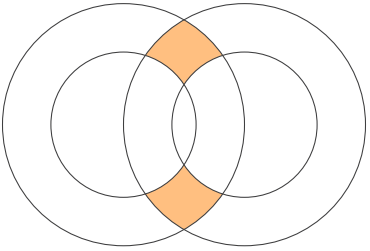




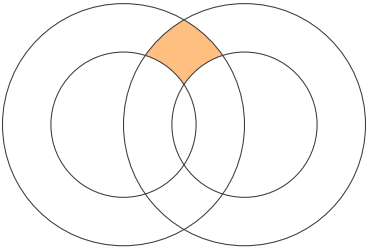
```
\begin{tikzpicture}
  \draw (-1,0) circle (1.2) (-1,0) circle (2);
  \draw  (1,0) circle (1.2)  (1,0) circle (2);
\end{tikzpicture}
```

```
\begin{tikzpicture}
  \fill[orange!50] (-1,0) circle (1.2) (-1,0) circle (2);
  \fill[orange!50]  (1,0) circle (1.2)  (1,0) circle (2);
\end{tikzpicture}
```

```
\begin{tikzpicture}[even odd rule]
  \fill[orange!50] (-1,0) circle (1.2) (-1,0) circle (2);
  \fill[orange!50]  (1,0) circle (1.2)  (1,0) circle (2);
\end{tikzpicture}
```



```
\begin{tikzpicture}[even odd rule]
\begin{scope}
  \clip (-1,0) circle (1.2) (-1,0) circle (2);
  \fill[orange!50] (1,0) circle (1.2) (1,0) circle (2);
\end{scope}
  \draw (-1,0) circle (1.2) (-1,0) circle (2);
  \draw  (1,0) circle (1.2)  (1,0) circle (2);
\end{tikzpicture}
```

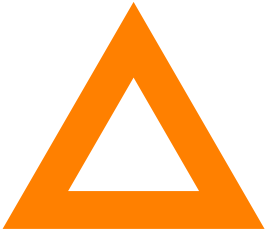


```
\begin{tikzpicture}[even odd rule]
\begin{scope}
  \clip (-1,0) circle (1.2) (-1,0) circle (2);
  \clip (-3,0) rectangle (3,2);
  \fill[orange!50] (1,0) circle (1.2) (1,0) circle (2);
\end{scope}
  \draw (-1,0) circle (1.2) (-1,0) circle (2);
  \draw  (1,0) circle (1.2)  (1,0) circle (2);
\end{tikzpicture}
```

src

Shading

```
\fill[orange]
  (90:2) -- (210:2) -- (330:2) -- cycle
  (90:1) -- (330:1) -- (210:1) -- cycle;
```



Shading

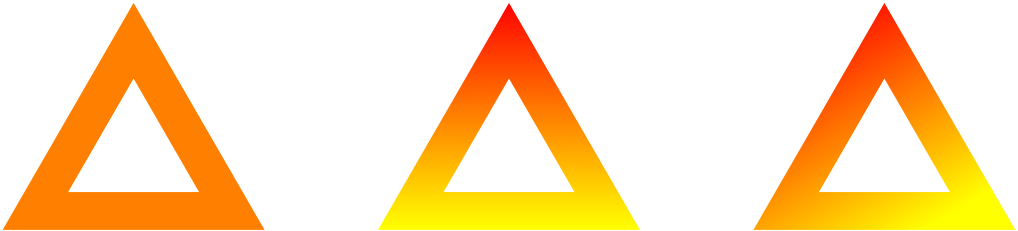
```
\usetikzlibrary{shadings}

\shade[top color=red, bottom color=yellow]
  (90:2) -- (210:2) -- (330:2) -- cycle
  (90:1) -- (330:1) -- (210:1) -- cycle;
```

Shading

```
\usetikzlibrary{shadings}

\shade[top color=red, bottom color=yellow, shading angle=30]
  (90:2) -- (210:2) -- (330:2) -- cycle
  (90:1) -- (330:1) -- (210:1) -- cycle;
```

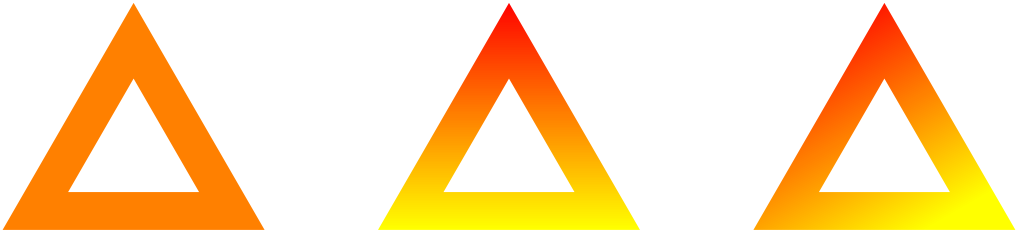


Shading

```
\usetikzlibrary{shadings}

\shade[top color=red, bottom color=yellow, shading angle=30]
  (90:2) -- (210:2) -- (330:2) -- cycle
  (90:1) -- (330:1) -- (210:1) -- cycle;
```

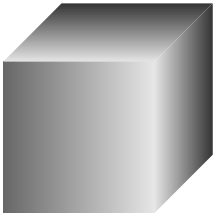
src



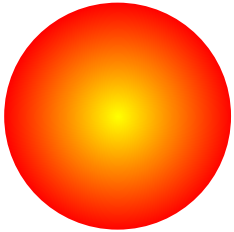
```
\shade[left color=black!60, right color=black!10]
    (0,0,0) -- (1,0,0)  -- (1,1,0)  -- (0,1,0);
\shade[left color=black!10, right color=black!80]
    (1,0,0) -- (1,0,-1) -- (1,1,-1) -- (1,1,0);
\shade[bottom color=black!10, top color=black!80]
    (0,1,0) -- (0,1,-1) -- (1,1,-1) -- (1,1,0);
```

```
\shade[left color=black!60, right color=black!10]
    (0,0,0) -- (1,0,0)  -- (1,1,0)  -- (0,1,0);
\shade[left color=black!10, right color=black!80]
    (1,0,0) -- (1,0,-1) -- (1,1,-1) -- (1,1,0);
\shade[bottom color=black!10, top color=black!80]
    (0,1,0) -- (0,1,-1) -- (1,1,-1) -- (1,1,0);
```

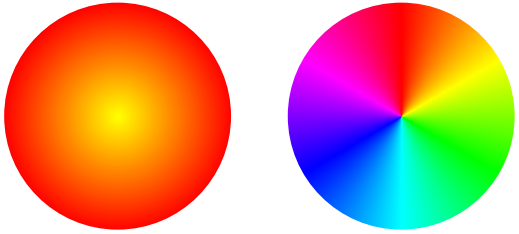
src



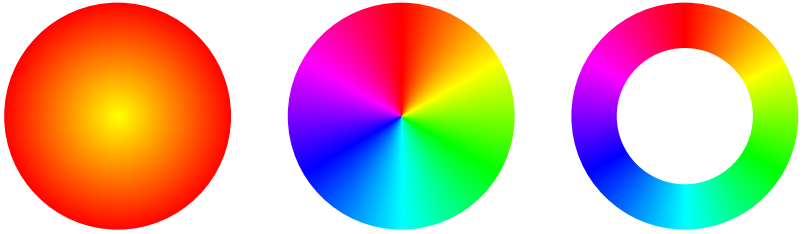
```
\usetikzlibrary{shadings}
\shade[inner color=yellow, outer color=red] (0,0) circle (1);
```



```
\usetikzlibrary{shadings}
\shade[inner color=yellow, outer color=red] (0,0) circle (1);
\shade[shading=color wheel] (2.5,0) circle (1);
```



```
\usetikzlibrary{shadings}
\shade[inner color=yellow, outer color=red] (0,0) circle (1);
\shade[shading=color wheel] (2.5,0) circle (1);
\shade[shading=color wheel, even odd rule]
    (5,0) circle (0.6) (5,0) circle (1);
```



```
\usetikzlibrary{shadings}
\shade[inner color=yellow, outer color=red] (0,0) circle (1);
\shade[shading=color wheel] (2.5,0) circle (1);
\shade[shading=color wheel, even odd rule]
    (5,0) circle (0.6) (5,0) circle (1);
\shade[shading=color wheel white center] (7.5,0) circle (1);
```

src