# TikZ picture
## 사용설명서

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# 사용 준비 I

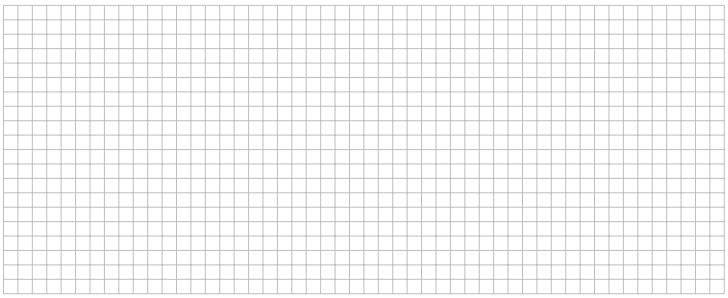
## packag

```
\usepackage { tikz }
\usetikzlibrary {shapes,arrows,positioning}

\begin { tikzpicture }
    code
\end { tikzpicture }
```

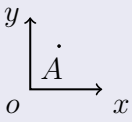
그림으로 삽입하고자 하는 경우 \begin { figure } \end { figure } 안에 넣으면 된다

## draw help line

```
\draw [ help lines, step=.2, color=lightgray ]
(0 , 0) grid ( 10, 4) ;
```



## 좌표축



# Node

## Node

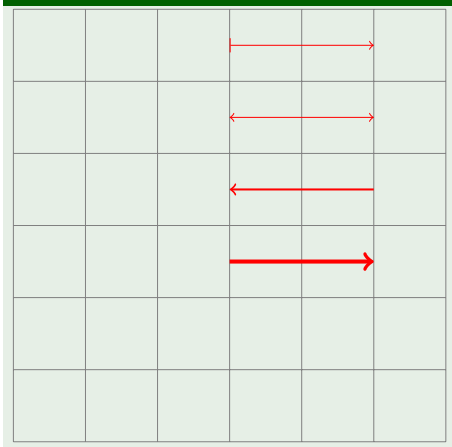
\node ( 노드이름 ) at ( 0 , 0 ) { 내용 }
\node [ shape=형태 ] ( 노드이름 ) [ 위치 ] { 내용 }

# 예제 : 선의 두께

## 선의 두께 종류

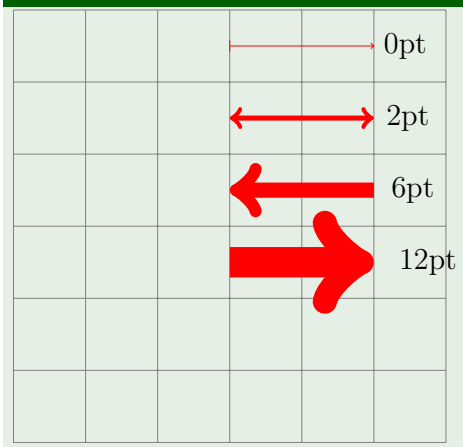
ultra thin
very thin
thin
semithick
thick
very thick
ultra thick

## Example



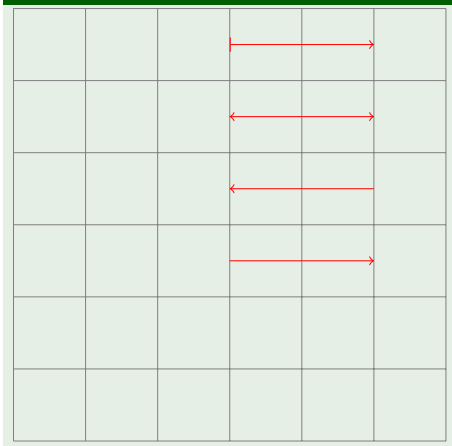
## 선의 두께 : 사용자 정의

## Example



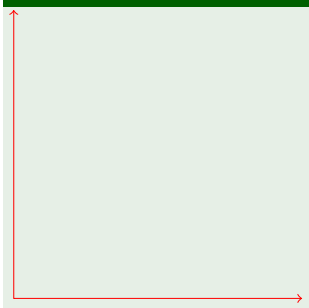
# 선의 끝부분 형태

## Example



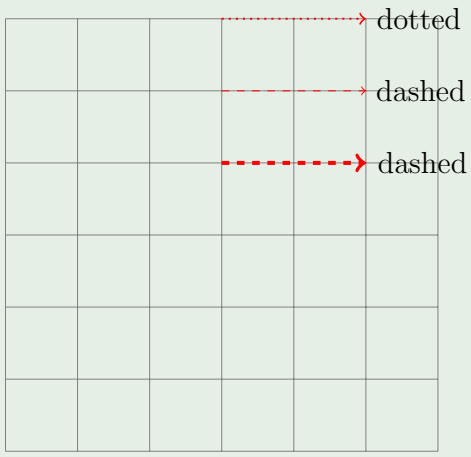
## 선의 끝부분 형태지정을 활용한 좌표축 그림

## Example



# 예제 : 선의 종류 : 데쉬와 도트

## Example



# 선의 색깔

## 선의 색깔 종류

red
green
blue
cyan
magenta
yellow
black
gray
darkgray
lightgray
brown
lime
olive
orange
pink
purple
teal
violet
white

# 기본 그리기 명령 : 선그리기

## Draw

\draw ( _ , _ ) -- ( _ , _ ) ;
\draw [ verythin, red ] ( _ , _ ) -- ( _ , _ ) ;

## Example



## Path

\path ( a , b )
\path ( $\alpha$ : rim )
$\alpha$ : angle
rim : radius

## Path [ line ]

## Example

\tikzstyle{line} = [ draw , -latex]
\begin{tikzpicture}
\path [line] (0,0)–(1,0);
\end{tikzpicture}

## Example



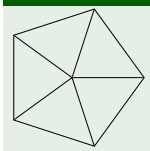
## Example

# 기본 그리기 명령

## Example

```
\begin { tikzpicture}
% Define the points of a regular pentagon
\path (0,0) coordinate (origin) ;
\path (0 : 1cm) coordinate (P0 ) ;
\path (1*72 : 1cm) coordinate (P1 ) ;
\path (2*72 : 1cm) coordinate (P2 ) ;
\path (3*72 : 1cm) coordinate (P3 ) ;
\path (4*72 : 1cm) coordinate (P4 ) ;
% Define the points of a regular pentagon
\draw (p0) -- (p1) -- (p2) -- (p3) -- (p4) -- cycle;
% Add spokes
\draw (origin) -- (p0) (origin) -- (p1) (origin) -- (p2) (origin) -- (p3) (origin) -- (p4);
\end {tikzpicture }
```

## Example



# 기본 그리기 명령 : node

## node

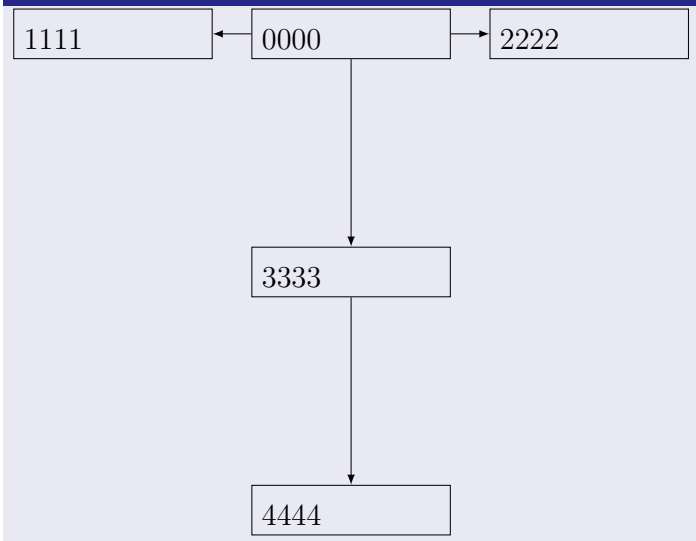
### node block

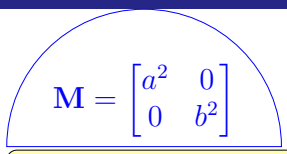
```
\tikzstyle {block} = [ rectangle, draw, text width=6em, text height=1em]
\tikzstyle{line} = [ draw , -latex]
\begin{tikzpicture}[node distance = 8em and 2em, auto]

\node [block] (b0)  0000
\node [block, left of=b0 ] (b1)  1111
\node [block, right of=b0 ] (b2)  1111
\node [block, below of=b0 ] (b3)  1111
\node [block, below of=b3 ] (b4)  1111
\path [line] (b0) -- (b1)
\path [line] (b0) -- (b2)
\path [line] (b0) -- (b3)
\path [line] (b3) -- (b4)
\end{tikzpicture}
```

- block스타일 정의에서 넓이
- block스타일 정의에서 높이
- line의 -retex의 의미
- block의 배치
  - left
  - right
  - below
  - above

distance의 8 과 2의 의미

### node






A minipage with an enumeration:

1. an item,
2. another item.

# positing 라이버러리 사용

## node distance

\node [block, below of=b0 ] (b3) { 3333 };
\node [block, below=2em of b0 ] (b3) { 3333 };

## xshift, yshift

xshift = -2em
yshift = -2em

## node distance

\begin{tikzpicture}[node distance = 8em and 2em, auto]

# Placing Nodes

## Placing Nodes Using at syntax

\node at ( − , − )

## Placing Nodes Using Relative Placement

\node [below of=−− ] (b3) { 3333 };
\node [above of=−− ] (b3) { 3333 };
\node [left of=−− ] (b3) { 3333 };
\node [right of=−− ] (b3) { 3333 };

## Placing Nodes Using Anchors

\node [anchor=north west] (b3) { 3333 };
\node [anchor=north ] (b3) { 3333 };
\node [anchor=north east] (b3) { 3333 };
\node [anchor=west] (b3) { 3333 };
\node [anchor=east] (b3) { 3333 };
\node [base] (b3) { 3333 };

TikZ picture

# Tikz Style

## Tikz Style

\tikzstyle {block} = [ rectangle, draw, text width=6em, text height=1em]
\tikzstyle{line} = [ draw , -latex]

## width, height

text width = 6em
text height = 6em
minimum width = 6em
minimum height = 6em

## Tikz Style

round corners
text centered
draw=black
fill=red!30

## trapezium

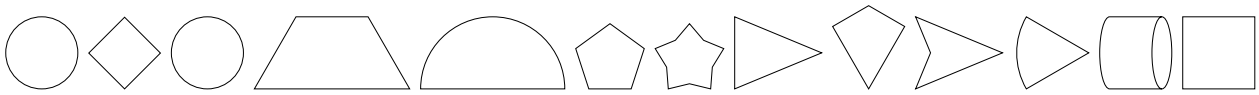
trapezium left angle=70
trapezium right angle=110

# Shape Library

# Shape Library: Predefined Shapes

## shape

- circle
- diamond
- ellipse
- trapezium
- semicircle
- regular polygon
- star
- isosceles triangle
- kite
- dart
- circular sector
- cylinder
- rectangle
- coordinate



## 원 그리기 예제

```
\begin {tikzpicture}
\draw (0,0) circle (0.5);
\end{tikzpicture}
```

## Example

## 원 그리기 예제

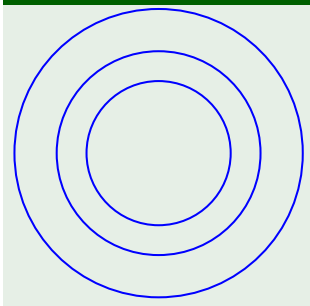
```
\begin {tikzpicture}
\path node [shape=circle, draw, color=red] {hello};
\end{tikzpicture}
```

## Example

## 원 그리기 예제

```
\begin {tikzpicture}
\draw [blue] (0,0) rectangle (2,4);
\draw[blue,thick] (0,0) circle [radius=1cm] ;
\draw[blue,thick] (0,0) circle [radius=1.414cm] ;
\draw[blue,thick] (0,0) circle [radius=2cm] ;
\end{tikzpicture}
```

## Example



# Shape Library: Symbol Shapes

## shape

forbidden sign
magnifying glass
cloud
starburst
signal
tape

# Shape Library: Arrow Shapes

## Arrow shape

# Shape Library: Shapes with Multple Text parts

## Shapes with Multple Text parts

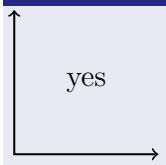
# Shape Library: Callout Shapes

## Callout Shapes

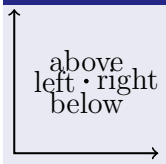
Text

# Text

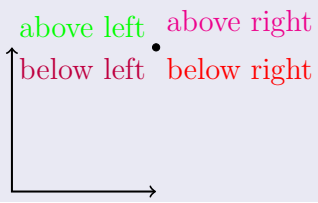
## Text 배치

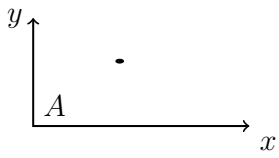



## 아래위 좌우에 배치




## 혼합해서 배치



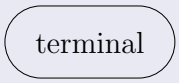
# flowchart

# flowchart

## flowchart 사용준비

```
\usepackage {flowchart}
\usetikzlibrary {arrows}
```

### Process

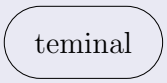


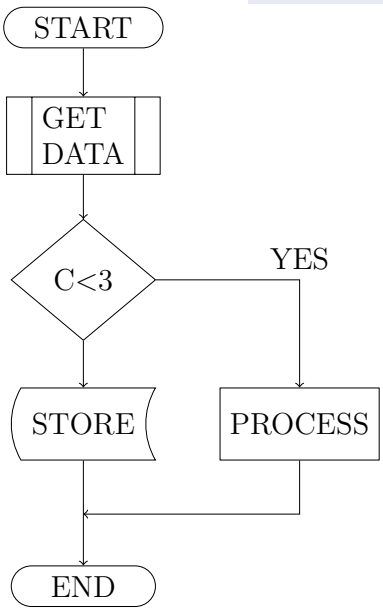

### Decision

### Predefined Process

### Storage

### Terminal



# 구조계산 그림

# 특수문자 : 구조 계산 그림용 package marvosym

## 특수문자 : 구조 계산 그림용 package marvosym

\usepackage {marvosys}

### 모델링

- \Beam
- \Force
- \Lineload
- \Lefttorque
- \Righttorque
- \Fixedbearing
- \Bearing
- \Loosebearing
- \Rectpipe
- \Squarepipe
- \Circpipe

### 단면

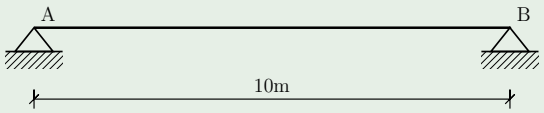
- \Circsteel
- \Octosteel
- \Hexasteel
- \Squaresteel
- \Rectsteel
- \Tsteel
- \RoundedTsteel
- \TTsteel
- \RoundedTTsteel
- \Flatsteel
- \Lsteel
- \RoundedLsteel

# structuralan alysis : 사용준비

## structural analysis 사용준비

```
\usepackage{structuralanalysis}
\usepackage{3dstructuralanalysis}
```

## Example




```
\begin{tikzpicture}
\point{a}{0}{0}; \point{}{10}{0};
\notation{1}{a}{A}; \notation{1}{b}{B};
\beam{2}{a}{b}[0][1];
\support{1}{a}[0]; \support{1}{b}[0];
\dimensioning{1}{a}{b}{-1.5}[10m]
\end{tikzpicture}
```

# structural analysis : 명령어

## structural analysis 사용준비

\scaling
\point
\beam
\support
\hinge
\load
\lineload
\temperature
\internalforces
\dimensioning
\influenceline
\notation
\addon

# scaling

## scaling

```
\scaling {scaling_value};
```

# point

## point

\point{name}{x-coordiante}{y-coordiante};

# beam

## beam

\beam{type}{initial point}{end point} [rounded initial point][rounded end point];

## beam

beam + 보강재 \beam{1}
{initial point}
{end point[rounded initial point][rounded end point]};

truss \beam{2}{initial point}{end point}
[rounded initial point][rounded end point];

보이지 않는 부재 \beam{3}{initial point}{end point};

Beam \beam{4}{initial point}{end point}
[rounded initial point][rounded end point];

## typ 1

## typ 2

## typ 3

## typ 4

# support

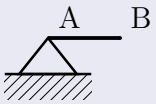
## support

\support{type}{insertion point}[rotation];

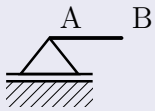
## support

| | |
|---|---|
| Festlager | : \support{1}{insertion point}[rotation]; |
| Loslager | : \support{2}{insertion point}[rotation]; |
| Einspannung | : \support{3}{insertion point}[rotation]; |
| Lose Einspannung | : \support{4}{insertion point}[rotation]; |
| Wegfeder | : \support{5}{insertion point}[rotation]; |
| Drehfeder | : \support{6}{insertion point}[rotation]; |

### typ 1



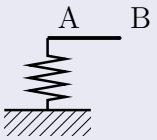

### typ 2




### typ 3

### typ 4

### typ 5




### typ 6

# hinge

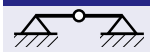
## hinge

\hinge{type}{insertion point}[optional][optional][optional];

## hinge

| | |
|---|---|
| Vollgelenk : 완전힌지 | \hinge{1}{insertion point}; |
| Halbgelenk : 반힌지 | \hinge{2}{insertion point}[initial point][end point][orientation]; |
| Querkraftgelenk : 전단력공동 | \hinge{3}{insertion point}[rotation]; |
| Normalkraftgelenk | \hinge{4}{insertion point}[rotation]; |
| Aussteifung der Ecken : 코너 보강 | \hinge{5}{insertion point}[initial point][end point]; |

## typ 1



## typ 2

## typ 3

## typ 4

## typ 5

# load

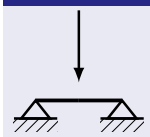
## load

\load{type}{insertion point}[rotation][length or included angle][loaddistance];

## load

1 Einzelkraft : 단일 힘
\load{1}{insertion point}[rotation][length][loaddistance];
2 Moment im Uhrzeigersinn : 모멘트 시계방향으로
\load{2}{insertion point}[rotation][included angle][moment distance];
3 Moment gegen den Uhrzeigersinn : 모멘트 시계반대 방향으로
\load{3}{insertion point}[rotation][included angle][moment distance];

### typ 1



### typ 2

### typ 3

하중 입력을 절점에만 해야 하는지?

# lineload

## lineload

\lineload{type}{initial point}{end point}[optional][optional][optional][optional];

## lineload

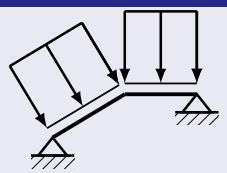
1 Linienlast normal zur Stabachse : 축에 법선
\lineload {1} {initial point T}{end point}
[initial force value] [end force value] [force interval];

2 Linienlast normal zur x-Achse : 전체축 X축에 수직
\lineload {2} {initial point }{end point}
[initial force value] [end force value] [force interval];

3 Linienlast projeziert auf den Stab : 투영 재하
\lineload {3} {initial point }{end point}
[initial force value] [end force value] [lineload_distance from inital point] [force interval];

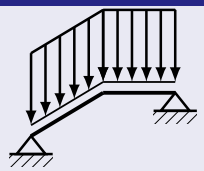
4 Linienlast entlang der Stabachse : 부재축을 따라 선재하
\lineload {4} {initial point }{end point}
[force interval][force length];

### typ 1



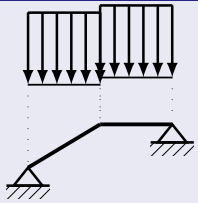
### Example

### typ 2



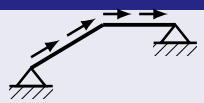
### Example

### typ 3



### Example

### typ 4



### Example

# temperature

## temperature

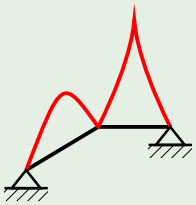
```
\temperature{initial point}{end point}
            {temperature_below}
            {temperature_above}
            [temperature_position]
            [temperature_value_below]
            [temperature_value_above]
            [text_orientation_below]
            [text_orientation_above];
```

# internalforces

## internalforces

\internalforces **{initial point}{end point} {initial value}{end value}**
[parabola height]
[color]
[bend position];

## Example



## internalforces

initial point
end point
initial value
end value
parabola height
color
bend position

# dimensioning

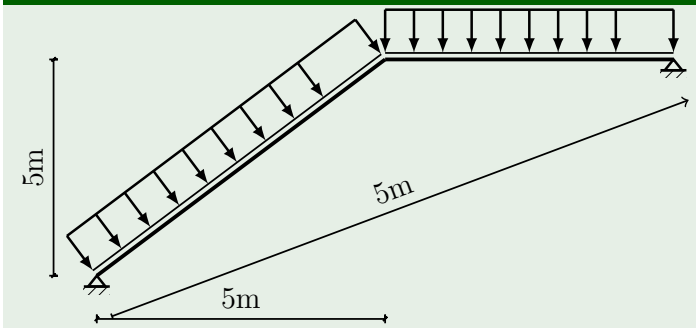
## dimensioning

\dimensioning{type} {initial point} {end point} {distance from point of origin}
[measure];

## dimensioning

1 BemaBung horizontal : 수평
\dimensioning {1} {initial point} {end point} {distance from point of origin} [measure];
2 BemaBung vertikal : 수직
\dimensioning {2} {initial point} {end point} {distance from point of origin} [measure];
3 BemaBung einerr Verschiebung : 변화
\dimensioning {3} {initial point} {end point} {distance from inital point} [measure];

## Example

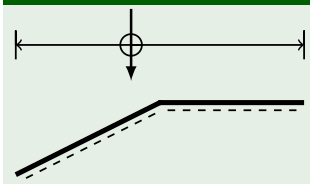


# influenceline

## influenceline

\influenceline{initial point}{end point}{distance from initial point} [arrow position];

## Example



# notation

## notation

\notation{type}{insertion point}{} [ ] [ ] [ ] [ ];

## notation

1 Bezeichnung
\notation{1} {insertion point} {labelling} [ orientation ];

2 Bezeichnung mit Strich am Punkt
\notation{2} {insertion point} {labelling} [ orientation ];

3 Bezeichnung mit Strich auf der Linie : 라인식별
\notation{3} {initial point} {end point} [ labelling ] [ position ] [ orientation ];

4 Bezeichnung mit Rechteck auf der Linie : 라인에 사각형모양 식별
\notation{4} {initial point} {end point} [ labelling ] [ position ] [ orientation ] [ textorientation ];

5 Bezeichnung auf der Linie : 라인에 제목
\notation{5} {initial point} {end point} [ labelling ] [ position ] [ orientation ] [ textorientation ];

6 Bezeichnung in einem Kreis : 지점 번호 표시용 원이음
\notation{6}{insertion point}{labelling};

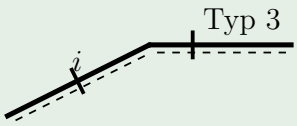
## Example

Typ 1

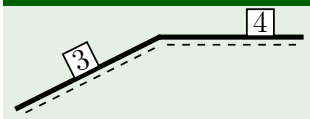
## Example

Typ 2

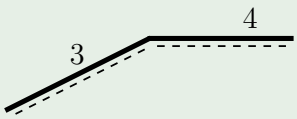
## Example



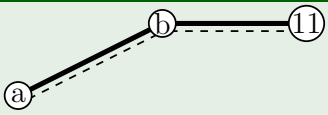

## Example




## Example




## Example



# addon

## addon

\addontypeinsertion point[];

## addon

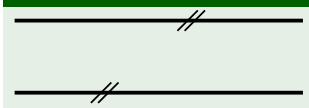
1 Symbol für parallele Stäbe : 병렬바
\addon{1}{insertion point}{end point}{position};

2 Symbol für Stäbe die normal aufeinander stehen : 수직표시
\addon{2} {insertion point} {initial point} {end point} [orientation];

3 Winkelsymbol : 각표시
\addon{3} {insertion point} {initial point} {end point} [orientation];

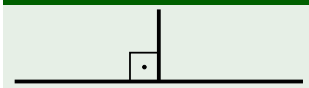
addon : type 1 : 병렬바 표시

**Example**



addon : type 2 : 수직표시

**Example**

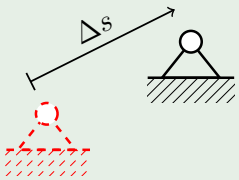


addon : type 3 : 각 표시

**Example**

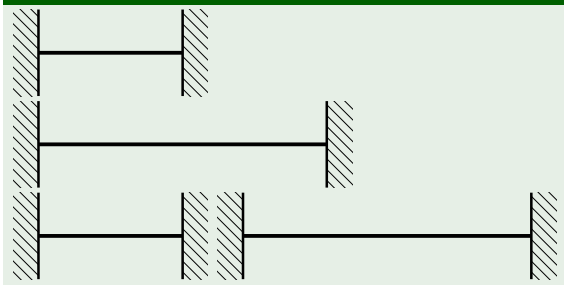
# scope

## Example



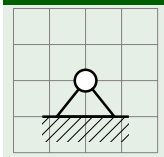
# scaling

## Example



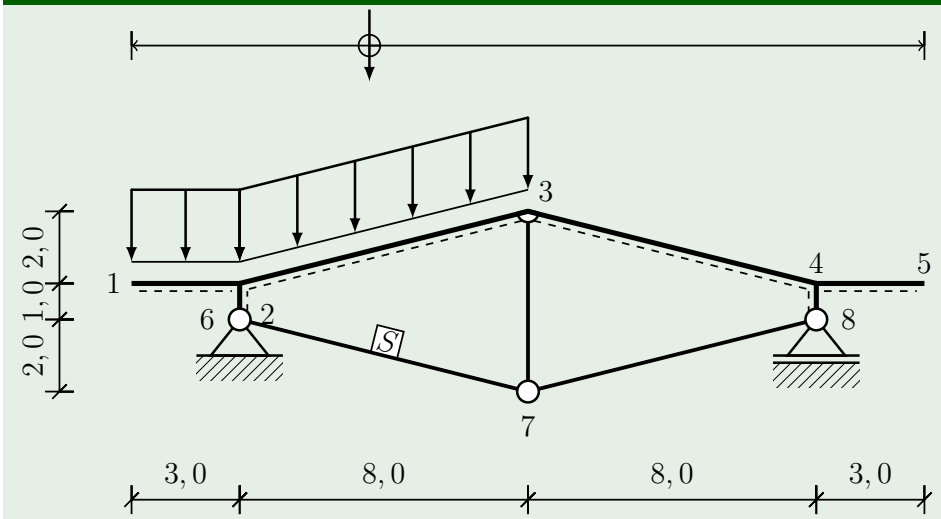
# help line

## Example



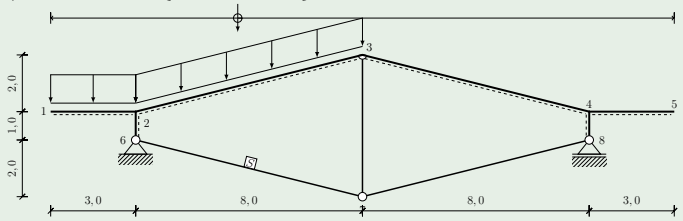
# 사용예

## Example

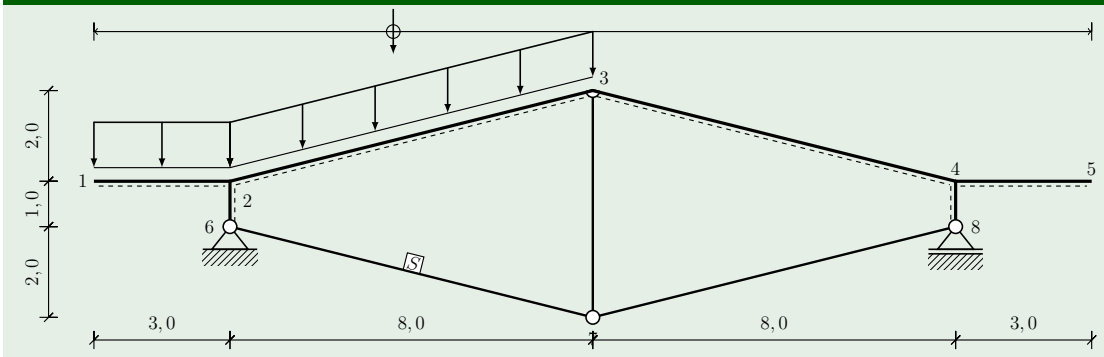



## Example

\usepackage{adjustbox}



## Example



# Gantt chart

# gantt chart

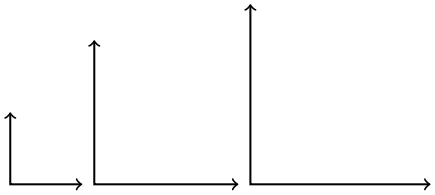
## gantt chart : Link

\ganttchart [< option >] { < start element name > } { < end element name > }

# 원래 치수되로 그려서 스케일로 축소해서 그림 삽입

**Example**

```
\begin {tikzpicture} [xscale=3, yscale=1]
\draw [thick, < − > ] (0,1) – (0,0) – (1,0);
\end {tikzpicture }
```



# 함수의 플로팅

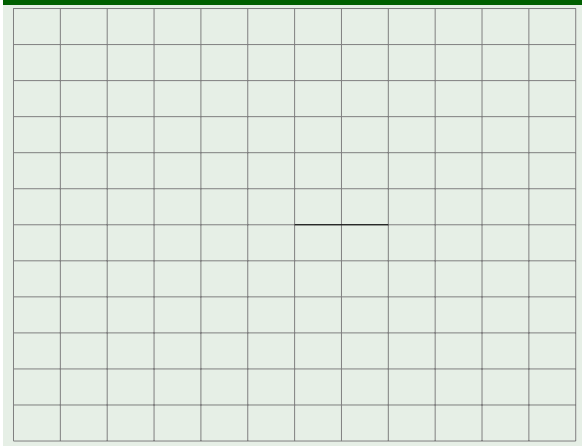
# 색깔 채우기

## draw 채우기

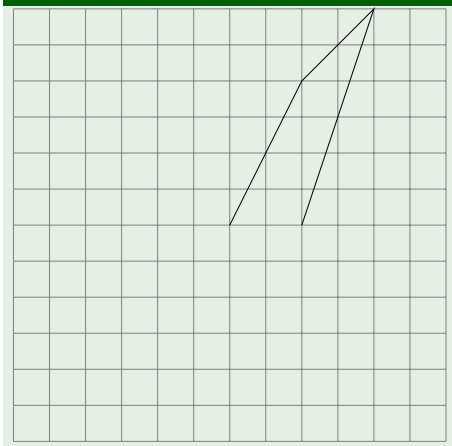
## path 채우기

# 예제 001

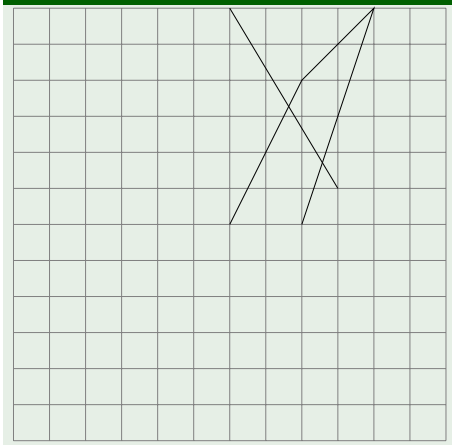
## Example



## Example



## Example

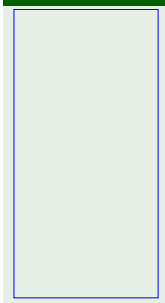


# 예제 : 사각형 그리기 예제

## 사각형 그리기 예제

```
\begin {tikzpicture}
\draw [blue] (0,0) rectangle (2,4);
\end{tikzpicture}
```

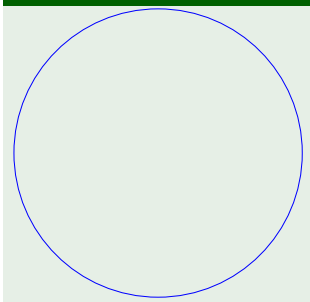
**Example**



## 원 그리기 예제

```
\begin {tikzpicture}
\draw [blue] (0,0) circle [radius=2];
\end{tikzpicture}
```

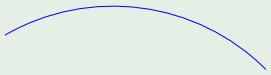
**Example**



## 호 그리기 예제

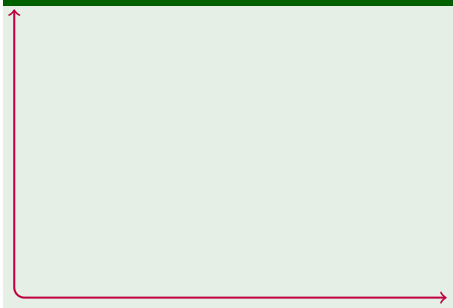
```
\begin {tikzpicture}
\draw [blue] (0,0) arc [radius=3, start angle=45, end
angle=120 ];
\end{tikzpicture}
```

**Example**



# 예제 : rounded corners

## Example



# 예제 001

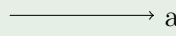
## Example

this happen in period 1 and is aligned left

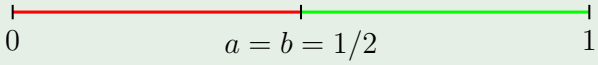
this happen in period 2 and is centered centered

this happen in period 3 and isright right

## Example



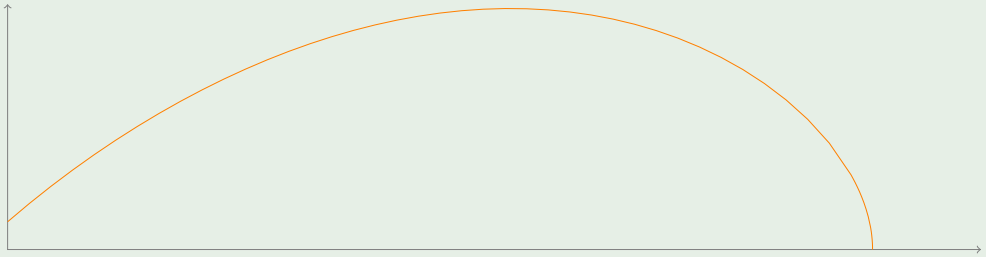
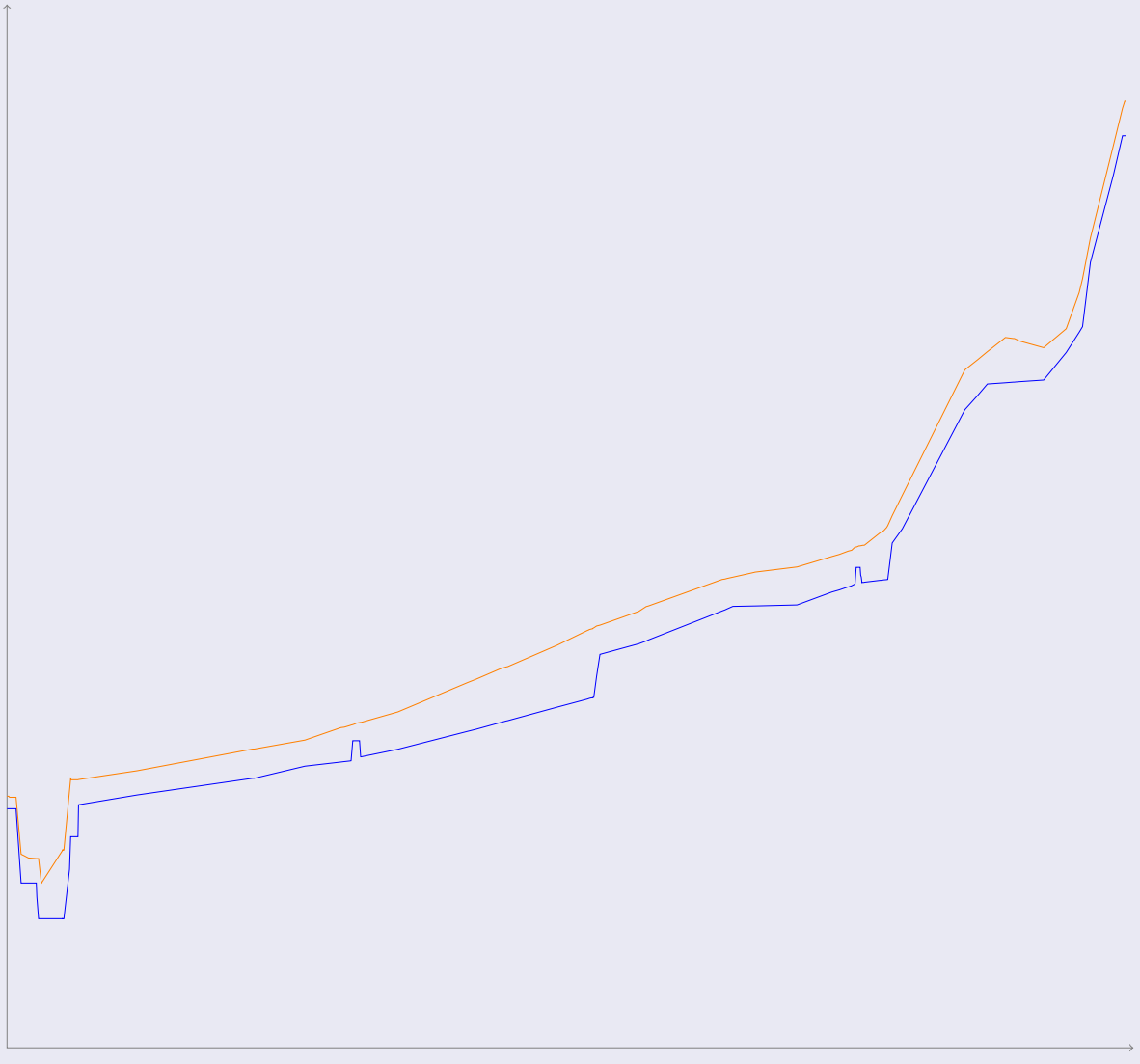

## Example




## Example

# 예제 001

## Example



## 코카콜라 종단 분석