Diagramming

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1 Configure

- System: install plantuml (e.g. `brew install plantuml`)
- Emacs: install plantuml-mode. Configuration:

```
(setq plantuml-jar-path "/usr/local/Cellar/plantuml/1.2019.6/libexec/plantuml.jar")
(setq plantuml-jar-args '("-charset" "UTF-8" "-config" "~/plantuml.txt"))
(setq org-startup-with-inline-images t)
(add-to-list 'org-src-lang-modes '("plantuml" . plantuml))
(org-babel-do-load-languages
 'org-babel-load-languages
 '((plantuml . t)))
```

- `C-c C-c` in a source block to render a diagram.
- May need to `org-toggle-inline-images` to view inline.

2 Embedding a Diagram

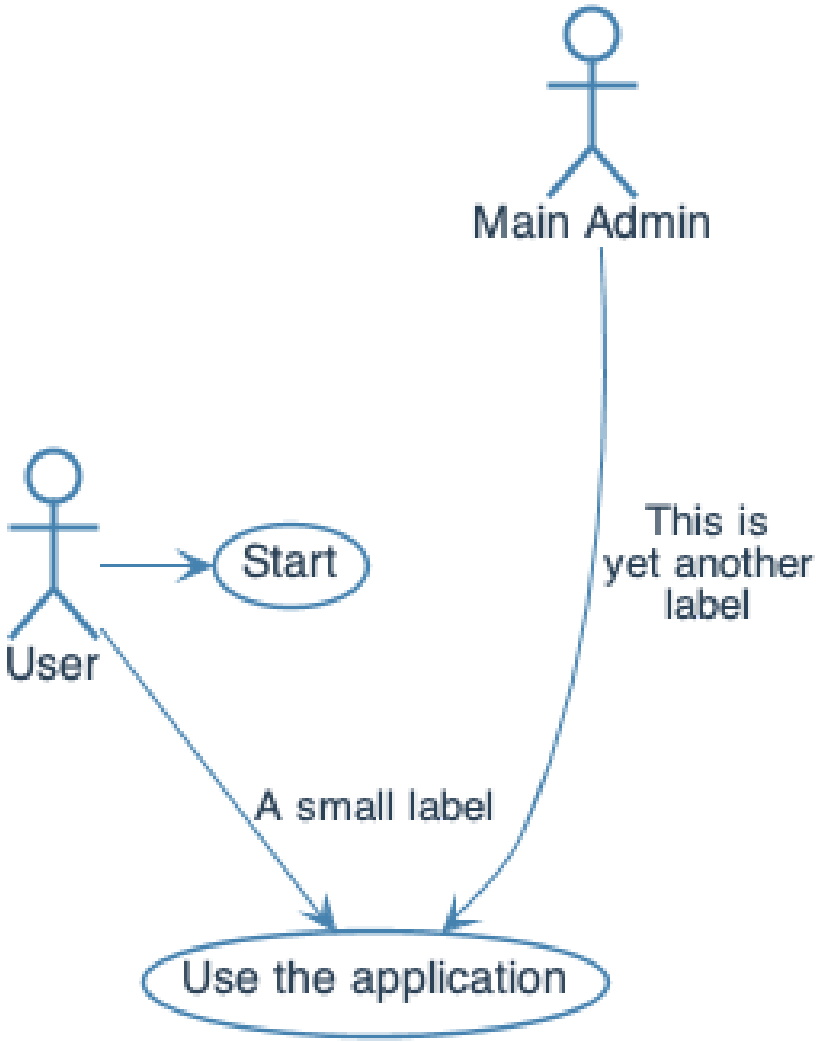
`#+begin_src plantuml :file output.png` Begin diagram

`#+end_src` End diagram

`#+STARTUP: inlineimages` Display diagrams inline (put at top of file)

2.1 Example

3 Use Case Diagrams



4 Sequence Diagrams

4.1 Arrows

-> **or** <- Solid arrow

--> **or** <-- Dotted arrow

`-\` **or** `-/` Half arrowhead

`-\\`, `-»`, `«-`, `-//` Skinny arrowhead

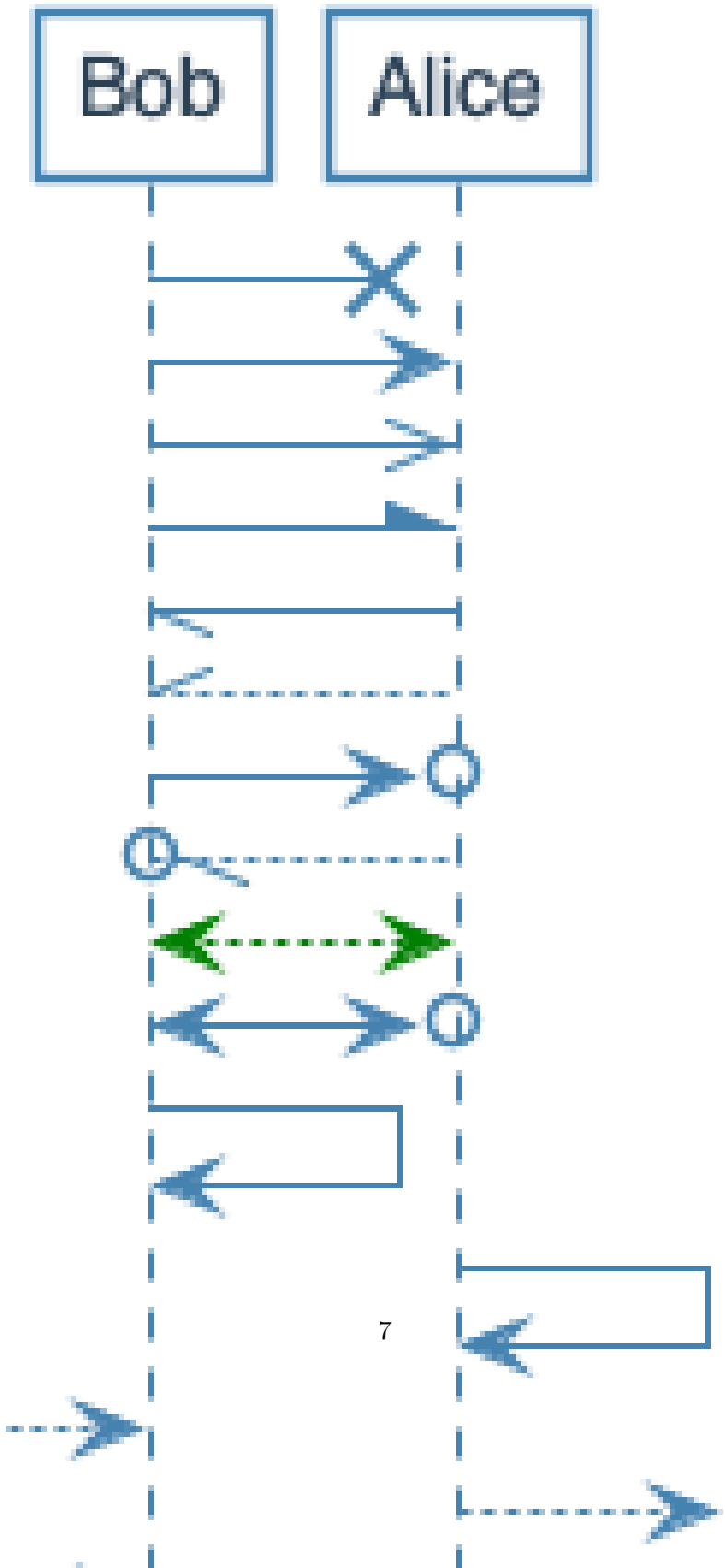
`->o` Arrow points to circle

`<->` Bidirectional arrow

`-[#red]->` Arrow color

`[->`, `->]`, `[<-`, `<-]` Un-anchored lines

4.1.1 Example Sequence Diagram Arrows



4.2 Participants

`actor ActorName` Define an actor

`boundary BoundaryName` Define boundary system

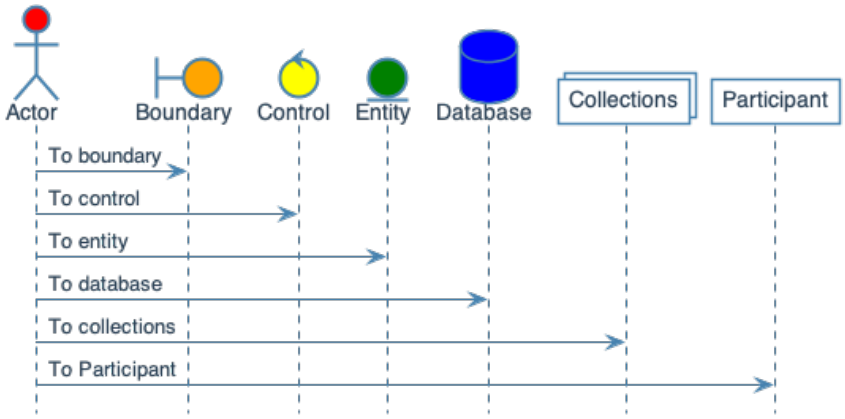
`control ControlName` Define a control system

`entity EntityName` Define an entity

`database DatabaseName` Define a database

`collections CollectionsName` Define a collection

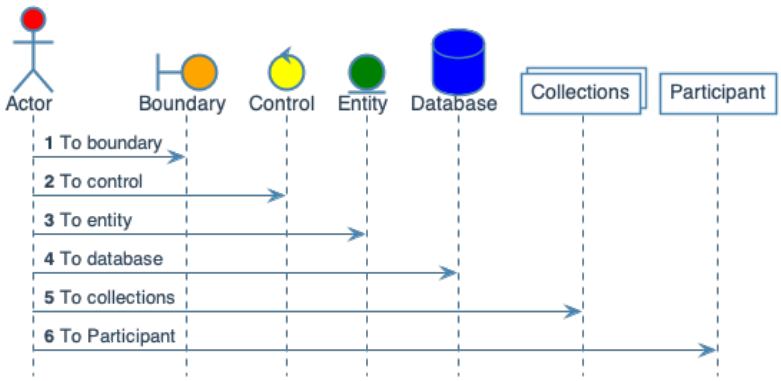
4.2.1 Example Sequence Diagram



4.2.2 Sequence Numbering

`autonumber <start>` Begin numbering at <start> or 1

1. Example autonumbering



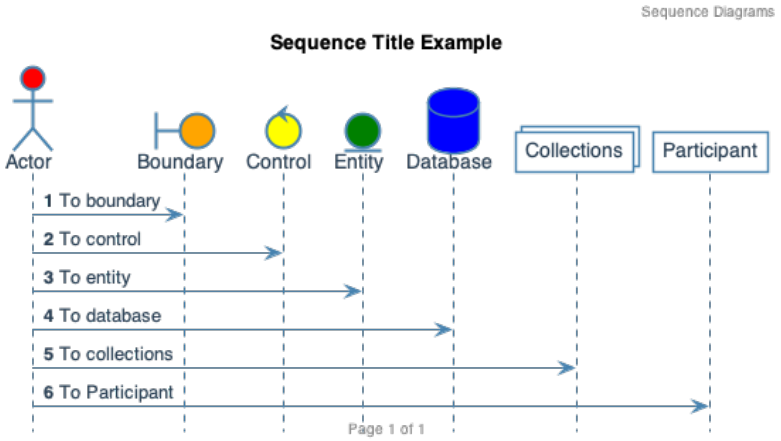
4.2.3 Page Titles, Headers, Footers

`header <content>` Defines header content

`title` <**content**> Defines title content

`footer <content>` Defines footer content

1. Example Titles, Headers, Footers



4.3 Sequence Grouping Boxes

`alt <title> ...  else <title> ...  end` Define alternates

`loop <title>` Steps in group are looped

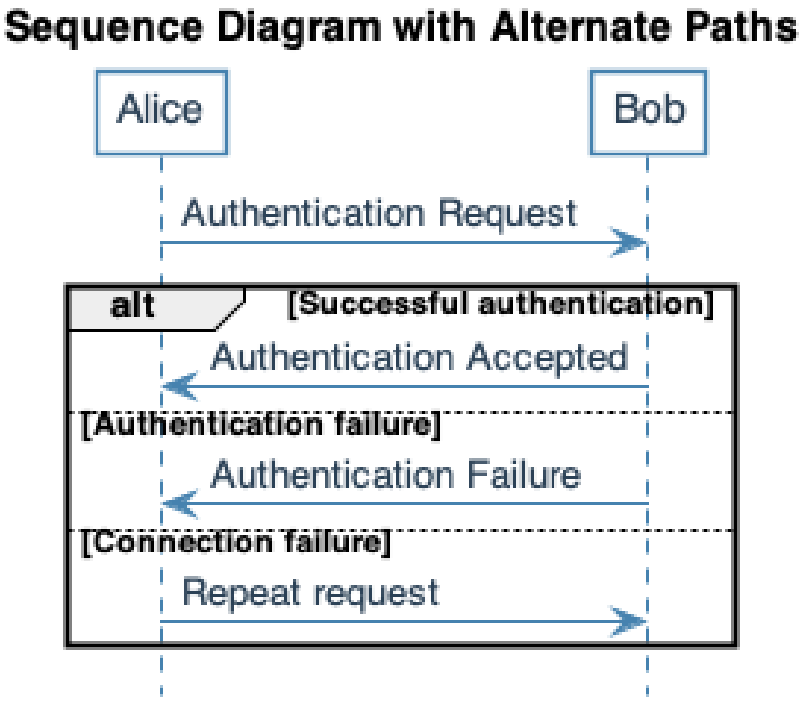
`par` Steps run in parallel

`break` Steps supercede subsequent steps

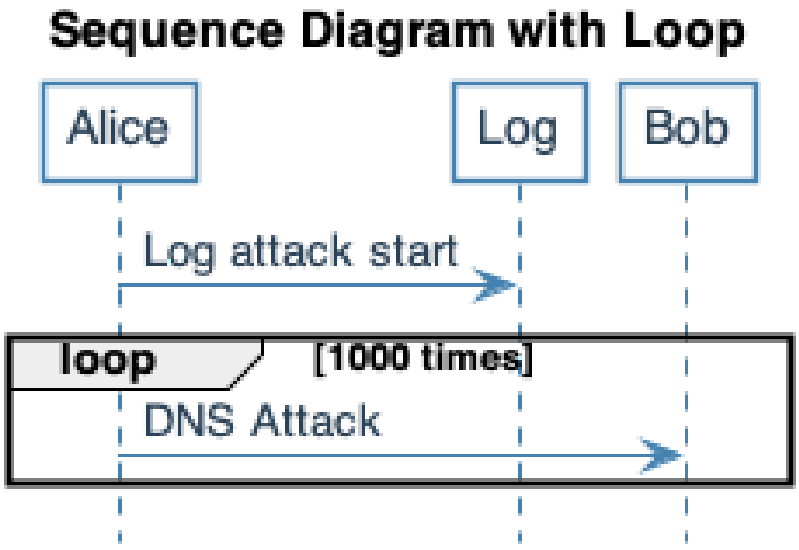
`critical` Steps must not be interleaved

`group <title>` Custom grouping

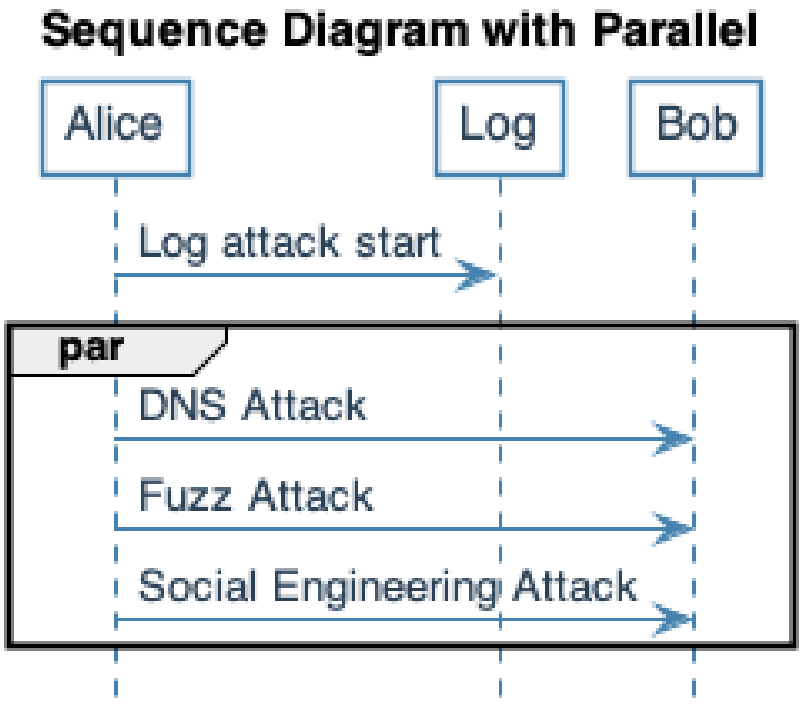
4.3.1 Example Sequence Diagram - Alternates



4.3.2 Example Sequence Diagram - Loops



4.3.3 Example Sequence Diagram - Parallel



4.4 Notes

4.4.1 Notes relative to message

Put note below the message

`note left: <note text>` Add a note to the left

`note right: <note right>` Add a note to the right

`note left ... end note` Multiline note

4.4.2 Notes relative to participant

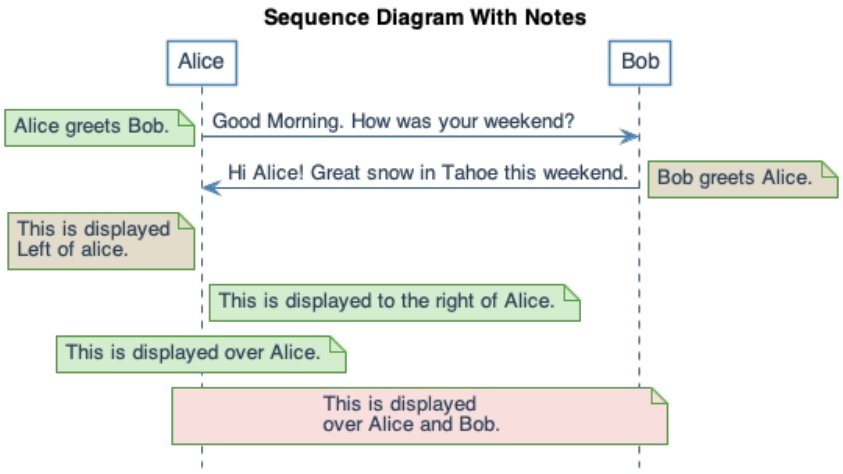
Put note below the participant

`note left of <Participant>` Place note left of participant

`note over <Participant>` Place note over participant

`note right of <Particpant>` Place note right of participant

4.4.3 Example Sequence Diagram With Notes



4.5 Formatting

`**bold**` Bold text

`//italics//` Italics text

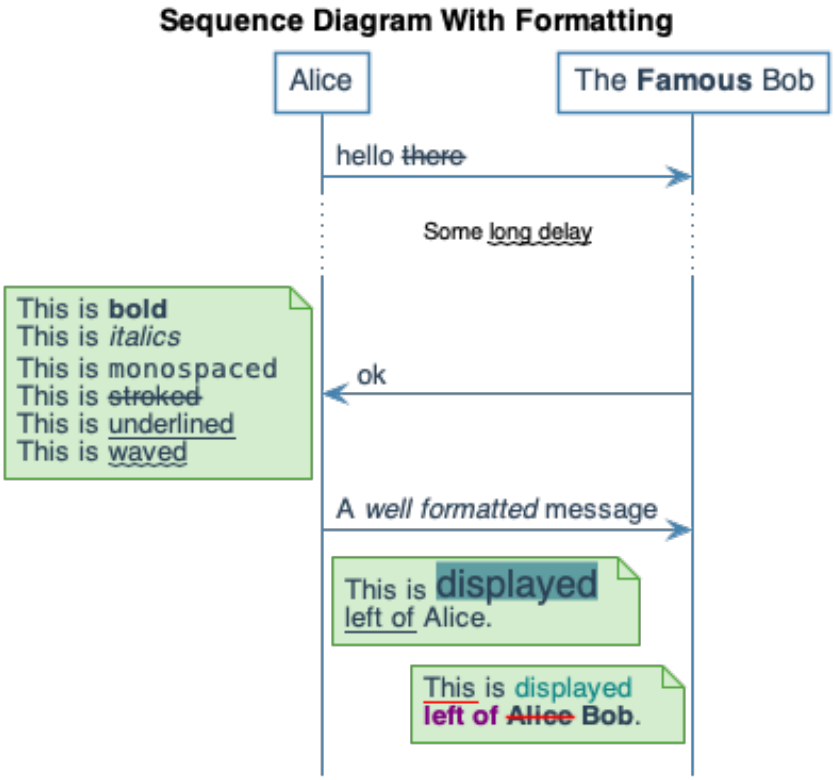
`""monospaced""` Monospaced text

`--strikethrough--` Strikethrough text

`__underline__` Underlined text

`~~wavy underline~~` Wavy underline text

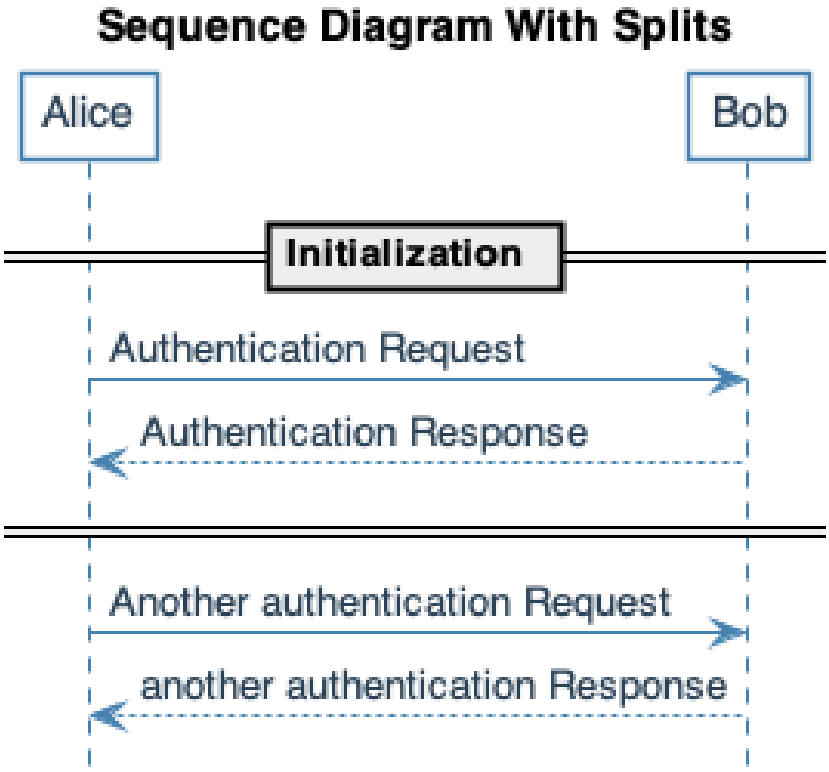
4.5.1 Example Sequence Diagram With Formatting



4.6 Splits

`== label ==` Insert a split

4.6.1 Example Sequence Diagram With Split

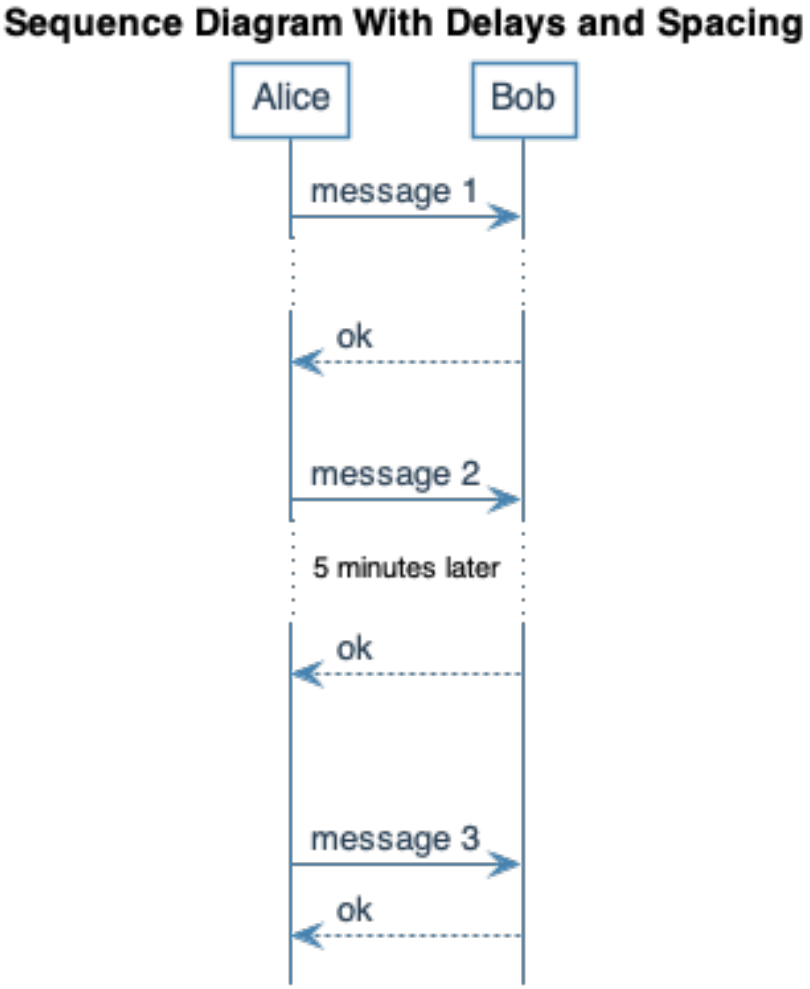


4.7 Delays & Spacing

. . . A delay in the sequence

| | | Add extra Vertical Spacing

4.7.1 Example Sequence Diagram With Delays And Spacing



4.8 Lifelines

`activate <id>` **or** `++` Mark start of lifeline <id>

`deactivate <id>` **or** `--` Mark end of lifeline <id>

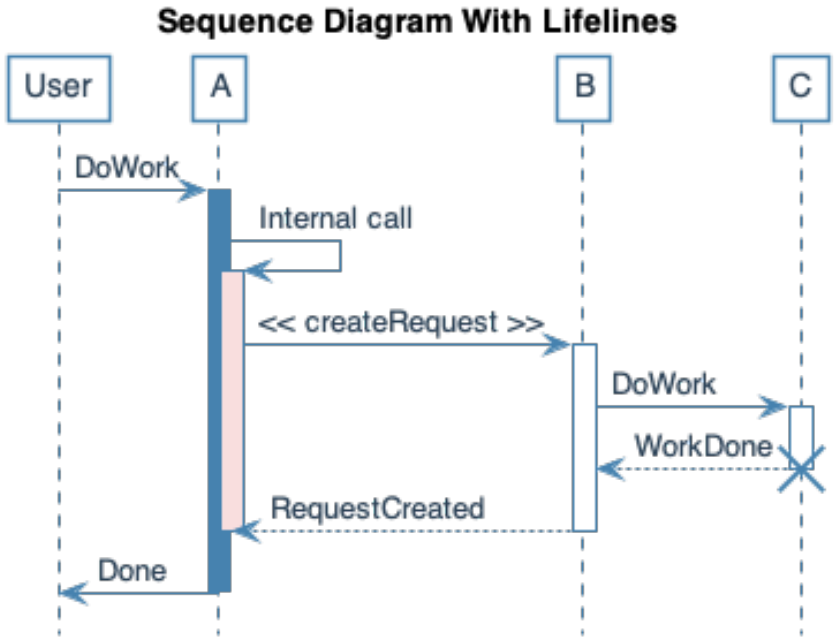
`autoactivate on` Turn on autoactivation

`create <type> <name>` **or** `**` Create a participant

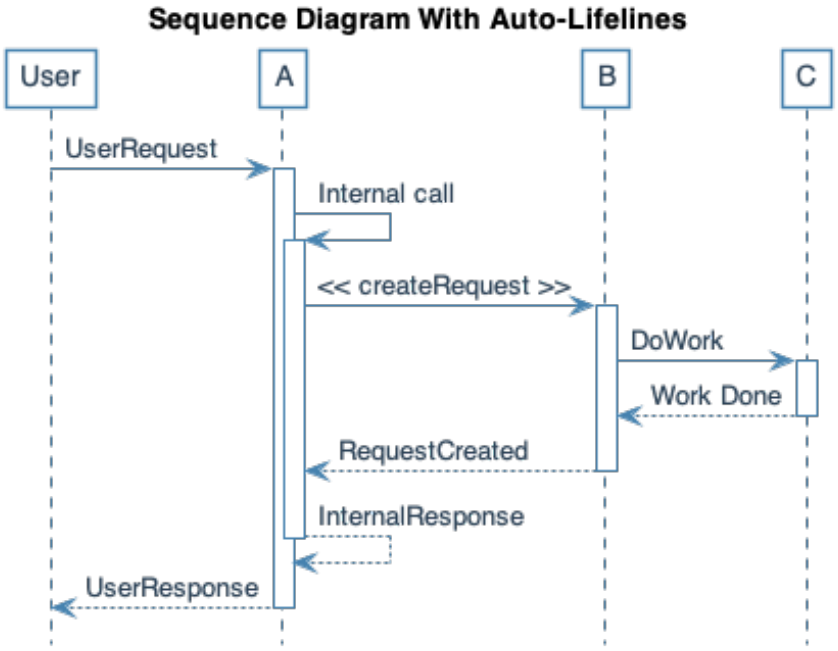
`destroy <id>` **or** `!!` Destroy participant

`return <label>` Deactivate lifeline with <label>

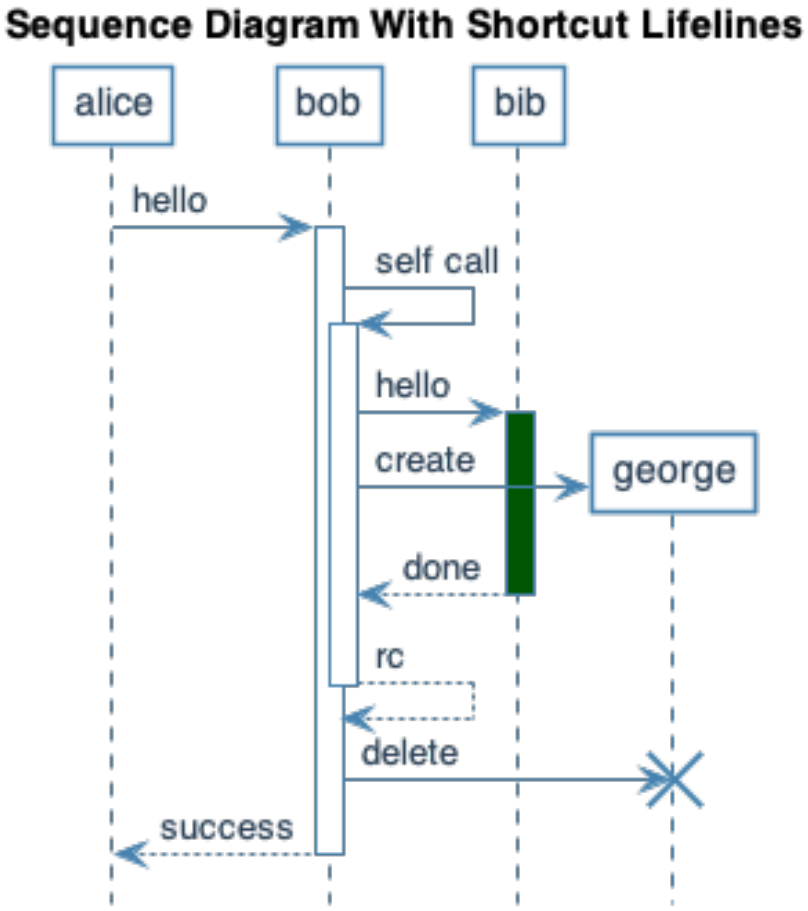
4.8.1 Example Sequence Diagram With Lifelines



4.8.2 Example Sequence Diagram With Auto-lifelines



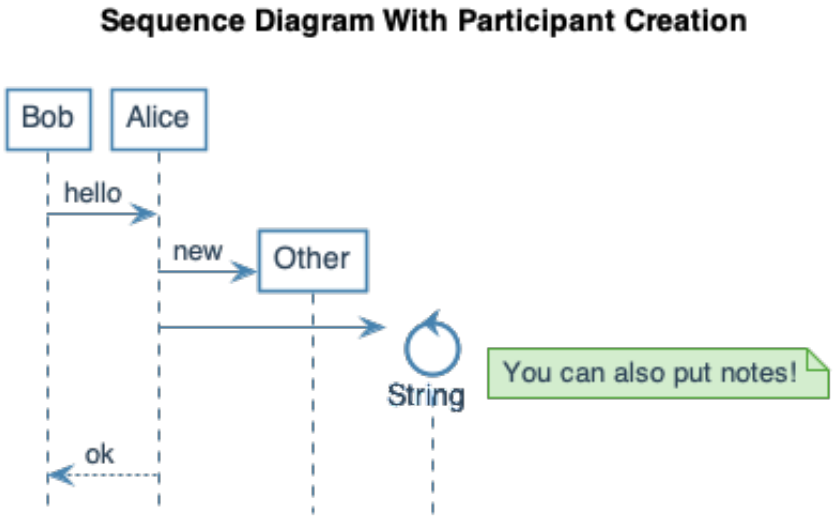
4.8.3 Example Sequence with Shortcut Lifelines



4.9 Participant Creation

~create <participant type> <participant name> Create a participant

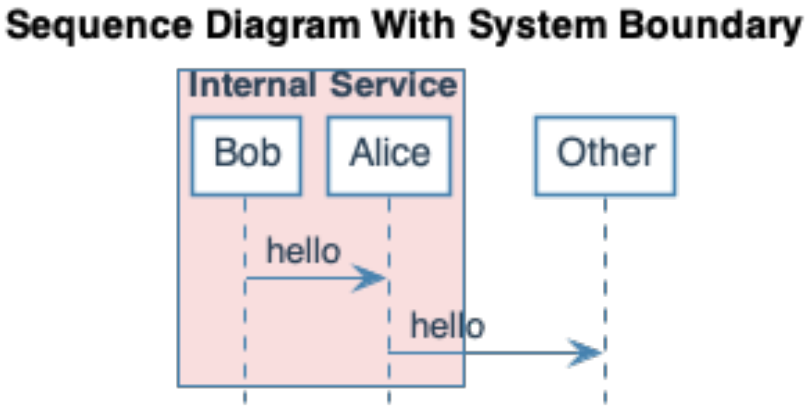
4.9.1 Example Sequence Diagram With Participant Creation



4.10 System Boundaries

`box <name> <color> ...  end box` Wrap in a box

4.10.1 Example Sequence Diagram With System Boundary



5 Entity Diagrams

5.1 Entities

`entity EntityName` Define an entity

`* indentifying_attribute` Identifying attribute

`--` Divider

`* indentifying_attribute` Identifying attribute

`optional_attribute` Optional attribute

5.2 Connectors

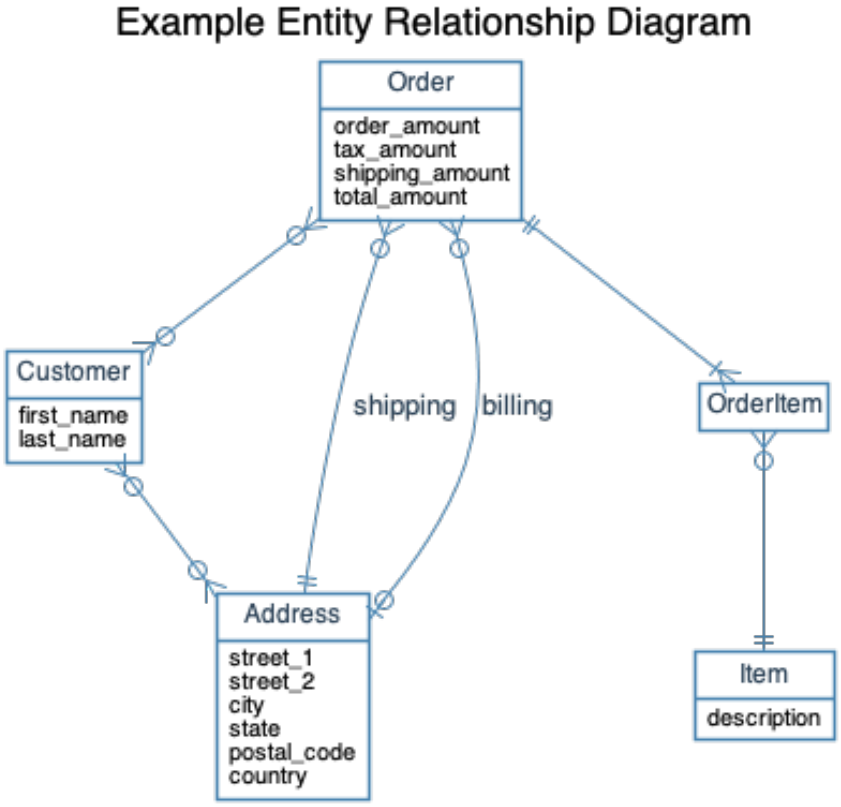
`A |o--o| B` Zero or one

`A ||--|| B` Eactly one

`A }o--o{ B` Zero or many ("crows foot")

`A }|--|{` One or many

5.3 Example Entity Diagram



* Class Diagrams

5.4 Lines

`--` Solid line

`..` Dotted line

5.5 Arrows

`<|--`, `--|>` Extension

`*--`, `--*` Composition

`o--`, `--o` Aggregation

`()--`, `--()` Lollipop (interfaces)

5.6 Vertical vs Horizontal Layout

`--` Relationships with two dashes are laid out vertically

`-` Relationships with one dash are laid out horizontally

5.7 Relations

`Class A -- Class B` Relation

`ClA -- ClB : label` Labeled relation

`Driver - Car : drives > <, >` "acts on" label

5.8 Association Class

`(Student, Course) .. Enrollment` Enrollment associates Student & Course

5.9 Fields & Methods

`<ClassName> : <field>` Add a field to a class

`<ClassName> : <method>()` Add a method to a class

`class <ClassName> { (fields/methods) }` Define a class

5.10 Visibility

- `-` : private
- `#` : protected
- `~` : package private
- `+` : public

5.11 Abstract, Static, Stereotypes, annotation, enum

`{static}` static modifier

`{abstract}` Abstract modifer

`« name »` Stereotype (interface)

`enum` Define an enumeration

anootation Define an annotation

5.12 Separators

`==` Thick line

`..` Dotted line

`--` Plain line

`__` Medium line

`-- label --` Labeled line

5.13 Notes

`note "text" as N1` Define a floating note; attach with `..`

`note left of <class>` Attach note above <class>

`note right of <class>` Attach note right <class>

`note top of <class>` Attach note top <class>

`note bottom of <class>` Attach note bottom <class>

`note <left|right|top|bottom> on link` Add a note to a link

5.14 Example Class Diagram