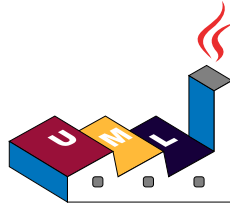


# Drawing UML with PlantUML



## PlantUML Language Reference Guide

(Version 1.2019.6)

**PlantUML** is a component that allows to quickly write :

- Sequence diagram
- Usecase diagram
- Class diagram
- Activity diagram
- Component diagram
- State diagram
- Object diagram
- Deployment diagram
- Timing diagram

The following non-UML diagrams are also supported:

- Wireframe graphical interface
- Archimate diagram
- Specification and Description Language (SDL)
- Dita diagram
- Gantt diagram
- MindMap diagram
- Work Breakdown Structure diagram
- Mathematic with AsciiMath or JLaTeXMath notation

Diagrams are defined using a simple and intuitive language.

# 1 Sequence Diagram

## 1.1 Basic examples

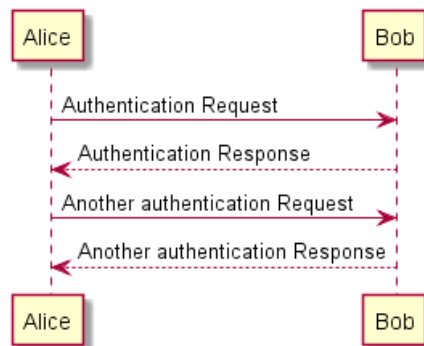
The sequence `->` is used to draw a message between two participants. Participants do not have to be explicitly declared.

To have a dotted arrow, you use `-->`

It is also possible to use `<-` and `<--`. That does not change the drawing, but may improve readability. Note that this is only true for sequence diagrams, rules are different for the other diagrams.

```
@startuml
Alice -> Bob: Authentication Request
Bob --> Alice: Authentication Response

Alice -> Bob: Another authentication Request
Alice <-- Bob: Another authentication Response
@enduml
```



## 1.2 Declaring participant

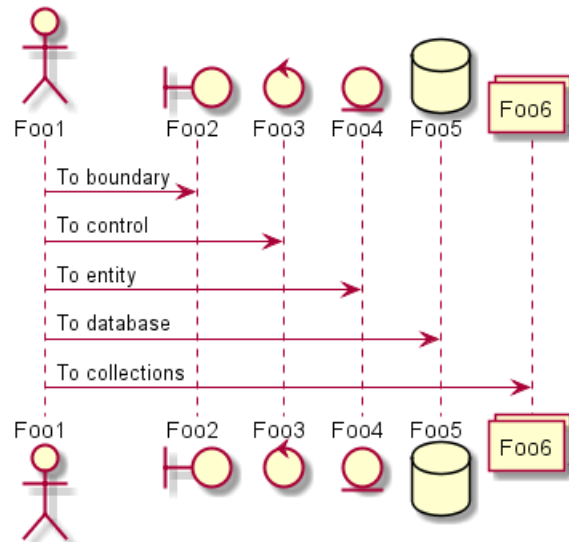
It is possible to change participant order using the participant keyword.

It is also possible to use other keywords to declare a participant:

- actor
- boundary
- control
- entity
- database
- collections

```
@startuml
actor Foo1
boundary Foo2
control Foo3
entity Foo4
database Foo5
collections Foo6
Foo1 -> Foo2 : To boundary
Foo1 -> Foo3 : To control
Foo1 -> Foo4 : To entity
Foo1 -> Foo5 : To database
Foo1 -> Foo6 : To collections
@enduml
```



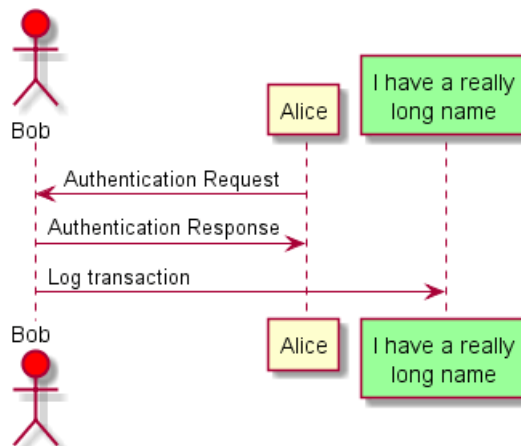


You can rename a participant using the as keyword.

You can also change the background color of actor or participant.

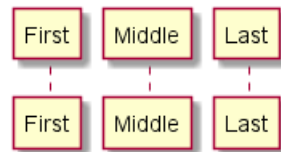
```
@startuml
actor Bob #red
' The only difference between actor
'and participant is the drawing
participant Alice
participant "I have a really\nlong name" as L #99FF99
/' You can also declare:
    participant L as "I have a really\nlong name" #99FF99
/'
```

```
Alice->Bob: Authentication Request
Bob->Alice: Authentication Response
Bob->L: Log transaction
@enduml
```



You can use the order keyword to custom the print order of participant.

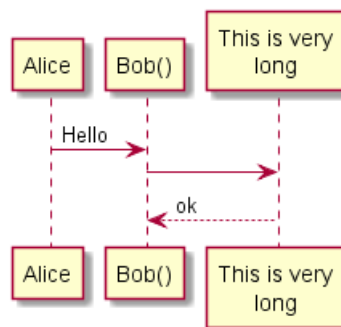
```
@startuml
participant Last order 30
participant Middle order 20
participant First order 10
@enduml
```



### 1.3 Use non-letters in participants

You can use quotes to define participants. And you can use the `as` keyword to give an alias to those participants.

```
@startuml
Alice -> "Bob()" : Hello
"Bob()" -> "This is very\nlong" as Long
' You can also declare:
' "Bob()" -> Long as "This is very\nlong"
Long --> "Bob()" : ok
@enduml
```

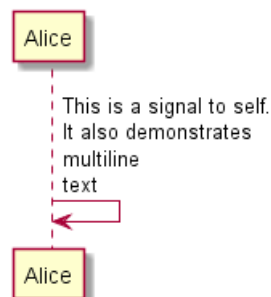


### 1.4 Message to Self

A participant can send a message to itself.

It is also possible to have multi-line using `\n`.

```
@startuml
Alice->Alice: This is a signal to self.\nIt also demonstrates\nmultiline \ntext
@enduml
```



### 1.5 Change arrow style

You can change arrow style by several ways:

- add a final `x` to denote a lost message
- use `\` or `/` instead of `<` or `>` to
- have only the bottom or top part of the arrow
- repeat the arrow head (for example, `>>` or `//`) head to have a thin drawing

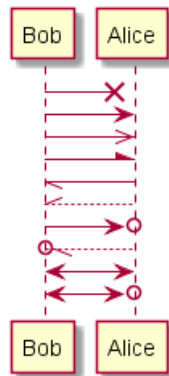


- use `--` instead of `-` to have a dotted arrow
- add a final `"o"` at arrow head
- use bidirectional arrow `<->`

```
@startuml
Bob ->x Alice
Bob -> Alice
Bob ->> Alice
Bob -\ Alice
Bob \\\- Alice
Bob //-- Alice

Bob ->o Alice
Bob o\\-- Alice

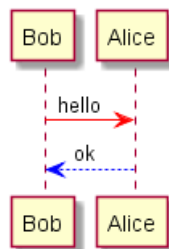
Bob <-> Alice
Bob <->o Alice
@enduml
```



## 1.6 Change arrow color

You can change the color of individual arrows using the following notation:

```
@startuml
Bob -[#red]> Alice : hello
Alice -[#0000FF]->Bob : ok
@enduml
```



## 1.7 Message sequence numbering

The keyword `autonumber` is used to automatically add number to messages.

```
@startuml
autonumber
Bob -> Alice : Authentication Request
Bob <- Alice : Authentication Response
@enduml
```





You can specify a startnumber with `autonumber start`, and also an increment with `autonumber start increment`.

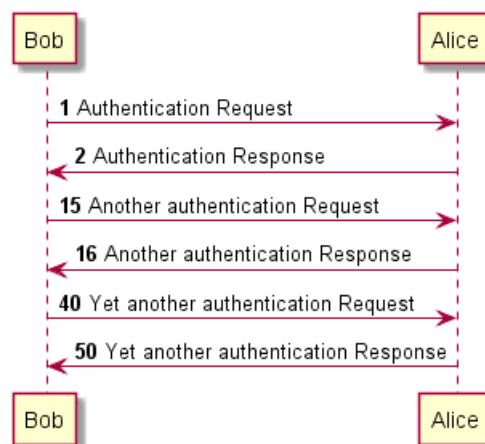
```

@startuml
autonumber
Bob -> Alice : Authentication Request
Bob <- Alice : Authentication Response

autonumber 15
Bob -> Alice : Another authentication Request
Bob <- Alice : Another authentication Response

autonumber 40 10
Bob -> Alice : Yet another authentication Request
Bob <- Alice : Yet another authentication Response

@enduml
  
```



You can specify a format for your number by using between double-quote.

The formatting is done with the Java class `DecimalFormat` (0 means digit, # means digit and zero if absent).

You can use some html tag in the format.

```

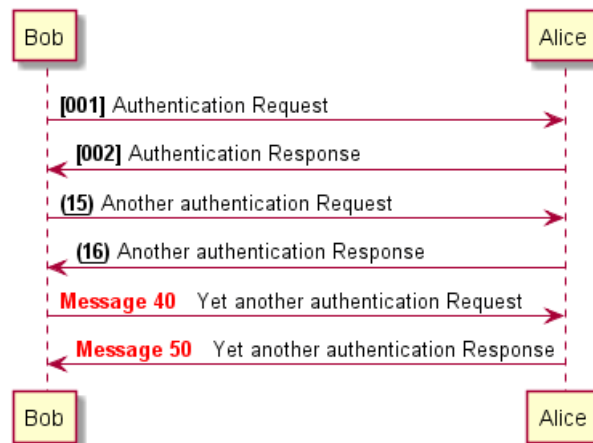
@startuml
autonumber "<b>[000]"
Bob -> Alice : Authentication Request
Bob <- Alice : Authentication Response

autonumber 15 "<b>(<u>##</u>)"
Bob -> Alice : Another authentication Request
Bob <- Alice : Another authentication Response

autonumber 40 10 "<font color=red><b>Message 0 "
Bob -> Alice : Yet another authentication Request
Bob <- Alice : Yet another authentication Response

@enduml
  
```





You can also use `autonumber stop` and `autonumber resume increment format` to respectively pause and resume automatic numbering.

```

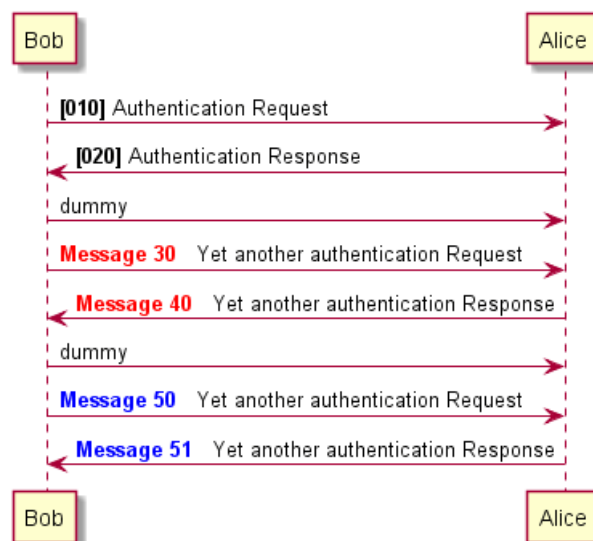
@startuml
autonumber 10 10 "<b>[000]"
Bob -> Alice : Authentication Request
Bob <- Alice : Authentication Response

autonumber stop
Bob -> Alice : dummy

autonumber resume "<font color=red><b>Message 0 "
Bob -> Alice : Yet another authentication Request
Bob <- Alice : Yet another authentication Response

autonumber stop
Bob -> Alice : dummy

autonumber resume 1 "<font color=blue><b>Message 0 "
Bob -> Alice : Yet another authentication Request
Bob <- Alice : Yet another authentication Response
@enduml
  
```



## 1.8 Page Title, Header and Footer

The `title` keyword is used to add a title to the page.



Pages can display headers and footers using header and footer.

```
@startuml
```

```
header Page Header
```

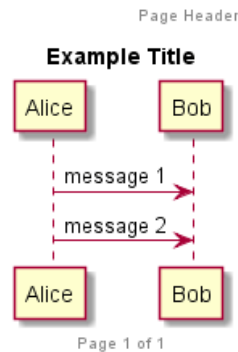
```
footer Page %page% of %lastpage%
```

```
title Example Title
```

```
Alice -> Bob : message 1
```

```
Alice -> Bob : message 2
```

```
@enduml
```



## 1.9 Splitting diagrams

The `newpage` keyword is used to split a diagram into several images.

You can put a title for the new page just after the `newpage` keyword. This title overrides the previously specified title if any.

This is very handy with *Word* to print long diagram on several pages.

(Note: this really does work. Only the first page is shown below, but it is a display artifact.)

```
@startuml
```

```
Alice -> Bob : message 1
```

```
Alice -> Bob : message 2
```

```
newpage
```

```
Alice -> Bob : message 3
```

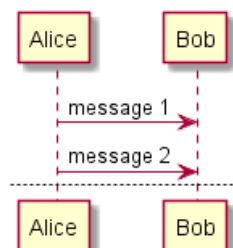
```
Alice -> Bob : message 4
```

```
newpage A title for the\nlast page
```

```
Alice -> Bob : message 5
```

```
Alice -> Bob : message 6
```

```
@enduml
```





## 1.10 Grouping message

It is possible to group messages together using the following keywords:

- alt/else
- opt
- loop
- par
- break
- critical
- group, followed by a text to be displayed

It is possible to add a text that will be displayed into the header (except for group).

The end keyword is used to close the group.

Note that it is possible to nest groups.

```
@startuml
```

```
Alice -> Bob: Authentication Request
```

```
alt successful case
```

```
Bob -> Alice: Authentication Accepted
```

```
else some kind of failure
```

```
Bob -> Alice: Authentication Failure
```

```
group My own label
```

```
Alice -> Log : Log attack start
```

```
loop 1000 times
```

```
    Alice -> Bob: DNS Attack
```

```
end
```

```
Alice -> Log : Log attack end
```

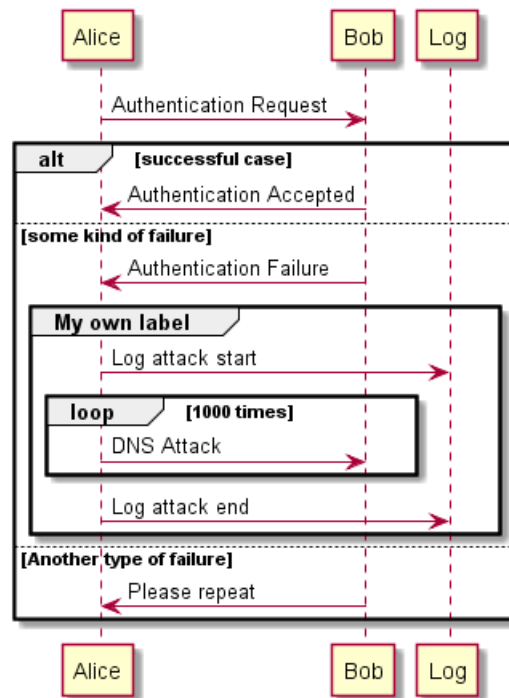
```
end
```

```
else Another type of failure
```

```
    Bob -> Alice: Please repeat
```

```
end
```

```
@enduml
```



## 1.11 Notes on messages

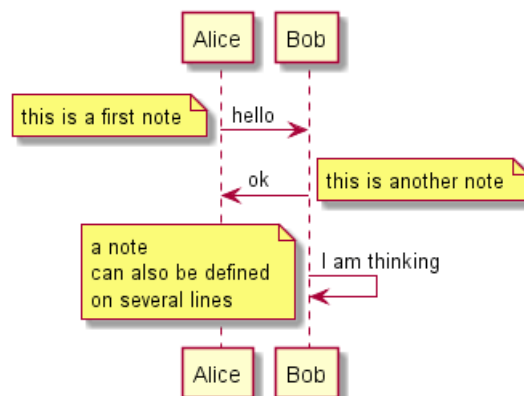
It is possible to put notes on message using the `note left` or `note right` keywords *just after the message*.

You can have a multi-line note using the `end note` keywords.

```
@startuml
Alice->Bob : hello
note left: this is a first note

Bob->Alice : ok
note right: this is another note

Bob->Bob : I am thinking
note left
a note
can also be defined
on several lines
end note
@enduml
```



## 1.12 Some other notes

It is also possible to place notes relative to participant with `note left of`, `note right of` or `note over` keywords.

It is possible to highlight a note by changing its background color.

You can also have a multi-line note using the `end note` keywords.

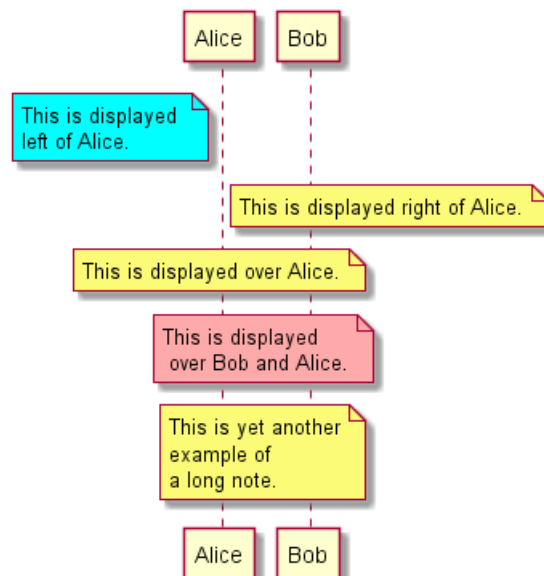
```
@startuml
participant Alice
participant Bob
note left of Alice #aqua
This is displayed
left of Alice.
end note

note right of Alice: This is displayed right of Alice.

note over Alice: This is displayed over Alice.

note over Alice, Bob #FFAAAA: This is displayed\n over Bob and Alice.

note over Bob, Alice
This is yet another
example of
a long note.
end note
@enduml
```



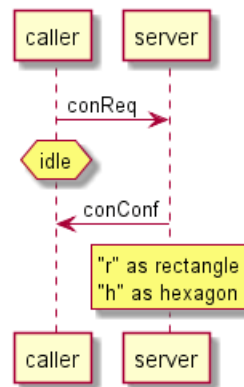
## 1.13 Changing notes shape

You can use `hnote` and `rnote` keywords to change note shapes.

```
@startuml
caller -> server : conReq
hnote over caller : idle
caller <- server : conConf
rnote over server
  "r" as rectangle
  "h" as hexagon
```



```
endrnote
@enduml
```



## 1.14 Creole and HTML

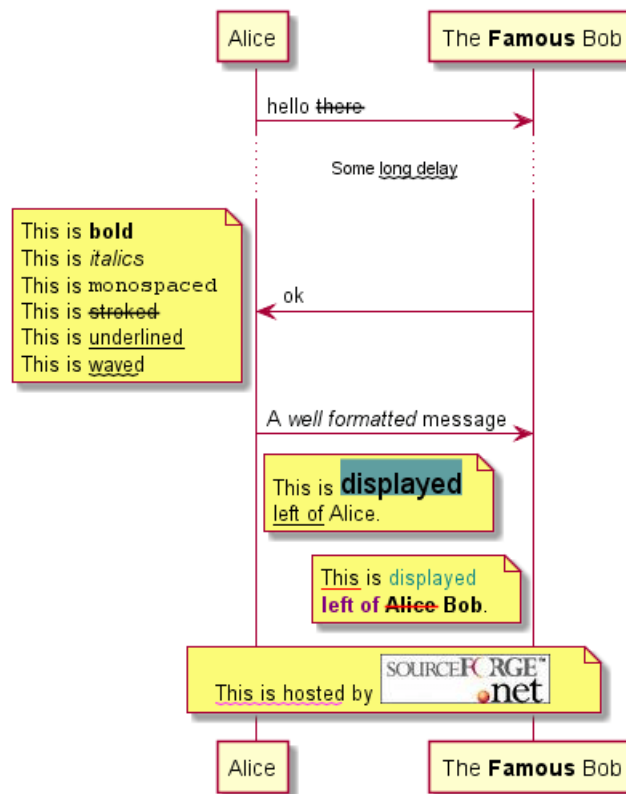
It is also possible to use creole formatting:

```
@startuml
participant Alice
participant "The Famous Bob" as Bob

Alice -> Bob : hello --there--
... Some ~~long delay~~ ...
Bob -> Alice : ok
note left
    This is bold
    This is italics
    This is "monospaced"
    This is --stroked--
    This is underlined
    This is ~~waved~~
end note

Alice -> Bob : A //well formatted// message
note right of Alice
    This is <back:cadetblue><size:18>displayed</size></back>
    __left of__ Alice.
end note
note left of Bob
    <u:red>This</u> is <color #118888>displayed</color>
    <color purple>left of</color> <s:red>Alice</strike> Bob</b>.
end note
note over Alice, Bob
    <w:#FF33FF>This is hosted</w> by <img sourceforge.jpg>
end note
@enduml
```





## 1.15 Divider

If you want, you can split a diagram using == separator to divide your diagram into logical steps.

```
@startuml
```

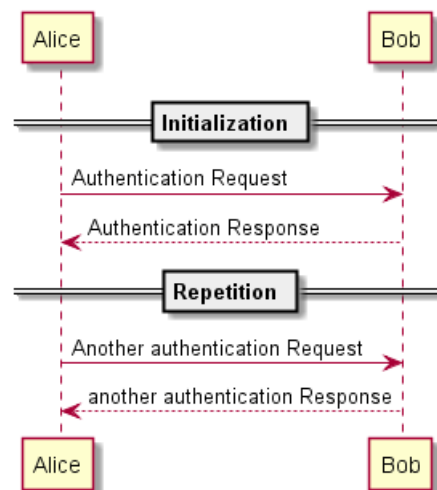
```
== Initialization ==
```

```
Alice -> Bob: Authentication Request
Bob --> Alice: Authentication Response
```

```
== Repetition ==
```

```
Alice -> Bob: Another authentication Request
Alice <-- Bob: another authentication Response
```

```
@enduml
```



## 1.16 Reference

You can use reference in a diagram, using the keyword `ref` over.

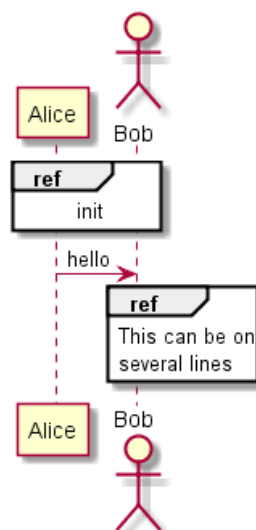
```

@startuml
participant Alice
actor Bob

ref over Alice, Bob : init

Alice -> Bob : hello

ref over Bob
    This can be on
    several lines
end ref
@enduml
  
```



## 1.17 Delay

You can use `...` to indicate a delay in the diagram. And it is also possible to put a message with this delay.

```

@startuml
  
```

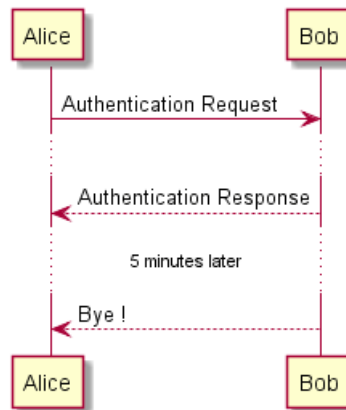


```

Alice -> Bob: Authentication Request
...
Bob --> Alice: Authentication Response
...5 minutes later...
Bob --> Alice: Bye !

@enduml

```



## 1.18 Space

You can use `|||` to indicate some spacing in the diagram.

It is also possible to specify a number of pixel to be used.

```

@startuml

Alice -> Bob: message 1
Bob --> Alice: ok
|||
Alice -> Bob: message 2
Bob --> Alice: ok
||45||
Alice -> Bob: message 3
Bob --> Alice: ok

@enduml

```



## 1.19 Lifeline Activation and Destruction

The `activate` and `deactivate` are used to denote participant activation.

Once a participant is activated, its lifeline appears.

The `activate` and `deactivate` apply on the previous message.

The `destroy` denote the end of the lifeline of a participant.

```
@startuml
participant User

User -> A: DoWork
activate A

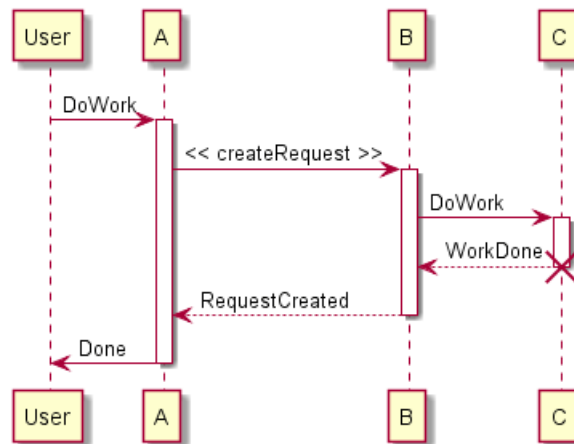
A -> B: << createRequest >>
activate B

B -> C: DoWork
activate C
C --> B: WorkDone
destroy C

B --> A: RequestCreated
deactivate B

A -> User: Done
deactivate A

@enduml
```



Nested lifeline can be used, and it is possible to add a color on the lifeline.

```
@startuml
participant User

User -> A: DoWork
activate A #FFBBBB

A -> A: Internal call
activate A #DarkSalmon

A -> B: << createRequest >>
activate B

B --> A: RequestCreated
```





```

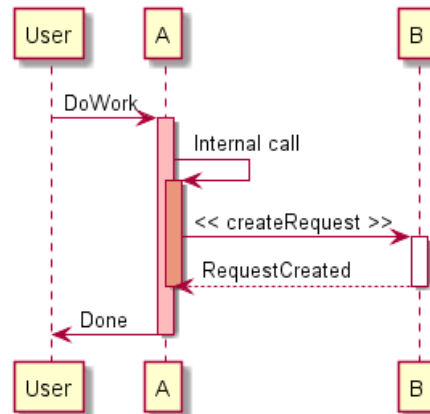
deactivate B
deactivate A
A -> User: Done
deactivate A

```

```

@enduml

```

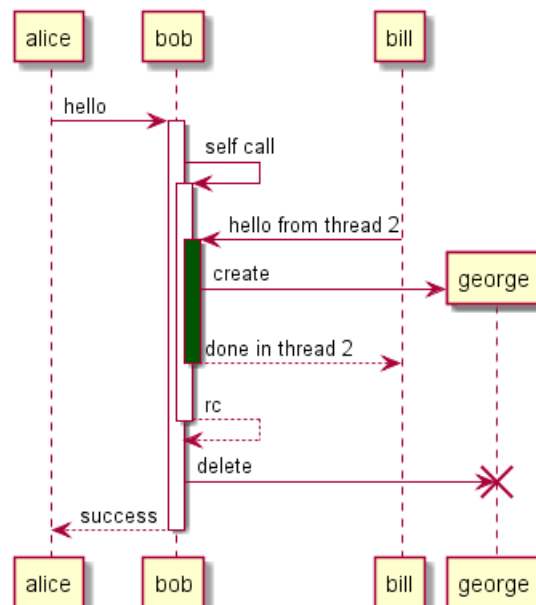


Autoactivation is possible and works with the return keywords:

```

@startuml
autoactivate on
alice -> bob : hello
bob -> bob : self call
bill -> bob #005500 : hello from thread 2
bob -> george ** : create
return done in thread 2
return rc
bob -> george !! : delete
return success
@enduml

```



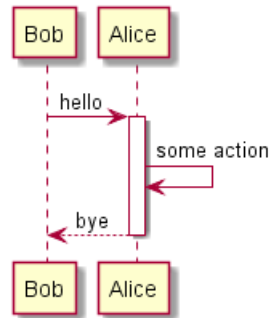
## 1.20 Return

A new command `return` for generating a return message with optional text label. The point returned to is the point that cause the most recently activated life-line. The syntax is simply `return label` where label, if provided, can be



any string acceptable on conventional messages.

```
@startuml
Bob -> Alice : hello
activate Alice
Alice -> Alice : some action
return bye
@enduml
```



## 1.21 Participant creation

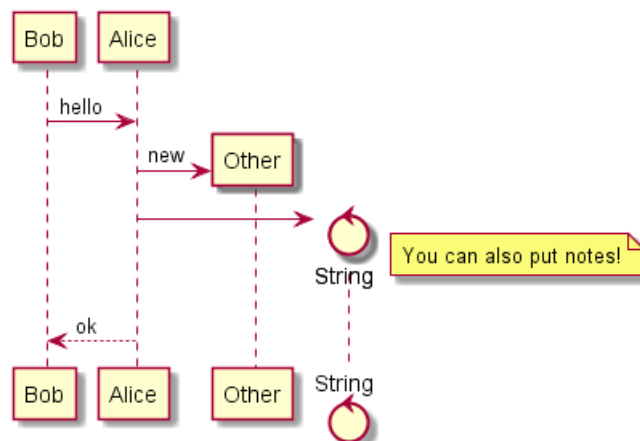
You can use the `create` keyword just before the first reception of a message to emphasize the fact that this message is actually *creating* this new object.

```
@startuml
Bob -> Alice : hello

create Other
Alice -> Other : new

create control String
Alice -> String
note right : You can also put notes!

Alice --> Bob : ok
@enduml
```



## 1.22 Shortcut syntax for activation, deactivation, creation

Immediately after specifying the target participant, the following syntax can be used:

- ++ Activate the target (optionally a #color may follow this)

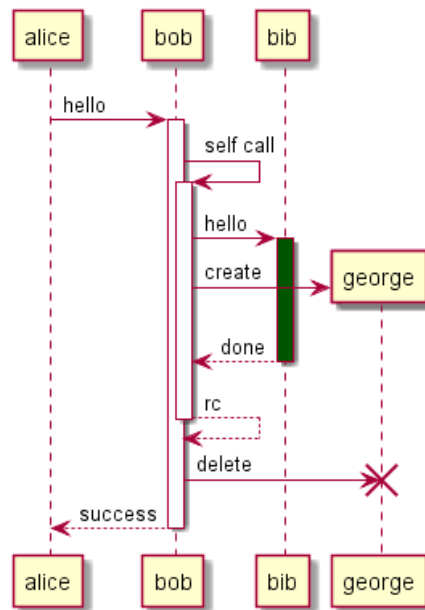


- -- Deactivate the source
- \*\* Create an instance of the target
- !! Destroy an instance of the target

```

@startuml
alice -> bob ++ : hello
bob -> bob ++ : self call
bob -> bib ++ #005500 : hello
bob -> george ** : create
return done
return rc
bob -> george !! : delete
return success
@enduml

```



## 1.23 Incoming and outgoing messages

You can use incoming or outgoing arrows if you want to focus on a part of the diagram.

Use square brackets to denote the left "[" or the right "]" side of the diagram.

```

@startuml
[-> A: DoWork

activate A

A -> A: Internal call
activate A

A ->] : << createRequest >>

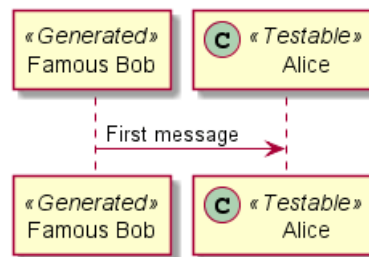
A<--] : RequestCreated
deactivate A
[<- A: Done
deactivate A
@enduml

```





@enduml



By default, the *guillemet* character is used to display the stereotype. You can change this behaviour using the skinparam guillemet:

@startuml

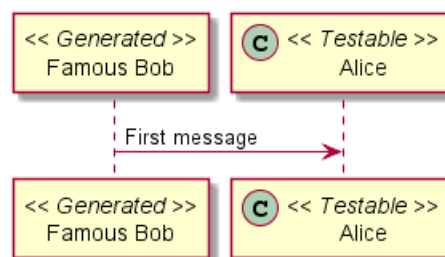
```

skinparam guillemet false
participant "Famous Bob" as Bob << Generated >>
participant Alice << (C,#ADD1B2) Testable >>

```

Bob->Alice: First message

@enduml



@startuml

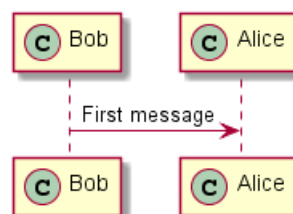
```

participant Bob << (C,#ADD1B2) >>
participant Alice << (C,#ADD1B2) >>

```

Bob->Alice: First message

@enduml



## 1.25 More information on titles

You can use creole formatting in the title.

@startuml

```

title __Simple__ **communication** example

```

```

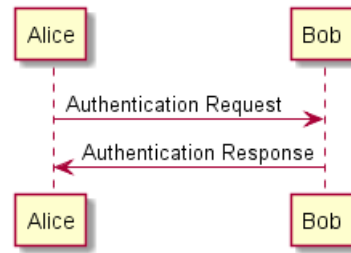
Alice -> Bob: Authentication Request
Bob -> Alice: Authentication Response

```



```
@enduml
```

### Simple communication example



You can add newline using \n in the title description.

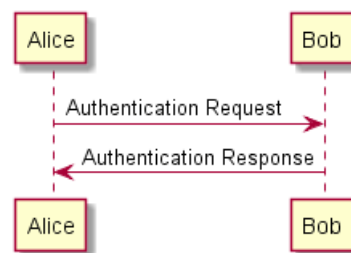
```
@startuml
```

```
title __Simple__ communication example\non several lines
```

```
Alice -> Bob: Authentication Request
Bob -> Alice: Authentication Response
```

```
@enduml
```

### Simple communication example on several lines



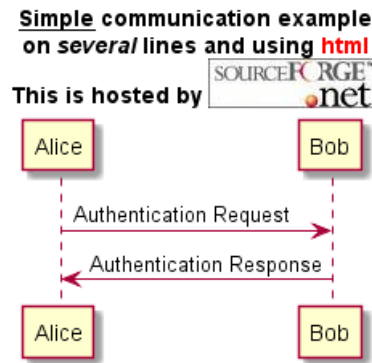
You can also define title on several lines using title and end title keywords.

```
@startuml
```

```
title
  <u>Simple</u> communication example
  on <i>several</i> lines and using <font color=red>html</font>
  This is hosted by <img:sourceforge.jpg>
end title
```

```
Alice -> Bob: Authentication Request
Bob -> Alice: Authentication Response
```

```
@enduml
```



## 1.26 Participants encompass

It is possible to draw a box around some participants, using `box` and `end box` commands.

You can add an optional title or a optional background color, after the `box` keyword.

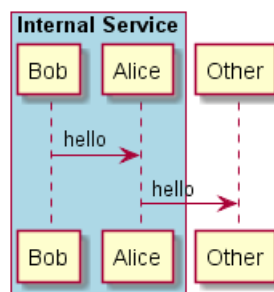
```

@startuml

box "Internal Service" #LightBlue
    participant Bob
    participant Alice
end box
participant Other

Bob -> Alice : hello
Alice -> Other : hello

@enduml
  
```



## 1.27 Removing Foot Boxes

You can use the `hide footbox` keywords to remove the foot boxes of the diagram.

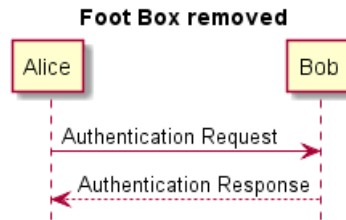
```

@startuml

hide footbox
title Foot Box removed

Alice -> Bob: Authentication Request
Bob --> Alice: Authentication Response

@enduml
  
```



## 1.28 Skinparam

You can use the `skinparam` command to change colors and fonts for the drawing.

You can use this command:

- In the diagram definition, like any other commands,
- In an included file,
- In a configuration file, provided in the command line or the ANT task.

You can also change other rendering parameter, as seen in the following examples:

```

@startuml
skinparam sequenceArrowThickness 2
skinparam roundcorner 20
skinparam maxmessagesize 60
skinparam sequenceParticipant underline
  
```

```

actor User
participant "First Class" as A
participant "Second Class" as B
participant "Last Class" as C
  
```

```

User -> A: DoWork
activate A
  
```

```

A -> B: Create Request
activate B
  
```

```

B -> C: DoWork
activate C
C --> B: WorkDone
destroy C
  
```

```

B --> A: Request Created
deactivate B
  
```

```

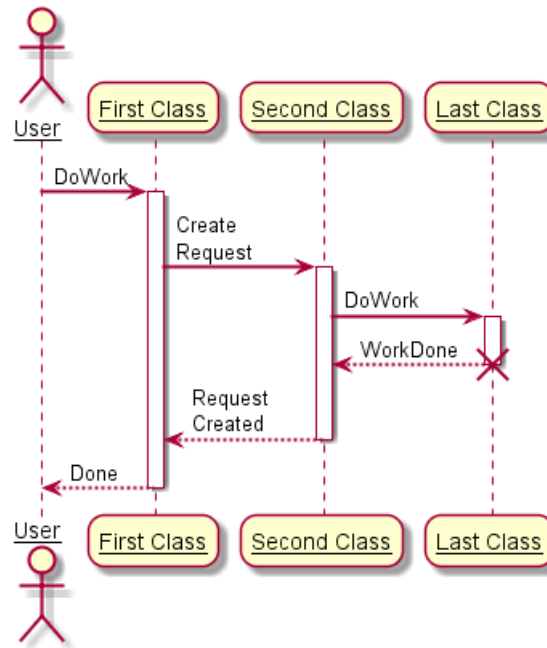
A --> User: Done
deactivate A
  
```

```

@enduml
  
```







```

@startuml
skinparam backgroundColor #EEEBDC
skinparam handwritten true

skinparam sequence {
  ArrowColor DeepSkyBlue
  ActorBorderColor DeepSkyBlue
  LifeLineBorderColor blue
  LifeLineBackgroundColor #A9DCDF

  ParticipantBorderColor DeepSkyBlue
  ParticipantBackgroundColor DodgerBlue
  ParticipantFontName Impact
  ParticipantFontSize 17
  ParticipantFontColor #A9DCDF

  ActorBackgroundColor aqua
  ActorFontColor DeepSkyBlue
  ActorFontSize 17
  ActorFontName Apex
}

actor User
participant "First Class" as A
participant "Second Class" as B
participant "Last Class" as C

User -> A: DoWork
activate A

A -> B: Create Request
activate B

B -> C: DoWork
activate C
C --> B: WorkDone
deactivate C

B --> A: Request Created
deactivate B

A --> User: Done
deactivate A
destroy A
destroy B
destroy C
  
```



```

B --> A: Request Created
deactivate B

```

```

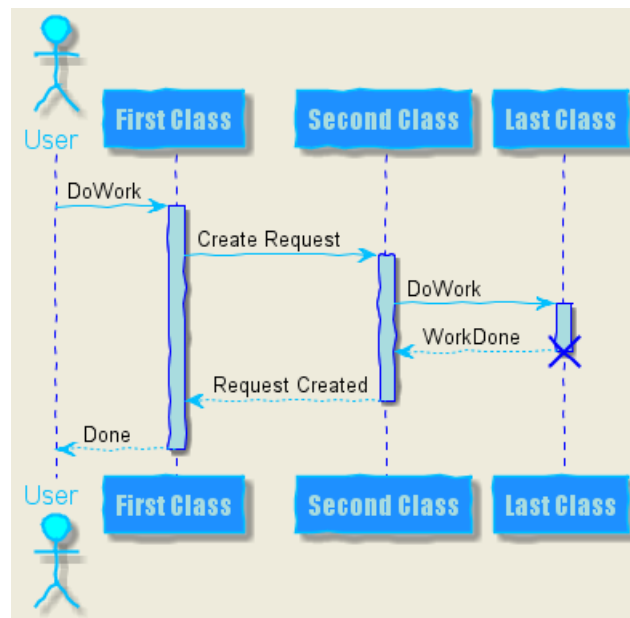
A --> User: Done
deactivate A

```

```

@enduml

```



## 1.29 Changing padding

It is possible to tune some padding settings.

```

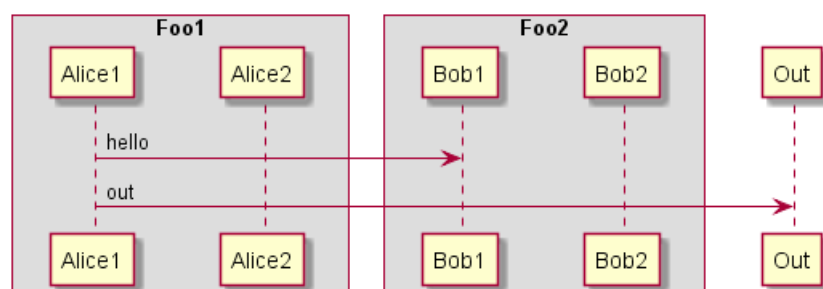
@startuml
skinparam ParticipantPadding 20
skinparam BoxPadding 10

```

```

box "Foo1"
participant Alice1
participant Alice2
end box
box "Foo2"
participant Bob1
participant Bob2
end box
Alice1 -> Bob1 : hello
Alice1 -> Out : out
@enduml

```



## 2 Use Case Diagram

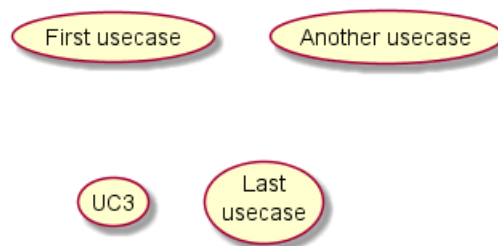
Let's have few examples :

### 2.1 Usecases

Use cases are enclosed using between parentheses (because two parentheses looks like an oval).

You can also use the `usecase` keyword to define a usecase. And you can define an alias, using the `as` keyword. This alias will be used latter, when defining relations.

```
@startuml
(First usecase)
(Another usecase) as (UC2)
usecase UC3
usecase (Last\nusecase) as UC4
@enduml
```



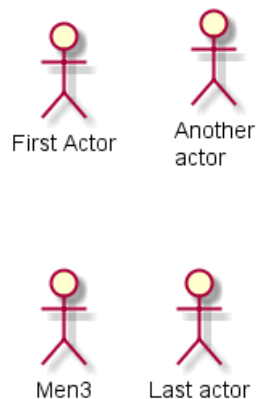
### 2.2 Actors

Actor are enclosed using between two points.

You can also use the `actor` keyword to define an actor. And you can define an alias, using the `as` keyword. This alias will be used latter, when defining relations.

We will see later that the actor definitions are optional.

```
@startuml
:First Actor:
:Another\nactor: as Men2
actor Men3
actor :Last actor: as Men4
@enduml
```

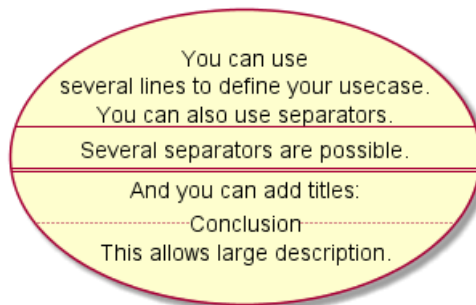


## 2.3 Usecases description

If you want to have description on several lines, you can use quotes.

You can also use the following separators: -- .. == \_\_. And you can put titles within the separators.

```
@startuml
usecase UC1 as "You can use
several lines to define your usecase.
You can also use separators.
--
Several separators are possible.
==
And you can add titles:
..Conclusion..
This allows large description."
@enduml
```



## 2.4 Basic example

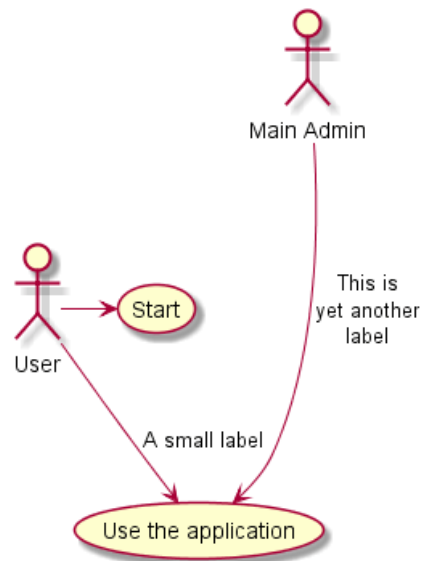
To link actors and use cases, the arrow --> is used.

The more dashes - in the arrow, the longer the arrow. You can add a label on the arrow, by adding a : character in the arrow definition.

In this example, you see that *User* has not been defined before, and is used as an actor.

```
@startuml
User -> (Start)
User --> (Use the application) : A small label

:Main Admin: ---> (Use the application) : This is\nyet another\nlabel
@enduml
```



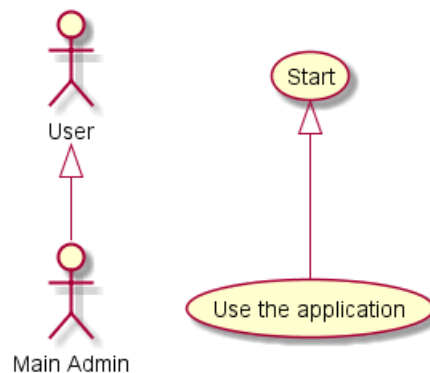
## 2.5 Extension

If one actor/use case extends another one, you can use the symbol <|--.

```
@startuml
:Main Admin: as Admin
(Use the application) as (Use)
```

```
User <|-- Admin
(Start) <|-- (Use)
```

```
@enduml
```



## 2.6 Using notes

You can use the note left of ,note right of ,note top of ,note bottom of keywords to define notes related to a single object.

A note can be also define alone with the note keywords, then linked to other objects using the .. symbol.

```
@startuml
:Main Admin: as Admin
(Use the application) as (Use)
```

```
User -> (Start)
```

```
User --> (Use)
```



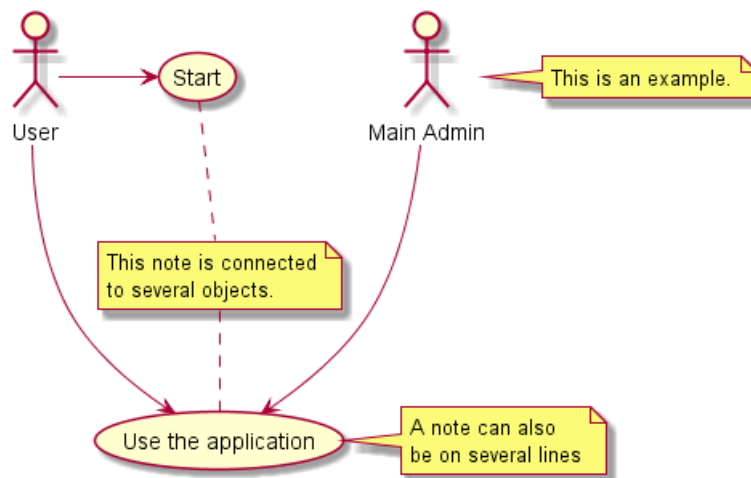
```
Admin ---> (Use)
```

```
note right of Admin : This is an example.
```

```
note right of (Use)
```

```
  A note can also  
  be on several lines  
end note
```

```
note "This note is connected\nto several objects." as N2  
(Start) .. N2  
N2 .. (Use)  
@enduml
```



## 2.7 Stereotypes

You can add stereotypes while defining actors and use cases using << and >>.

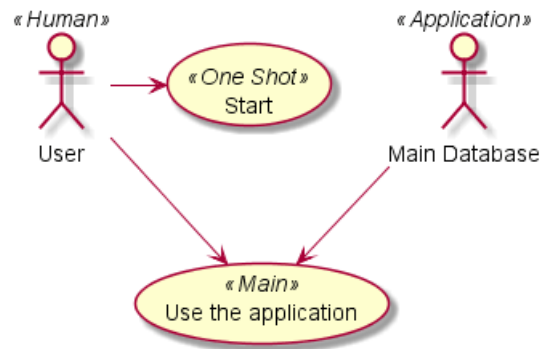
```
@startuml
User << Human >>
:Main Database: as MySQL << Application >>
(Start) << One Shot >>
(Use the application) as (Use) << Main >>
```

```
User -> (Start)
```

```
User --> (Use)
```

```
MySQL --> (Use)
```

```
@enduml
```



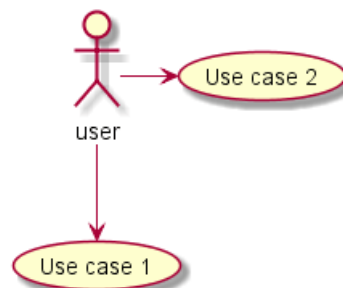
## 2.8 Changing arrows direction

By default, links between classes have two dashes -- and are vertically oriented. It is possible to use horizontal link by putting a single dash (or dot) like this:

```

@startuml
:user: --> (Use case 1)
:user: -> (Use case 2)
@enduml

```

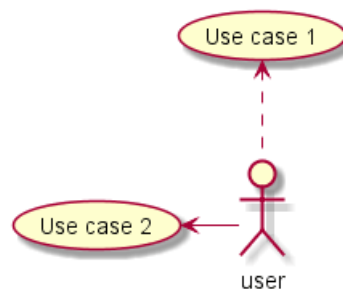


You can also change directions by reversing the link:

```

@startuml
(Use case 1) <.. :user:
(Use case 2) <- :user:
@enduml

```

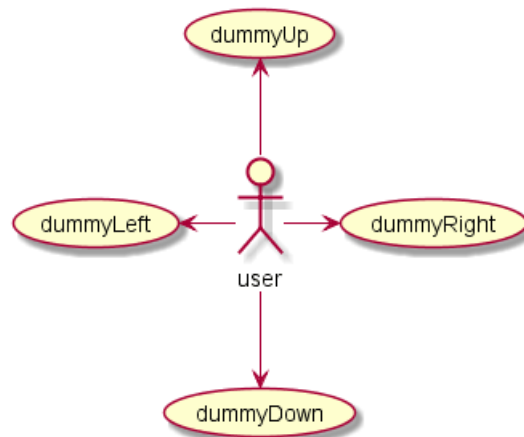


It is also possible to change arrow direction by adding left, right, up or down keywords inside the arrow:

```

@startuml
:user: -left-> (dummyLeft)
:user: -right-> (dummyRight)
:user: -up-> (dummyUp)
:user: -down-> (dummyDown)
@enduml

```



You can shorten the arrow by using only the first character of the direction (for example, `-d-` instead of `-down-`) or the two first characters (`-do-`).

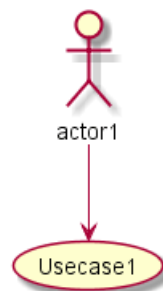
Please note that you should not abuse this functionality : *Graphviz* gives usually good results without tweaking.

## 2.9 Splitting diagrams

The newpage keywords to split your diagram into several pages or images.

```

@startuml
:actor1: --> (Usecase1)
newpage
:actor2: --> (Usecase2)
@enduml
  
```



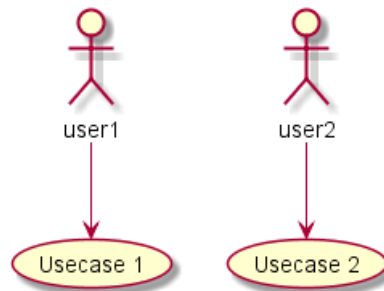
## 2.10 Left to right direction

The general default behavior when building diagram is **top to bottom**.

```

@startuml
'default
top to bottom direction
user1 --> (Usecase 1)
user2 --> (Usecase 2)
@enduml
  
```





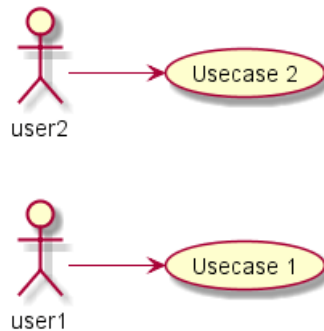
You may change to **left to right** using the left to right direction command. The result is often better with this direction.

```

@startuml

left to right direction
user1 --> (Usecase 1)
user2 --> (Usecase 2)

@enduml
  
```



## 2.11 Skinparam

You can use the skinparam command to change colors and fonts for the drawing.

You can use this command :

- In the diagram definition, like any other commands,
- In an included file,
- In a configuration file, provided in the command line or the ANT task.

You can define specific color and fonts for stereotyped actors and usecases.

```

@startuml
skinparam handwritten true

skinparam usecase {
  BackgroundColor DarkSeaGreen
  BorderColor DarkSlateGray

  BackgroundColor<< Main >> YellowGreen
  BorderColor<< Main >> YellowGreen

  ArrowColor Olive
  ActorBorderColor black
  ActorFontName Courier

  ActorBackgroundColor<< Human >> Gold
  
```



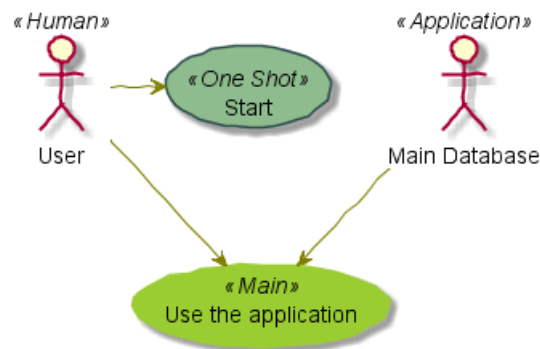
```
}
```

```
User << Human >>
:Main Database: as MySql << Application >>
(Start) << One Shot >>
(Use the application) as (Use) << Main >>
```

```
User -> (Start)
User --> (Use)
```

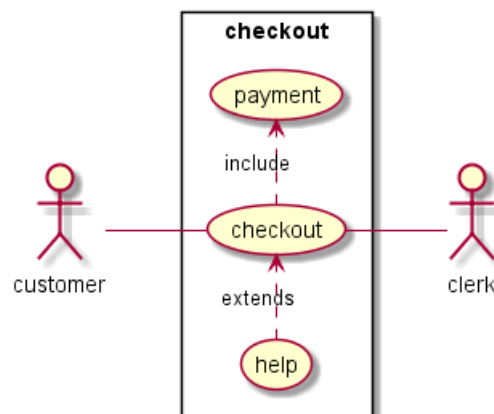
```
MySql --> (Use)
```

```
@enduml
```



## 2.12 Complete example




```
@startuml
left to right direction
skinparam packageStyle rectangle
actor customer
actor clerk
rectangle checkout {
  customer -- (checkout)
  (checkout) .> (payment) : include
  (help) .> (checkout) : extends
  (checkout) -- clerk
}
@enduml
```



## 3 Class Diagram

### 3.1 Relations between classes

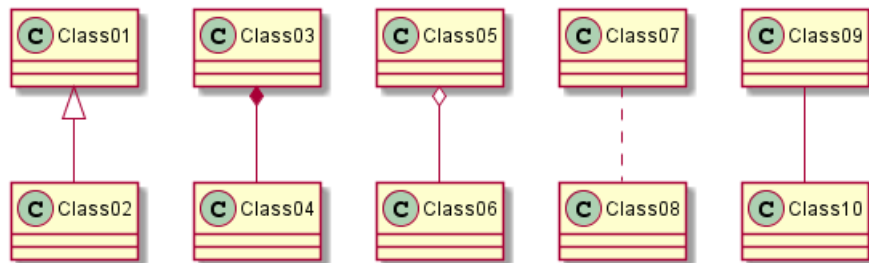
Relations between classes are defined using the following symbols :

| Type        | Symbol | Drawing   |
|-------------|--------|---|
| Extension   | < --   |  |
| Composition | *--    |  |
| Aggregation | o--    |  |

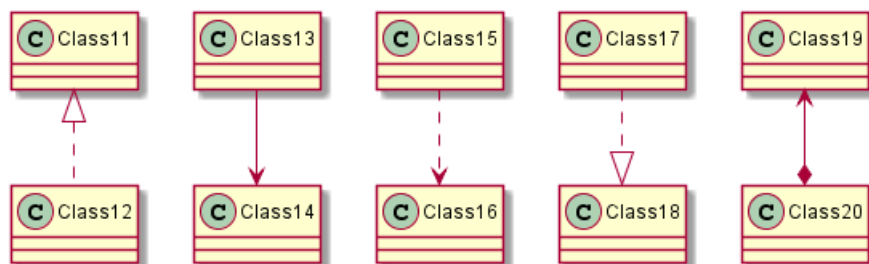
It is possible to replace -- by . . to have a dotted line.

Knowing those rules, it is possible to draw the following drawings:

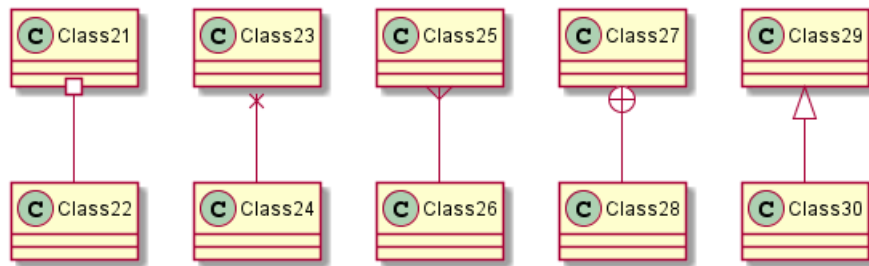
```
@startuml
Class01 <|-- Class02
Class03 *-- Class04
Class05 o-- Class06
Class07 .. Class08
Class09 -- Class10
@enduml
```



```
@startuml
Class11 <|.. Class12
Class13 --> Class14
Class15 ..> Class16
Class17 ..|> Class18
Class19 <--* Class20
@enduml
```



```
@startuml
Class21 #-- Class22
Class23 x-- Class24
Class25 }-- Class26
Class27 +-- Class28
Class29 ^-- Class30
@enduml
```



### 3.2 Label on relations

It is possible to add a label on the relation, using :, followed by the text of the label.

For cardinality, you can use double-quotes "" on each side of the relation.

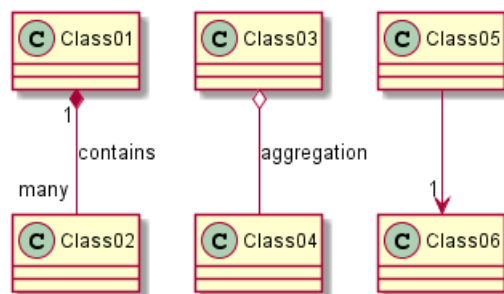
```
@startuml
```

```
Class01 "1" *-- "many" Class02 : contains
```

```
Class03 o-- Class04 : aggregation
```

```
Class05 --> "1" Class06
```

```
@enduml
```



You can add an extra arrow pointing at one object showing which object acts on the other object, using < or > at the begin or at the end of the label.

```
@startuml
```

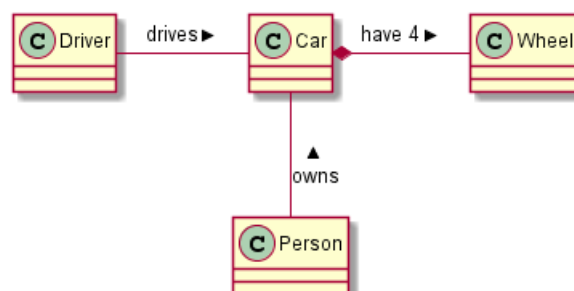
```
class Car
```

```
Driver - Car : drives >
```

```
Car *- Wheel : have 4 >
```

```
Car -- Person : < owns
```

```
@enduml
```



### 3.3 Adding methods

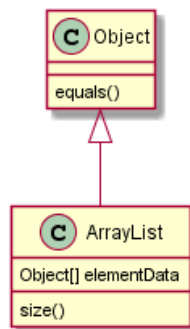
To declare fields and methods, you can use the symbol `:` followed by the field's or method's name.

The system checks for parenthesis to choose between methods and fields.

```
@startuml
Object <|-- ArrayList

Object : equals()
ArrayList : Object[] elementData
ArrayList : size()

@enduml
```



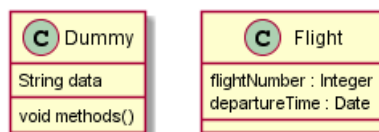
It is also possible to group between brackets `{}` all fields and methods.

Note that the syntax is highly flexible about type/name order.

```
@startuml
class Dummy {
    String data
    void methods()
}

class Flight {
    flightNumber : Integer
    departureTime : Date
}

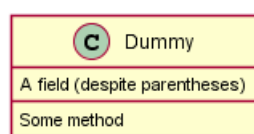
@enduml
```



You can use `{field}` and `{method}` modifiers to override default behaviour of the parser about fields and methods.









```
@startuml
class Dummy {
    {field} A field (despite parentheses)
    {method} Some method
}

@enduml
```



### 3.4 Defining visibility

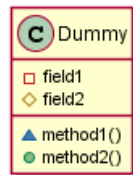
When you define methods or fields, you can use characters to define the visibility of the corresponding item:

| Character | Icon for field  | Icon for method   | Visibility      |
|-----------|---|---|-----------------|
| -         |  |  | private         |
| #         |  |  | protected       |
| ~         |  |  | package private |
| +         |  |  | public          |

```
@startuml
```

```
class Dummy {
  -field1
  #field2
  ~method1()
  +method2()
}
```

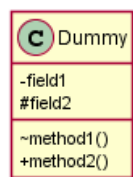
```
@enduml
```



You can turn off this feature using the skinparam classAttributeIconSize 0 command :

```
@startuml
skinparam classAttributeIconSize 0
class Dummy {
  -field1
  #field2
  ~method1()
  +method2()
}
```

```
@enduml
```



### 3.5 Abstract and Static

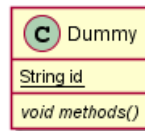
You can define static or abstract methods or fields using the {static} or {abstract} modifier.

These modifiers can be used at the start or at the end of the line. You can also use {classifier} instead of {static}.

```
@startuml
class Dummy {
  {static} String id
  {abstract} void methods()
}
```

```
@enduml
```





### 3.6 Advanced class body

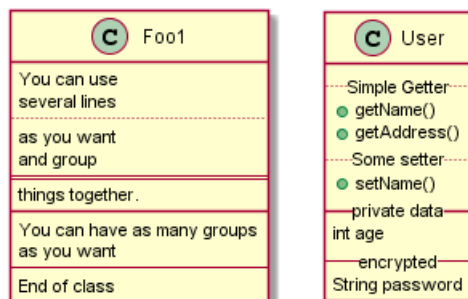
By default, methods and fields are automatically regrouped by PlantUML. You can use separators to define your own way of ordering fields and methods. The following separators are possible : -- .. == \_\_.

You can also use titles within the separators:

```
@startuml
class Foo1 {
    You can use
    several lines
    ..
    as you want
    and group
    ==
    things together.
    --
    You can have as many groups
    as you want
    --
    End of class
}

class User {
    .. Simple Getter ..
    + getName()
    + getAddress()
    .. Some setter ..
    + setName()
    __ private data __
    int age
    -- encrypted --
    String password
}

@enduml
```



### 3.7 Notes and stereotypes

Stereotypes are defined with the class keyword, << and >>.

You can also define notes using note left of ,note right of ,note top of ,note bottom of keywords.



You can also define a note on the last defined class using `note left`, `note right`, `note top`, `note bottom`.

A note can be also define alone with the note keywords, then linked to other objects using the `..` symbol.

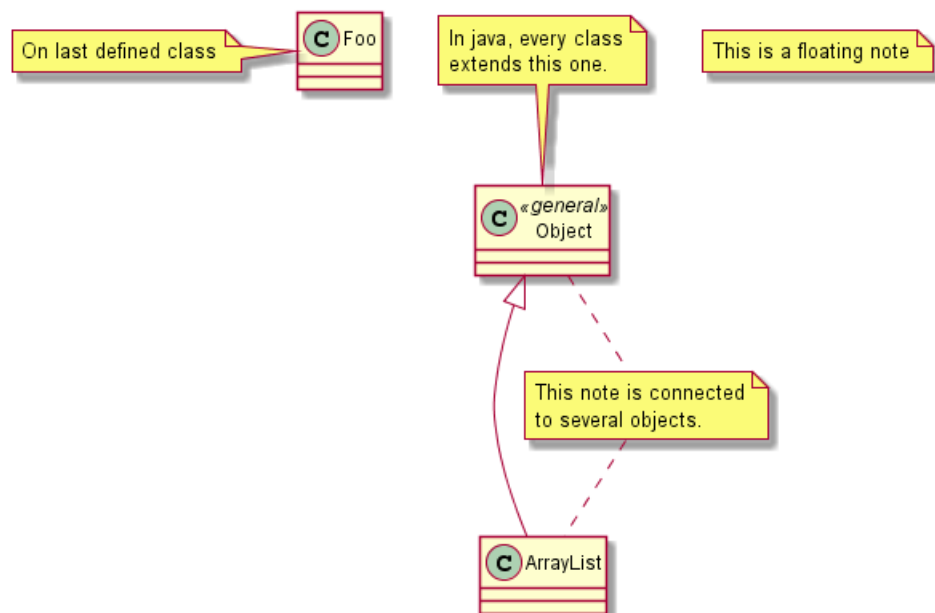
```
@startuml
class Object << general >>
Object <|--- ArrayList
```

```
note top of Object : In java, every class\nextends this one.
```

```
note "This is a floating note" as N1
note "This note is connected\nto several objects." as N2
Object .. N2
N2 .. ArrayList
```

```
class Foo
note left: On last defined class
```

```
@enduml
```



### 3.8 More on notes

It is also possible to use few html tags like :

- `<b>`
- `<u>`
- `<i>`
- `<s>`, `<del>`, `<strike>`
- `<font color="#AAAAAA">` or `<font color="colorName">`
- `<color:#AAAAAA>` or `<color:colorName>`
- `<size:nn>` to change font size
- `` or `<img:file>`: the file must be accessible by the filesystem

You can also have a note on several lines.

You can also define a note on the last defined class using `note left`, `note right`, `note top`, `note bottom`.





```

@startuml

class Foo

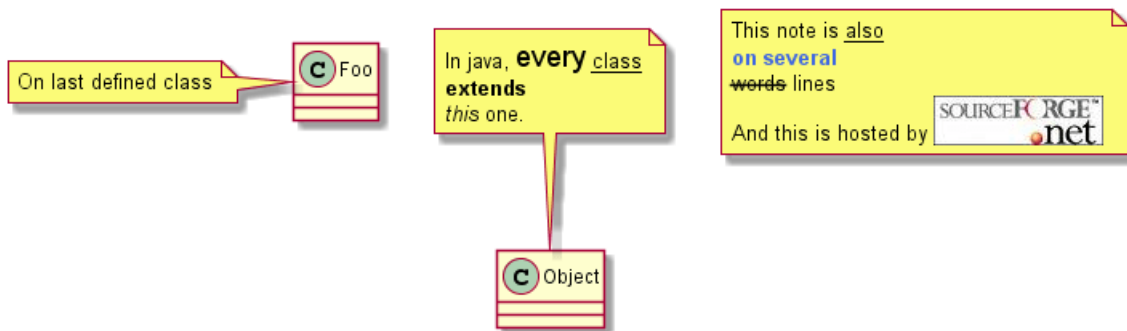
note left: On last defined class

note top of Object
  In java, <size:18>every</size> <u>class</u>
  <b>extends</b>
  <i>this</i> one.
end note

note as N1
  This note is <u>also</u>
  <b><color:royalBlue>on several</color>
  <s>words</s> lines
  And this is hosted by <img:sourceforge.jpg>
end note

@enduml

```



### 3.9 Note on links

It is possible to add a note on a link, just after the link definition, using `note on link`.

You can also use `note left on link`, `note right on link`, `note top on link`, `note bottom on link` if you want to change the relative position of the note with the label.

```

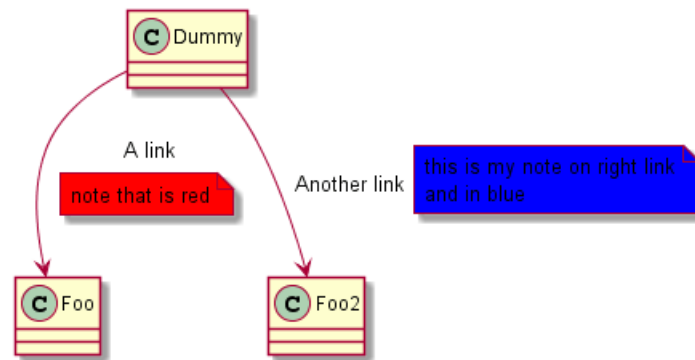
@startuml

class Dummy
Dummy --> Foo : A link
note on link #red: note that is red

Dummy --> Foo2 : Another link
note right on link #blue
this is my note on right link
and in blue
end note

@enduml

```



### 3.10 Abstract class and interface

You can declare a class as abstract using `abstract` or `abstract class` keywords.

The class will be printed in *italic*.

You can use the `interface`, `annotation` and `enum` keywords too.

@startuml

```

abstract class AbstractList
abstract AbstractCollection
interface List
interface Collection

```

```

List <|-- AbstractList
Collection <|-- AbstractCollection

```

```

Collection <|-- List
AbstractCollection <|-- AbstractList
AbstractList <|-- ArrayList

```

```

class ArrayList {
    Object[] elementData
    size()
}

```

```

enum TimeUnit {
    DAYS
    HOURS
    MINUTES
}

```

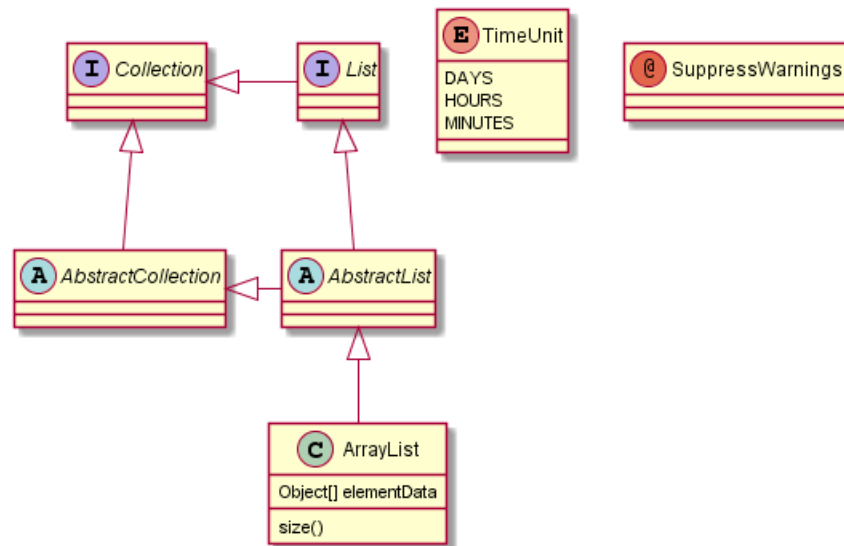
```

annotation SuppressWarnings

```

@enduml





### 3.11 Using non-letters

If you want to use non-letters in the class (or enum...) display, you can either :

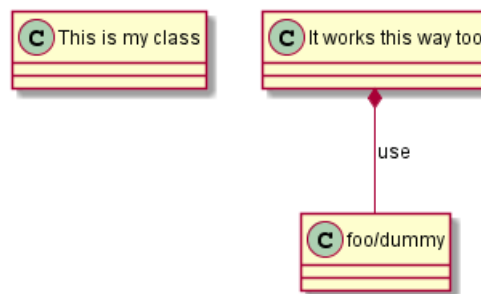
- Use the `as` keyword in the class definition
- Put quotes "" around the class name

```

@startuml
class "This is my class" as class1
class class2 as "It works this way too"

class2 *-- "foo/dummy" : use
@enduml

```



### 3.12 Hide attributes, methods...

You can parameterize the display of classes using the `hide/show` command.

The basic command is: `hide empty members`. This command will hide attributes or methods if they are empty.

Instead of `empty members`, you can use:

- `empty fields` or `empty attributes` for empty fields,
- `empty methods` for empty methods,
- `fields` or `attributes` which will hide fields, even if they are described,
- `methods` which will hide methods, even if they are described,
- `members` which will hide fields and methods, even if they are described,
- `circle` for the circled character in front of class name,

- stereotype for the stereotype.

You can also provide, just after the hide or show keyword:

- class for all classes,
- interface for all interfaces,
- enum for all enums,
- <<foo1>> for classes which are stereotyped with *foo1*,
- an existing class name.

You can use several show/hide commands to define rules and exceptions.

```
@startuml
```

```
class Dummy1 {
    +myMethods()
}
```

```
class Dummy2 {
    +hiddenMethod()
}
```

```
class Dummy3 <<Serializable>> {
    String name
}
```

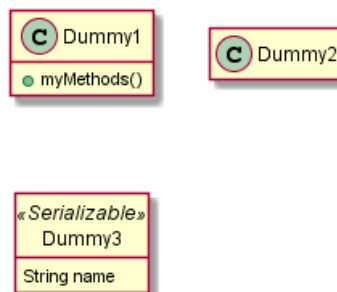
```
hide members
```

```
hide <<Serializable>> circle
```

```
show Dummy1 methods
```

```
show <<Serializable>> fields
```

```
@enduml
```



### 3.13 Hide classes

You can also use the show/hide commands to hide classes.

This may be useful if you define a large !included file, and if you want to hide some classes after file inclusion.

```
@startuml
```

```
class Foo1
class Foo2
```

```
Foo2 *-- Foo1
```

```
hide Foo2
```

```
@enduml
```





### 3.14 Use generics

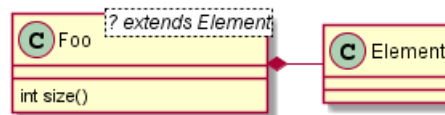
You can also use bracket < and > to define generics usage in a class.

@startuml

```

class Foo<? extends Element> {
    int size()
}
Foo *- Element
  
```

@enduml



It is possible to disable this drawing using `skinparam genericDisplay old` command.

### 3.15 Specific Spot

Usually, a spotted character (C, I, E or A) is used for classes, interface, enum and abstract classes.

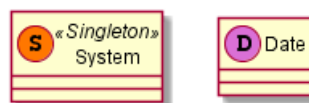
But you can define your own spot for a class when you define the stereotype, adding a single character and a color, like in this example:

@startuml

```

class System << (S,#FF7700) Singleton >>
class Date << (D,orchid) >>
  
```

@enduml



### 3.16 Packages

You can define a package using the package keyword, and optionally declare a background color for your package (Using a html color code or name).

Note that package definitions can be nested.

@startuml

```

package "Classic Collections" #DDDDDD {
    Object <|-- ArrayList
}
  
```

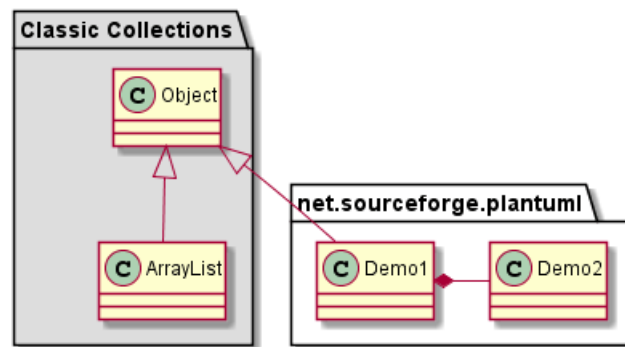


```

package net.sourceforge.plantuml {
    Object <|-- Demo1
    Demo1 *- Demo2
}

@enduml

```



### 3.17 Packages style

There are different styles available for packages.

You can specify them either by setting a default style with the command : `skinparam packageStyle`, or by using a stereotype on the package:

```

@startuml
scale 750 width
package foo1 <<Node>> {
    class Class1
}

package foo2 <<Rectangle>> {
    class Class2
}

package foo3 <<Folder>> {
    class Class3
}

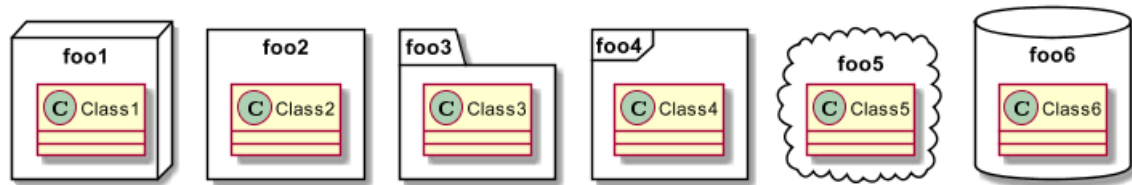
package foo4 <<Frame>> {
    class Class4
}

package foo5 <<Cloud>> {
    class Class5
}

package foo6 <<Database>> {
    class Class6
}

@enduml

```



You can also define links between packages, like in the following example:

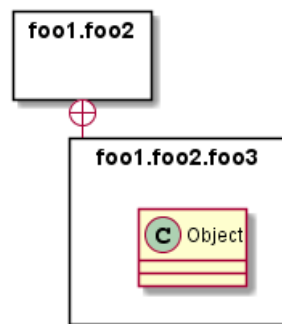
```
@startuml
skinparam packageStyle rectangle

package foo1.foo2 {

package foo1.foo2.foo3 {
    class Object
}

foo1.foo2 +-- foo1.foo2.foo3

@enduml
```



### 3.18 Namespaces

In packages, the name of a class is the unique identifier of this class. It means that you cannot have two classes with the very same name in different packages.

In that case, you should use namespaces instead of packages.

You can refer to classes from other namespaces by fully qualify them. Classes from the default namespace are qualified with a starting dot.

Note that you don't have to explicitly create namespace : a fully qualified class is automatically put in the right namespace.

```
@startuml
class BaseClass

namespace net.dummy #DDDDDD {
    .BaseClass <|-- Person
    Meeting o-- Person

    .BaseClass <|-- Meeting
}

namespace net.foo {
```



```

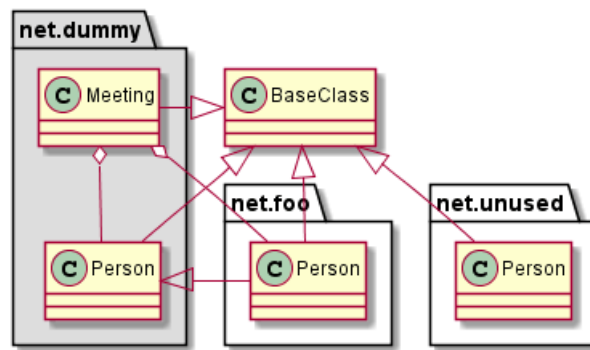
net.dummy.Person <|-- Person
.BaseClass <|-- Person

net.dummy.Meeting o-- Person
}

BaseClass <|-- net.unused.Person

@enduml

```



### 3.19 Automatic namespace creation

You can define another separator (other than the dot) using the command : set namespaceSeparator ???.

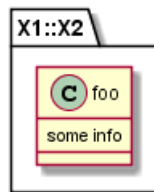
```

@startuml

set namespaceSeparator ::
class X1::X2::foo {
    some info
}

@enduml

```



You can disable automatic package creation using the command set namespaceSeparator none.

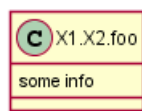
```

@startuml

set namespaceSeparator none
class X1.X2.foo {
    some info
}

@enduml

```



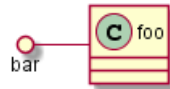


### 3.20 Lollipop interface

You can also define lollipops interface on classes, using the following syntax:

- bar ()- foo
- bar ()-- foo
- foo -() bar

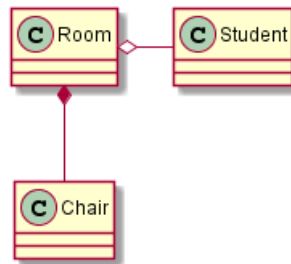
```
@startuml
class foo
bar ()- foo
@enduml
```



### 3.21 Changing arrows direction

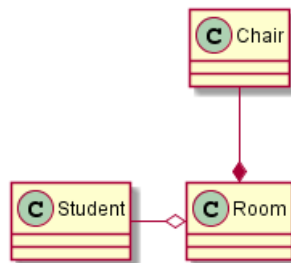
By default, links between classes have two dashes -- and are vertically oriented. It is possible to use horizontal link by putting a single dash (or dot) like this:

```
@startuml
Room o- Student
Room *-- Chair
@enduml
```



You can also change directions by reversing the link:

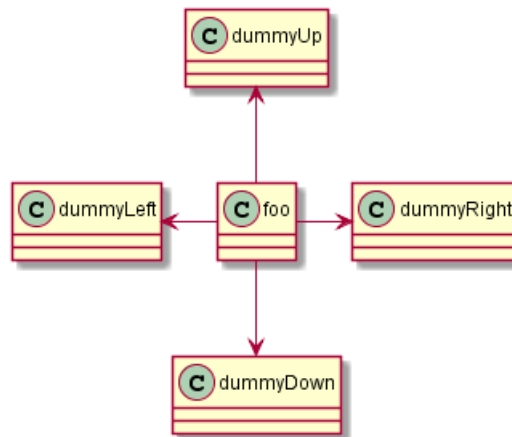
```
@startuml
Student -o Room
Chair --* Room
@enduml
```



It is also possible to change arrow direction by adding left, right, up or down keywords inside the arrow:

```
@startuml
foo -left-> dummyLeft
foo -right-> dummyRight
foo -up-> dummyUp
foo -down-> dummyDown
@enduml
```





You can shorten the arrow by using only the first character of the direction (for example, `-d-` instead of `-down-`) or the two first characters (`-do-`).

Please note that you should not abuse this functionality : *Graphviz* gives usually good results without tweaking.

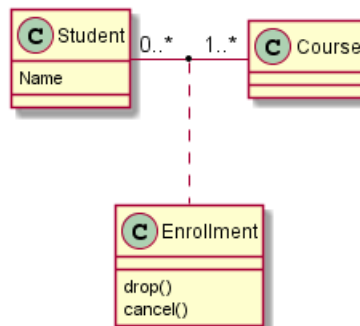
### 3.22 Association classes

You can define *association class* after that a relation has been defined between two classes, like in this example:

```

@startuml
class Student {
    Name
}
Student "0..*" -- "1..*" Course
(Student, Course) .. Enrollment

class Enrollment {
    drop()
    cancel()
}
@enduml
  
```



You can define it in another direction:

```

@startuml
class Student {
    Name
}
Student "0..*" -- "1..*" Course
(Student, Course) . Enrollment

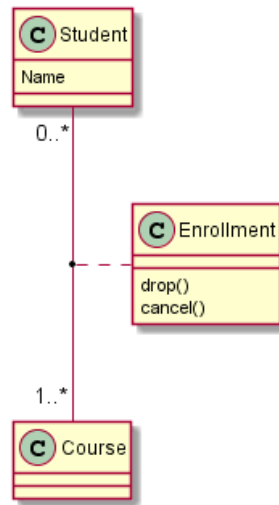
class Enrollment {
    drop()
    cancel()
}
@enduml
  
```



```

}
@enduml

```



### 3.23 Skinparam

You can use the `skinparam` command to change colors and fonts for the drawing.

You can use this command :

- In the diagram definition, like any other commands,
- In an included file,
- In a configuration file, provided in the command line or the ANT task.

```
@startuml
```

```

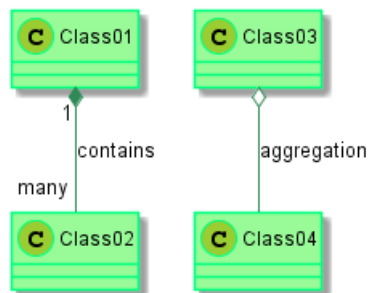
skinparam class {
  BackgroundColor PaleGreen
  ArrowColor SeaGreen
  BorderColor SpringGreen
}
skinparam stereotypeCBackgroundColor YellowGreen

```

```
Class01 "1" *-- "many" Class02 : contains
```

```
Class03 o-- Class04 : aggregation
```

```
@enduml
```



### 3.24 Skinned Stereotypes

You can define specific color and fonts for stereotyped classes.



```

@startuml

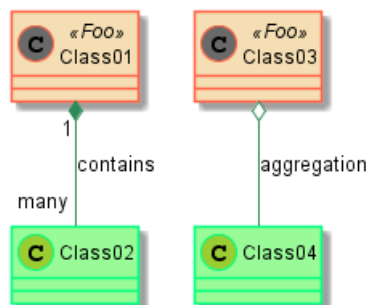
skinparam class {
  BackgroundColor PaleGreen
  ArrowColor SeaGreen
  BorderColor SpringGreen
  BackgroundColor<<Foo>> Wheat
  BorderColor<<Foo>> Tomato
}
skinparam stereotypeCBackgroundColor YellowGreen
skinparam stereotypeCBackgroundColor<< Foo >> DimGray

Class01 <<Foo>>
Class03 <<Foo>>
Class01 "1" *-- "many" Class02 : contains

Class03 o-- Class04 : aggregation

@enduml

```



### 3.25 Color gradient

It's possible to declare individual color for classes or note using the # notation.

You can use either standard color name or RGB code.

You can also use color gradient in background, with the following syntax: two colors names separated either by:

- |,
- /,
- \,
- or -

depending the direction of the gradient.

For example, you could have:

```

@startuml

skinparam backgroundcolor AntiqueWhite/Gold
skinparam classBackgroundColor Wheat|CornflowerBlue

class Foo #red-green
note left of Foo #blue\9932CC
  this is my
  note on this class
end note

package example #GreenYellow/LightGoldenRodYellow {

```

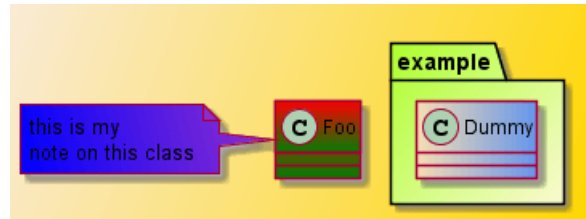


```

class Dummy
}

@enduml

```



### 3.26 Help on layout

Sometimes, the default layout is not perfect...

You can use `together` keyword to group some classes together : the layout engine will try to group them (as if they were in the same package).

You can also use hidden links to force the layout.

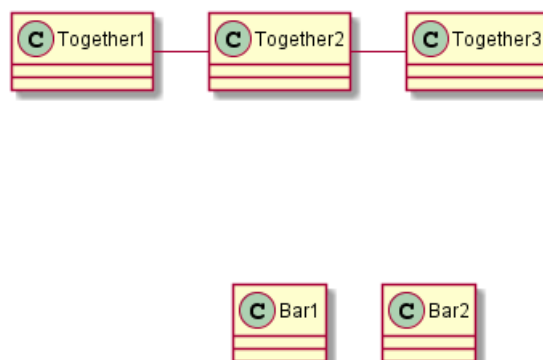
```

@startuml

class Bar1
class Bar2
together {
    class Together1
    class Together2
    class Together3
}
Together1 - Together2
Together2 - Together3
Together2 -[hidden]--> Bar1
Bar1 -[hidden]> Bar2

@enduml

```



### 3.27 Splitting large files

Sometimes, you will get some very large image files.

You can use the `page (hpages)x(vpages)` command to split the generated image into several files :

`hpages` is a number that indicated the number of horizontal pages, and `vpages` is a number that indicated the number of vertical pages.



You can also use some specific skinparam settings to put borders on splitted pages (see example).

```
@startuml
' Split into 4 pages
page 2x2
skinparam pageMargin 10
skinparam pageExternalColor gray
skinparam pageBorderColor black

class BaseClass

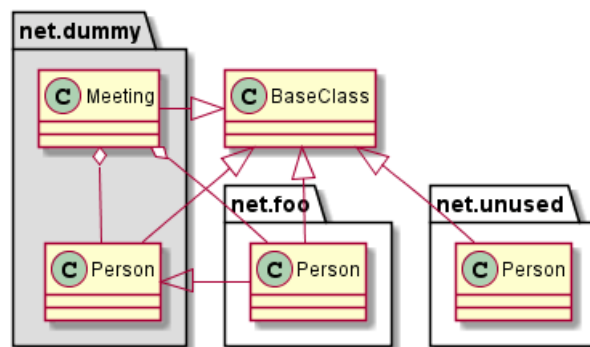
namespace net.dummy #DDDDDD {
.BaseClass <|-- Person
Meeting o-- Person

.BaseClass <|-- Meeting
}

namespace net.foo {
  net.dummy.Person <|-- Person
  .BaseClass <|-- Person

  net.dummy.Meeting o-- Person
}

BaseClass <|-- net.unused.Person
@enduml
```



## 4 Activity Diagram

### 4.1 Simple Activity

You can use (\*) for the starting point and ending point of the activity diagram.

In some occasion, you may want to use (\*top) to force the starting point to be at the top of the diagram.

Use --> for arrows.

```
@startuml
(*) --> "First Activity"
"First Activity" --> (*)
@enduml
```

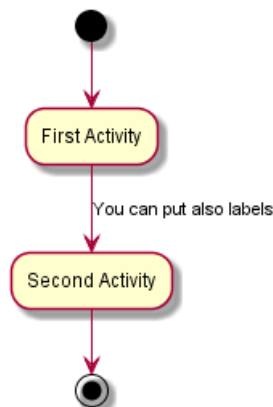


### 4.2 Label on arrows

By default, an arrow starts at the last used activity.

You can put a label on an arrow using brackets [ and ] just after the arrow definition.

```
@startuml
(*) --> "First Activity"
-->[You can put also labels] "Second Activity"
--> (*)
@enduml
```



### 4.3 Changing arrow direction

You can use -> for horizontal arrows. It is possible to force arrow's direction using the following syntax:

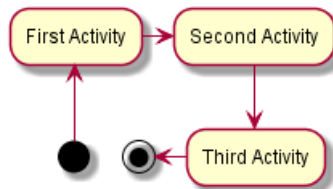
- -down-> (default arrow)
- -right-> or ->



```

    • -left->
    • -up->
@startuml
    (*) -up-> "First Activity"
    -right-> "Second Activity"
    --> "Third Activity"
    -left-> (*)
@enduml

```



## 4.4 Branches

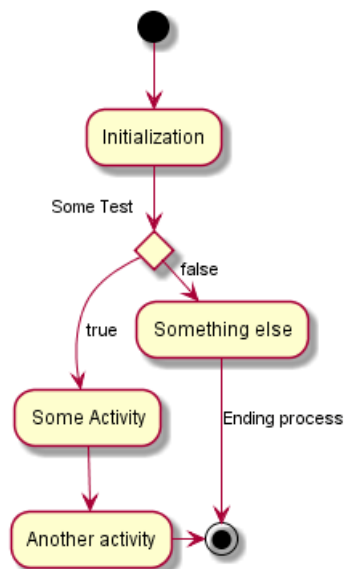
You can use if/then/else keywords to define branches.

```

@startuml
    (*) --> "Initialization"

    if "Some Test" then
        -->[true] "Some Activity"
        --> "Another activity"
        -right-> (*)
    else
        ->[false] "Something else"
        -->[Ending process] (*)
    endif
@enduml

```



Unfortunately, you will have to sometimes repeat the same activity in the diagram text:

```

@startuml
    (*) --> "check input"

```

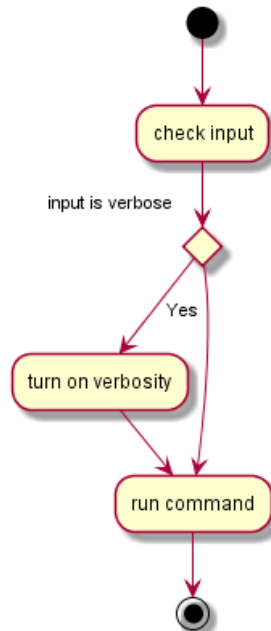




```

If "input is verbose" then
--> [Yes] "turn on verbosity"
--> "run command"
else
--> "run command"
Endif
-->(*)
@enduml

```



## 4.5 More on Branches

By default, a branch is connected to the last defined activity, but it is possible to override this and to define a link with the `if` keywords.

It is also possible to nest branches.

```

@startuml
(*) --> if "Some Test" then
    -->[true] "activity 1"
    if "" then
-> "activity 3" as a3
    else
if "Other test" then
    -left-> "activity 5"
else
    --> "activity 6"
endif
endif
else
    ->[false] "activity 2"
endif

```

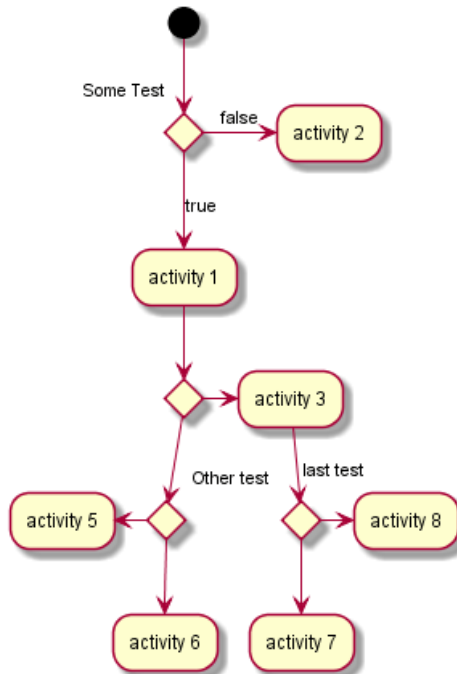


```

a3 --> if "last test" then
  --> "activity 7"
else
  --> "activity 8"
endif

@enduml

```



## 4.6 Synchronization

You can use `=== code ===` to display synchronization bars.

```

@startuml

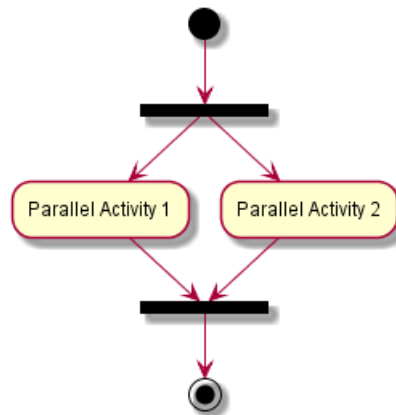
(*) --> ===B1===
--> "Parallel Activity 1"
--> ===B2===

===B1=== --> "Parallel Activity 2"
--> ===B2===

--> (*)

@enduml

```



## 4.7 Long activity description

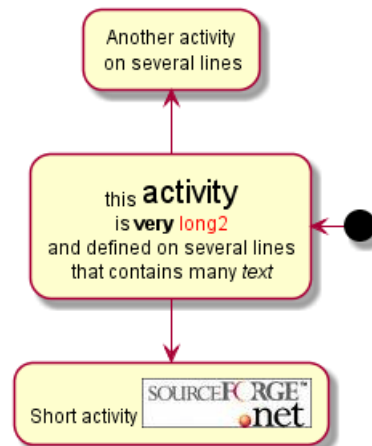
When you declare activities, you can span on several lines the description text. You can also add `\n` in the description.

You can also give a short code to the activity with the `as` keyword. This code can be used latter in the diagram description.

```
@startuml
(*) -left-> "this <size:20>activity</size>
is <b>very</b> <color:red>long2</color>
and defined on several lines
that contains many <i>text</i>" as A1

-up-> "Another activity\n on several lines"

A1 --> "Short activity <img:sourceforge.jpg>"
@enduml
```



## 4.8 Notes

You can add notes on a activity using the commands `note left`, `note right`, `note top` or `note bottom`, just after the description of the activity you want to note.

If you want to put a note on the starting point, define the note at the very beginning of the diagram description.

You can also have a note on several lines, using the `endnote` keywords.

```
@startuml
```

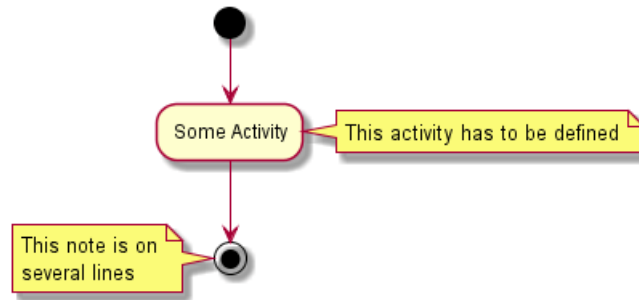


```

(*) --> "Some Activity"
note right: This activity has to be defined
"Some Activity" --> (*)
note left
  This note is on
  several lines
end note

@enduml

```



## 4.9 Partition

You can define a partition using the `partition` keyword, and optionally declare a background color for your partition (Using a html color code or name)

When you declare activities, they are automatically put in the last used partition.

You can close the partition definition using a closing bracket `}`.

```

@startuml

partition Conductor {
  (*) --> "Climbs on Platform"
  --> === S1 ===
  --> Bows
}

partition Audience #LightSkyBlue {
  === S1 === --> Applauds
}

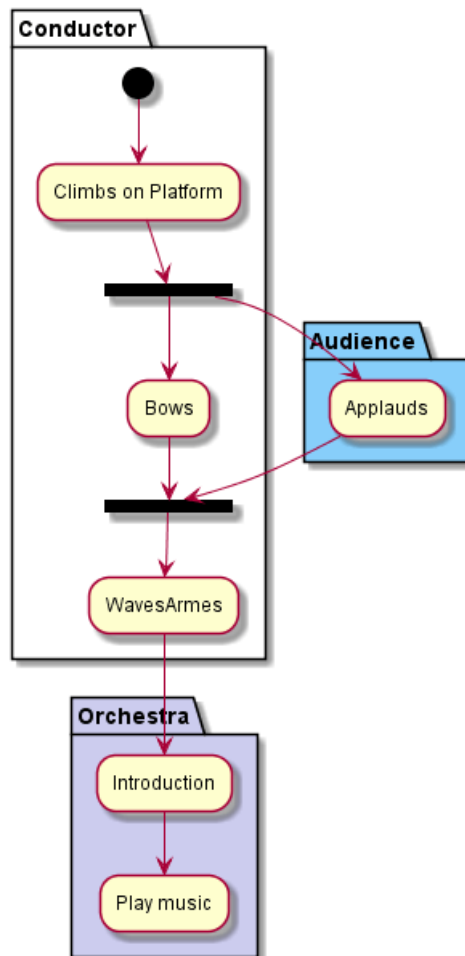
partition Conductor {
  Bows --> === S2 ===
  --> WavesArmes
  Applauds --> === S2 ===
}

partition Orchestra #CCCCEE {
  WavesArmes --> Introduction
  --> "Play music"
}

@enduml

```





## 4.10 Skinparam

You can use the `skinparam` command to change colors and fonts for the drawing.

You can use this command :

- In the diagram definition, like any other commands,
- In an included file,
- In a configuration file, provided in the command line or the ANT task.

You can define specific color and fonts for stereotyped activities.

```
@startuml
```

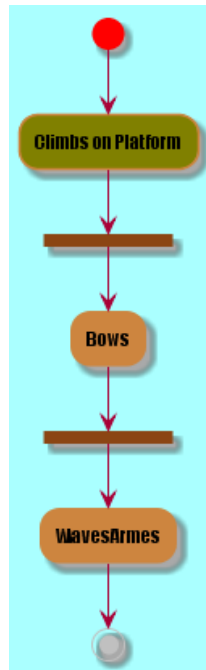
```
skinparam backgroundColor #AAFFFF
skinparam activity {
  StartColor red
  BarColor SaddleBrown
  EndColor Silver
  BackgroundColor Peru
  BackgroundColor<< Begin >> Olive
  BorderColor Peru
  FontName Impact
}
```

```
(*) --> "Climbs on Platform" << Begin >>
```



```
--> === S1 ===
--> Bows
--> === S2 ===
--> WavesArmes
--> (*)
```

```
@enduml
```



## 4.11 Octagon

You can change the shape of activities to octagon using the skinparam activityShape octagon command.

```
@startuml
'Default is skinparam activityShape roundBox
skinparam activityShape octagon
```

```
(*) --> "First Activity"
"First Activity" --> (*)
```

```
@enduml
```



## 4.12 Complete example

```
@startuml
title Servlet Container

(*) --> "ClickServlet.handleRequest()"
```



```

--> "new Page"

if "Page.onSecurityCheck" then
  ->[true] "Page.onInit()"

  if "isForward?" then
    ->[no] "Process controls"

    if "continue processing?" then
      -->[yes] ===RENDERING===
    else
      -->[no] ===REDIRECT_CHECK===
    endif

  else
    -->[yes] ===RENDERING===
  endif

  if "is Post?" then
    -->[yes] "Page.onPost()"
    --> "Page.onRender()" as render
    --> ===REDIRECT_CHECK===
  else
    -->[no] "Page.onGet()"
    --> render
  endif

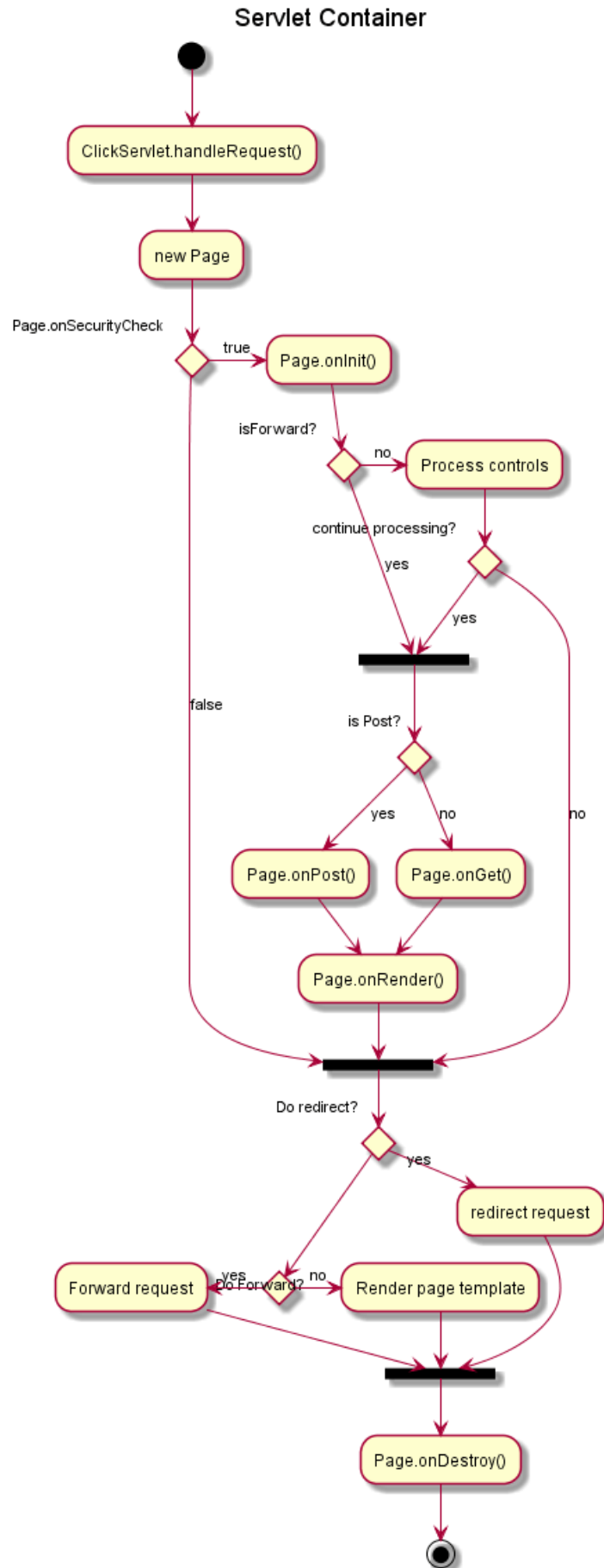
else
  -->[false] ===REDIRECT_CHECK===
endif

if "Do redirect?" then
  ->[yes] "redirect request"
  --> ==BEFORE_DESTROY==
else
  if "Do Forward?" then
    -left->[yes] "Forward request"
    --> ==BEFORE_DESTROY==
  else
    -right->[no] "Render page template"
    --> ==BEFORE_DESTROY==
  endif
endif

--> "Page.onDestroy()"
-->(*)

@enduml

```





## 5 Activity Diagram (beta)

Current syntax for activity diagram has several limitations and drawbacks (for example, it's difficult to maintain).

So a completely new syntax and implementation is proposed as **beta version** to users (starting with V7947), so that we could define a better format and syntax.

Another advantage of this new implementation is that it's done without the need of having Graphviz installed (as for sequence diagrams).

The new syntax will replace the old one. However, for compatibility reason, the old syntax will still be recognized, to ensure *ascending compatibility*.

Users are simply encouraged to migrate to the new syntax.

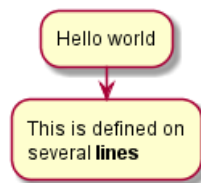
### 5.1 Simple Activity

Activities label starts with : and ends with ;.

Text formatting can be done using creole wiki syntax.

They are implicitly linked in their definition order.

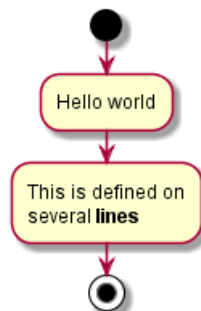
```
@startuml
:Hello world;
:This is defined on
several lines;
@enduml
```



### 5.2 Start/Stop

You can use start and stop keywords to denote the beginning and the end of a diagram.

```
@startuml
start
:Hello world;
:This is defined on
several lines;
stop
@enduml
```

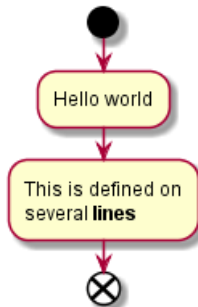


You can also use the end keyword.

```

@startuml
start
:Hello world;
:This is defined on
several lines;
end
@enduml

```



### 5.3 Conditional

You can use `if`, `then` and `else` keywords to put tests in your diagram. Labels can be provided using parentheses.

```

@startuml

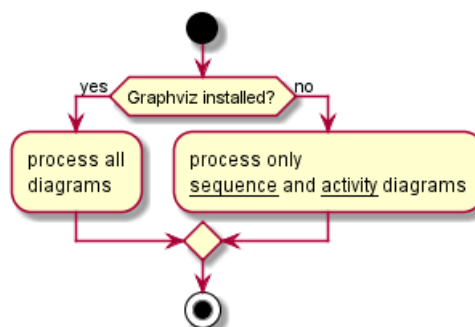
start

if (Graphviz installed?) then (yes)
    :process all\ndiagrams;
else (no)
    :process only
    __sequence__ and __activity__ diagrams;
endif

stop

@enduml

```



You can use the `elseif` keyword to have several tests :

```

@startuml
start
if (condition A) then (yes)
    :Text 1;
elseif (condition B) then (yes)
    :Text 2;
    stop
elseif (condition C) then (yes)

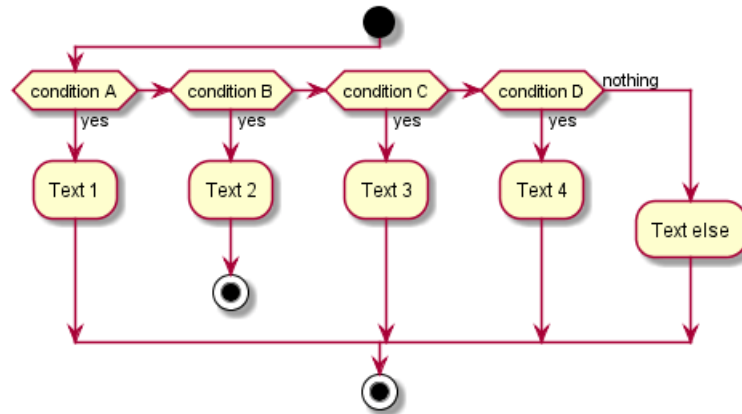
```



```

:Text 3;
elseif (condition D) then (yes)
:Text 4;
else (nothing)
:Text else;
endif
stop
@enduml

```



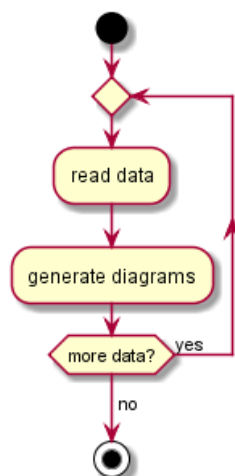
## 5.4 Repeat loop

You can use `repeat` and `repeatwhile` keywords to have repeat loops.

```

@startuml
start
repeat
:read data;
:generate diagrams;
repeat while (more data?) is (yes)
->no;
stop
@enduml

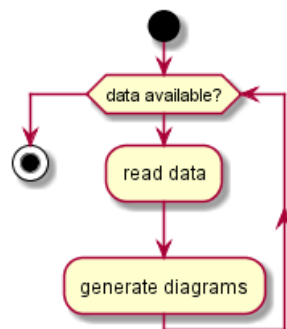
```



## 5.5 While loop

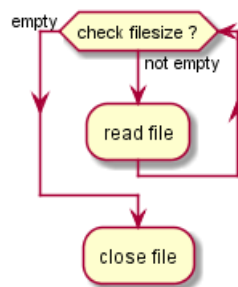
You can use `while` and `end while` keywords to have repeat loops.

```
@startuml
start
while (data available?)
    :read data;
    :generate diagrams;
endwhile
stop
@enduml
```



It is possible to provide a label after the `endwhile` keyword, or using the `is` keyword.

```
@startuml
while (check filesize ?) is (not empty)
    :read file;
endwhile (empty)
:close file;
@enduml
```



## 5.6 Parallel processing

You can use `fork`, `fork again` and `end fork` keywords to denote parallel processing.

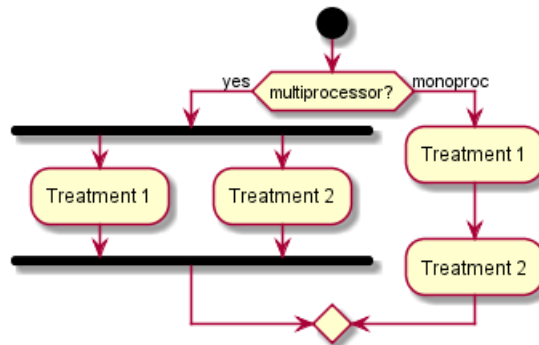
```
@startuml
start
if (multiprocessor?) then (yes)
    fork
    :Treatment 1;
    fork again
end fork
```



```

:Treatment 2;
  end fork
else (monoproc)
  :Treatment 1;
  :Treatment 2;
endif
@enduml

```



## 5.7 Notes

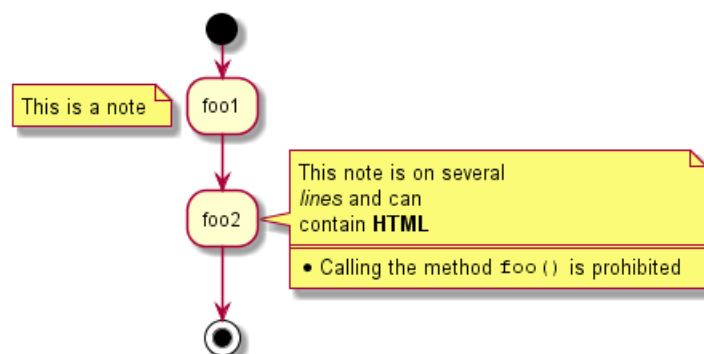
Text formatting can be done using creole wiki syntax.

A note can be floating, using floating keyword.

```

@startuml
start
:foo1;
floating note left: This is a note
:foo2;
note right
  This note is on several
  //lines// and can
  contain <b>HTML</b>
  ====
  * Calling the method ""foo()"" is prohibited
end note
stop
@enduml

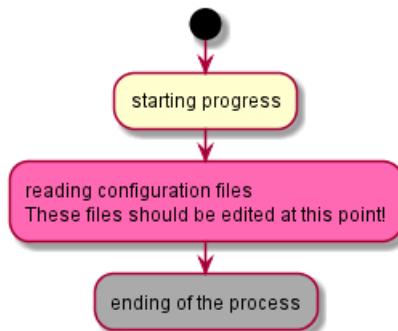
```



## 5.8 Colors

You can specify a color for some activities.

```
@startuml
start
:starting progress;
#HotPink:reading configuration files
These files should be edited at this point!;
#AAAAAA:ending of the process;
@enduml
```



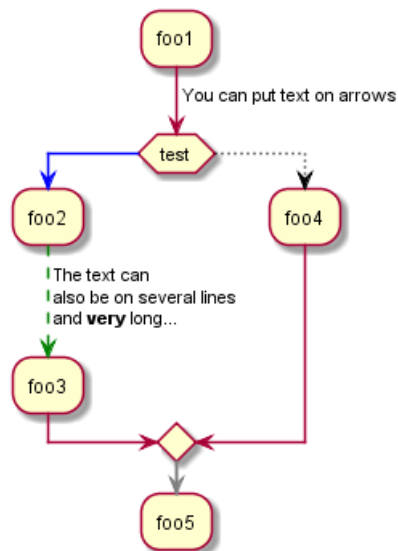
## 5.9 Arrows

Using the `->` notation, you can add texts to arrow, and change their color.

It's also possible to have dotted, dashed, bold or hidden arrows.

```
@startuml
:foo1;
-> You can put text on arrows;
if (test) then
-[#blue]->
:foo2;
-[#green,dashed]-> The text can
also be on several lines
and very long...;
:foo3;
else
-[#black,dotted]->
:foo4;
endif
-[#gray,bold]->
:foo5;
@enduml
```



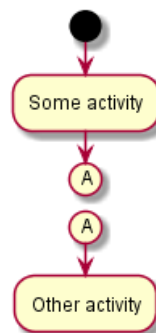


## 5.10 Connector

You can use parentheses to denote connector.

```

@startuml
start
:Some activity;
(A)
detach
(A)
:Other activity;
@enduml
  
```



## 5.11 Grouping

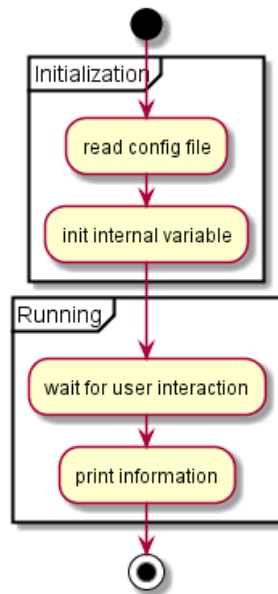
You can group activity together by defining partition:

```

@startuml
start
partition Initialization {
:read config file;
:init internal variable;
}
partition Running {
:wait for user interaction;
:print information;
}
  
```



```
stop
@enduml
```



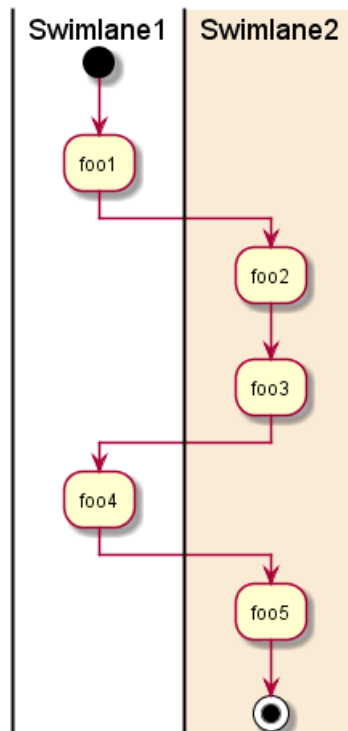
## 5.12 Swimlanes

Using pipe |, you can define swimlanes.

It's also possible to change swimlanes color.

```
@startuml
|Swimlane1|
start
:foo1;
|#AntiqueWhite|Swimlane2|
:foo2;
:foo3;
|Swimlane1|
:foo4;
|Swimlane2|
:foo5;
stop
@enduml
```





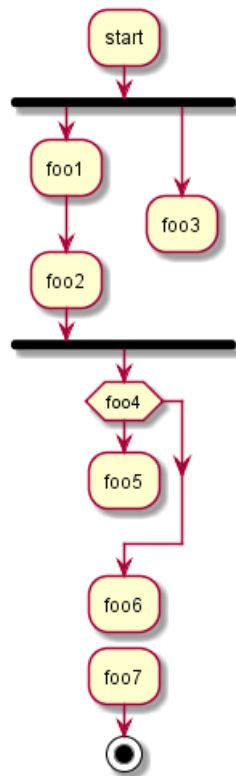
### 5.13 Detach

It's possible to remove an arrow using the detach keyword.

```

@startuml
: start;
fork
: foo1;
: foo2;
fork again
: foo3;
detach
endfork
if (foo4) then
: foo5;
detach
endif
: foo6;
detach
: foo7;
stop
@enduml

```



## 5.14 SDL

By changing the final ; separator, you can set different rendering for the activity:

- |
- <
- >
- /
- ]
- }

```

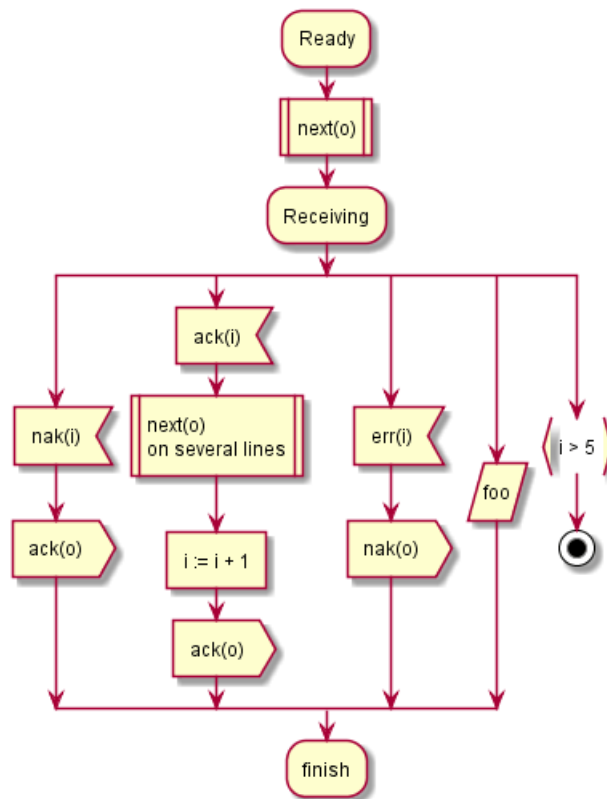
@startuml
:Ready;
:next(o)|
:Receiving;
split
:na<(i)<
:ack(o)>
split again
:ack(i)<
:next(o)
on several lines|
:i := i + 1]
:ack(o)>
split again
:err(i)<
:na<(o)>
split again
:foo/
split again
:i > 5}
  
```



```

stop
end split
:finish;
@enduml

```



## 5.15 Complete example

```

@startuml

start
:ClickServlet.handleRequest();
:new page;
if (Page.onSecurityCheck) then (true)
    :Page.onInit();
    if (isForward?) then (no)
:Process controls;
if (continue processing?) then (no)
    stop
endif
endif

if (isPost?) then (yes)
    :Page.onPost();
else (no)
    :Page.onGet();
endif
:Page.onRender();
endif
else (false)
endif

if (do redirect?) then (yes)

```



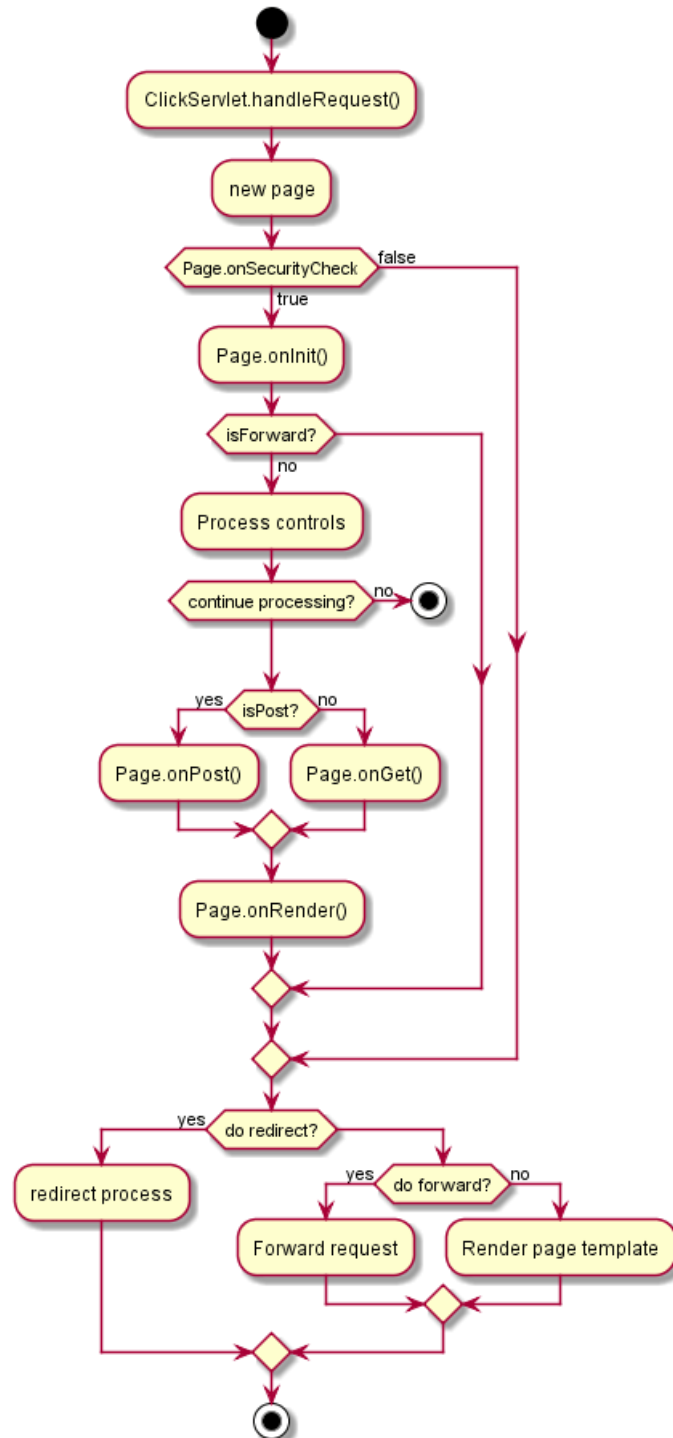
```

:redirect process;
else
  if (do forward?) then (yes)
:Forward request;
  else (no)
:Render page template;
  endif
endif
endif

stop

@enduml

```



## 6 Component Diagram

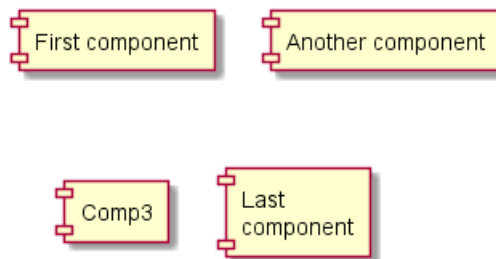
Let's have few examples :

### 6.1 Components

Components must be bracketed.

You can also use the component keyword to define a component. And you can define an alias, using the as keyword. This alias will be used latter, when defining relations.

```
@startuml
[First component]
[Another component] as Comp2
component Comp3
component [Last\ncomponent] as Comp4
@enduml
```



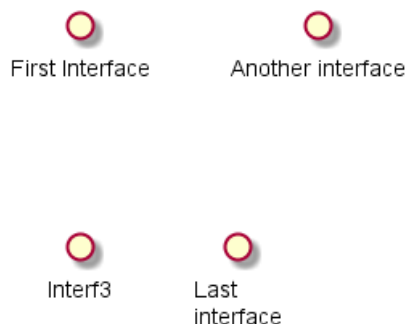
### 6.2 Interfaces

Interface can be defined using the () symbol (because this looks like a circle).

You can also use the interface keyword to define an interface. And you can define an alias, using the as keyword. This alias will be used latter, when defining relations.

We will see latter that interface definition is optional.

```
@startuml
() "First Interface"
() "Another interface" as Interf2
interface Interf3
interface "Last\ninterface" as Interf4
@enduml
```



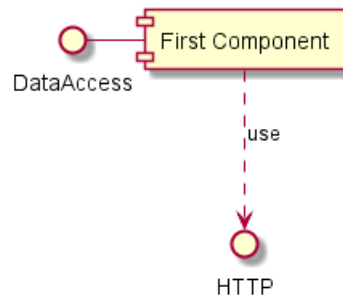
### 6.3 Basic example

Links between elements are made using combinations of dotted line (.), straight line (--), and arrows (-->) symbols.

```
@startuml
```

```
DataAccess - [First Component]
[First Component] ..> HTTP : use
```

```
@enduml
```



### 6.4 Using notes

You can use the note left of, note right of, note top of, note bottom of keywords to define notes related to a single object.

A note can be also define alone with the note keywords, then linked to other objects using the .. symbol.

```
@startuml
```

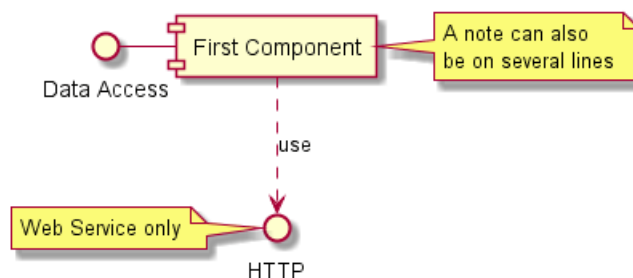
```
interface "Data Access" as DA
```

```
DA - [First Component]
[First Component] ..> HTTP : use
```

```
note left of HTTP : Web Service only
```

```
note right of [First Component]
    A note can also
    be on several lines
end note
```

```
@enduml
```



### 6.5 Grouping Components

You can use several keywords to group components and interfaces together:



- package
- node
- folder
- frame
- cloud
- database

```
@startuml

package "Some Group" {
    HTTP - [First Component]
    [Another Component]
}

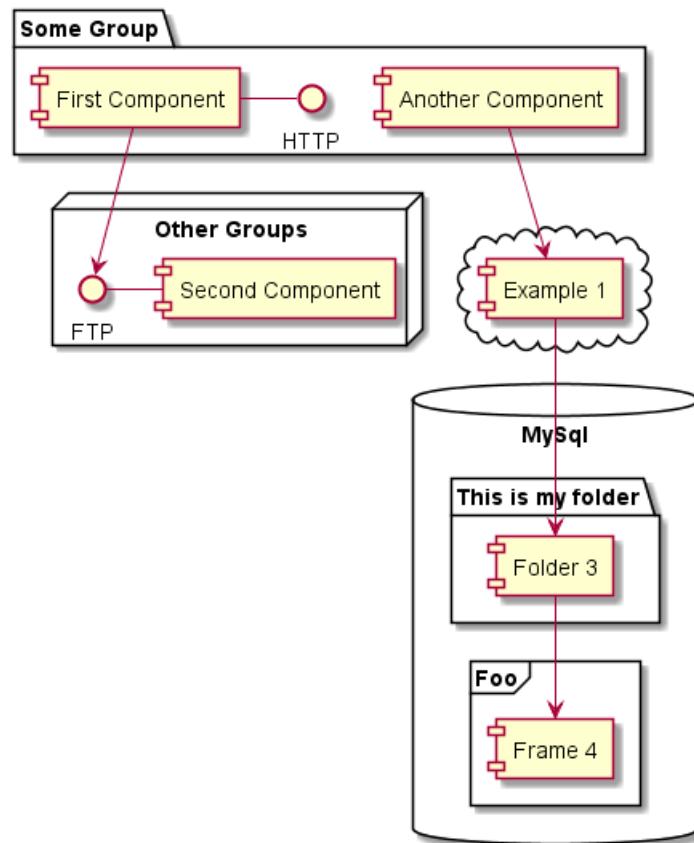
node "Other Groups" {
    FTP - [Second Component]
    [First Component] --> FTP
}

cloud {
    [Example 1]
}

database "MySQL" {
    folder "This is my folder" {
        [Folder 3]
    }
    frame "Foo" {
        [Frame 4]
    }
}

[Another Component] --> [Example 1]
[Example 1] --> [Folder 3]
[Folder 3] --> [Frame 4]

@enduml
```



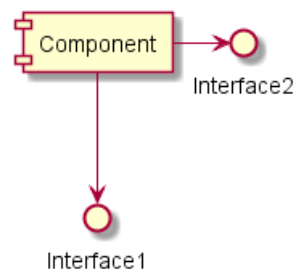
## 6.6 Changing arrows direction

By default, links between classes have two dashes -- and are vertically oriented. It is possible to use horizontal link by putting a single dash (or dot) like this:

```

@startuml
[Component] --> Interface1
[Component] -> Interface2
@enduml

```



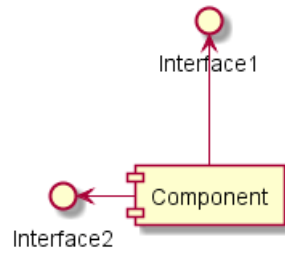
You can also change directions by reversing the link:

```

@startuml
Interface1 <-- [Component]
Interface2 <- [Component]
@enduml

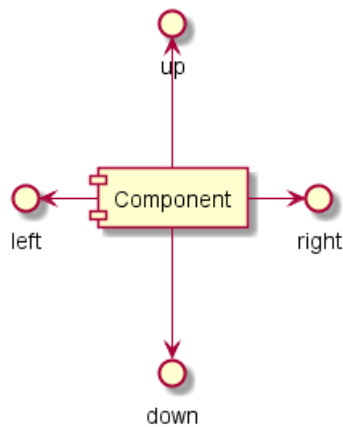
```





It is also possible to change arrow direction by adding left, right, up or down keywords inside the arrow:

```
@startuml
[Component] -left-> left
[Component] -right-> right
[Component] -up-> up
[Component] -down-> down
@enduml
```



You can shorten the arrow by using only the first character of the direction (for example, -d- instead of -down-) or the two first characters (-do-).

Please note that you should not abuse this functionality : *Graphviz* gives usually good results without tweaking.

## 6.7 Use UML2 notation

The `skinparam componentStyle uml2` command is used to switch to UML2 notation.

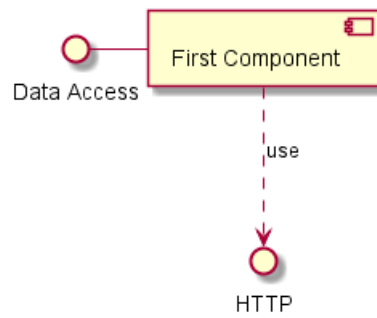
```
@startuml
skinparam componentStyle uml2

interface "Data Access" as DA

DA - [First Component]
[First Component] ..> HTTP : use

@enduml
```



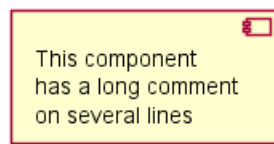


## 6.8 Long description

It is possible to put description on several lines using square brackets.

```

@startuml
component comp1 [
This component
has a long comment
on several lines
]
@enduml
  
```



## 6.9 Individual colors

You can specify a color after component definition.

```

@startuml
component [Web Server] #Yellow
@enduml
  
```



## 6.10 Using Sprite in Stereotype

You can use sprites within stereotype components.

```

@startuml
sprite $businessProcess [16x16/16] {
FFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFF
FFFFFFFFF0FFFFF
FFFFFFFFF0FFFFF
FF0000000000FFF
FF0000000000FFF
FF0000000000FFF
FFFFFFFFF0FFFFF
FFFFFFFFF0FFFFF
}
  
```

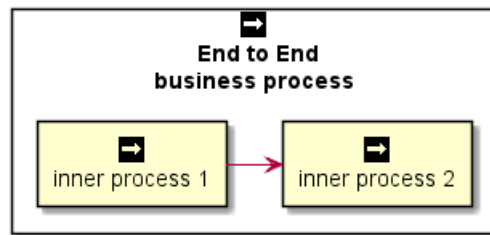


```

FFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFF
}

rectangle " End to End\nbusiness process" <<$businessProcess>> {
  rectangle "inner process 1" <<$businessProcess>> as src
  rectangle "inner process 2" <<$businessProcess>> as tgt
  src -> tgt
}
@enduml

```



## 6.11 Skinparam

You can use the skinparam command to change colors and fonts for the drawing.

You can use this command :

- In the diagram definition, like any other commands,
- In an included file,
- In a configuration file, provided in the command line or the ANT task.

You can define specific color and fonts for stereotyped components and interfaces.

```

@startuml

skinparam interface {
  backgroundColor RosyBrown
  borderColor orange
}

skinparam component {
  FontSize 13
  BackgroundColor<<Apache>> Red
  BorderColor<<Apache>> #FF6655
  FontName Courier
  BorderColor black
  BackgroundColor gold
  ArrowFontName Impact
  ArrowColor #FF6655
  ArrowFontColor #777777
}

() "Data Access" as DA

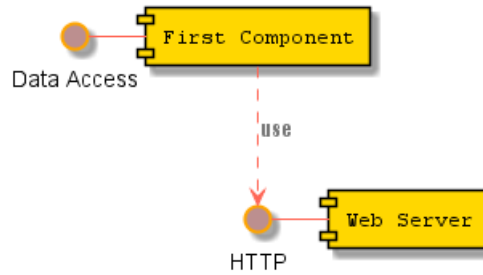
DA - [First Component]
[First Component] ..> () HTTP : use

```



HTTP - [Web Server] << Apache >>

@enduml



@startuml

[AA] <<static lib>>

[BB] <<shared lib>>

[CC] <<static lib>>

node node1

node node2 <<shared node>>

database Production

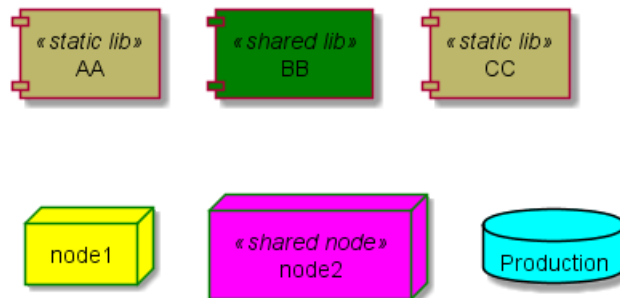
```

skinparam component {
  backgroundColor<<static lib>> DarkKhaki
  backgroundColor<<shared lib>> Green
}
  
```

```

skinparam node {
  borderColor Green
  backgroundColor Yellow
  backgroundColor<<shared node>> Magenta
}
skinparam databaseBackgroundColor Aqua
  
```

@enduml



## 7 State Diagram

State diagrams are used to give an abstract description of the behavior of a system. This behavior is represented as a series of events that can occur in one or more possible states.

### 7.1 Simple State

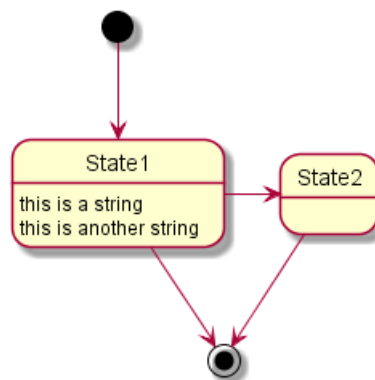
You can use [\*] for the starting point and ending point of the state diagram.

Use --> for arrows.

```
@startuml
[*] --> State1
State1 --> [*]
State1 : this is a string
State1 : this is another string

State1 -> State2
State2 --> [*]

@enduml
```



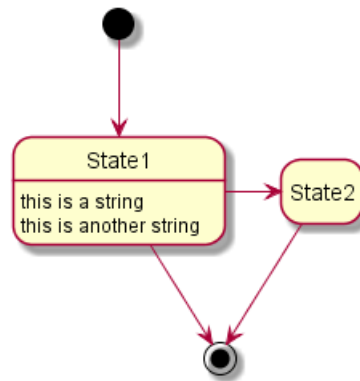
### 7.2 Change state rendering

You can use `hide empty description` to render state as simple box.

```
@startuml
hide empty description
[*] --> State1
State1 --> [*]
State1 : this is a string
State1 : this is another string

State1 -> State2
State2 --> [*]

@enduml
```



### 7.3 Composite state

A state can also be composite. You have to define it using the state keywords and brackets.

```

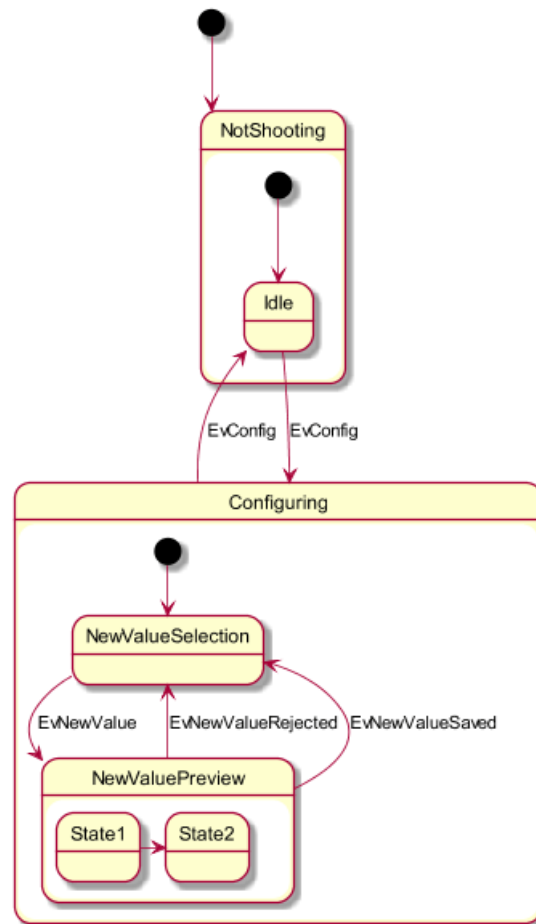
@startuml
scale 350 width
[*] --> NotShooting

state NotShooting {
    [*] --> Idle
    Idle --> Configuring : EvConfig
    Configuring --> Idle : EvConfig
}

state Configuring {
    [*] --> NewValueSelection
    NewValueSelection --> NewValuePreview : EvNewValue
    NewValuePreview --> NewValueSelection : EvNewValueRejected
    NewValuePreview --> NewValueSelection : EvNewValueSaved

    state NewValuePreview {
        State1 -> State2
    }
}

@enduml
  
```



## 7.4 Long name

You can also use the state keyword to use long description for states.

```

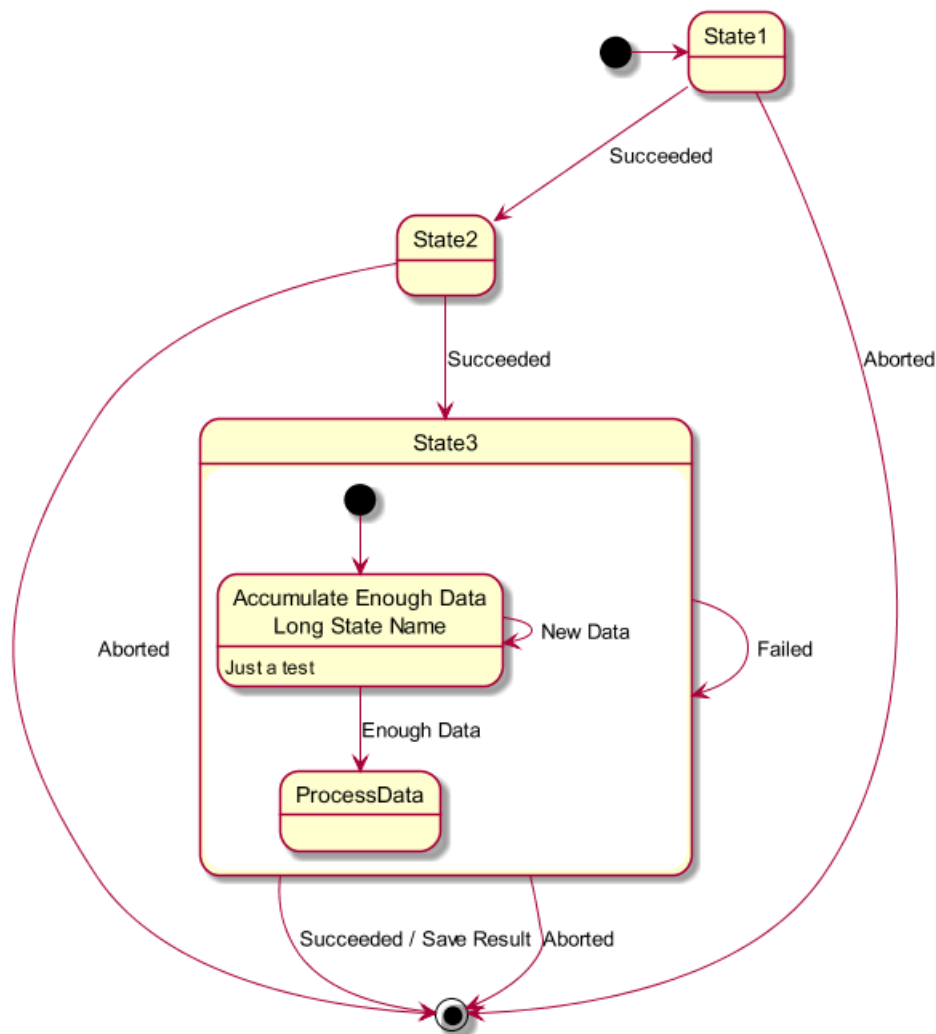
@startuml
scale 600 width

[*] -> State1
State1 --> State2 : Succeeded
State1 --> [*] : Aborted
State2 --> State3 : Succeeded
State2 --> [*] : Aborted
state State3 {
    state "Accumulate Enough Data\nLong State Name" as long1
    long1 : Just a test
    [*] --> long1
    long1 --> long1 : New Data
    long1 --> ProcessData : Enough Data
}
State3 --> State3 : Failed
State3 --> [*] : Succeeded / Save Result
State3 --> [*] : Aborted

@enduml

```





## 7.5 Fork

You can also fork and join using the <<fork>> and <<join>> stereotypes.

```

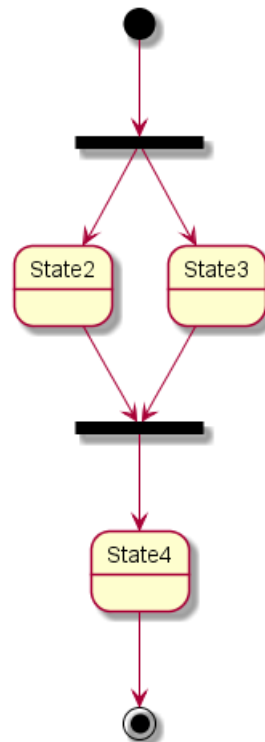
@startuml

state fork_state <<fork>>
[*] --> fork_state
fork_state --> State2
fork_state --> State3

state join_state <<join>>
State2 --> join_state
State3 --> join_state
join_state --> State4
State4 --> [*]

@enduml
  
```





## 7.6 Concurrent state

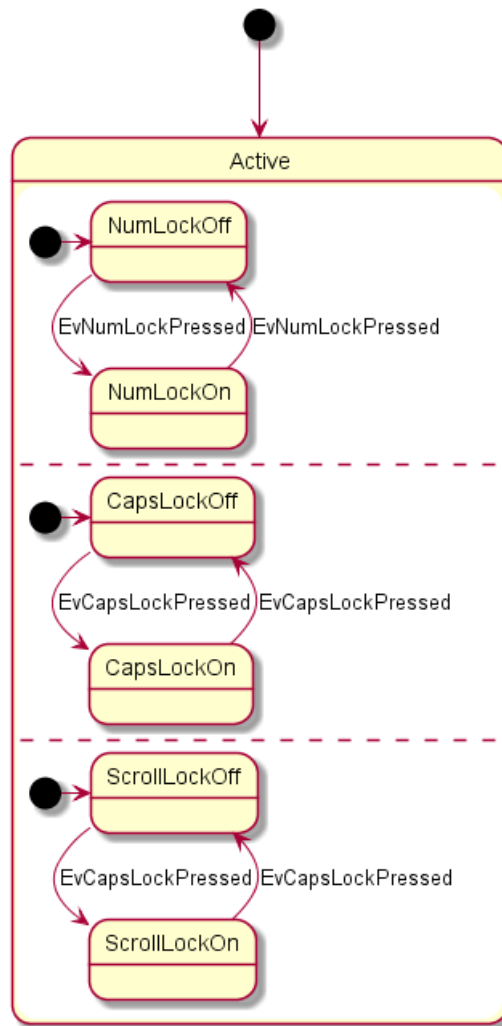
You can define concurrent state into a composite state using either `--` or `||` symbol as separator.

```

@startuml
[*] --> Active

state Active {
    [*] -> NumLockOff
    NumLockOff --> NumLockOn : EvNumLockPressed
    NumLockOn --> NumLockOff : EvNumLockPressed
    --
    [*] -> CapsLockOff
    CapsLockOff --> CapsLockOn : EvCapsLockPressed
    CapsLockOn --> CapsLockOff : EvCapsLockPressed
    --
    [*] -> ScrollLockOff
    ScrollLockOff --> ScrollLockOn : EvCapsLockPressed
    ScrollLockOn --> ScrollLockOff : EvCapsLockPressed
}

@enduml
  
```



## 7.7 Arrow direction

You can use `->` for horizontal arrows. It is possible to force arrow's direction using the following syntax:

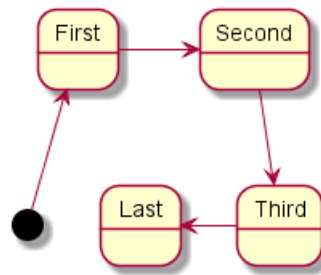
- `-down->` (default arrow)
- `-right->` or `->`
- `-left->`
- `-up->`

```
@startuml
```

```
[*] -up-> First
First -right-> Second
Second --> Third
Third -left-> Last
```

```
@enduml
```





You can shorten the arrow by using only the first character of the direction (for example, `-d-` instead of `-down-`) or the two first characters (`-do-`).

Please note that you should not abuse this functionality : *Graphviz* gives usually good results without tweaking.

## 7.8 Note

You can also define notes using `note left of`, `note right of`, `note top of`, `note bottom of` keywords.

You can also define notes on several lines.

```
@startuml
```

```
[*] --> Active
```

```
Active --> Inactive
```

```
note left of Active : this is a short\nnote
```

```
note right of Inactive
```

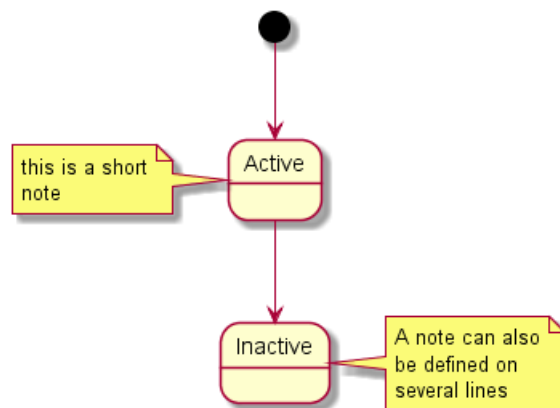
```
  A note can also
```

```
  be defined on
```

```
  several lines
```

```
end note
```

```
@enduml
```



You can also have floating notes.

```
@startuml
```

```
state foo
```

```
note "This is a floating note" as N1
```

```
@enduml
```





## 7.9 More in notes

You can put notes on composite states.

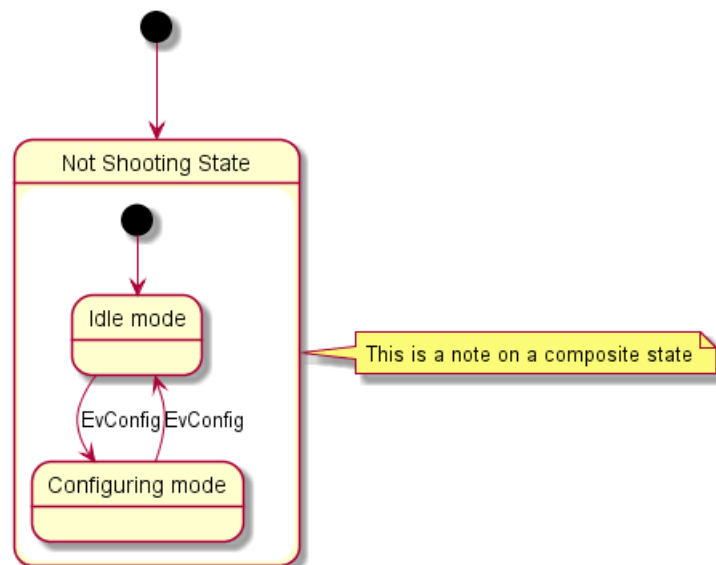
```
@startuml
```

```
[*] --> NotShooting
```

```
state "Not Shooting State" as NotShooting {
    state "Idle mode" as Idle
    state "Configuring mode" as Configuring
    [*] --> Idle
    Idle --> Configuring : EvConfig
    Configuring --> Idle : EvConfig
}
```

```
note right of NotShooting : This is a note on a composite state
```

```
@enduml
```



## 7.10 Skinparam

You can use the `skinparam` command to change colors and fonts for the drawing.

You can use this command :

- In the diagram definition, like any other commands,
- In an included file,
- In a configuration file, provided in the command line or the ANT task.

You can define specific color and fonts for stereotyped states.

```
@startuml
skinparam backgroundColor LightYellow
skinparam state {
    StartColor MediumBlue
```



```

    EndColor Red
    BackgroundColor Peru
    BackgroundColor<<Warning>> Olive
    BorderColor Gray
    FontName Impact
}

```

```

[*] --> NotShooting

```

```

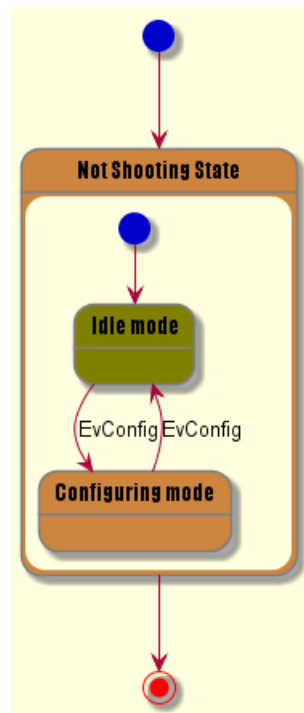
state "Not Shooting State" as NotShooting {
    state "Idle mode" as Idle <<Warning>>
    state "Configuring mode" as Configuring
    [*] --> Idle
    Idle --> Configuring : EvConfig
    Configuring --> Idle : EvConfig
}

```

```

NotShooting --> [*]
@enduml

```

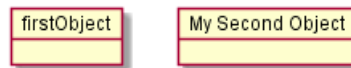


## 8 Object Diagram

### 8.1 Definition of objects

You define instance of objects using the object keywords.

```
@startuml
object firstObject
object "My Second Object" as o2
@enduml
```



### 8.2 Relations between objects

Relations between objects are defined using the following symbols :

| Type        | Symbol | Image |
|-------------|--------|-------|
| Extension   | < --   |       |
| Composition | *--    |       |
| Aggregation | o--    |       |

It is possible to replace -- by . . to have a dotted line.

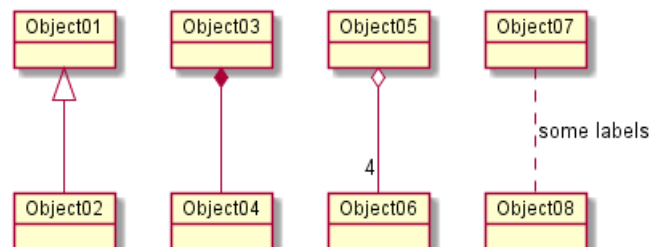
Knowing those rules, it is possible to draw the following drawings.

It is possible to add a label on the relation, using : followed by the text of the label.

For cardinality, you can use double-quotes "" on each side of the relation.

```
@startuml
object Object01
object Object02
object Object03
object Object04
object Object05
object Object06
object Object07
object Object08

Object01 <|-- Object02
Object03 *-- Object04
Object05 o-- "4" Object06
Object07 .. Object08 : some labels
@enduml
```

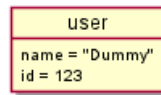


### 8.3 Adding fields

To declare fields, you can use the symbol : followed by the field's name.

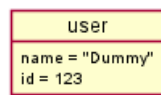


```
@startuml  
  
object user  
  
user : name = "Dummy"  
user : id = 123  
  
@enduml
```



It is also possible to group all fields between brackets {}.

```
@startuml  
  
object user {  
    name = "Dummy"  
    id = 123  
}  
  
@enduml
```



## 8.4 Common features with class diagrams

- Hide attributes, methods...
- Defines notes
- Use packages
- Skin the output

## 9 Timing Diagram

This is only a proposal and subject to change.

You are very welcome to create a new discussion on this future syntax. Your feedbacks, ideas and suggestions help us to find the right solution.

### 9.1 Declaring participant

You declare participant using concise or robust keyword, depending on how you want them to be drawn.

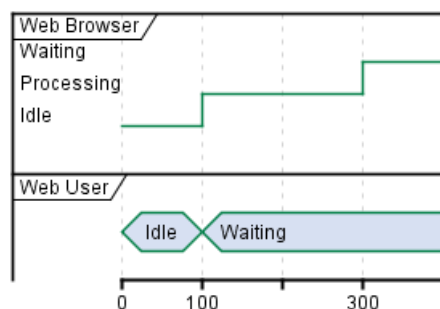
You define state change using the @ notation, and the is verb.

```
@startuml
robust "Web Browser" as WB
concise "Web User" as WU
```

```
@0
WU is Idle
WB is Idle
```

```
@100
WU is Waiting
WB is Processing
```

```
@300
WB is Waiting
@enduml
```



### 9.2 Adding message

You can add message using the following syntax.

```
@startuml
robust "Web Browser" as WB
concise "Web User" as WU
```

```
@0
WU is Idle
WB is Idle
```

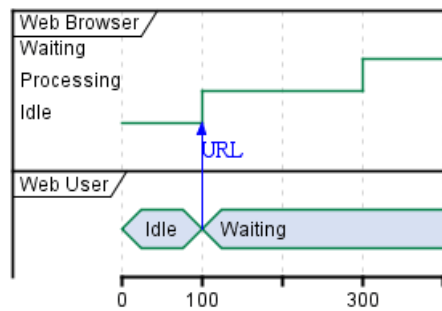
```
@100
WU -> WB : URL
WU is Waiting
WB is Processing
```

```
@300
WB is Waiting
```





@enduml



### 9.3 Relative time

It is possible to use relative time with @.

```

@startuml
robust "DNS Resolver" as DNS
robust "Web Browser" as WB
concise "Web User" as WU
  
```

```

@0
WU is Idle
WB is Idle
DNS is Idle
  
```

```

@+100
WU -> WB : URL
WU is Waiting
WB is Processing
  
```

```

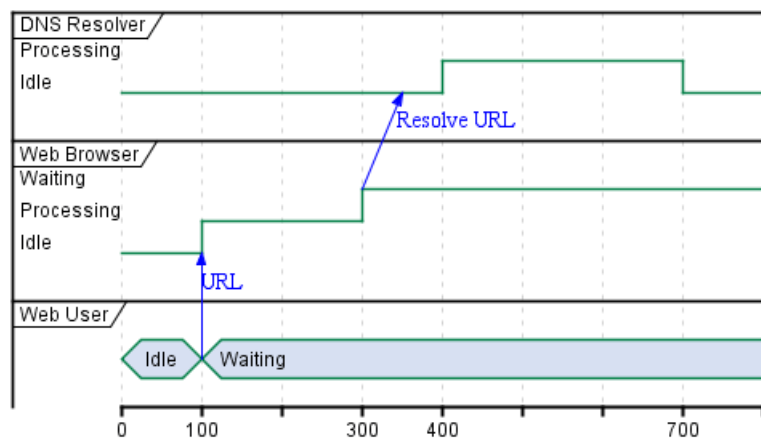
@+200
WB is Waiting
WB -> DNS@+50 : Resolve URL
  
```

```

@+100
DNS is Processing
  
```

```

@+300
DNS is Idle
@enduml
  
```



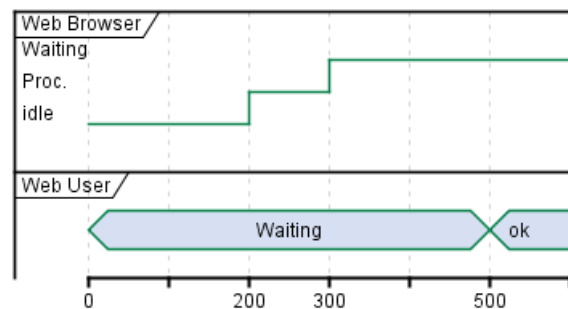
## 9.4 Participant oriented

Rather than declare the diagram in chronological order, you can define it by participant.

```
@startuml
robust "Web Browser" as WB
concise "Web User" as WU
```

```
@WB
0 is idle
+200 is Proc.
+100 is Waiting
```

```
@WU
0 is Waiting
+500 is ok
@enduml
```

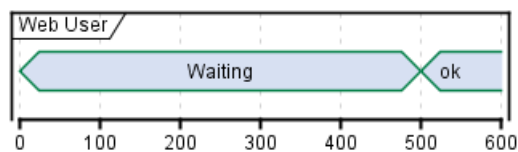


## 9.5 Setting scale

You can also set a specific scale.

```
@startuml
concise "Web User" as WU
scale 100 as 50 pixels
```

```
@WU
0 is Waiting
+500 is ok
@enduml
```



## 9.6 Initial state

You can also define an initial state.

```
@startuml
robust "Web Browser" as WB
concise "Web User" as WU
```

```
WB is Initializing
WU is Absent
```

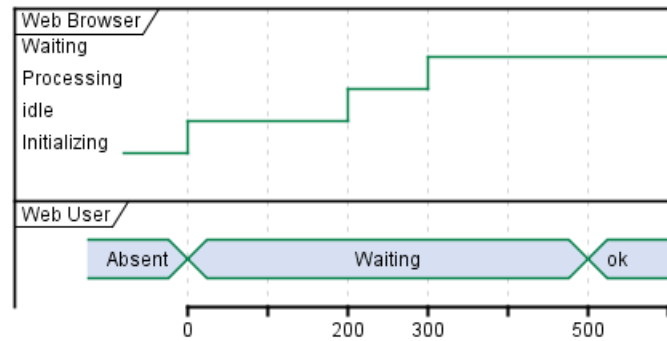


```

@WB
0 is idle
+200 is Processing
+100 is Waiting

@WU
0 is Waiting
+500 is ok
@enduml

```



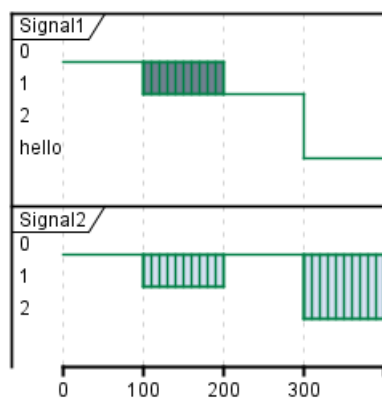
## 9.7 Intricated state

A signal could be in some undefined state.

```

@startuml
robust "Signal1" as S1
robust "Signal2" as S2
S1 has 0,1,2,hello
S2 has 0,1,2
@0
S1 is 0
S2 is 0
@100
S1 is {0,1} #SlateGrey
S2 is {0,1}
@200
S1 is 1
S2 is 0
@300
S1 is hello
S2 is {0,2}
@enduml

```



## 9.8 Hidden state

It is also possible to hide some state.

```
@startuml
concise "Web User" as WU

@0
WU is {-}

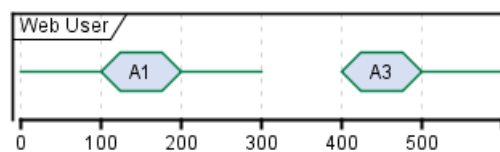
@100
WU is A1

@200
WU is {-}

@300
WU is {hidden}

@400
WU is A3

@500
WU is {-}
@enduml
```



## 9.9 Adding constraint

It is possible to display time constraints on the diagrams.

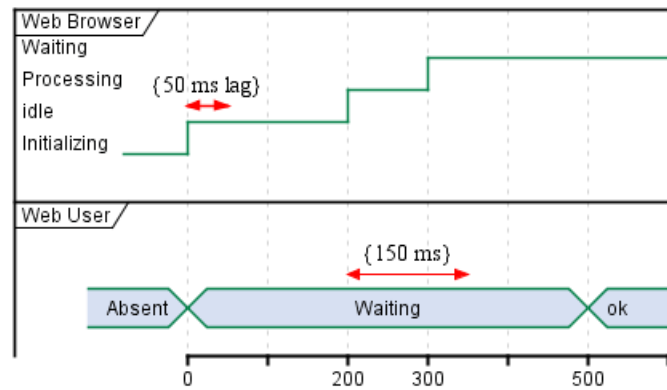
```
@startuml
robust "Web Browser" as WB
concise "Web User" as WU

WB is Initializing
WU is Absent

@WB
0 is idle
+200 is Processing
+100 is Waiting
WB@0 <-> @50 : {50 ms lag}

@WU
0 is Waiting
+500 is ok
@200 <-> @+150 : {150 ms}
@enduml
```





## 9.10 Adding texts

You can optionally add a title, a header, a footer, a legend and a caption:

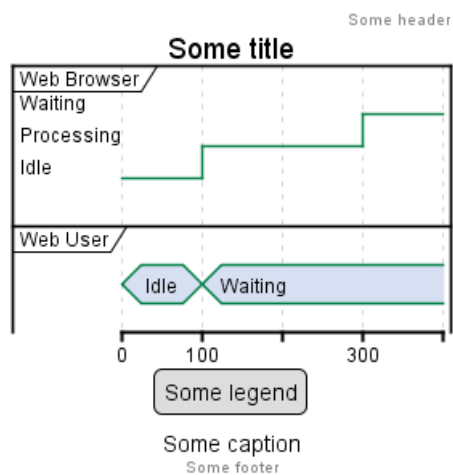
```
@startuml
Title this is my title
header: some header
footer: some footer
legend
Some legend
end legend
caption some caption

robust "Web Browser" as WB
concise "Web User" as WU

@0
WU is Idle
WB is Idle

@100
WU is Waiting
WB is Processing

@300
WB is Waiting
@enduml
```



## 10 Gantt Diagram

This is only a proposal and subject to change.

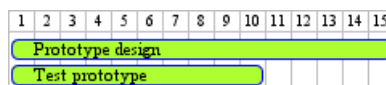
You are very welcome to create a new discussion on this future syntax. Your feedbacks, ideas and suggestions help us to find the right solution.

The Gantt is described in *natural* language, using very simple sentences (subject-verb-complement).

### 10.1 Declaring tasks

Tasks defined using square bracket. Their durations are defined using the last verb:

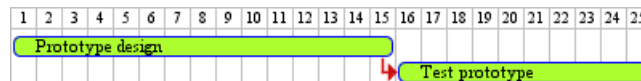
```
@startgantt
[Prototype design] lasts 15 days
[Test prototype] lasts 10 days
@endgantt
```



### 10.2 Adding constraints

It is possible to add constraints between task.

```
@startgantt
[Prototype design] lasts 15 days
[Test prototype] lasts 10 days
[Test prototype] starts at [Prototype design]'s end
@endgantt
```



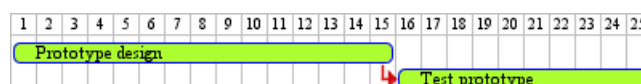
```
@startgantt
[Prototype design] lasts 10 days
[Code prototype] lasts 10 days
[Write tests] lasts 5 days
[Code prototype] starts at [Prototype design]'s end
[Write tests] starts at [Code prototype]'s start
@endgantt
```



### 10.3 Short names

It is possible to define short name for tasks with the as keyword.

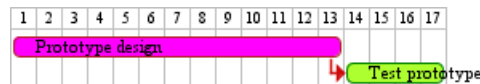
```
@startgantt
[Prototype design] as [D] lasts 15 days
[Test prototype] as [T] lasts 10 days
[T] starts at [D]'s end
@endgantt
```



## 10.4 Customize colors

It also possible to customize colors.

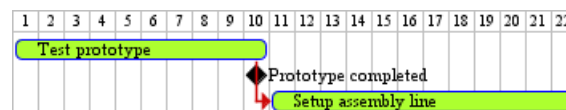
```
@startgantt
[Prototype design] lasts 13 days
[Test prototype] lasts 4 days
[Test prototype] starts at [Prototype design]'s end
[Prototype design] is colored in Fuchsia/FireBrick
[Test prototype] is colored in GreenYellow/Green
@endgantt
```



## 10.5 Milestone

You can define Milestones using the happens verb.

```
@startgantt
[Test prototype] lasts 10 days
[Prototype completed] happens at [Test prototype]'s end
[Setup assembly line] lasts 12 days
[Setup assembly line] starts at [Test prototype]'s end
@endgantt
```



## 10.6 Calendar

You can specify a starting date for the whole project. By default, the first task starts at this date.

```
@startgantt
Project starts the 20th of september 2017
[Prototype design] as [TASK1] lasts 13 days
[TASK1] is colored in Lavender/LightBlue
@endgantt
```



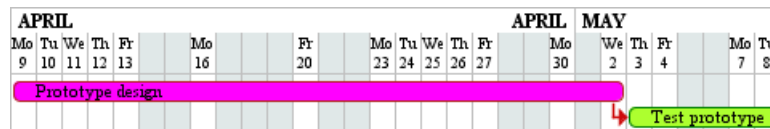
## 10.7 Close day

It is possible to close some day.

```
@startgantt
project starts the 2018/04/09
saturday are closed
sunday are closed
2018/05/01 is closed
2018/04/17 to 2018/04/19 is closed
[Prototype design] lasts 14 days
[Test prototype] lasts 4 days
[Test prototype] starts at [Prototype design]'s end
[Prototype design] is colored in Fuchsia/FireBrick
[Test prototype] is colored in GreenYellow/Green
```



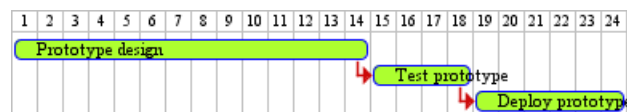
```
@endgantt
```



## 10.8 Simplified task succession

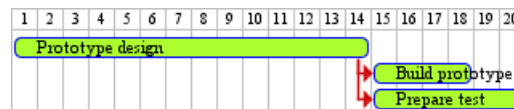
It's possible to use the then keyword to denote consecutive tasks.

```
@startgantt
[Prototype design] lasts 14 days
then [Test prototype] lasts 4 days
then [Deploy prototype] lasts 6 days
@endgantt
```



You can also use arrow ->

```
@startgantt
[Prototype design] lasts 14 days
[Build prototype] lasts 4 days
[Prepare test] lasts 6 days
[Prototype design] -> [Build prototype]
[Prototype design] -> [Prepare test]
@endgantt
```



## 10.9 Separator

You can use -- to separate sets of tasks.

```
@startgantt
[Task1] lasts 10 days
then [Task2] lasts 4 days
-- Phase Two --
then [Task3] lasts 5 days
then [Task4] lasts 6 days
@endgantt
```



## 10.10 Working with resources

You can affect tasks on resources using the on keyword and brackets for resource name.

```
@startgantt
[Task1] on {Alice} lasts 10 days
[Task2] on {Bob:50%} lasts 2 days
```

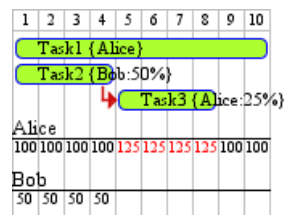




```

then [Task3] on {Alice:25%} lasts 1 days
@endgant

```



## 10.11 Complex example

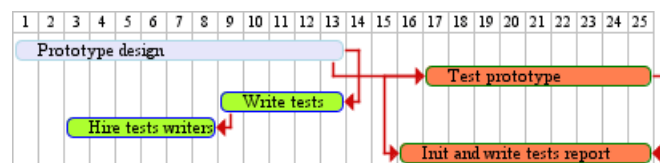
It also possible to use the and conjunction.

You can also add delays in constraints.

```

@startgant
[Prototype design] lasts 13 days and is colored in Lavender/LightBlue
[Test prototype] lasts 9 days and is colored in Coral/Green and starts 3 days after [Prototype design]'s e
[Write tests] lasts 5 days and ends at [Prototype design]'s end
[Hire tests writers] lasts 6 days and ends at [Write tests]'s start
[Init and write tests report] is colored in Coral/Green
[Init and write tests report] starts 1 day before [Test prototype]'s start and ends at [Test prototype]'s
@endgant

```



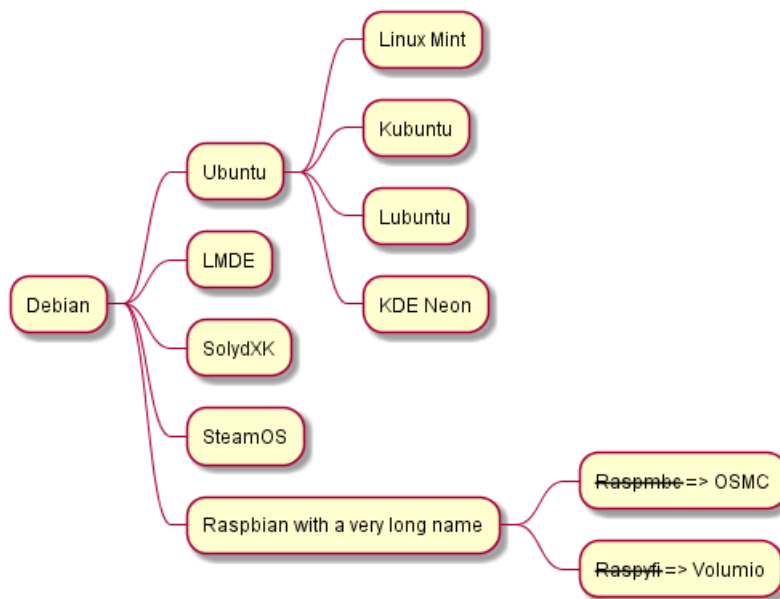
## 11 MindMap

MindMap diagram are still in beta: the syntax may change without notice.

### 11.1 OrgMode syntax

This syntax is compatible with OrgMode

```
@startmindmap
* Debian
** Ubuntu
*** Linux Mint
*** Kubuntu
*** Lubuntu
*** KDE Neon
** LMDE
** SolydXK
** SteamOS
** Raspbian with a very long name
*** <s>Raspmbc</s> => OSMC
*** <s>Raspyfi</s> => Volumio
@endmindmap
```

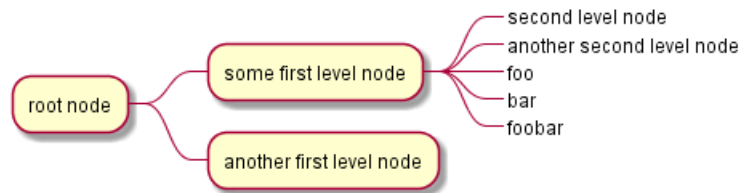


### 11.2 Removing box

You can remove the box drawing using an underscore.

```
@startmindmap
* root node
** some first level node
***_ second level node
***_ another second level node
***_ foo
***_ bar
***_ foobar
** another first level node
@endmindmap
```



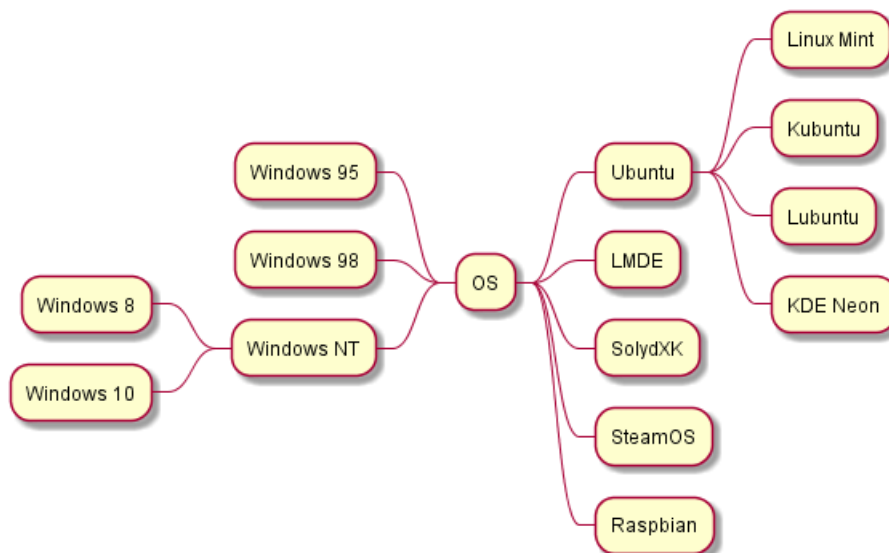


### 11.3 Arithmetic notation

You can use the following notation to choose diagram side.

```

@startmindmap
+ OS
++ Ubuntu
+++ Linux Mint
+++ Kubuntu
+++ Lubuntu
+++ KDE Neon
++ LMDE
++ SolydXK
++ SteamOS
++ Raspbian
-- Windows 95
-- Windows 98
-- Windows NT
--- Windows 8
--- Windows 10
@endmindmap
  
```



### 11.4 Markdown syntax

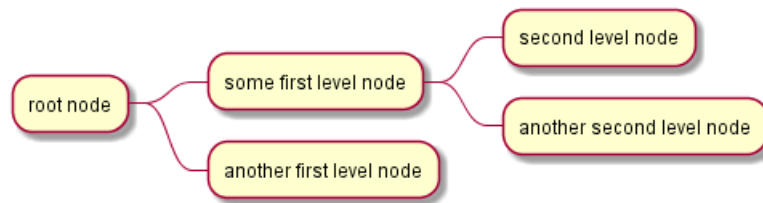
This syntax is compatible with Markdown

```

@startmindmap
* root node
* some first level node
* second level node
* another second level node
  
```



```
* another first level node
@endmindmap
```



## 11.5 Changing diagram direction

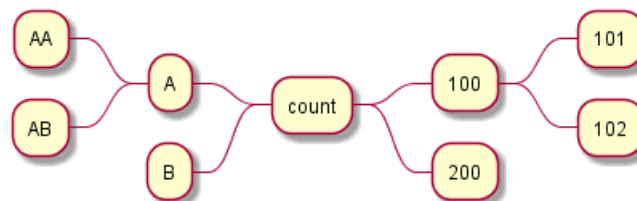
It is possible to use both sides of the diagram.

```
@startmindmap
```

```
* count
** 100
*** 101
*** 102
** 200
```

```
left side
```

```
** A
*** AA
*** AB
** B
@endmindmap
```



## 11.6 Complete example

```
@startmindmap
caption figure 1
title My super title
```

```
* <&flag>Debian
** <&globe>Ubuntu
*** Linux Mint
*** Kubuntu
*** Lubuntu
*** KDE Neon
** <&graph>LMDE
** <&pulse>SolydXK
** <&people>SteamOS
** <&star>Raspbian with a very long name
*** <s>Raspmbc</s> => OSMC
*** <s>Raspyfi</s> => Volumio
```



```

header
My super header
endheader

center footer My super footer

legend right
  Short
  legend
endlegend
@endmindmap

```

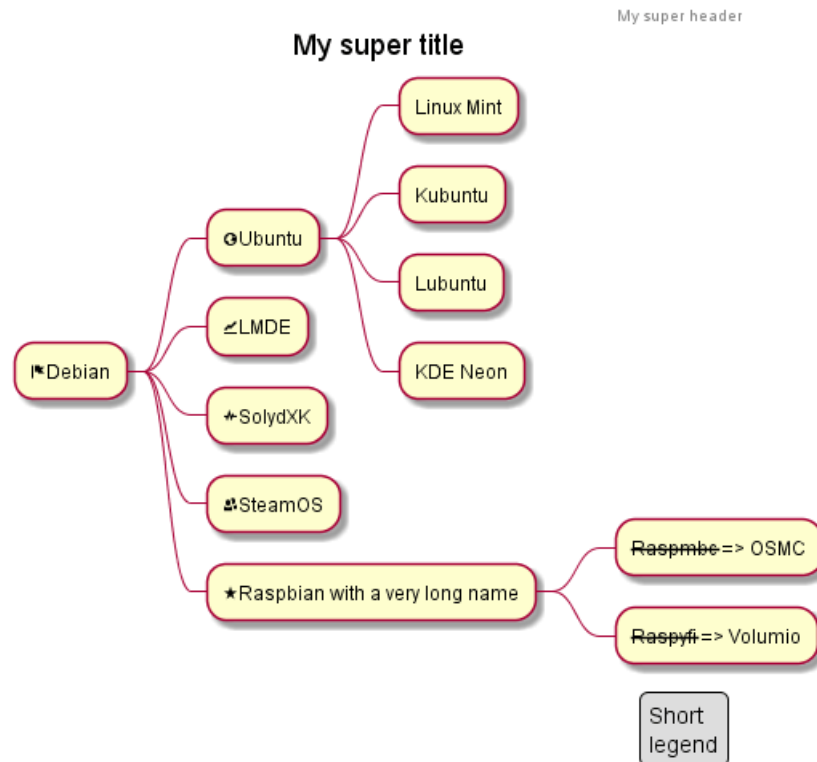


figure 1  
My super footer

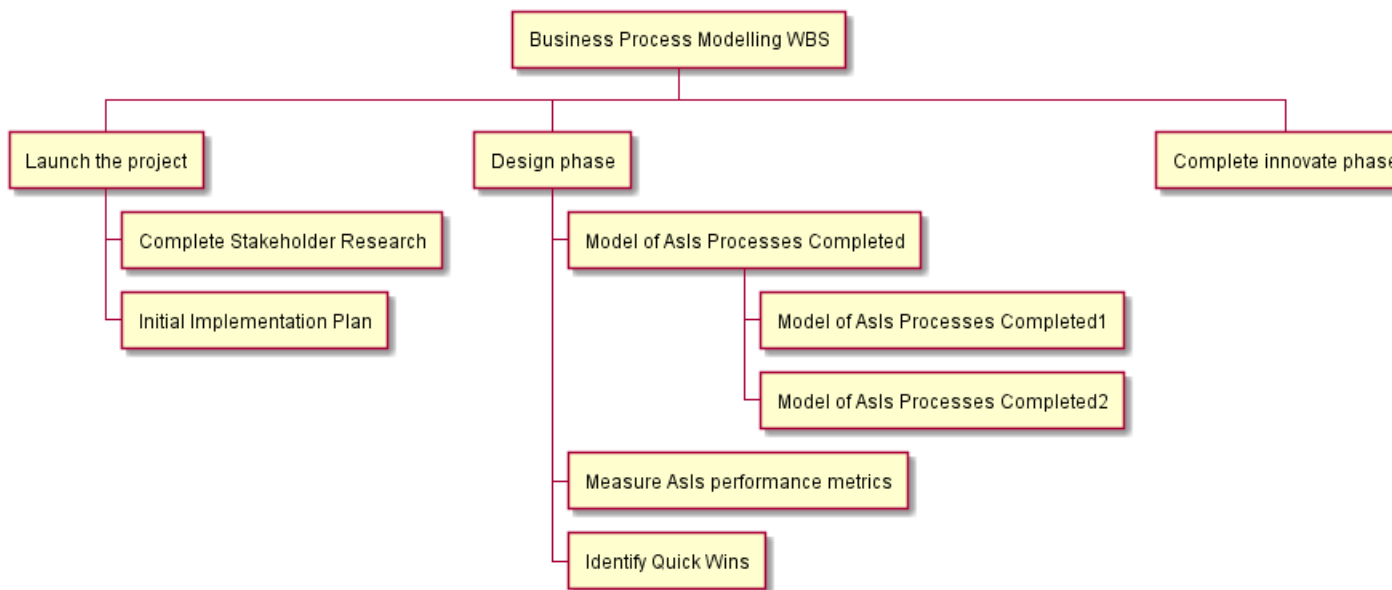
## 12 Work Breakdown Structure

WBS diagram are still in beta: the syntax may change without notice.

### 12.1 OrgMode syntax

This syntax is compatible with OrgMode

```
@startwbs
* Business Process Modelling WBS
** Launch the project
*** Complete Stakeholder Research
*** Initial Implementation Plan
** Design phase
*** Model of AsIs Processes Completed
**** Model of AsIs Processes Completed1
**** Model of AsIs Processes Completed2
*** Measure AsIs performance metrics
*** Identify Quick Wins
** Complete innovate phase
@endwbs
```



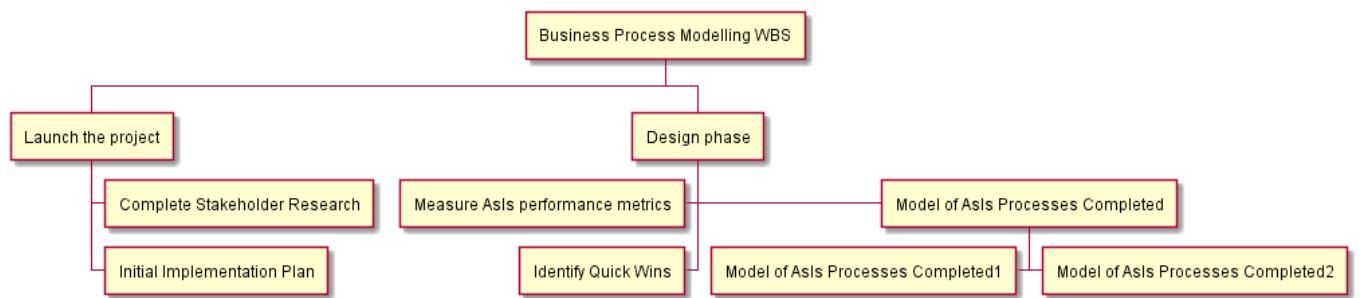
### 12.2 Change direction

You can change direction using < and >

```
@startwbs
* Business Process Modelling WBS
** Launch the project
*** Complete Stakeholder Research
*** Initial Implementation Plan
** Design phase
*** Model of AsIs Processes Completed
****< Model of AsIs Processes Completed1
****> Model of AsIs Processes Completed2
***< Measure AsIs performance metrics
***< Identify Quick Wins
```



@endwbs

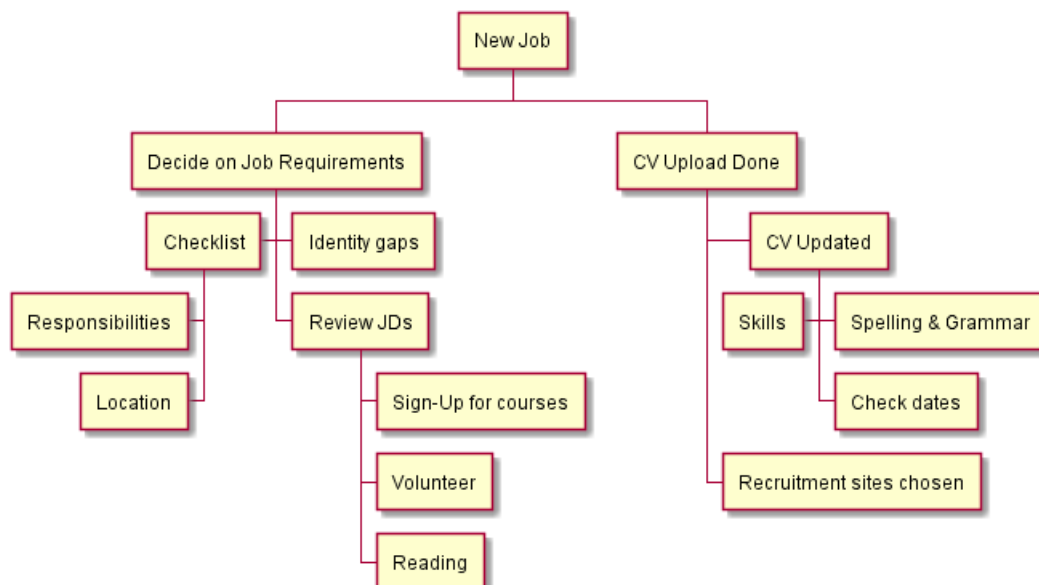


## 12.3 Arithmetic notation

You can use the following notation to choose diagram side.

```

@startwbs
+ New Job
++ Decide on Job Requirements
+++ Identity gaps
+++ Review JDs
++++ Sign-Up for courses
++++ Volunteer
++++ Reading
++- Checklist
+++- Responsibilities
+++- Location
++ CV Upload Done
+++ CV Updated
++++ Spelling & Grammar
++++ Check dates
---- Skills
+++ Recruitment sites chosen
@endwbs
  
```



You can use underscore \_ to remove box drawing.

```

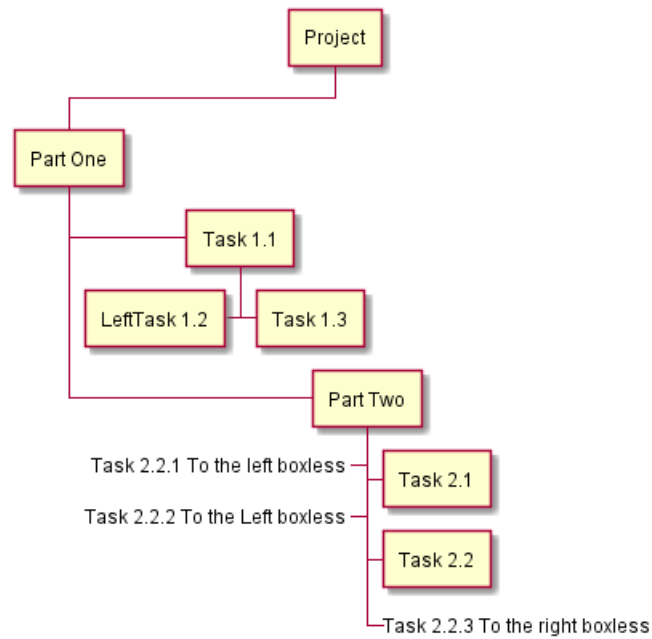
@startwbs
+ Project
  
```



```

+ Part One
+ Task 1.1
- LeftTask 1.2
+ Task 1.3
+ Part Two
+ Task 2.1
+ Task 2.2
- _ Task 2.2.1 To the left boxless
- _ Task 2.2.2 To the Left boxless
+ _ Task 2.2.3 To the right boxless
@endwbs

```

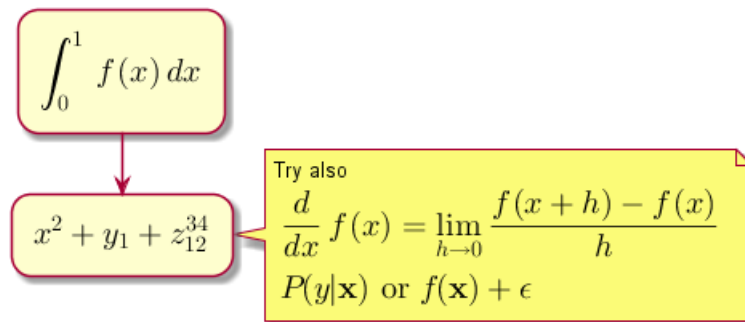




## 13 Maths

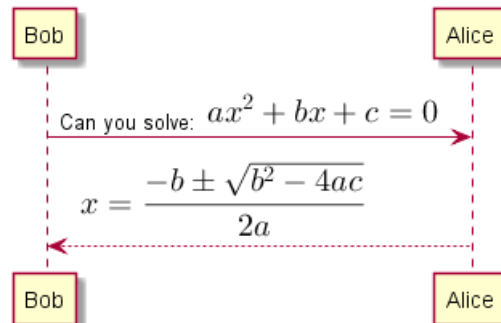
You can use AsciiMath or JLaTeXMath notation within PlantUML:

```
@startuml
: <math>\int_0^1 f(x) dx</math>;
: <math>x^2 + y_1 + z_{12}^{34}</math>;
note right
Try also
<math>\frac{d}{dx} f(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}</math>
<latex>P(y|\mathbf{x}) \ \mbox{ or } \ f(\mathbf{x}) + \epsilon</latex>
end note
@enduml
```



or:

```
@startuml
Bob -> Alice : Can you solve: <math>ax^2+bx+c=0</math>
Alice --> Bob: <math>x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}</math>
@enduml
```



### 13.1 Standalone diagram

You can also use @startmath/@endmath to create standalone AsciiMath formula.

```
@startmath
f(t)=(a_0)/2 + \sum_{n=1}^{\infty} a_n \cos((n\pi t)/L) + \sum_{n=1}^{\infty} b_n \sin((n\pi t)/L)
@endmath
```

$$f(t) = \frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos\left(\frac{n\pi t}{L}\right) + \sum_{n=1}^{\infty} b_n \sin\left(\frac{n\pi t}{L}\right)$$

Or use @startlatex/@endlatex to create standalone JLaTeXMath formula.

```
@startlatex
\sum_{i=0}^{n-1} (a_i + b_i^2)
@endlatex
```



$$\sum_{i=0}^{n-1} (a_i + b_i^2)$$

## 13.2 How is this working ?

To draw those formulas, PlantUML uses two OpenSource projects:

- AsciiMath that converts AsciiMath notation to LaTeX expression.
- JLatexMath that displays mathematical formulas written in LaTeX. JLaTeXMath is the best Java library to display LaTeX code.

ASCIIMathTeXImg.js is small enough to be integrated into PlantUML standard distribution.

Since JLatexMath is bigger, you have to download it separately, then unzip the 4 jar files (*batik-all-1.7.jar*, *jlatexmath-minimal-1.0.3.jar*, *jlm\_cyrillic.jar* and *jlm\_greek.jar*) in the same folder as *PlantUML.jar*.



## 14 Common commands

### 14.1 Comments

Everything that starts with `simple quote ' is a comment.`

You can also put comments on several lines using `/' to start and ' / to end.`

### 14.2 Footer and header

You can use the commands `header` or `footer` to add a footer or a header on any generated diagram.

You can optionally specify if you want a `center`, `left` or `right` footer/header, by adding a keyword.

As for title, it is possible to define a header or a footer on several lines.

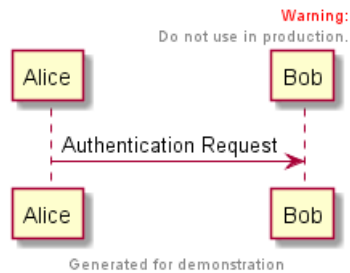
It is also possible to put some HTML into the header or footer.

```
@startuml
Alice -> Bob: Authentication Request
```

```
header
<font color=red>Warning:</font>
Do not use in production.
endheader
```

```
center footer Generated for demonstration
```

```
@enduml
```



### 14.3 Zoom

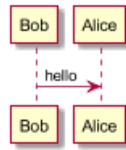
You can use the `scale` command to zoom the generated image.

You can use either a number or a fraction to define the scale factor. You can also specify either width or height (in pixel). And you can also give both width and height : the image is scaled to fit inside the specified dimension.

- `scale 1.5`
- `scale 2/3`
- `scale 200 width`
- `scale 200 height`
- `scale 200*100`
- `scale max 300*200`
- `scale max 1024 width`
- `scale max 800 height`



```
@startuml
scale 180*90
Bob->Alice : hello
@enduml
```



## 14.4 Title

The title keywords is used to put a title. You can add newline using \n in the title description.

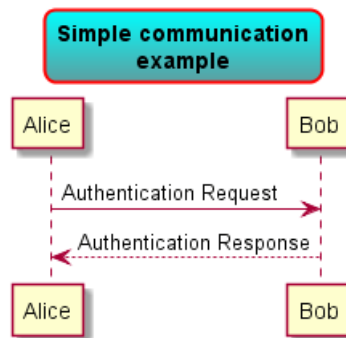
Some skinparam settings are available to put borders on the title.

```
@startuml
skinparam titleBorderRoundCorner 15
skinparam titleBorderThickness 2
skinparam titleBorderColor red
skinparam titleBackgroundColor Aqua-CadetBlue

title Simple communication\nexample

Alice -> Bob: Authentication Request
Bob --> Alice: Authentication Response

@enduml
```



You can use creole formatting in the title.

You can also define title on several lines using title and end title keywords.

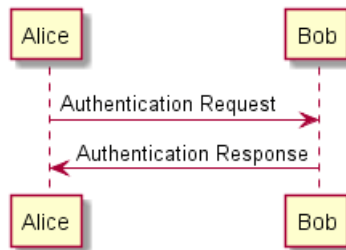
```
@startuml

title
  <u>Simple</u> communication example
  on <i>several</i> lines and using <back:cadetblue>creole tags</back>
end title

Alice -> Bob: Authentication Request
Bob -> Alice: Authentication Response

@enduml
```

**Simple communication example  
on several lines and using creole tags**



## 14.5 Caption

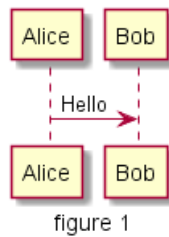
There is also a caption keyword to put a caption under the diagram.

```

@startuml

caption figure 1
Alice -> Bob: Hello

@enduml
  
```



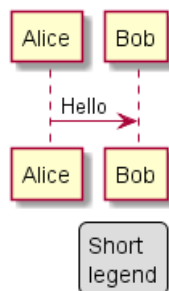
## 14.6 Legend the diagram

The legend and end legend are keywords is used to put a legend.

You can optionally specify to have left, right, top, bottom or center alignment for the legend.

```

@startuml
Alice -> Bob : Hello
legend right
  Short
  legend
endlegend
@enduml
  
```

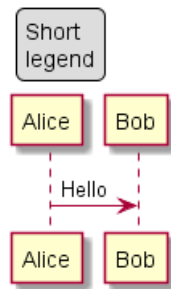


```

@startuml
Alice -> Bob : Hello
legend top left
  Short
  
```



```
legend
endlegend
@enduml
```



## 15 Salt (wireframe)

**Salt** is a subproject included in PlantUML that may help you to design graphical interface.

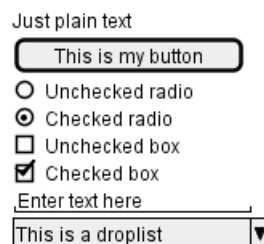
You can use either `@startsalt` keyword, or `@startuml` followed by a line with `salt` keyword.

### 15.1 Basic widgets

A window must start and end with brackets. You can then define:

- Button using `[` and `]`.
- Radio button using `(` and `)`.
- Checkbox using `[` and `]`.
- User text area using `"`.

```
@startuml
salt
{
  Just plain text
  [This is my button]
  ( ) Unchecked radio
  (X) Checked radio
  [] Unchecked box
  [X] Checked box
  "Enter text here "
  ^This is a droplist^
}
@enduml
```



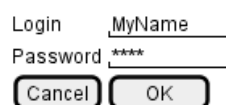
The goal of this tool is to discuss about simple and sample windows.

### 15.2 Using grid

A table is automatically created when you use an opening bracket `{`. And you have to use `|` to separate columns.

For example:

```
@startsalt
{
  Login    | "MyName  "
  Password | "****"   "
  [Cancel] | [ OK   ]
}
@endsalt
```



Just after the opening bracket, you can use a character to define if you want to draw lines or columns of the grid :

| Symbol | Result                                       |
|--------|--|
| #      | To display all vertical and horizontal lines |
| !      | To display all vertical lines                |
| -      | To display all horizontal lines              |
| +      | To display external lines                    |

```
@startsalt
{+
  Login    | "MyName  "
  Password | "****   "
  [Cancel] | [ OK   ]
}
@endsalt
```

### 15.3 Group box

```
more info
@startsalt
{~"My group box"
  Login    | "MyName  "
  Password | "****   "
  [Cancel] | [ OK   ]
}
@endsalt
```

### 15.4 Using separator

You can use several horizontal lines as separator.

```
@startsalt
{
  Text1
  ..
  "Some field"
  ==
  Note on usage
  ~~
  Another text
  --
  [Ok]
}
@endsalt
```





Text1

Some field

Note on usage

Another text

Ok

## 15.5 Tree widget

To have a Tree, you have to start with {T and to use + to denote hierarchy.

```
@startsalt
{
{T
+ World
++ America
+++ Canada
+++ USA
++++ New York
++++ Boston
+++ Mexico
++ Europe
+++ Italy
+++ Germany
++++ Berlin
++ Africa
}
}
@endsalt
```



## 15.6 Enclosing brackets

You can define subelements by opening a new opening bracket.

```
@startsalt
{
Name          | "
Modifiers:    | { (X) public | () default | () private | () protected
              | [] abstract | [] final   | [] static }
Superclass:   | { "java.lang.Object " | [Browse...] }
}
@endsalt
```

Name

Modifiers: ☒ public ☐ default ☐ private ☐ protected  
☐ abstract ☐ final ☐ static

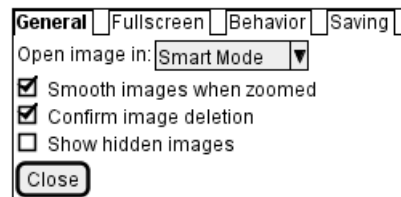
Superclass: java.lang.Object



## 15.7 Adding tabs

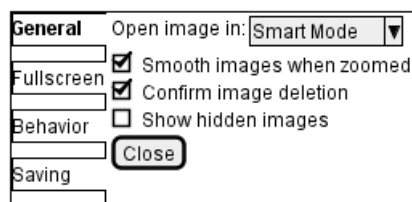
You can add tabs using {/ notation. Note that you can use HTML code to have bold text.

```
@startsalt
{+
{/ <b>General | Fullscreen | Behavior | Saving }
{
{ Open image in: | ^Smart Mode^ }
[X] Smooth images when zoomed
[X] Confirm image deletion
[ ] Show hidden images
}
[Close]
}
@endsalt
```



Tab could also be vertically oriented:

```
@startsalt
{+
{/ <b>General
Fullscreen
Behavior
Saving } |
{
{ Open image in: | ^Smart Mode^ }
[X] Smooth images when zoomed
[X] Confirm image deletion
[ ] Show hidden images
[Close]
}
}
@endsalt
```



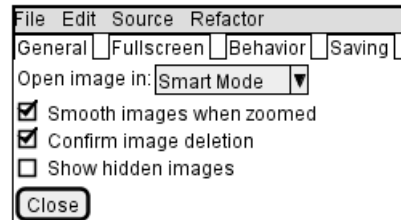
## 15.8 Using menu

You can add a menu by using {\* notation.

```
@startsalt
{+
{* File | Edit | Source | Refactor }
{/ General | Fullscreen | Behavior | Saving }
{
{ Open image in: | ^Smart Mode^ }
[X] Smooth images when zoomed
```

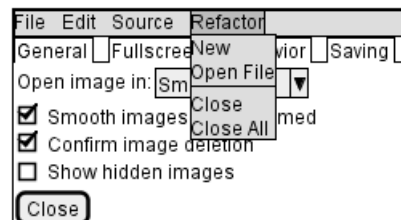


```
[X] Confirm image deletion
[ ] Show hidden images
}
[Close]
}
@endsalt
```



It is also possible to open a menu:

```
@startsalt
{+
{* File | Edit | Source | Refactor
  Refactor | New | Open File | - | Close | Close All }
{/ General | Fullscreen | Behavior | Saving }
{
{ Open image in: | ^Smart Mode^ }
[X] Smooth images when zoomed
[X] Confirm image deletion
[ ] Show hidden images
}
[Close]
}
@endsalt
```



## 15.9 Advanced table

You can use two special notations for table :

- \* to indicate that a cell with span with left
- . to denotate an empty cell

```
@startsalt
{#
. | Column 2 | Column 3
Row header 1 | value 1 | value 2
Row header 2 | A long cell | *
}
@endsalt
```

|              | Column 2    | Column 3 |
|--------------|-------------|----------|
| Row header 1 | value 1     | value 2  |
| Row header 2 | A long cell |          |



## 15.10 OpenIconic

OpenIconic is an very nice open source icon set. Those icons have been integrated into the creole parser, so you can use them out-of-the-box. You can use the following syntax: `<&ICON_NAME>`.

```
@startsalt
{
  Login<&person> | "MyName"
  Password<&key> | "****"
  [Cancel <&circle-x>] | [OK <&account-login>]
}
@endsalt
```



The complete list is available on OpenIconic Website, or you can use the following special diagram:

```
@startuml
listopeniconic
@enduml
```

### List Open Iconic

Credit to  
<https://useiconic.com/open>

|                       |                  |                            |                    |                       |                   |                         |
|-----------------------|------------------|----------------------------|--------------------|-----------------------|-------------------|-------------------------|
| ➤ account-login       | 🔔 bell           | ☁ cloud                    | 📄 excerpt          | ⌵ justify-right       | 🎵 musical-note    | ★ star                  |
| ➤ account-logout      | 📶 bluetooth      | ☁ cloudy                   | ⌵ expand-down      | 🔑 key                 | 📎 paperclip       | ☀ sun                   |
| ↶ action-redo         | 🔧 bolt           | 🔗 code                     | ⌵ expand-left      | 💻 laptop              | ✎ pencil          | 📱 tablet                |
| ↷ action-undo         | 📖 book           | 🧠 cog                      | ⌵ expand-right     | 📷 layers              | 👤 people          | 🏷 tag                   |
| ≡ align-center        | 📁 bookmark       | ⌵ collapse-down            | ⌵ expand-up        | 💡 lightbulb           | 👤 person          | 🏷 tags                  |
| ≡ align-left          | 📦 box            | ⌵ collapse-left            | 🔗 external-link    | 🔗 link-broken         | 📱 phone           | 🎯 target                |
| ≡ align-right         | 📧 briefcase      | ⌵ collapse-right           | 👁 eye              | 🔗 link-intact         | 📊 pie-chart       | 📋 task                  |
| 🔍 aperture            | 🔧 brush          | ⌵ collapse-up              | 👁 eyedropper       | 📋 list-rich           | 📌 pin             | 💻 terminal              |
| ↓ arrow-bottom        | 🐛 bug            | 🔑 command                  | 📄 file             | 📋 list                | 🎮 play-circle     | 📄 text                  |
| 🕒 arrow-circle-bottom | 📣 bullhorn       | 🔑 comment-square           | 🔥 fire             | 📍 location            | ➕ plus            | 👇 thumb-down            |
| 🕒 arrow-circle-left   | 📊 calculator     | 🔑 compass                  | 🚩 flag             | 🔒 lock-locked         | 🔌 power-standby   | 👍 thumb-up              |
| 🕒 arrow-circle-right  | 📅 calendar       | 🔑 contrast                 | ⚡ flash            | 🔓 lock-unlocked       | 🖨 print           | ⌚ timer                 |
| 🕒 arrow-circle-top    | 📷 camera-slr     | 🔑 copywriting              | 📁 folder           | 🔄 loop-circular       | 📁 project         | ⇄ transfer              |
| ↶ arrow-left          | 📶 caret-bottom   | 🔑 credit-card              | 🔧 fork             | 🔄 loop-square         | 📄 pulse           | 🗑 trash                 |
| → arrow-right         | ↶ caret-left     | 🔑 crop                     | 🖥 fullscreen-enter | 🔄 loop                | 🧩 puzzle-piece    | 📏 underline             |
| ↓ arrow-thick-bottom  | ↷ caret-right    | 📊 dashboard                | 🔌 fullscreen-exit  | 🔍 magnifying-glass    | ❓ question-mark   | 📏 vertical-align-bottom |
| ↶ arrow-thick-left    | ⬆ caret-top      | ⬇ data-transfer-download   | 🌐 globe            | 📍 map-marker          | 🌧 rain            | 📏 vertical-align-center |
| → arrow-thick-right   | 🛒 cart           | ⬆ data-transfer-upload     | 📊 graph            | 📍 map                 | 🎲 random          | 📏 vertical-align-top    |
| ↑ arrow-thick-top     | 💬 chat           | 🗑 delete                   | 📊 grid-four-up     | ⏸ media-pause         | 🔄 reload          | 📺 video                 |
| ↑ arrow-top           | ✓ check          | 📞 dial                     | 📊 grid-three-up    | ▶ media-play          | ↕ resize-both     | 🔊 volume-high           |
| 🔊 audio-spectrum      | ▼ chevron-bottom | 📄 document                 | 📊 grid-two-up      | 📄 media-record        | ↕ resize-height   | 🔊 volume-low            |
| 🔊 audio               | ↶ chevron-left   | 💵 dollar                   | 💾 hard-drive       | ⏮ media-skip-backward | ↔ resize-width    | 🔊 volume-off            |
| 🏷 badge               | ↷ chevron-right  | 🔢 double-quote-sans-left   | 📀 header           | ⏭ media-skip-forward  | 📡 rss-alt         | ⚠ warning               |
| 🚫 ban                 | ⬆ chevron-top    | 🔢 double-quote-sans-right  | 🎧 headphones       | ⏮ media-step-backward | 📡 rss             | 📶 wifi                  |
| 📊 bar-chart           | 🕒 circle-check   | 🔢 double-quote-serif-left  | ♥ heart            | ⏭ media-step-forward  | 📄 script          | 🔧 wrench                |
| 📋 basket              | 🕒 circle-x       | 🔢 double-quote-serif-right | 🏠 home             | ⏮ media-stop          | 📦 share-boxed     | ✖ x                     |
| 📦 battery-empty       | 🕒 circle-x       | 🔑 droplet                  | 📄 image            | 🏥 medical-cross       | ➦ share           | 👤 yen                   |
| 🔋 battery-full        | 📋 clipboard      | 🔑 eject                    | 📁 inbox            | ☰ menu                | 🛡 shield          | 🔍 zoom-in               |
| 🧴 beaker              | 🕒 clock          | 🔑 elevator                 | ∞ infinity         | 🎤 microphone          | 📶 signal          | 🔍 zoom-out              |
|                       | 🕒 cloud-download | 🔑 ellipses                 | 📄 info             | ➖ minus               | 📶 signpost        |                         |
|                       | ☁ cloud-upload   | 🔑 envelope-closed          | 📄 italic           | 📺 monitor             | ↕ sort-ascending  |                         |
|                       |                  | 🔑 envelope-open            | ≡ justify-center   | 🌙 moon                | ↕ sort-descending |                         |
|                       |                  | € euro                     | ≡ justify-left     | ➕ move                | 📊 spreadsheet     |                         |

## 15.11 Include Salt

see: <http://forum.plantuml.net/2427/salt-with-minimum-flowchat-capabilities?show=2427#q2427>

```
@startuml
(*) --> "
{{
salt
{+
<b>an example
choose one option
()one
```



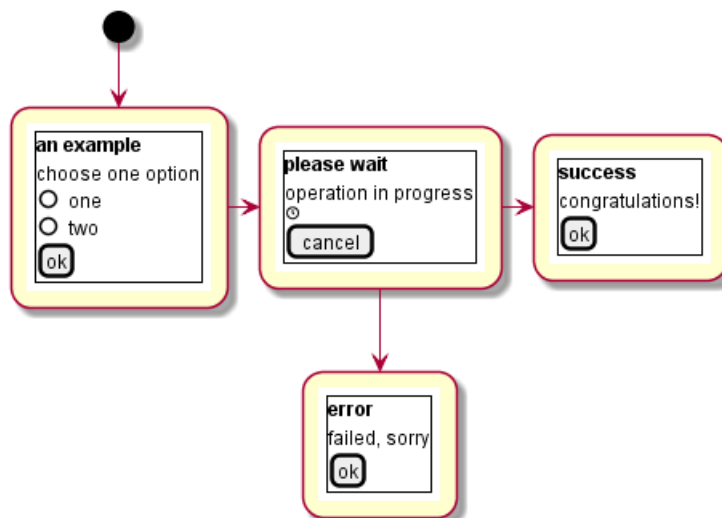
```

()two
[ok]
}
}}
" as choose

choose -right-> "
{{
salt
{+
<b>please wait
operation in progress
<&clock>
[cancel]
}
}}
" as wait
wait -right-> "
{{
salt
{+
<b>success
congratulations!
[ok]
}
}}
" as success

wait -down-> "
{{
salt
{+
<b>error
failed, sorry
[ok]
}
}}
"
@enduml

```



It can also be combined with define macro.



```

@startuml
!unquoted function SALT($x)
"{{
salt
%invoke_void_func("_"+"$x)
}}" as $x
!endfunction

!function _choose()
{+
<b>an example
choose one option
()one
()two
[ok]
}
!endfunction

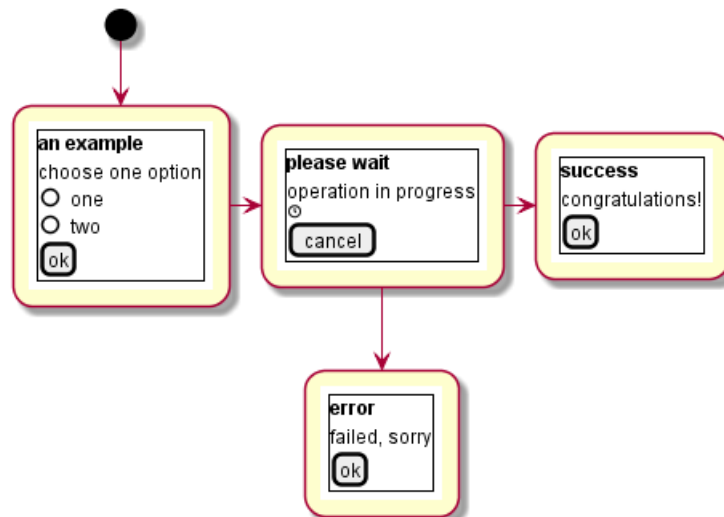
!function _wait()
{+
<b>please wait
operation in progress
<&clock>
[cancel]
}
!endfunction

!function _success()
{+
<b>success
congratulations!
[ok]
}
!endfunction

!function _error()
{+
<b>error
failed, sorry
[ok]
}
!endfunction

(*) --> SALT(choose)
-right-> SALT(wait)
wait -right-> SALT(success)
wait -down-> SALT(error)
@enduml

```



## 15.12 Scroll Bars

You can use "S" as scroll bar like in following examples:

```
@startsalt
{S
Message
.
.
.
.
}
@endsalt
```



```
@startsalt
{SI
Message
.
.
.
.
}
@endsalt
```

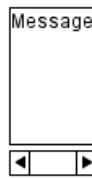


```
@startsalt
{S-
Message
.
.
.

```



```
.  
}  
@endsalt
```





## 16 Creole

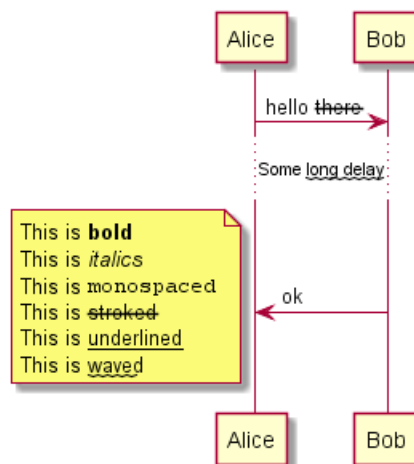
A light Creole engine has been integrated into PlantUML to have a standardized way of defining text style.

All diagrams are now supporting this syntax.

Note that ascending compatibility with HTML syntax is preserved.

### 16.1 Emphasized text

```
@startuml
Alice -> Bob : hello --there--
... Some ~~long delay~~ ...
Bob -> Alice : ok
note left
  This is bold
  This is //italics//
  This is "monospaced"
  This is --stroked--
  This is underlined
  This is ~~~waved~~~
end note
@enduml
```



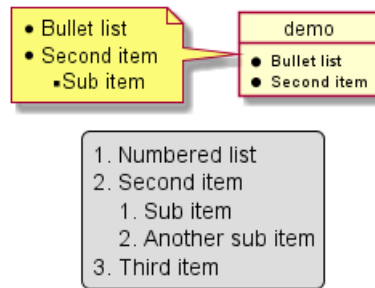
### 16.2 List

```
@startuml
object demo {
  * Bullet list
  * Second item
}
note left
  * Bullet list
  * Second item
  ** Sub item
end note

legend
  # Numbered list
  # Second item
  ## Sub item
  ## Another sub item
end
```



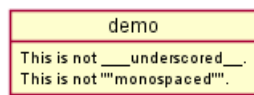
```
# Third item
end legend
@enduml
```



### 16.3 Escape character

You can use the tilde ~ to escape special creole characters.

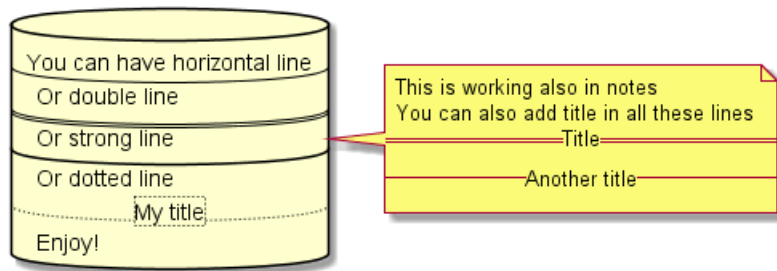
```
@startuml
object demo {
    This is not ~___underscored___.
    This is not ~""monospaced"".
}
@enduml
```



### 16.4 Horizontal lines

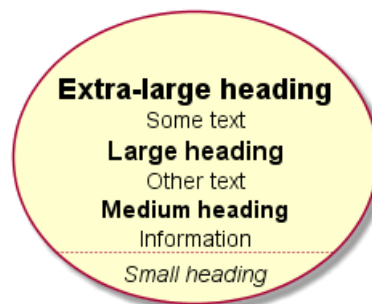
```
@startuml
database DB1 as "
You can have horizontal line
----
Or double line
====
Or strong line
----
Or dotted line
..My title..
Enjoy!
"
note right
    This is working also in notes
    You can also add title in all these lines
    ==Title==
    --Another title--
end note
@enduml
```





## 16.5 Headings

```
@startuml
usecase UC1 as "
= Extra-large heading
Some text
== Large heading
Other text
=== Medium heading
Information
....
==== Small heading"
@enduml
```



## 16.6 Legacy HTML

Some HTML tags are also working:

- `<b>` for bold text
- `<u>` or `<u:#AAAAAA>` or `<u:colorName>` for underline
- `<i>` for italic
- `<s>` or `<s:#AAAAAA>` or `<s:colorName>` for strike text
- `<w>` or `<w:#AAAAAA>` or `<w:colorName>` for wave underline text
- `<color:#AAAAAA>` or `<color:colorName>`
- `<back:#AAAAAA>` or `<back:colorName>` for background color
- `<size:nn>` to change font size
- `<img:file>` : the file must be accessible by the filesystem
- `<img:http://plantuml.com/logo3.png>` : the URL must be available from the Internet

```
@startuml
:* You can change <color:red>text color</color>
* You can change <back:cadetblue>background color</back>
* You can change <size:18>size</size>
```



```
* You use <u>legacy</u> <b>HTML <i>tag</i></b>
* You use <u:red>color</u> <s:green>in HTML</s> <w:#0000FF>tag</w>
----
* Use image : <img:http://plantuml.com/logo3.png>
;
@enduml
```



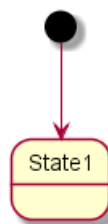
## 16.7 Table

It is possible to build table.

```
@startuml
skinparam titleFontSize 14
title
  Example of simple table
  | = | = table | = header |
  | a | table | row |
  | b | table | row |
end title
[*] --> State1
@enduml
```

Example of simple table

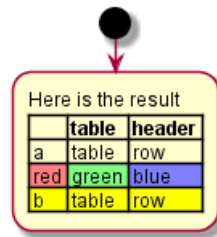
|   | table | header |
|---|-------|--------|
| a | table | row    |
| b | table | row    |



You can specify background colors for cells and lines.

```
@startuml
start
:Here is the result
| = | = table | = header |
| a | table | row |
|<#FF8080> red |<#80FF80> green |<#8080FF> blue |
<#yellow>| b | table | row |;
@enduml
```



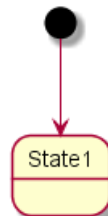


## 16.8 Tree

You can use |\_ characters to build a tree.

```
@startuml
skinparam titleFontSize 14
title
    Example of Tree
    |_ First line
    |_ **Bom(Model)**
|_ prop1
|_ prop2
|_ prop3
    |_ Last line
end title
[*] --> State1
@enduml
```

```
Example of Tree
|_ First line
|_ Bom(Model)
    |_ prop1
    |_ prop2
    |_ prop3
    |_ Last line
```



## 16.9 Special characters

It's possible to use any unicode characters with &# syntax or <U+XXXX>

```
@startuml
usecase foo as "this is &#8734; long"
usecase bar as "this is also <U+221E> long"
@enduml
```



## 16.10 OpenIconic

OpenIconic is an very nice open source icon set. Those icons have been integrated into the creole parser, so you can use them out-of-the-box.



You can use the following syntax: `<&ICON_NAME>`.

```
@startuml
title: <size:20><&heart>Use of OpenIconic<&heart></size>
class Wifi
note left
    Click on <&wifi>
end note
@enduml
```

### ♥Use of OpenIconic♥



The complete list is available on OpenIconic Website, or you can use the following special diagram:

```
@startuml
listopeniconic
@enduml
```

#### List Open Iconic

*Credit to*  
<https://useiconic.com/open>

|                       |                  |                            |                    |                       |                   |                         |
|-----------------------|------------------|----------------------------|--------------------|-----------------------|-------------------|-------------------------|
| → account-login       | 🔔 bell           | ☁ cloud                    | 📄 excerpt          | ⌵ justify-right       | 🎵 musical-note    | ★ star                  |
| → account-logout      | 📶 bluetooth      | ☁️ cloudy                  | ⌵ expand-down      | 🔑 key                 | 📎 paperclip       | ☀ sun                   |
| ↶ action-redo         | ⚡ bolt           | 🔌 code                     | ⌵ expand-left      | 💻 laptop              | ✎ pencil          | 📱 tablet                |
| ↷ action-undo         | 📖 book           | ⚙ cog                      | ⌵ expand-right     | 📷 layers              | 👤 people          | 🏷 tag                   |
| ≡ align-center        | 📁 bookmark       | ⌵ collapse-down            | ⌵ expand-up        | 💡 lightbulb           | 👤 person          | 🏷 tags                  |
| ≡ align-left          | 📦 box            | ⌵ collapse-left            | 🔗 external-link    | 🔗 link-broken         | 📱 phone           | 🎯 target                |
| ≡ align-right         | 📅 briefcase      | ⌵ collapse-right           | 👁 eye              | 🔗 link-intact         | 📊 pie-chart       | 📋 task                  |
| ⦿ aperture            | £ british-pound  | ⌵ collapse-up              | 👉 eyedropper       | 📋 list-rich           | 📌 pin             | 💻 terminal              |
| ↓ arrow-bottom        | 🗂 browser        | ⚡ command                  | 📁 file             | 📋 list                | 🎮 play-circle     | 📄 text                  |
| ⦿ arrow-circle-bottom | 🖱 brush          | 📄 comment-square           | 🔥 fire             | 📍 location            | ➕ plus            | 👇 thumb-down            |
| ⦿ arrow-circle-left   | 🐛 bug            | 🧭 compass                  | 🚩 flag             | 🔒 lock-locked         | 🔌 power-standby   | 👍 thumb-up              |
| ⦿ arrow-circle-right  | 📢 bullhorn       | ⚖ contrast                 | ⚡ flash            | 🔓 lock-unlocked       | 🖨 print           | ⌚ timer                 |
| ⦿ arrow-circle-top    | 📊 calculator     | 📝 copywriting              | 📁 folder           | 🔄 loop-circular       | 📁 project         | ➡ transfer              |
| ↶ arrow-left          | 📅 calendar       | 📄 credit-card              | 🔧 fork             | 📐 loop-square         | ★ pulse           | 🗑 trash                 |
| → arrow-right         | 📷 camera-slr     | 📊 dashboard                | 🖥 fullscreen-enter | 📐 loop                | 🧩 puzzle-piece    | 📏 underline             |
| ↓ arrow-thick-bottom  | ↶ caret-bottom   | 📶 data-transfer-download   | 🔍 fullscreen-exit  | 🔍 magnifying-glass    | ? question-mark   | 📊 vertical-align-bottom |
| ↶ arrow-thick-left    | ↶ caret-left     | 📶 data-transfer-upload     | 🌐 globe            | 📍 map-marker          | 🌧 rain            | 📊 vertical-align-center |
| → arrow-thick-right   | ↶ caret-right    | 🗑 delete                   | 📊 graph            | 📍 map                 | 🎲 random          | 📊 vertical-align-top    |
| ↑ arrow-thick-top     | ⬆ caret-top      | 🗑 dial                     | 📊 grid-four-up     | ⏸ media-pause         | 🔄 reload          | 📺 video                 |
| 📊 audio-spectrum      | 🚗 cart           | 📄 document                 | 📊 grid-three-up    | ▶ media-play          | ↔ resize-both     | 🔊 volume-high           |
| 🏷 badge               | 💬 chat           | 💵 dollar                   | 📊 grid-two-up      | 🎵 media-record        | ↕ resize-height   | 🔊 volume-low            |
| 🚫 ban                 | ✓ check          | 💵 double-quote-sans-left   | 💾 hard-drive       | ⏮ media-skip-backward | ↔ resize-width    | 🔊 volume-off            |
| 📊 bar-chart           | ↶ chevron-bottom | 💵 double-quote-sans-right  | 📄 header           | ▶ media-skip-forward  | 📡 rss-alt         | ⚠ warning               |
| 🧺 basket              | ↶ chevron-left   | 💵 double-quote-serif-left  | 🎧 headphones       | ⏪ media-step-backward | 📡 rss             | 📶 wifi                  |
| 🔋 battery-empty       | ↶ chevron-right  | 💵 double-quote-serif-right | ♥ heart            | ⏩ media-step-forward  | 📜 script          | 🔧 wrench                |
| 🔋 battery-full        | ⬆ chevron-top    | 🔍 droplet                  | 🏠 home             | ⏹ media-stop          | 📦 share-boxed     | ✖ x                     |
| 🧴 beaker              | 🔍 circle-check   | 📄 eject                    | 🖼 image            | 🏥 medical-cross       | ➦ share           | ¥ yen                   |
|                       | ⦿ circle-x       | 📶 elevator                 | 📁 inbox            | ☰ menu                | 🛡 shield          | 📶 zoom-in               |
|                       | 📄 clipboard      | 📄 ellipses                 | ∞ infinity         | 🎤 microphone          | 📶 signal          | 🔍 zoom-out              |
|                       | 🕒 clock          | ✉ envelope-closed          | 📄 info             | ➖ minus               | 📶 signpost        |                         |
|                       | ☁ cloud-download | ✉ envelope-open            | 📄 italic           | 📺 monitor             | ↗ sort-ascending  |                         |
|                       | ☁ cloud-upload   | € euro                     | ≡ justify-center   | 🌙 moon                | ↘ sort-descending |                         |
|                       |                  |                            | ≡ justify-left     | ➡ move                | 📊 spreadsheet     |                         |



## 17 Defining and using sprites

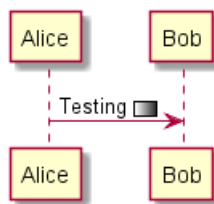
A *Sprite* is a small graphic element that can be used in diagrams.

In PlantUML, sprites are monochrome and can have either 4, 8 or 16 gray level.

To define a sprite, you have to use a hexadecimal digit between 0 and F per pixel.

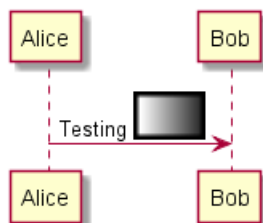
Then you can use the sprite using <\$XXX> where XXX is the name of the sprite.

```
@startuml
sprite $foo1 {
  FFFFFFFFFFFFFFFF
  F0123456789ABCF
  F0123456789ABCF
  F0123456789ABCF
  F0123456789ABCF
  F0123456789ABCF
  F0123456789ABCF
  F0123456789ABCF
  F0123456789ABCF
  F0123456789ABCF
  FFFFFFFFFFFFFFFF
}
Alice -> Bob : Testing <$foo1>
@enduml
```



You can scale the sprite.

```
@startuml
sprite $foo1 {
  FFFFFFFFFFFFFFFF
  F0123456789ABCF
  F0123456789ABCF
  F0123456789ABCF
  F0123456789ABCF
  F0123456789ABCF
  F0123456789ABCF
  F0123456789ABCF
  F0123456789ABCF
  F0123456789ABCF
  FFFFFFFFFFFFFFFF
}
Alice -> Bob : Testing <$foo1{scale=3}>
@enduml
```



## 17.1 Encoding Sprite

To encode sprite, you can use the command line like:

```
java -jar plantuml.jar -encodesprite 16z foo.png
```

where `foo.png` is the image file you want to use (it will be converted to gray automatically).

After `-encodesprite`, you have to specify a format: 4, 8, 16, 4z, 8z or 16z.

The number indicates the gray level and the optional `z` is used to enable compression in sprite definition.

## 17.2 Importing Sprite

You can also launch the GUI to generate a sprite from an existing image.

Click in the menubar then on `File/Open Sprite Window`.

After copying an image into you clipboard, several possible definitions of the corresponding sprite will be displayed : you will just have to pickup the one you want.

## 17.3 Examples

```
@startuml
sprite $printer [15x15/8z] N0tH3W0W208HxFz_kMAhj7lHWpa1XC716sz0Pq4MVPEWfBHIuxP3L6kbTcizR8tAhzaqFvXwvF
start
:click on <$printer> to print the page;
@enduml
```



```
@startuml
sprite $bug [15x15/16z] PKzR2i0m2BFMi15p__FEjQEgB1z27aeqCqixa8S40T7C53cKpsHpaYPDJY_12MHM-BLRyywPhrrlw
sprite $printer [15x15/8z] N0tH3W0W208HxFz_kMAhj7lHWpa1XC716sz0Pq4MVPEWfBHIuxP3L6kbTcizR8tAhzaqFvXwvF
sprite $disk {
  444445566677881
  436000000009991
  43600000000ACA1
  53700000001A7A1
  53700000012B8A1
  53800000123B8A1
  63800001233C9A1
  634999AABBC99B1
  744566778899AB1
  7456AAAAA99AAB1
  8566AFC228AABB1
  8567AC8118BBBB1
  867BD4433BBBBB1
  39AAAAABBBBBBC1
}

```

```
title Use of sprites (<$printer>, <$bug>...)
```

```
class Example {
  Can have some bug : <$bug>
  Click on <$disk> to save
}
```

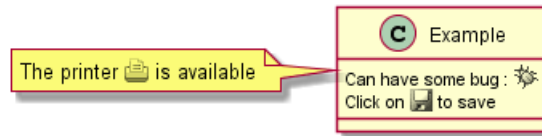




```
note left : The printer <$printer> is available
```

```
@enduml
```

### Use of sprites (🖨️, 🐛...)



## 18 Skinparam command

You can change colors and font of the drawing using the `skinparam` command.

Example:

```
skinparam backgroundColor transparent
```

### 18.1 Usage

You can use this command :

- In the diagram definition, like any other commands,
- In an included file,
- In a configuration file, provided in the command line or the ANT task.

### 18.2 Nested

To avoid repetition, it is possible to nest definition. So the following definition :

```
skinparam xxxxParam1 value1
skinparam xxxxParam2 value2
skinparam xxxxParam3 value3
skinparam xxxxParam4 value4
```

is strictly equivalent to:

```
skinparam xxxx {
    Param1 value1
    Param2 value2
    Param3 value3
    Param4 value4
}
```

### 18.3 Black and White

You can force the use of a black&white output using `skinparam monochrome true` command.

```
@startuml
```

```
skinparam monochrome true
```

```
actor User
participant "First Class" as A
participant "Second Class" as B
participant "Last Class" as C
```

```
User -> A: DoWork
activate A
```

```
A -> B: Create Request
activate B
```

```
B -> C: DoWork
activate C
C --> B: WorkDone
destroy C
```

```
B --> A: Request Created
```



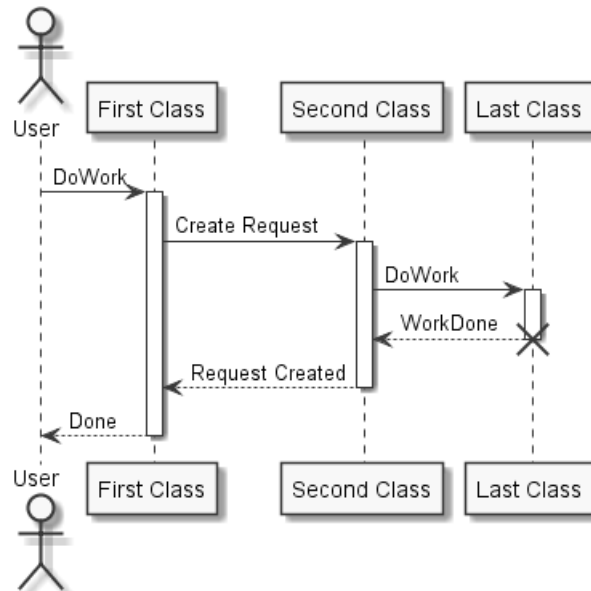
```

deactivate B

A --> User: Done
deactivate A

@enduml

```



## 18.4 Shadowing

You can disable the shadowing using the `skinparam shadowing false` command.

```

@startuml

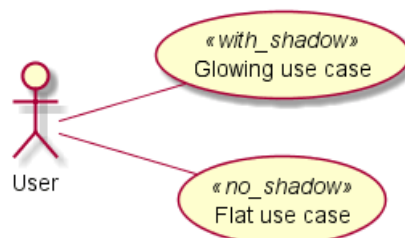
left to right direction

skinparam shadowing<<no_shadow>> false
skinparam shadowing<<with_shadow>> true

actor User
(Glowing use case) <<with_shadow>> as guc
(Flat use case) <<no_shadow>> as fuc
User -- guc
User -- fuc

@enduml

```



## 18.5 Reverse colors

You can force the use of a black&white output using `skinparam monochrome reverse` command. This can be useful for black background environment.

```
@startuml
skinparam monochrome reverse

actor User
participant "First Class" as A
participant "Second Class" as B
participant "Last Class" as C

User -> A: DoWork
activate A

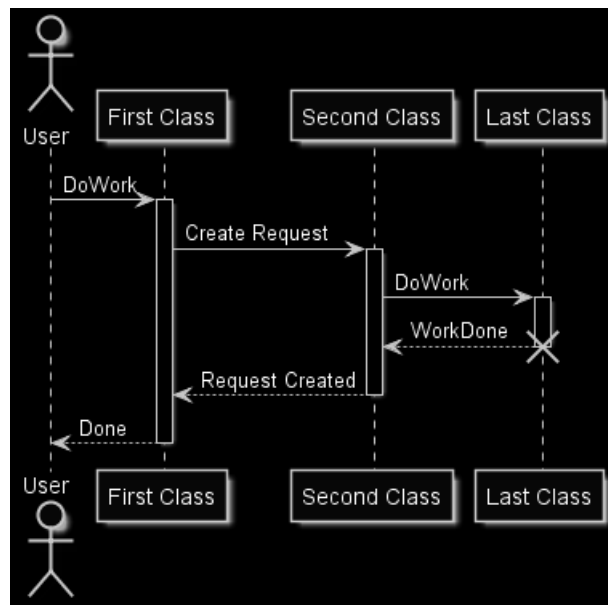
A -> B: Create Request
activate B

B -> C: DoWork
activate C
C --> B: WorkDone
destroy C

B --> A: Request Created
deactivate B

A --> User: Done
deactivate A

@enduml
```



## 18.6 Colors

You can use either standard color name or RGB code.



|                |                |                |                      |                   |               |             |             |
|----------------|----------------|----------------|----------------------|-------------------|---------------|-------------|-------------|
| APPLICATION    | Crimson        | DeepPink       | Indigo               | LightYellow       | Navy          | RoyalBlue   | Turquoise   |
| AliceBlue      | Cyan           | DeepSkyBlue    | Ivory                | Lime              | OldLace       | STRATEGY    | Violet      |
| AntiqueWhite   | DarkBlue       | DimGray        | Khaki                | LimeGreen         | Olive         | SaddleBrown | Wheat       |
| Aqua           | DarkCyan       | DimGrey        | Lavender             | Linen             | OliveDrab     | Salmon      | White       |
| Aquamarine     | DarkGoldenRod  | DodgerBlue     | LavenderBlush        | MOTIVATION        | Orange        | SandyBrown  | WhiteSmoke  |
| Azure          | DarkGray       | FireBrick      | LawnGreen            | Magenta           | OrangeRed     | SeaGreen    | Yellow      |
| BUSINESS       | DarkGreen      | FloralWhite    | LemonChiffon         | Maroon            | Orchid        | SeaShell    | YellowGreen |
| Beige          | DarkGrey       | ForestGreen    | LightBlue            | MediumAquaMarine  | PHYSICAL      | Sienna      |             |
| Bisque         | DarkKhaki      | Fuchsia        | LightCoral           | MediumBlue        | PaleGoldenRod | Silver      |             |
| Black          | DarkMagenta    | Gainsboro      | LightCyan            | MediumOrchid      | PaleGreen     | SkyBlue     |             |
| BlanchedAlmond | DarkOliveGreen | GhostWhite     | LightGoldenRodYellow | MediumPurple      | PaleTurquoise | SlateBlue   |             |
| Blue           | DarkOrchid     | Gold           | LightGray            | MediumSeaGreen    | PaleVioletRed | SlateGray   |             |
| BlueViolet     | DarkRed        | GoldenRod      | LightGreen           | MediumSlateBlue   | PapayaWhip    | SlateGrey   |             |
| Brown          | DarkSalmon     | Gray           | LightGrey            | MediumSpringGreen | PeachPuff     | Snow        |             |
| BurlyWood      | DarkSeaGreen   | Green          | LightPink            | MediumTurquoise   | Peru          | SpringGreen |             |
| CadetBlue      | DarkSlateBlue  | GreenYellow    | LightSalmon          | MediumVioletRed   | Pink          | SteelBlue   |             |
| Chartreuse     | DarkSlateGray  | Grey           | LightSeaGreen        | MidnightBlue      | Plum          | TECHNOLOGY  |             |
| Chocolate      | DarkSlateGrey  | HoneyDew       | LightSkyBlue         | MintCream         | PowderBlue    | Tan         |             |
| Coral          | DarkTurquoise  | HotPink        | LightSlateGray       | MistyRose         | Purple        | Teal        |             |
| CornflowerBlue | DarkViolet     | IMPLEMENTATION | LightSlateGrey       | Moccasin          | Red           | Thistle     |             |
| Cornsilk       | Darkorange     | IndianRed      | LightSteelBlue       | NavajoWhite       | RosyBrown     | Tomato      |             |

transparent can only be used for background of the image.

## 18.7 Font color, name and size

You can change the font for the drawing using `xxxFontColor`, `xxxFontSize` and `xxxFontName` parameters.

Example:

```
skinparam classFontColor red
skinparam classFontSize 10
skinparam classFontName Aapex
```

You can also change the default font for all fonts using `skinparam defaultFontName`.

Example:

```
skinparam defaultFontName Aapex
```

Please note the fontname is highly system dependent, so do not over use it, if you look for portability. Helvetica and Courier should be available on all system.

A lot of parameters are available. You can list them using the following command:

```
java -jar plantuml.jar -language
```

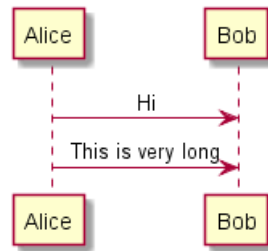
## 18.8 Text Alignment

Text alignment can be set up to left, right or center. You can also use `direction` or `reverseDirection` values for `sequenceMessageAlign` which align text depending on arrow direction.

| Param name                          | Default value | Comment                                |
|-------------------------------------|---------------|--|
| <code>sequenceMessageAlign</code>   | left          | Used for messages in sequence diagrams |
| <code>sequenceReferenceAlign</code> | center        | Used for ref over in sequence diagrams |

```
@startuml
skinparam sequenceMessageAlign center
Alice -> Bob : Hi
Alice -> Bob : This is very long
@enduml
```





## 18.9 Examples

```

@startuml
skinparam backgroundColor #EEEBDC
skinparam handwritten true

skinparam sequence {
ArrowColor DeepSkyBlue
ActorBorderColor DeepSkyBlue
LifeLineBorderColor blue
LifeLineBackgroundColor #A9DCDF

ParticipantBorderColor DeepSkyBlue
ParticipantBackgroundColor DodgerBlue
ParticipantFontName Impact
ParticipantFontSize 17
ParticipantFontColor #A9DCDF

ActorBackgroundColor aqua
ActorFontColor DeepSkyBlue
ActorFontSize 17
ActorFontName Aapex
}

actor User
participant "First Class" as A
participant "Second Class" as B
participant "Last Class" as C

User -> A: DoWork
activate A

A -> B: Create Request
activate B

B -> C: DoWork
activate C
C --> B: WorkDone
destroy C

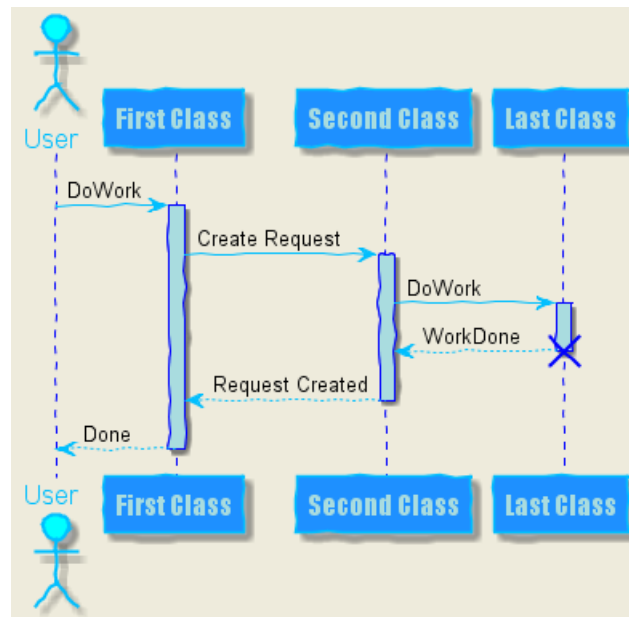
B --> A: Request Created
deactivate B

A --> User: Done
deactivate A

@enduml

```





```

@startuml
skinparam handwritten true

skinparam actor {
  BorderColor black
  FontName Courier
  BackgroundColor<< Human >> Gold
}

skinparam usecase {
  BackgroundColor DarkSeaGreen
  BorderColor DarkSlateGray
}

BackgroundColor<< Main >> YellowGreen
BorderColor<< Main >> YellowGreen

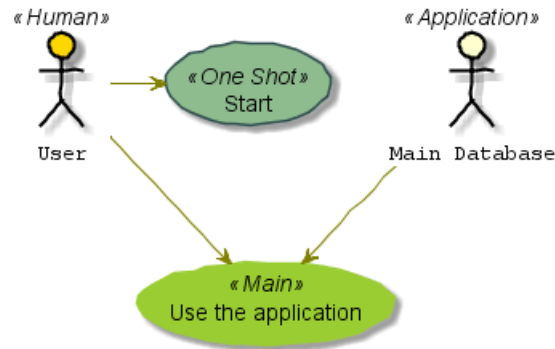
ArrowColor Olive
}

User << Human >>
:Main Database: as MySql << Application >>
(Start) << One Shot >>
(Use the application) as (Use) << Main >>

User -> (Start)
User --> (Use)

MySql --> (Use)
@enduml

```



```

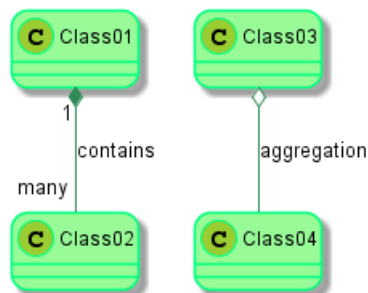
@startuml
skinparam roundcorner 20
skinparam class {
  BackgroundColor PaleGreen
  ArrowColor SeaGreen
  BorderColor SpringGreen
}
skinparam stereotypeCBackgroundColor YellowGreen
  
```

```

Class01 "1" *-- "many" Class02 : contains
  
```

```

Class03 o-- Class04 : aggregation
@enduml
  
```



```

@startuml
skinparam interface {
  backgroundColor RosyBrown
  borderColor orange
}

skinparam component {
  FontSize 13
  BackgroundColor<<Apache>> Red
  BorderColor<<Apache>> #FF6655
  FontName Courier
  BorderColor black
  BackgroundColor gold
  ArrowFontName Impact
  ArrowColor #FF6655
  ArrowFontColor #777777
}
  
```

```

() "Data Access" as DA
  
```

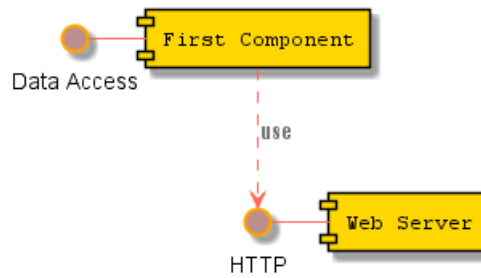
```

DA - [First Component]
[First Component] ..> () HTTP : use
  
```





```
HTTP - [Web Server] << Apache >>
@enduml
```

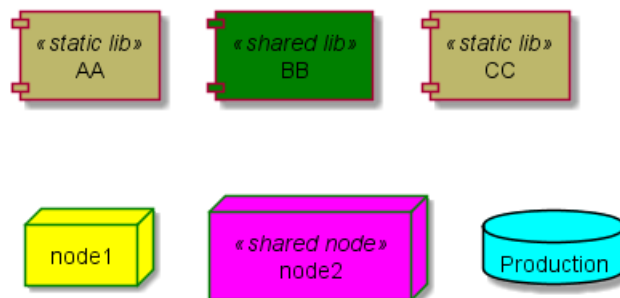


```
@startuml
[AA] <<static lib>>
[BB] <<shared lib>>
[CC] <<static lib>>

node node1
node node2 <<shared node>>
database Production

skinparam component {
  backgroundColor<<static lib>> DarkKhaki
  backgroundColor<<shared lib>> Green
}

skinparam node {
  borderColor Green
  backgroundColor Yellow
  backgroundColor<<shared node>> Magenta
}
skinparam databaseBackgroundColor Aqua
@enduml
```



## 18.10 List of all skinparam parameters

Since the documentation is not always up to date, you can have the complete list of parameters using this command:

```
java -jar plantuml.jar -language
```

Or you can generate a "diagram" with a list of all the skinparam parameters using:

```
@startuml
help skinparams
@enduml
```

That will give you the following result:



## Help on skinparam

The code of this command is located in *net.sourceforge.plantuml.help* package.

You may improve it on <https://github.com/plantuml/plantuml/tree/master/src/net/sourceforge/plantuml/help>

The possible skinparam are :

- ActivityBackgroundColor
- ActivityBarColor
- ActivityBorderColor
- ActivityBorderThickness
- ActivityDiamondBackgroundColor
- ActivityDiamondBorderColor
- ActivityDiamondFontColor
- ActivityDiamondFontName
- ActivityDiamondFontSize
- ActivityDiamondFontStyle
- ActivityEndColor
- ActivityFontColor
- ActivityFontName
- ActivityFontSize
- ActivityFontStyle
- ActivityStartColor
- ActorBackgroundColor
- ActorBorderColor
- ActorFontColor
- ActorFontName
- ActorFontSize
- ActorFontStyle
- ActorStereotypeFontColor
- ActorStereotypeFontName
- ActorStereotypeFontSize
- ActorStereotypeFontStyle
- AgentBackgroundColor
- AgentBorderColor
- AgentBorderThickness
- AgentFontColor
- AgentFontName
- AgentFontSize
- AgentFontStyle
- AgentStereotypeFontColor
- AgentStereotypeFontName
- AgentStereotypeFontSize
- AgentStereotypeFontStyle
- ArchimateBackgroundColor
- ArchimateBorderColor
- ArchimateBorderThickness
- ArchimateFontColor
- ArchimateFontName
- ArchimateFontSize
- ArchimateFontStyle
- ArchimateStereotypeFontColor
- ArchimateStereotypeFontName
- ArchimateStereotypeFontSize
- ArchimateStereotypeFontStyle
- ArrowColor
- ArrowFontColor
- ArrowFontName
- ArrowFontSize
- ArrowFontStyle
- ArrowFillColor
- ArrowMessageReference
- ArrowMessageAlignment
- ArrowThickness
- ArtifactBackgroundColor

You can also view each skinparam parameters with its results displayed at <https://plantuml-documentation.readthedocs.io/en/latest/formatting/all-skin-params.html>.

## 19 Preprocessing

Some minor preprocessing capabilities are included in **PlantUML**, and available for *all* diagrams.

Those functionalities are very similar to the C language preprocessor, except that the special character `#` has been changed to the exclamation mark `!`.

### 19.1 Migration notes

The actual preprocessor is an update from some legacy preprocessor.

Even if some legacy feature are still supported with the actual preprocessor, you should not use them any more (they might be finally removed in some long term future).

- You should not use `!define` and `!definelong` anymore. Use `!function` and variable definition instead
- `!include` allows now multiple inclusions : you don't have to use `!include_many` anymore
- `!include` now accept URL, so you don't need `!includeurl`
- Some features (like `%date%`) have been replaced by builtin functions (for example `%date()`)
- When calling a legacy `!definelong` macro with no arguments, you do have to use parenthesis. That is you have to use `my_own_definelong()` because `my_own_definelong` without parenthesis is not recognized by the new preprocessor.

Please contact us if you have any issues.

### 19.2 Variable definition

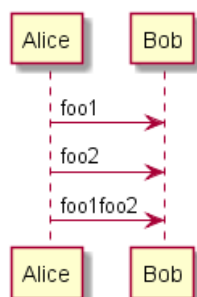
Although this is not mandatory, we highly suggest that variable name start with a `$`. There are two kind of data:

- Integer number
- String, that must be surrender by simple quote or double quote.

Variable created outside function are **global**, that is you can access to them from everywhere (including from functions). You can emphasize this by using the optional `global` keyword when defining a variable.

```
@startuml
!$ab = "foo1"
!$cd = "foo2"
!global $ef = $ab + $cd
```

```
Alice -> Bob : $ab
Alice -> Bob : $cd
Alice -> Bob : $ef
@enduml
```



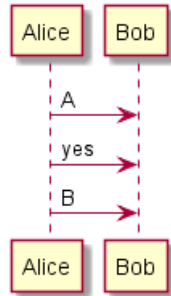
### 19.3 Conditions

- You can use expression in condition.



- *else* is also implemented

```
@startuml
!$a = 10
!$ijk = "foo"
Alice -> Bob : A
!if ($ijk == "foo") && ($a+10>=4)
Alice -> Bob : yes
!else
Alice -> Bob : This should not appear
!endif
Alice -> Bob : B
@enduml
```



## 19.4 Void function

- Function name *should* start by a \$
- Argument names *should* start by a \$
- Void functions can call other void functions

Example:

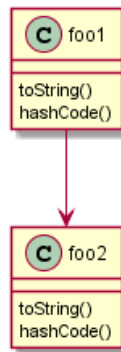
```
@startuml
!function msg($source, $destination)
$source --> $destination
!endfunction

!function init_class($name)
class $name {
$addCommonMethod()
}
!endfunction

!function $addCommonMethod()
toString()
hashCode()
!endfunction

init_class("foo1")
init_class("foo2")
msg("foo1", "foo2")
@enduml
```





Variables defined in functions are **local**. It means that the variable is destroyed when the function is exited.

## 19.5 Return function

A return function does not output any text. It just define a function that you can call:

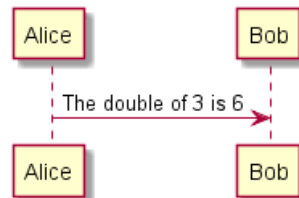
- directly in variable definition or in diagram text
- from other return function
- from other void function
- Function name *should* start by a \$
- Argument names *should* start by a \$

```

@startuml
!function $double($a)
!return $a + $a
!endfunction
  
```

```

Alice -> Bob : The double of 3 is $double(3)
@enduml
  
```



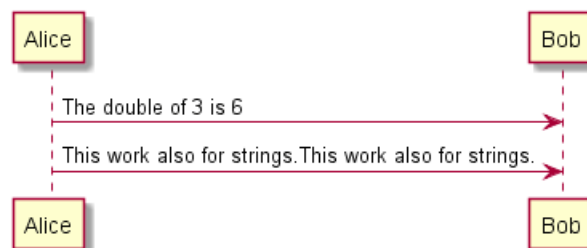
It is possible to shorten simple function definition in one line:

```

@startuml
!function $double($a) return $a + $a
  
```

```

Alice -> Bob : The double of 3 is $double(3)
Alice -> Bob : $double("This work also for strings.")
@enduml
  
```



As in void function, variable are local by default (they are destroyed when the function is exited). However, you can access to global variables from function. However, you can use the `local` keyword to create a local variable if ever a global variable exists with the same name.

```
@startuml
!function $dummy()
!local $ijk = "local"
Alice -> Bob : $ijk
!endfunction

!global $ijk = "foo"

Alice -> Bob : $ijk
$dummy()
Alice -> Bob : $ijk
@enduml
```

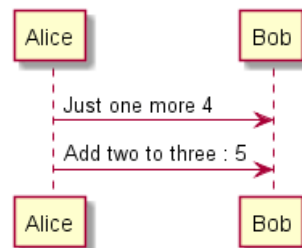


## 19.6 Default argument value

In both return and void function, you can define default value for argument.

```
@startuml
!function $inc($value, $step=1)
!if $step==0
!return $value
!endif
!return $value + $step
!endfunction

Alice -> Bob : Just one more $inc(3)
Alice -> Bob : Add two to three : $inc(3, 2)
@enduml
```



## 19.7 Unquoted function

By default, you have to put quotes when you call a function. It is possible to use the `unquoted` keyword to indicate that a function does not require quotes for its arguments.

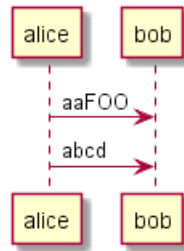
```
@startuml
!unquoted function id($text1, $text2="F00") return $text1 + $text2
```



```

alice -> bob : id(aa)
alice -> bob : id(ab,cd)
@enduml

```



## 19.8 Including files or URL

Use the `!include` directive to include file in your diagram. Using URL, you can also include file from Internet/Intranet.

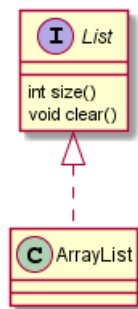
Imagine you have the very same class that appears in many diagrams. Instead of duplicating the description of this class, you can define a file that contains the description.

```

@startuml

!include List.iuml
List <|.. ArrayList
@enduml

```



### File List.iuml

```

interface List
List : int size()
List : void clear()

```

The file `List.iuml` can be included in many diagrams, and any modification in this file will change all diagrams that include it.

You can also put several `@startuml/@enduml` text block in an included file and then specify which block you want to include adding `!0` where `0` is the block number. The `!0` notation denotes the first diagram.

For example, if you use `!include foo.txt!1`, the second `@startuml/@enduml` block within `foo.txt` will be included.

You can also put an id to some `@startuml/@enduml` text block in an included file using `@startuml(id=MY_OWN_ID)` syntax and then include the block adding `!MY_OWN_ID` when including the file, so using something like `!include foo.txt!MY_OWN_ID`.

By default, a file can only be included once. You can use `!include_many` instead of `!include` if you want to include some file several times. Note that there is also a `!include_once` directive that raises an error if a file is included several times.





## 19.9 Including Subpart

You can also use `!startsub NAME` and `!endsub` to indicate sections of text to include from other files using `!includesub`. For example:

### file1.puml:

```
@startuml

A -> A : stuff1
!startsub BASIC
B -> B : stuff2
!endsub
C -> C : stuff3
!startsub BASIC
D -> D : stuff4
!endsub
@enduml
```

file1.puml would be rendered exactly as if it were:

```
@startuml

A -> A : stuff1
B -> B : stuff2
C -> C : stuff3
D -> D : stuff4
@enduml
```

However, this would also allow you to have another file2.puml like this:

### file2.puml

```
@startuml

title this contains only B and D
!includesub file1.puml!BASIC
@enduml
```

This file would be rendered exactly as if:

```
@startuml

title this contains only B and D
B -> B : stuff2
D -> D : stuff4
@enduml
```

## 19.10 Builtin functions

Some functions are defined by default. Their name starts by %



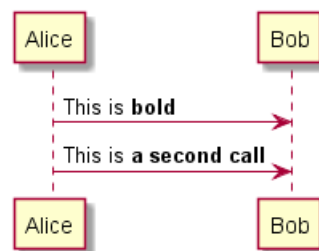
| Name                | Description  |                    |
|---------------------|--|--------------------|
| %strlen             | Calculate the length of a String                                       | %                  |
| %substr             | Extract a substring. Takes 2 or 3 arguments  %substr("abcdef", 3, 2)   | "d                 |
| %strpos             | Search a substring in a string   | %strpo             |
| %intval             | Convert a String to Int  | %                  |
| %file_exists        | Check if a file exists on the local filesystem                         | %file_exis         |
| %function_exists    | Check if a function exists   | %function_e        |
| %variable_exists    | Check if a variable exists   | %variable_         |
| %set_variable_value | Set a global variable  | %set_variable_valu |
| %get_variable_value | Retrieve some variable value   | %get_variab        |
| %getenv             | Retrieve environment variable value                                    | %                  |
| %dirpath            | Retrieve current dirpath   |                    |
| %filename           | Retrieve current filename  |                    |
| %date               | Retrieve current date. You can provide an optional format for the date | %date("y           |
| %true               | Return always true   |                    |
| %false              | Return always false  |                    |
| %not                | Return the logical negation of an expression                           |                    |

## 19.11 Logging

You can use `!log` to add some log output when generating the diagram. This has no impact at all on the diagram itself. However, those logs are printed in the command line's output stream. This could be useful for debug purpose.

```
@startuml
!function bold($text)
!$result = "<b>"+ $text + "</b>"
!log Calling bold function with $text. The result is $result
!return $result
!endfunction
```

```
Alice -> Bob : This is bold("bold")
Alice -> Bob : This is bold("a second call")
@enduml
```



## 19.12 Memory dump

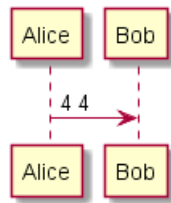
You can use `!memory_dump` to dump the full content of the memory when generating the diagram. An optional string can be put after `!memory_dump`. This has no impact at all on the diagram itself. This could be useful for debug purpose.

```
@startuml
!function $inc($string)
!$val = %intval($string)
!log value is $val
!dump_memory
!return $val+1
!endfunction
```

```
Alice -> Bob : 4 $inc("3")
```



```
!unused = "foo"
!dump_memory EOF
@enduml
```



### 19.13 Assertion

You can put assertion in your diagram.

```
@startuml
Alice -> Bob : Hello
!assert %strpos("abcdef", "cd")==3 : "This always fail"
@enduml
```

#### Welcome to PlantUML!

If you use this software, you accept its license.  
(details by typing license keyword)

You can start with a simple UML Diagram like:

```
Bob->Alice: Hello
```

Or

```
class Example
```

You will find more information about PlantUML syntax on <http://plantuml.com>



```
[From string (line 3) ]

@startuml
Alice -> Bob : Hello
!assert %strpos("abcdef", "cd")==3 : "This always fail"
Assertion error : This always fail
```

### 19.14 Building custom library

It's possible to package a set of included files into a single .zip or .jar archive. This single zip/jar can then be imported into your diagram using !import directive.

Once the library has been imported, you can !include file from this single zip/jar.

#### Example:

```
@startuml

!import /path/to/customLibrary.zip
' This just adds "customLibrary.zip" in the search path

!include myFolder/myFile.iuml
' Assuming that myFolder/myFile.iuml is located somewhere
' either inside "customLibrary.zip" or on the local filesystem

...
```



## 19.15 Search path

You can specify the java property `plantuml.include.path` in the command line.

For example:

```
java -Dplantuml.include.path="c:/mydir" -jar plantuml.jar atest1.txt
```

Note the this `-D` option has to put before the `-jar` option. `-D` options after the `-jar` option will be used to define constants within plantuml preprocessor.

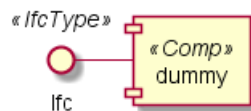
## 19.16 Argument concatenation

It is possible to append text to a macro argument using the `##` syntax.

```
@startuml
!unquoted function COMP_TEXTGENCOMP(name)
[name] << Comp >>
interface Ifc << IfcType >> AS name##Ifc
name##Ifc - [name]
!endfunction
```

```
COMP_TEXTGENCOMP(dummy)
```

```
@enduml
```



## 19.17 Dynamic function invocation

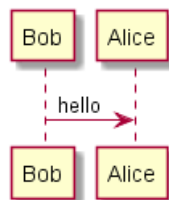
You can dynamically invoke a void function using the special `%invoke_void_func()` void function. This function takes as first argument the name of the actual void function to be called. The following argument are copied to the called function.

For example, you can have:

```
@startuml
!function $go()
  Bob -> Alice : hello
!endfunction

!$wrapper = "$go"

%invoke_void_func($wrapper)
@enduml
```

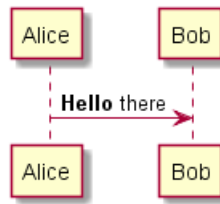


For return functions, you can use the corresponding special function `%call_user_func()` :

```
@startuml
!function bold($text)
!return "<b>" + $text + "</b>"
!endfunction
```



```
Alice -> Bob : %call_user_func("bold", "Hello") there  
@enduml
```



## 20 Unicode

The PlantUML language use *letters* to define actor, usecase and soon.

But *letters* are not only A-Z latin characters, it could be *any kind of letter from any language*.

### 20.1 Examples

```
@startuml
skinparam handwritten true
skinparam backgroundColor #EEEEBD

actor 使用者
participant "頭等艙" as A
participant "第二類" as B
participant "最後一堂課" as 別的東西
```

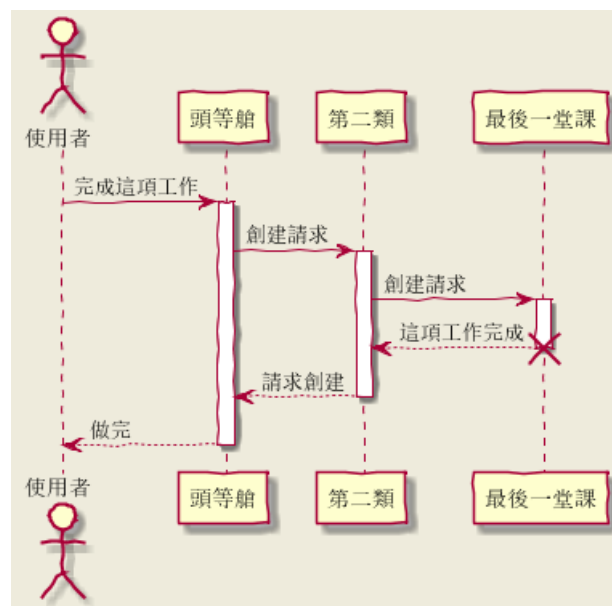
```
使用者 -> A: 完成這項工作
activate A
```

```
A -> B: 創建請求
activate B
```

```
B -> 別的東西: 創建請求
activate 別的東西
別的東西 --> B: 這項工作完成
destroy 別的東西
```

```
B --> A: 請求創建
deactivate B
```

```
A --> 使用者: 做完
deactivate A
@enduml
```



```
@startuml

(*) --> "膩平台"
--> == S1 ==
```



```
--> 鞠躬向公眾
--> === S2 ===
--> 這傢伙波武器
--> (*)
```

```
skinparam backgroundColor #AAFFFF
skinparam activityStartColor red
skinparam activityBarColor SaddleBrown
skinparam activityEndColor Silver
skinparam activityBackgroundColor Peru
skinparam activityBorderColor Peru
@enduml
```



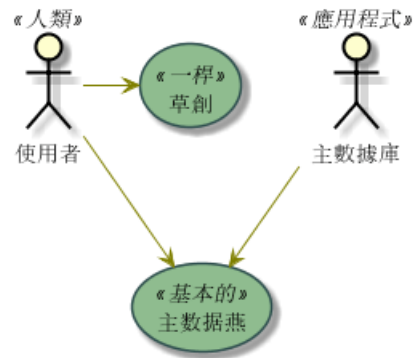
```
@startuml
skinparam usecaseBackgroundColor DarkSeaGreen
skinparam usecaseArrowColor Olive
skinparam actorBorderColor black
skinparam usecaseBorderColor DarkSlateGray
```

```
使用者 << 人類 >>
"主數據庫" as 數據庫 << 應用程式 >>
(草創) << 一桿 >>
"主数据燕" as (贏余) << 基本的 >>
```

```
使用者 -> (草創)
使用者 --> (贏余)
```

```
數據庫 --> (贏余)
@enduml
```





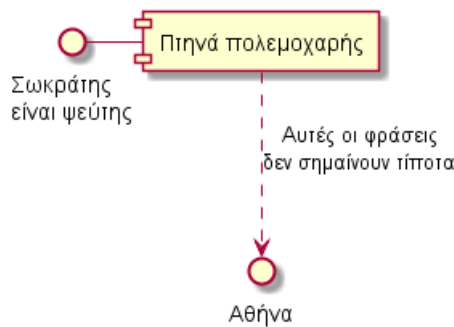
@startuml

() "Σωκράτης ψεύτης" as Σωκράτης

Σωκράτης - [Πτηνά πολεμοχαρές]

[Πτηνά πολεμοχαρές] ..> () Αθήνα : Αυτές οι φράσεις σημαίνουν τίποτα

@enduml



## 20.2 Charset

The default charset used when *reading* the text files containing the UML text description is system dependent.

Normally, it should just be fine, but in some case, you may want to use another charset. For example, with the command line:

```
java -jar plantuml.jar -charset UTF-8 files.txt
```

Or, with the ant task:

```
<!-- Put images in c:/images directory -->
<target name="main">
<plantuml dir="./src" charset="UTF-8" />
```

Depending of your Java installation, the following charset should be available: ISO-8859-1, UTF-8, UTF-16BE, UTF-16LE, UTF-16.





## 21 Standard Library

This page explains the official Standard Library for PlantUML. This Standard Library is now included in official releases of PlantUML. Including files follows the C convention for "C standard library" (see [https://en.wikipedia.org/wiki/C\\_standard\\_library](https://en.wikipedia.org/wiki/C_standard_library) )

Contents of the library come from third party contributors. We thank them for their useful contribution!

### 21.1 AWS library

<https://github.com/milo-minderbinder/AWS-PlantUML>

The AWS library consists of Amazon AWS icons, it provides icons of two different sizes.

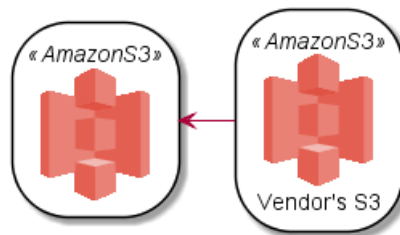
Use it by including the file that contains the sprite, eg: `!include <aws/Storage/AmazonS3/AmazonS3>`. When imported, you can use the sprite as normally you would, using `<$sprite_name>`.

You may also include the `common.puml` file, eg: `!include <aws/common>`, which contains helper macros defined. With the `common.puml` imported, you can use the `NAME_OF_SPRITE(parameters...)` macro.

Example of usage:

```
@startuml
!include <aws/common>
!include <aws/Storage/AmazonS3/AmazonS3>
!include <aws/Storage/AmazonS3/bucket/bucket>
```

```
AMAZONS3(s3_internal)
AMAZONS3(s3_partner,"Vendor's S3")
s3_internal <- s3_partner
@enduml
```



### 21.2 Azure library

<https://github.com/RicardoNiepel/Azure-PlantUML/>

The Azure library consists of Microsoft Azure icons.

Use it by including the file that contains the sprite, eg: `!include <azure/Analytics/AzureEventHub.puml>`. When imported, you can use the sprite as normally you would, using `<$sprite_name>`.

You may also include the `AzureCommon.puml` file, eg: `!include <azure/AzureCommon.puml>`, which contains helper macros defined. With the `AzureCommon.puml` imported, you can use the `NAME_OF_SPRITE(parameters...)` macro.

Example of usage:

```
@startuml
!include <azure/AzureCommon.puml>
!include <azure/Analytics/AzureEventHub.puml>
!include <azure/Analytics/AzureStreamAnalytics.puml>
!include <azure/Databases/AzureCosmosDb.puml>
```

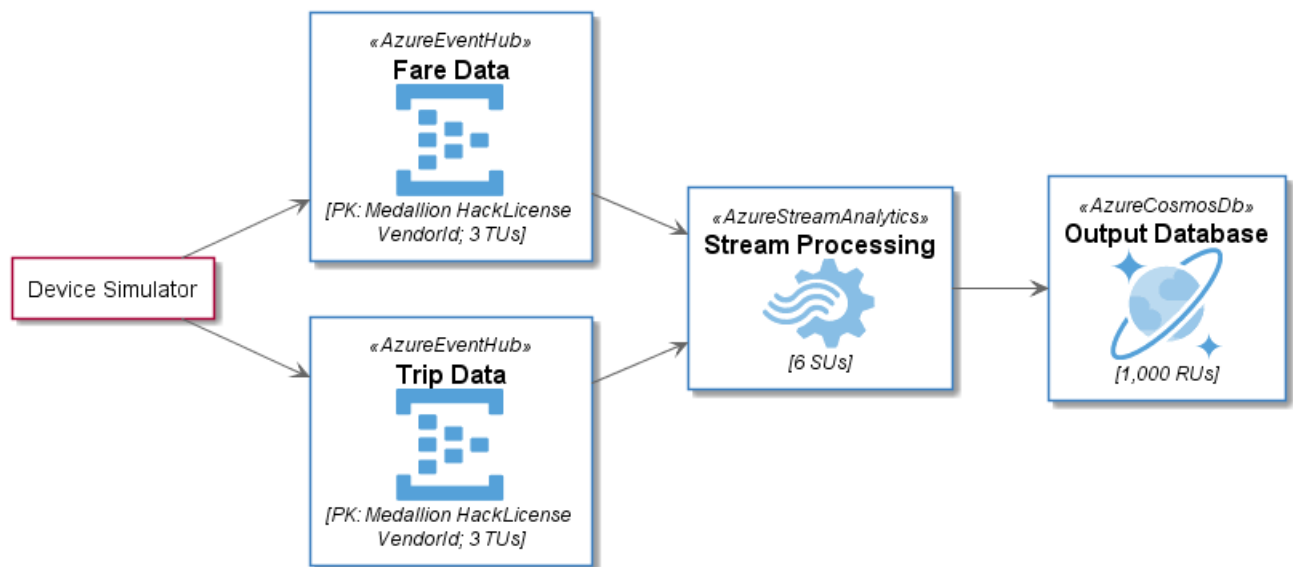
left to right direction



```
agent "Device Simulator" as devices #fff
```

```
AzureEventHub(fareDataEventHub, "Fare Data", "PK: Medallion HackLicense VendorId; 3 TUs")
AzureEventHub(tripDataEventHub, "Trip Data", "PK: Medallion HackLicense VendorId; 3 TUs")
AzureStreamAnalytics(streamAnalytics, "Stream Processing", "6 SUs")
AzureCosmosDb(outputCosmosDb, "Output Database", "1,000 RUs")
```

```
devices --> fareDataEventHub
devices --> tripDataEventHub
fareDataEventHub --> streamAnalytics
tripDataEventHub --> streamAnalytics
streamAnalytics --> outputCosmosDb
@enduml
```



## 21.3 Cloud Insight

<https://github.com/rabelenda/cicon-plantuml-sprites>

This repository contains PlantUML sprites generated from Cloudinsight icons, which can easily be used in PlantUML diagrams for nice visual representation of popular technologies.

```
@startuml
!include <cloudinsight/tomcat>
!include <cloudinsight/kafka>
!include <cloudinsight/java>
!include <cloudinsight/cassandra>

title Cloudinsight sprites example

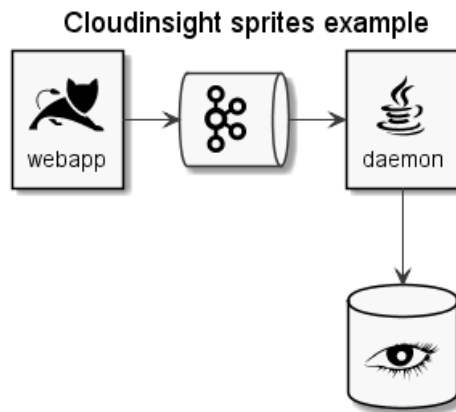
skinparam monochrome true

rectangle "<$tomcat>\nwebapp" as webapp
queue "<$kafka>" as kafka
rectangle "<$java>\ndaemon" as daemon
database "<$cassandra>" as cassandra

webapp -> kafka
kafka -> daemon
daemon --> cassandra
```



```
@enduml
```



## 21.4 Devicons and Font Awesome library

<https://github.com/tupadr3/plantuml-icon-font-sprites>

These two library consists respectively of Devicons and Font Awesome libraries of icons.

Use it by including the file that contains the sprite, eg: `!include <font-awesome/align_center>`. When imported, you can use the sprite as normally you would, using `<$sprite_name>`.

You may also include the `common.puml` file, eg: `!include <font-awesome/common>`, which contains helper macros defined. With the `common.puml` imported, you can use the `NAME_OF_SPRITE(parameters...)` macro.

Example of usage:

```

@startuml
!include <tupadr3/common>
!include <tupadr3/font-awesome/server>
!include <tupadr3/font-awesome/database>

title Styling example

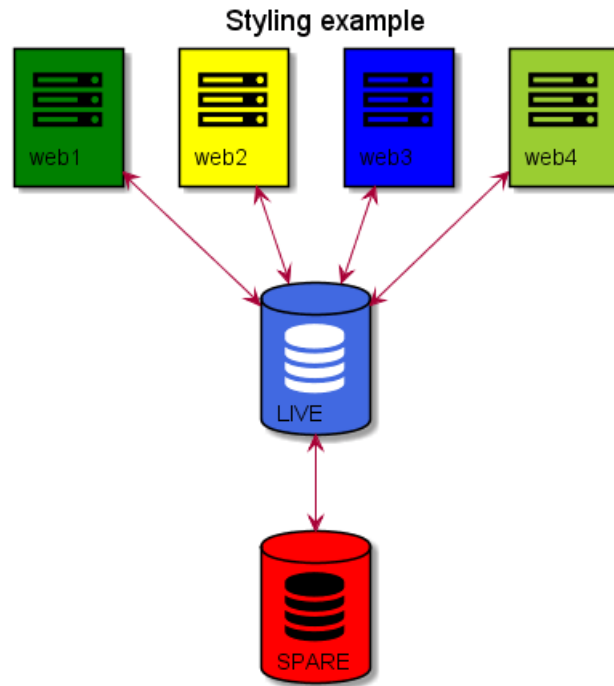
FA_SERVER(web1,web1) #Green
FA_SERVER(web2,web2) #Yellow
FA_SERVER(web3,web3) #Blue
FA_SERVER(web4,web4) #YellowGreen

FA_DATABASE(db1,LIVE,database,white) #RoyalBlue
FA_DATABASE(db2,SPARE,database) #Red

db1 <--> db2

web1 <--> db1
web2 <--> db1
web3 <--> db1
web4 <--> db1
@enduml
  
```



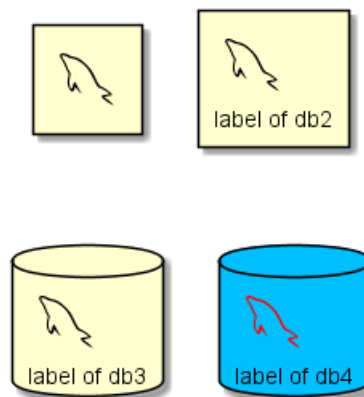


```

@startuml
!include <tupadr3/common>
!include <tupadr3/devicons/mysql>

DEV_MYSQL(db1)
DEV_MYSQL(db2,label of db2)
DEV_MYSQL(db3,label of db3,database)
DEV_MYSQL(db4,label of db4,database,red) #DeepSkyBlue
@enduml

```



## 21.5 Google Material Icons

<https://github.com/Templarian/MaterialDesign>

This library consists of a free Material style icons from Google and other artists.

Use it by including the file that contains the sprite, eg: `!include <material/ma_folder_move>`. When imported, you can use the sprite as normally you would, using `<$ma_sprite_name>`. Notice that this library requires an `ma_` prefix on sprites names, this is to avoid clash of names if multiple sprites have the same name on different libraries.

You may also include the `common.puml` file, eg: `!include <material/common>`, which contains helper macros defined. With the `common.puml` imported, you can use the `MA_NAME_OF_SPRITE(parameters...)` macro, note

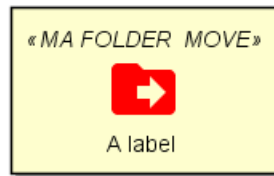


again the use of the prefix MA\_.

Example of usage:

```
@startuml
!include <material/common>
' To import the sprite file you DON'T need to place a prefix!
!include <material/folder_move>

MA_FOLDER_MOVE(Red, 1, dir, rectangle, "A label")
@enduml
```



#### Notes

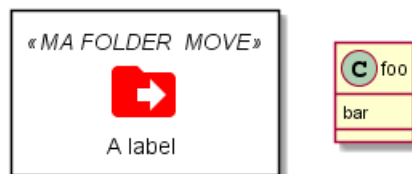
When mixing sprites macros with other elements you may get a syntax error if, for example, trying to add a rectangle along with classes. In those cases, add { and } after the macro to create the empty rectangle.

Example of usage:

```
@startuml
!include <material/common>
' To import the sprite file you DON'T need to place a prefix!
!include <material/folder_move>

MA_FOLDER_MOVE(Red, 1, dir, rectangle, "A label") {

class foo {
bar
}
}
@enduml
```



## 21.6 Office

<https://github.com/Roemer/plantuml-office>

There are sprites (\*.puml) and colored png icons available. Be aware that the sprites are all only monochrome even if they have a color in their name (due to automatically generating the files). You can either color the sprites with the macro (see examples below) or directly use the fully colored pngs. See the following examples on how to use the sprites, the pngs and the macros.

Example of usage:

```
@startuml
!include <tupadr3/common>

!include <office/Servers/database_server>
!include <office/Servers/application_server>
!include <office/Concepts/firewall_orange>
!include <office/Clouds/cloud_disaster_red>
```

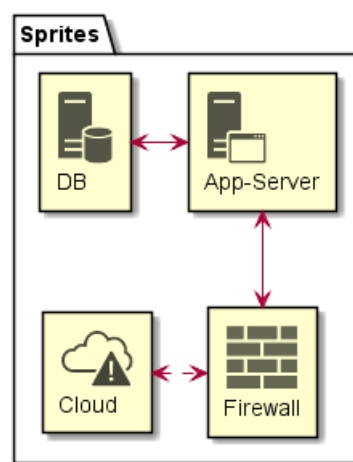


```
title Office Icons Example
```

```
package "Sprites" {
  OFF_DATABASE_SERVER(db,DB)
  OFF_APPLICATION_SERVER(app,App-Server)
  OFF_FIREWALL_ORANGE(fw,Firewall)
  OFF_CLOUD_DISASTER_RED(cloud,Cloud)
  db <-> app
  app <--> fw
  fw <.left.> cloud
}
```

```
@enduml
```

Office Icons Example



```
@startuml
```

```
!include <tupadr3/common>
```

```
!include <office/servers/database_server>
!include <office/servers/application_server>
!include <office/Concepts/firewall_orange>
!include <office/Clouds/cloud_disaster_red>
```

```
' Used to center the label under the images
skinparam defaultTextAlignment center
```

```
title Extended Office Icons Example
```

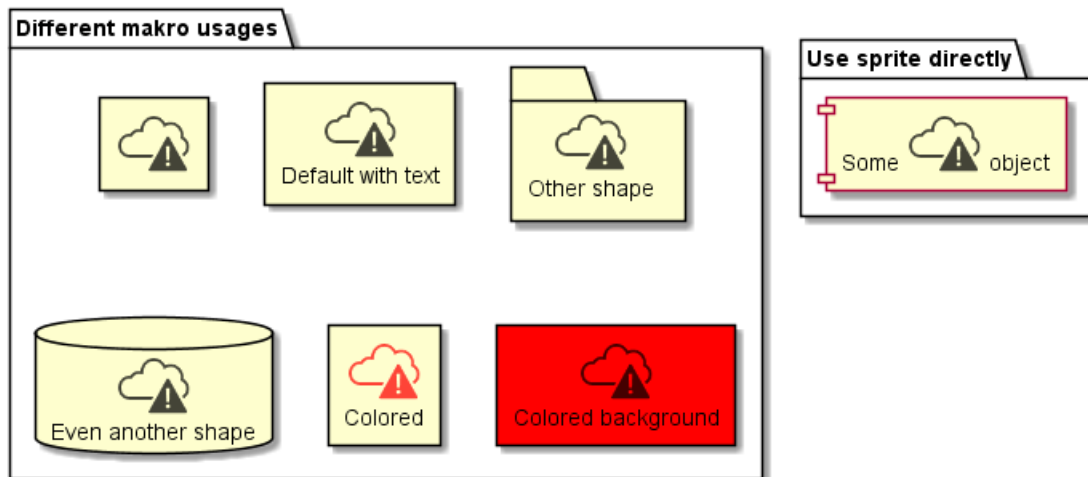
```
package "Use sprite directly" {
  [Some <$cloud_disaster_red> object]
}
```

```
package "Different makro usages" {
  OFF_CLOUD_DISASTER_RED(cloud1)
  OFF_CLOUD_DISASTER_RED(cloud2,Default with text)
  OFF_CLOUD_DISASTER_RED(cloud3,Other shape,Folder)
  OFF_CLOUD_DISASTER_RED(cloud4,Even another shape,Database)
  OFF_CLOUD_DISASTER_RED(cloud5,Colored,Rectangle, red)
  OFF_CLOUD_DISASTER_RED(cloud6,Colored background) #red
}
```

```
@enduml
```



## Extended Office Icons Example



## 21.7 ArchiMate

<https://github.com/ebbypeter/ArchiMate-PlantUML>

This repository contains ArchiMate PlantUML macros and other includes for creating ArchiMate Diagrams easily and consistantly.

@startuml Internet Browser Example

!includeurl <https://raw.githubusercontent.com/ebbypeter/ArchiMate-PlantUML/master/ArchiMate.puml>

title ArchiMate Sample - Internet Browser

' Elements

Business\_Object(businessObject, "A Business Object")

Business\_Process(someBusinessProcess, "Some Business Process")

Business\_Service(itSupportService, "IT Support for Business (Application Service)")

Application\_DataObject(dataObject, "Web Page Data \n 'on the fly'")

Application\_Function(webpageBehaviour, "Web page behaviour")

Application\_Component(ActivePartWebPage, "Active Part of the web page \n 'on the fly'")

Technology\_Artifact(inMemoryItem, "in memory / 'on the fly' html/javascript")

Technology\_Service(internetBrowser, "Internet Browser Generic & Plugin")

Technology\_Service(internetBrowserPlugin, "Some Internet Browser Plugin")

Technology\_Service(webServer, "Some web server")

' Relationships

Rel\_Flow\_Left(someBusinessProcess, businessObject, "")

Rel\_Serving\_Up(itSupportService, someBusinessProcess, "")

Rel\_Specilization\_Up(webpageBehaviour, itSupportService, "")

Rel\_Flow\_Right(dataObject, webpageBehaviour, "")

Rel\_Specilization\_Up(dataObject, businessObject, "")

Rel\_Assignment\_Left(ActivePartWebPage, webpageBehaviour, "")

Rel\_Specilization\_Up(inMemoryItem, dataObject, "")

Rel\_Realization\_Up(inMemoryItem, ActivePartWebPage, "")

Rel\_Specilization\_Right(inMemoryItem, internetBrowser, "")

Rel\_Serving\_Up(internetBrowser, webpageBehaviour, "")

Rel\_Serving\_Up(internetBrowserPlugin, webpageBehaviour, "")

Rel\_Aggregation\_Right(internetBrowser, internetBrowserPlugin, "")

Rel\_Access\_Up(webServer, inMemoryItem, "")



```
Rel_Serving_Up(webServer, internetBrowser, "")

@enduml
```

```
[From string (line 24) ]

@startuml Internet Browser Example

skinparam defaultTextAlignment center
skinparam wrapWidth 400
...
... ( skipping 48 lines )
...

title Archimate Sample - Internet Browser

archimate #BUSINESS "A Business Object" <<business-object>> as businessObject
archimate #BUSINESS "Some Business Process" <<business-process>> as someBusinessProcess
archimate #BUSINESS "IT Support for Business (Application Service)" <<business-service>> as itSupportService

archimate #APPLICATION "Web Page Data \n 'on the fly'" <<application-data-object>> as dataObject
archimate #APPLICATION "Web page behaviour" <<application-function>> as webpageBehaviour
archimate #APPLICATION "Active Part of the web page \n 'on the fly'" <<application-component>> as ActivePartWebPage

archimate #TECHNOLOGY "in memory / 'on the fly' html/javascript" <<technology-artifact>> as inMemoryItem
archimate #TECHNOLOGY "Internet Browser Generic & Plugin" <<technology-infra-service>> as internetBrowser
archimate #TECHNOLOGY "Some Internet Browser Plugin" <<technology-infra-service>> as internetBrowserPlugin
archimate #TECHNOLOGY "Some web server" <<technology-infra-service>> as webServer

someBusinessProcess .LEFT.>> businessObject : ""
itSupportService -UP-> someBusinessProcess : ""
Rel_Specilization_Up(webpageBehaviour, itSupportService, "")
Syntax Error?
```

## 21.8 Miscellaneous

You can list standard library folders using the special diagram:

```
@startuml
stdlib
@enduml
```





**aws**

Version 18.02.22

Delivered by <https://github.com/milo-minderbinder/AWS-PlantUML>**awslib**

Version 0.0.1

Delivered by <https://github.com/aws-labs/aws-icons-for-plantuml>**azure**

Version 2.1.0

Delivered by <https://github.com/RicardoNiepel/Azure-PlantUML>**c4**

Version 1.0.0

Delivered by <https://github.com/RicardoNiepel/C4-PlantUML>**cloudinsight**

Version 0.0.1

Delivered by <https://github.com/rabelenda/cicon-plantuml-sprites/>**cloudogu**

Version 0.0.1

Delivered by <https://github.com/cloudogu/plantuml-cloudogu-sprites>**material**

Version 0.0.1

Delivered by <https://github.com/Templarian/MaterialDesign>**office**

Version 0.0.1

Delivered by <https://github.com/Roemer/plantuml-office>**tupadr3**

Version 2.0.0

Delivered by <https://github.com/tupadr3/plantuml-icon-font-sprites>

It is also possible to use the command line `java -jar plantuml.jar -stdlib` to display the same list.

Finally, you can extract the full standard library sources using `java -jar plantuml.jar -extractstdlib`. All files will be extracted in the folder `stdlib`.

Sources used to build official PlantUML releases are hosted here <https://github.com/plantuml/plantuml-stdlib>. You can create Pull Request to update or add some library if you find it relevant.

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