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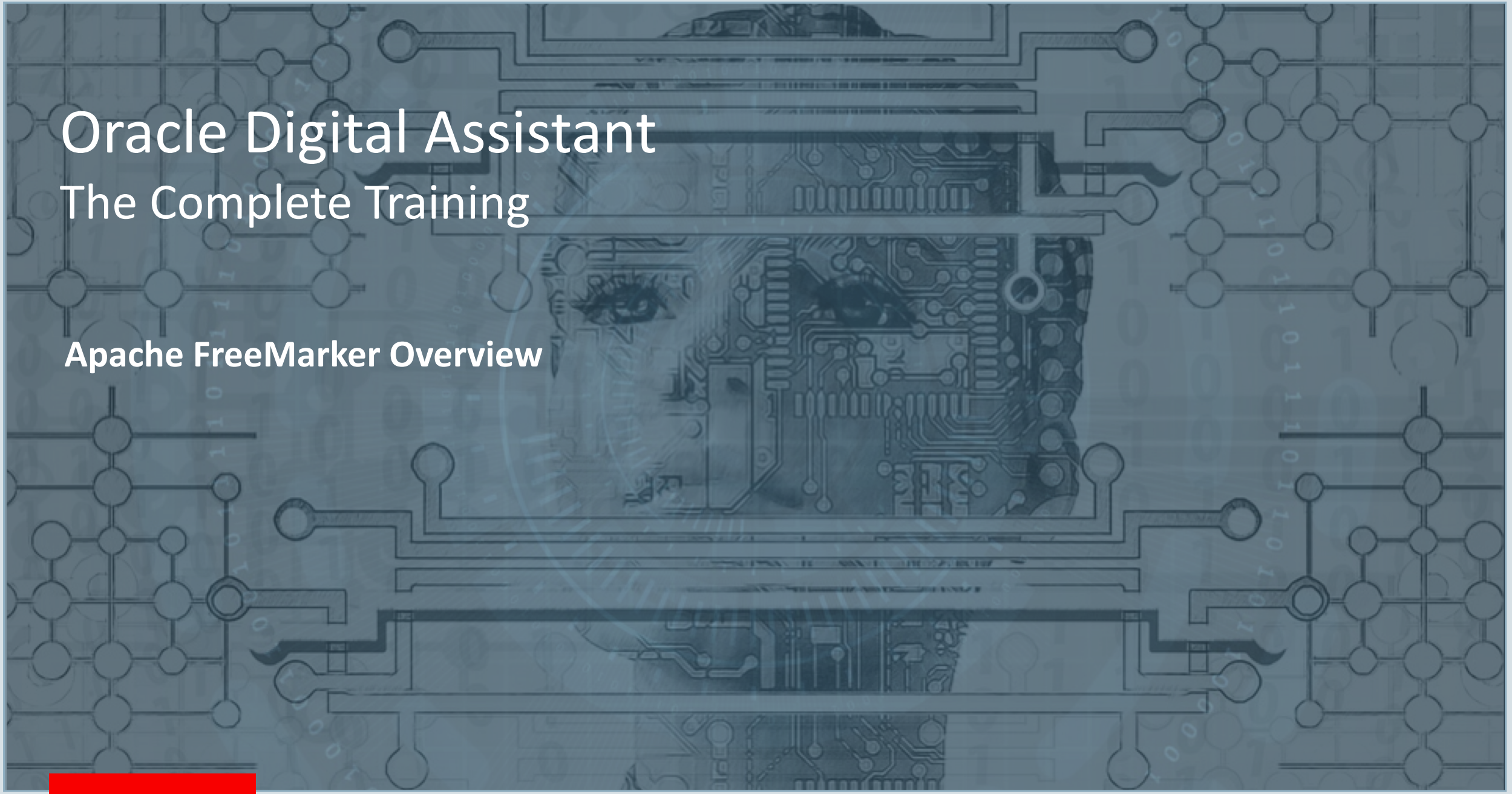
Oracle Digital Assistant

The Complete Training

Apache FreeMarker Overview



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Program agenda

1. Apache Freemarker – what is it good for?
2. Built-In expressions
3. Support for arrays
4. Directives

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Program agenda

1. Apache Freemarker – what is it good for?
2. Built-In expressions
3. Support for arrays
4. Introducing digital assistant and routing

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Apache Freemarker – what is it good for?

- Access variables in OBotML
- Conditionally show or hide response items
- Find key words in a user message
- Print a list of values
- Display arrays sorted by a specific data attribute
- It's your "get out of jail" card for many problems
  - In dialog flow, AND configuration settings

Custom components? No. Not needed!

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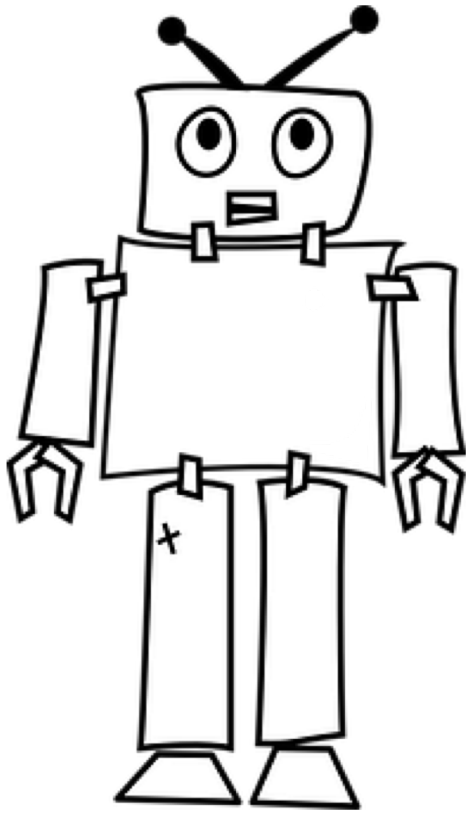
Apache FreeMarker is the **expression language** in Oracle Digital Asisstant.

You use it to **access**, **modify** and **format** data content, conditionally **show** or **hide** components, **assign values**, and many other use cases.



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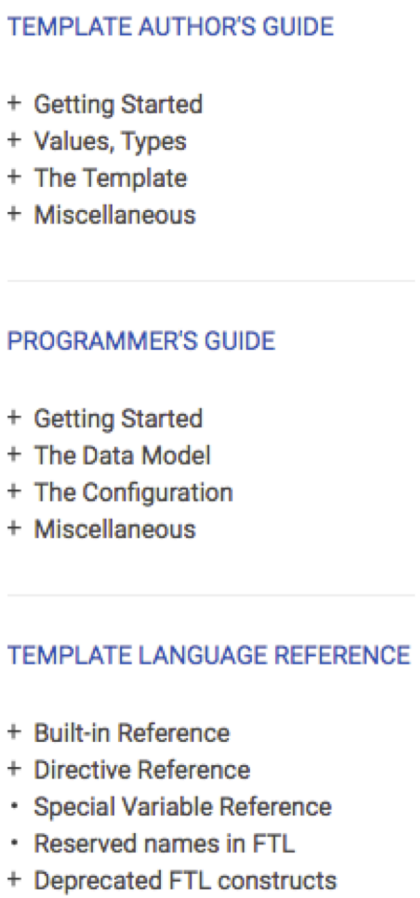
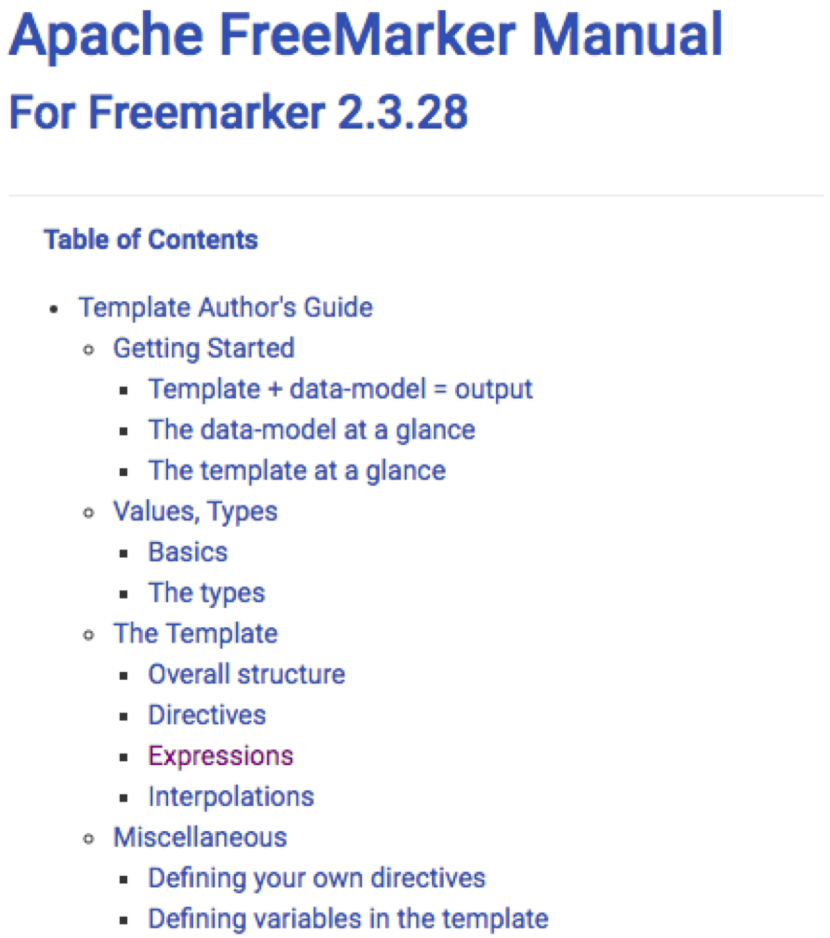
https://freemarker.apache.org/docs/index.html





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String built-in

- boolean
- capitalize
- contains
- date, time, datetime
- ends_with
- ensure_ends_with
- ensure_starts_with
- index_of
- keep_after
- keep_after_last
- keep_before
- keep_before_last
- last_index_of
- left_pad
- length
- lower_case / upper_case
- number
- match
- replace
- right_pad
- remove_beginning
- remove_ending
- slice
- split
- starts_with
- string
- switch
- trim

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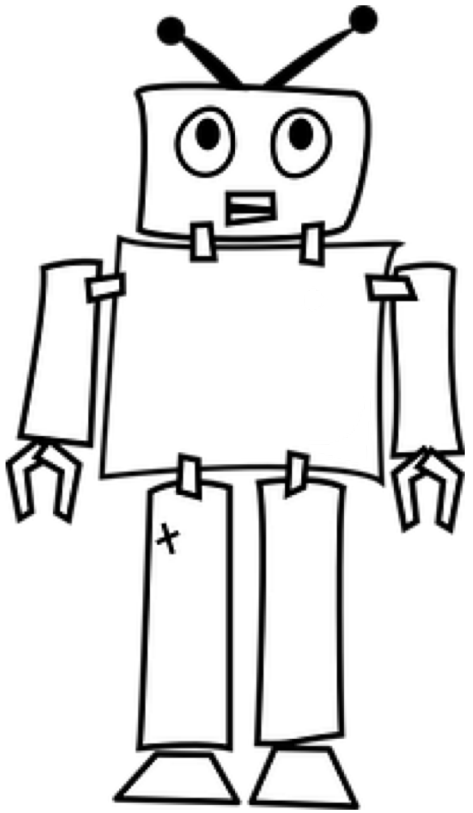
Apache FreeMarker built-ins are added to an expression using the '?' character



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String built-in examples

```
setStringValue:
  component: "System.SetVariable"
  properties:
    variable: "textVar"
    value: "Hello World"
```

FreeMarker Expression	Result
${textVar.value?length}	11
${textVar.value?replace('World', 'Friends')}	Hello Friends

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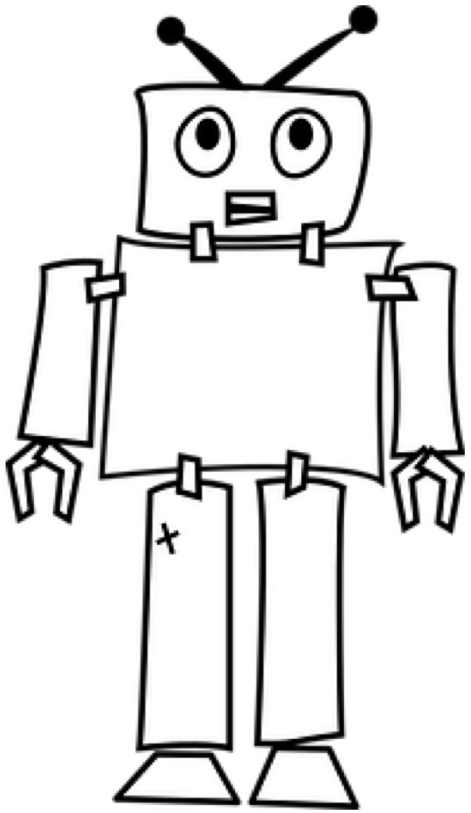
Apache FreeMarker built-in expressions can be **chained** together



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String built-in examples

```
setStringValue:
  component: "System.SetVariable"
  properties:
    variable: "flight"
    value: "UA 1234"
```

FreeMarker Expression	Result
${flight.value?contains('ua')?string('UA flight','other')}	UA flight
${flight.value?trim?lower_case?remove_beginning('ua ')}"	1234

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Number built-in

- abs
  - returns positive number
- round
  - rounds to the nearest whole number
  - ≥ n.5 rounded upwards
- floor
  - rounds the number downwards
- ceiling
  - rounds the number upwards

- lower_abc
  - converts 1, 2, 3, etc., to "a", "b", "c"
- upper_abc
  - converts 1, 2, 3, etc., to "A", "B", "C"

- string
  - converts a number to string
- <number>?string['###.##']
  - formatted string output
  - rounds to nearest neighbor
- Use utf-8 for currency
  - ?string['###.##\u00A4'] $
  - ?string['###.##\u20AC'] €
  - ?string['###.##\u00A3'] £

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Number examples

```
setNegativeValue:
    component: "System.SetVariable"
    properties:
      variable: "negativeValue"
      value: -2.512
```

FreeMarker Expression	Result
${negativeValue.value?abs}	2.512
${negativeValue.value?round}	- 2
${negativeValue.value?floor}	- 3
${negativeValue.value?string['###.##']}	- 2.51
${negativeValue.value?abs?string['###.##\u00A3']}	2.51 £

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Date examples

```
variables:
  dateVar: "DATE"
…
getNLPDate:
  component: "System.SetVariable"
  properties:
    variable: "dateVar"
    value: "${iResult.value.entityMatches['DATE'][0]}"
```

FreeMarker Expression	Result
${dateVar.value.date}	Date in milliseconds UTC
${dateVar.value.date?long?number_to_date?string.short}	4/13/18
${dateVar.value.date?long?number_to_date?string.medium}	April 13, 1:29:54 PM
${dateVar.value.date?long?number_to_date?string.long}	April 13, 1:29:54 PM UTC

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Date examples

```
variables:
  dateVar: "DATE"
…
getNLPDate:
  component: "System.SetVariable"
  properties:
    variable: "dateVar"
    value: "${iResult.value.entityMatches['DATE'][0]}"
```

FreeMarker Expression	Result
${dateVar.value.date?number_to_date?string['dd.MM.yyyy, HH:mm']}	13.04.2018, 13:29
${dateVar.value.date?long?number_to_datetime?iso_local}	2018-04-13T13:29:54Z
${dateVar.value.date?number_to_datetime?time}}	1:29:04 AM/PM

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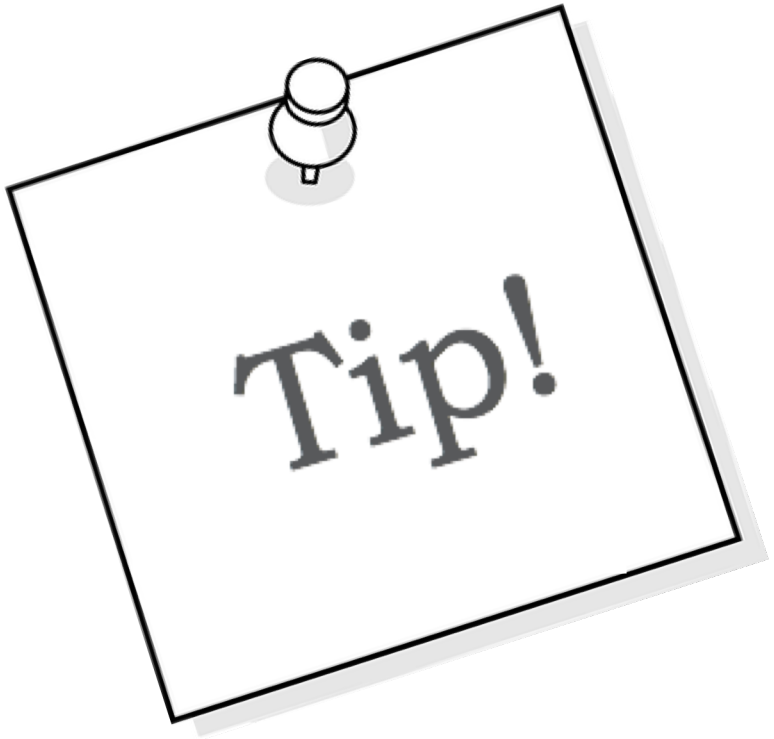

You can use Apache FreeMarker
To test if a variable or an object has content

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Handle variables with no value

- Solution works with all variable types, as well as variable attributes
- Print 'unknown' if a variable does not have a value
  - ${firstName.value! 'unknown'}
- Setting a default value if no value is set
  - Using System.SetVariable
  - ${subscriptionStart.value?has_content?then(subscriptionStart.value, .now)}
- Print 'hello stranger' if variable has no content
  - <#if firstName.value?has_content>hello ${firstName.value}<#else>hello stranger</#if>

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Arrays in Apache Freemarker

- System arrays
  - ${iResult.value.entityMatches['name of entity']}
  - ${iResult.value.intentMatches.summary}
    - ${iResult.value.intentMatches.summary[n].intent}
    - ${iResult.value.intentMatches.summary[n].score}
- Variable arrays
  - Context variable of type string
    - Custom Components
    - Apache FreeMarker Template Expression

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Array built-in

- first.<attribute>, last.<attribute>
  - Returns first or last element's attribute
- seq_index_of(value)
  - Works with simple arrays
- seq_last_index_of(value)
  - Works with simple arrays
- join('delimiter_char')
  - Returns simple array as strings delimited by delimiter_char
- seq_contains(value)?string('yes','no')
  - returns yes or no string
- min, max
  - For simple arrays of type number or datetime
  - Returns min or max value
- sort
  - Sorts simple array
- sort_by(attribute)
  - Sorts object array by named attribute

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Building arrays with Apache FreeMarker

Array of Objects

```
variables:
  fruits: "string"
  …
states:

  fruitArray:
    component: "System.SetVariable"
    properties:
      variable: "fruits"
      value:
      - name: "Apple"
        color: "green"
      - name: "Banana"
        color: "yellow"
```

Simple Array

```
variables:
  colors: "string"
  …
states:
  colorsArray:
    component: "System.SetVariable"
    properties:
      variable: "colors"
      value:
      - "red"
      - "green"
      - "blue"
      - "yellow"
```

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Array built-In examples

```
fruitArray:
    component: "System.SetVariable"
    properties:
      variable: "fruits"
      value:
      - name: "Apple"
        color: "green"
      - name: "Banana"
        color: "yellow"
```

FreeMarker Expression	Result
${fruits.value?size}	2
${fruits.value[0].name}	Apple
${fruits.value[0].name !'unknown'}	Same as above, but prints "unknown" if name is missing
${fruits.value?sort_by('color')?reverse[0].name}	Prints "Banana"

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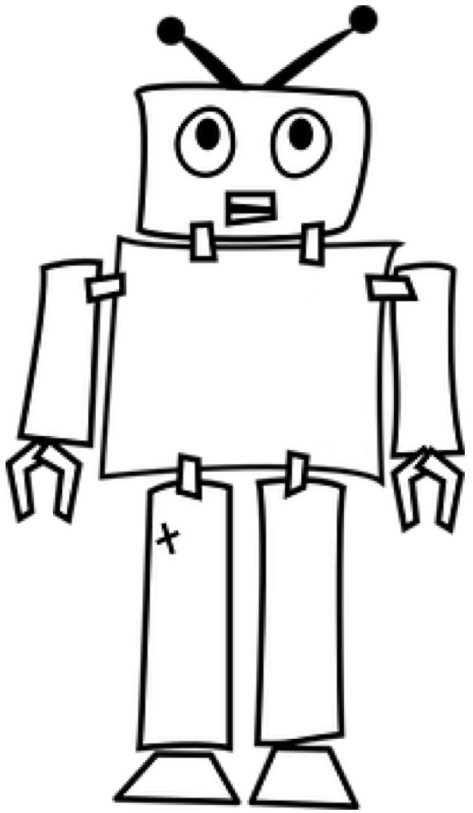
Apache FreeMarker **directives are scripts** that conditionally assign values or iterate through data arrays and data object keys and values



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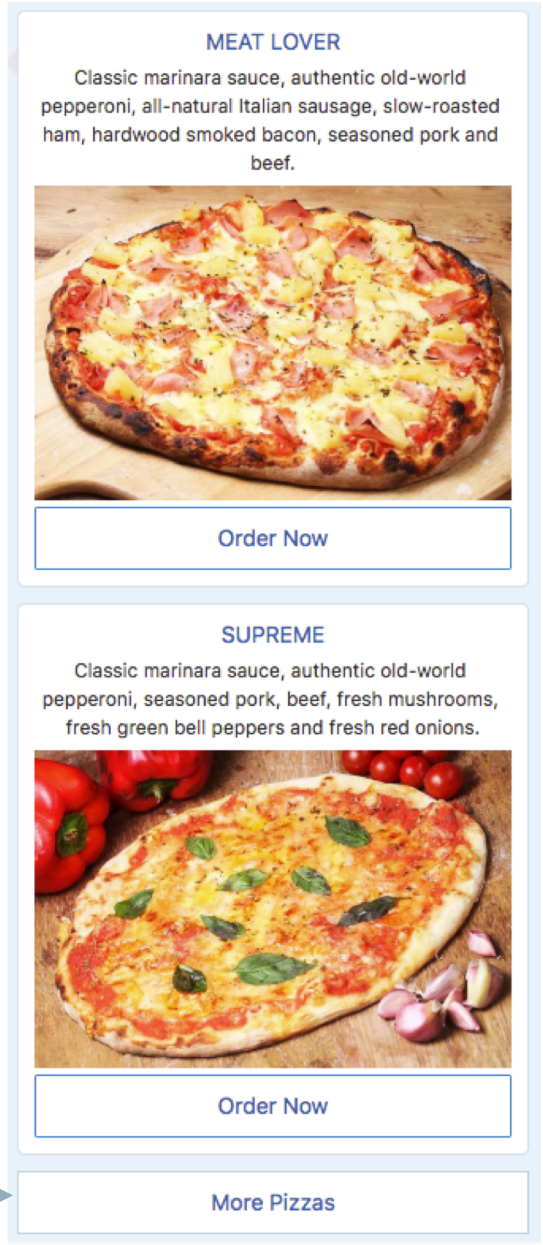
Commonly used directives

- If-else
  - <**#if** condition> … <**#elseif** condition2> … <#elseif condition3> … … **<#else>** … **</#if>**

```
actions:
- label: "More Pizzas"
  type: "postback"
  visible:
    expression: "<#if cardsRangeStart?number+4 < pizzas.value?size>true<#else>false</#if>"
  payload:
    action: "more"
    variables:
      cardsRangeStart: "${cardsRangeStart?number+4}"
  name: "More"
```



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Expert tip: comparison operator encoding

Because sometimes a comparison is interpreted as the end of the script

Operator	Encoding
>	>
<	<
>=	>=
<=	<=

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Commonly used directives

- List
  - <#list sequence as item> … </#list>
  - <#list hash as key, value> … </#list>
  - <#list sequence as item> … <#else> executed if 0 items </#list>

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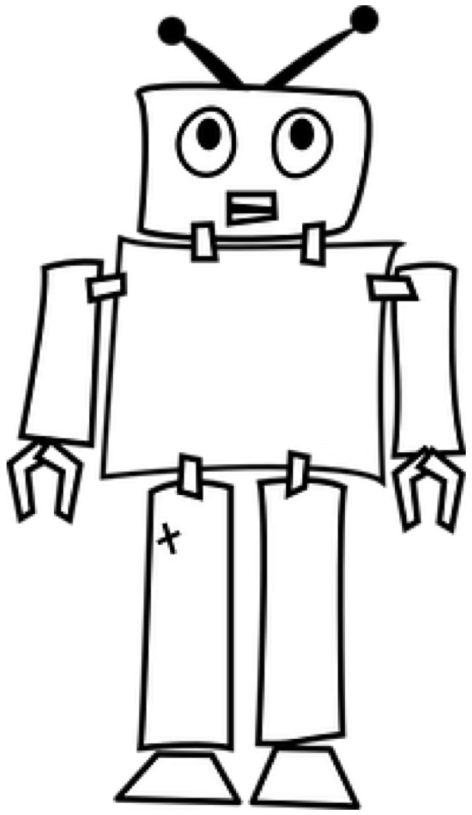
Note that you don't use ${ … } to declare expressions in the condition part of a directive. However, you do so in its body

```
<#list someArrayVariable.value as item>
 ${item}
<#/list>
```



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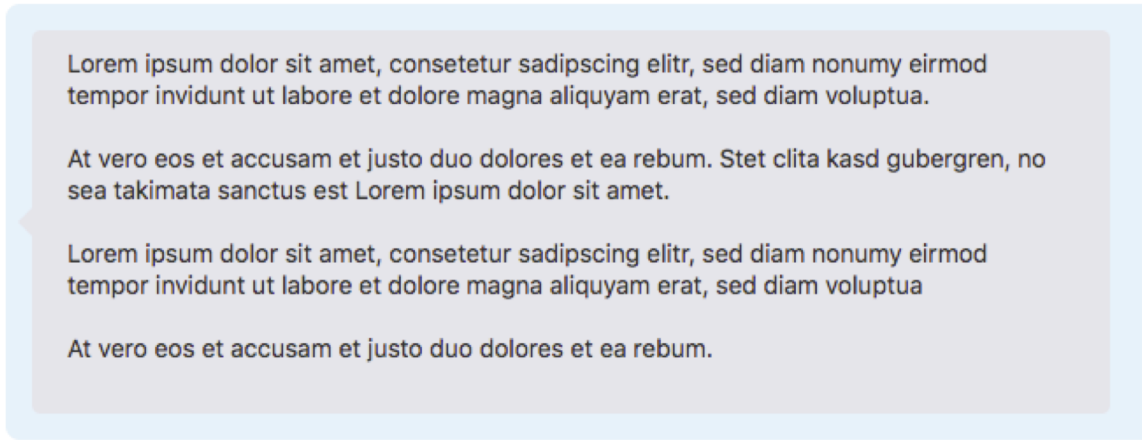
Example of iterating the values in an array

```
createArrayOfStrings:
  component: "System.SetVariable"
  properties:
    variable: "messages"
    value:
    - "Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy …"
    - "At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd  …"
    - "Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam  …"

printMessages:
    component: "System.Output"
    properties:
      text: |-
            <#list messages.value as text>${text}


            </#list>
    transitions:
      return: "done"
```



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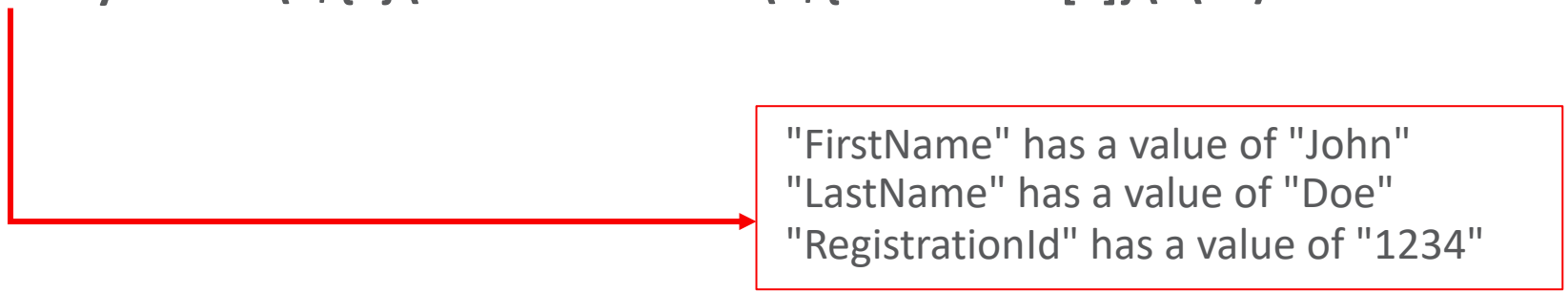
Example of iterating attributes in a data object

```
createPersonDataObject:
  component: "System.SetVariable"
  properties:
    variable: "data"
    value: {"FirstName":"John","LastName":"Doe","RegistrationId":"1234" }


print:
    component: "System.Output"
    properties:
      text: "<#list data.value?keys as k> \"${k}\" has a value of \"${data.value[k]}\"\n</#list>"
    transitions:
      return: "done"
```



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Commonly used directives

- Switch
  - Similar statement as in other programming languages
  - <#switch value> <#case refValue1> ... <#break> <#case refValue2> ... <#break> ... <#case refValueN> ... <#break> <#default> ... </#switch>

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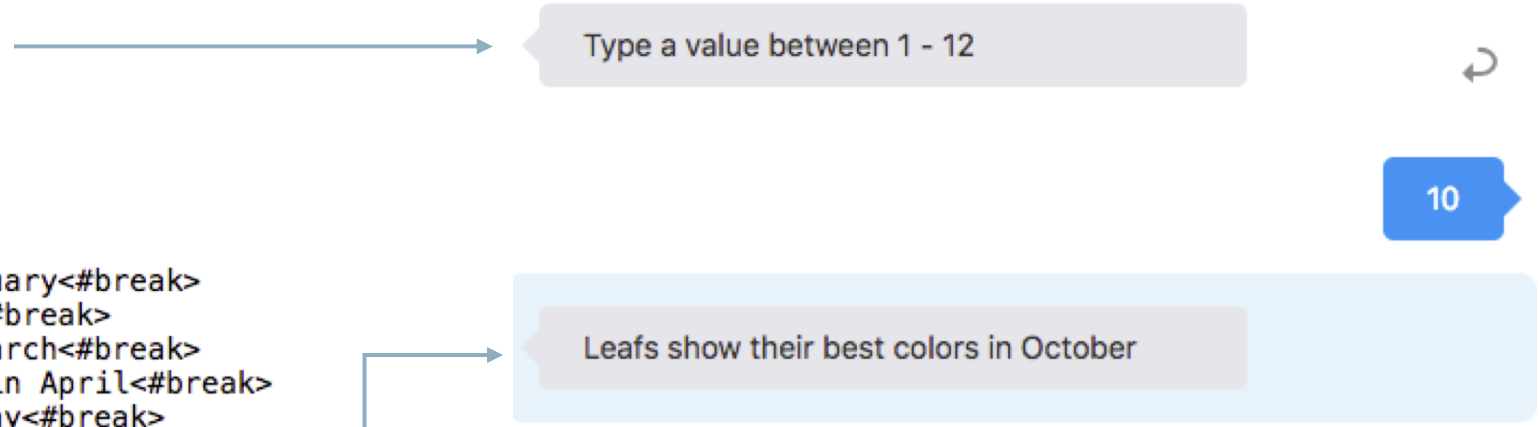
Example of using a switch statement

```
askMonthInYear:
  component: "System.Text"
  properties:
   prompt: "Type a value between 1 - 12"
   variable: "monthInYear"

printMonth:
  component: "System.Output"
  properties:
    text: "<#switch monthInYear.value>
           <#case 1>I love the snow in January<#break>
           <#case 2>Too colnd in February<#break>
           <#case 3>Sun is coming out in March<#break>
           <#case 4>Be aware of fools day in April<#break>
           <#case 5>It is spring time in May<#break>
           <#case 6>Summer is close in June<#break>
           <#case 7>Schools out in July<#break>
           <#case 8>Its hot in August<#break>
           <#case 9>Like the sunsets in September<#break>
           <#case 10>Leafs show their best colors in October<#break>
           <#case 11>Daylight is shorter in November<#break>
           <#case 12>Christmas is coming in December<#break>
           <#default>Not a valid month, sorry
           </#switch>"
  transitions:
    return: "done"
```



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TBD

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