

ORACLE®

# Oracle Digital Assistant

## The Complete Training

### Apache FreeMarker Overview

# Safe Harbor Statement

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# Program agenda

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



# Program agenda

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

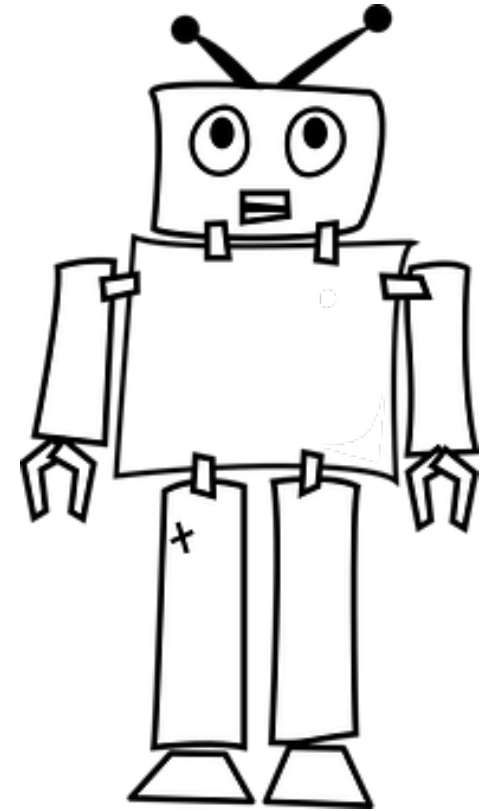
# Apache Freemarker – what is it good for?

- 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!

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

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



# <https://freemarker.apache.org/docs/index.html>

## TEMPLATE AUTHOR'S GUIDE

- + Getting Started
- + Values, Types
- + The Template
- + Miscellaneous

## PROGRAMMER'S GUIDE

- + Getting Started
- + The Data Model
- + The Configuration
- + Miscellaneous

## TEMPLATE LANGUAGE REFERENCE

- + Built-in Reference
- + Directive Reference
  - Special Variable Reference
  - Reserved names in FTL
- + Deprecated FTL constructs

## Apache FreeMarker Manual For Freemarker 2.3.28

### Table of Contents

- Template Author's Guide
  - Getting Started
    - Template + data-model = output
    - The data-model at a glance
    - The template at a glance
  - Values, Types
    - Basics
    - The types
  - The Template
    - Overall structure
    - Directives
    - Expressions
    - Interpolations
  - Miscellaneous
    - Defining your own directives
    - Defining variables in the template

# Program agenda

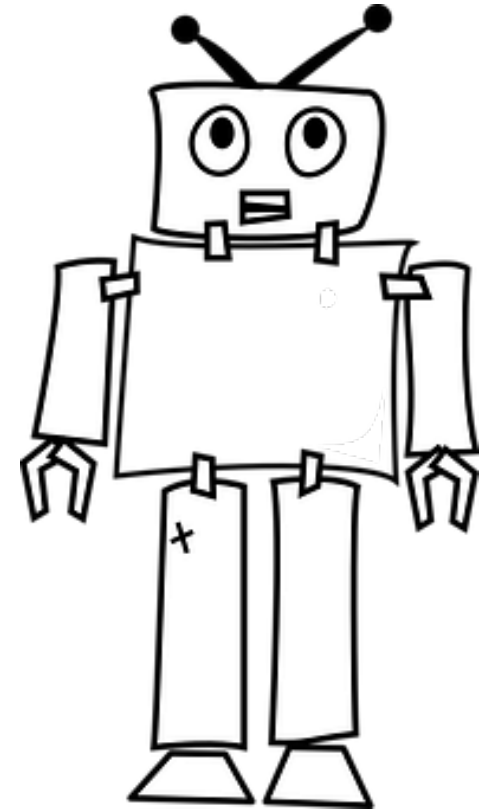
- 1 Apache Freemarker – what is it good for?
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- 3 Support for arrays
- 4 Directives

# 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



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

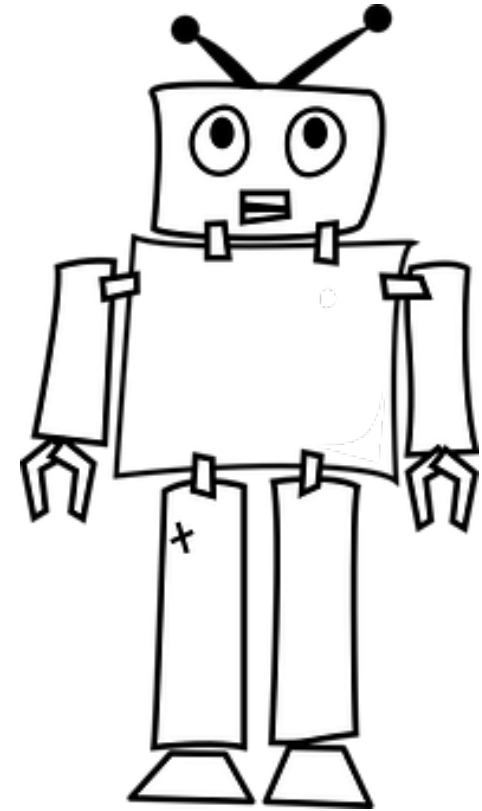


# String built-in examples

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

FreeMarker Expression	Result
<code>\${textVar.value?<b>length</b>}</code>	11
<code>\${textVar.value?<b>replace</b>('World', 'Friends')}</code>	Hello Friends

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



# String built-in examples

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

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

# Number built-in

- **abs**
    - returns positive number
  - **round**
    - rounds to the nearest whole number
    - $\geq n.5$  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'] £

# Number examples

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

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



# Date examples

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

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

# Date examples

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

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



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



# 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>`

# Program agenda

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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



# 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

# 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"
```

# Array built-In examples

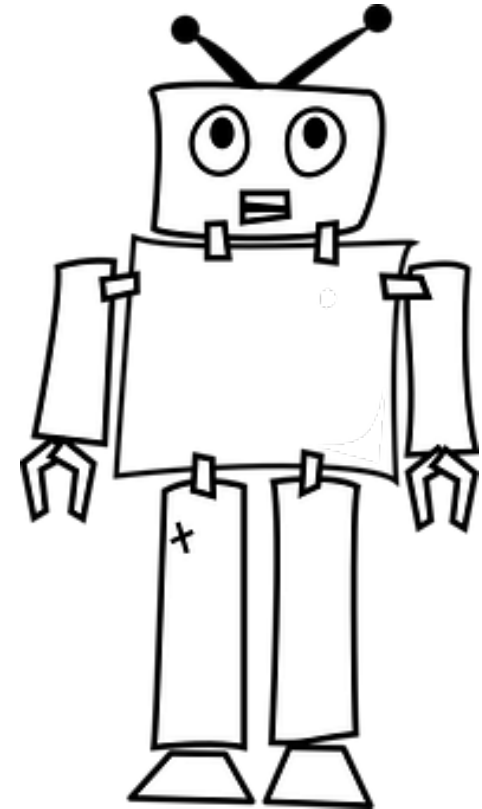
```
fruitArray:
  component: "System.SetVariable"
  properties:
    variable: "fruits"
    value:
      - name: "Apple"
        color: "green"
      - name: "Banana"
        color: "yellow"
```

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

# Program agenda

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



# 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"
```

## MEAT LOVER

Classic marinara sauce, authentic old-world pepperoni, all-natural Italian sausage, slow-roasted ham, hardwood smoked bacon, seasoned pork and beef.



Order Now

## SUPREME

Classic marinara sauce, authentic old-world pepperoni, seasoned pork, beef, fresh mushrooms, fresh green bell peppers and fresh red onions.



Order Now

More Pizzas



# Expert tip: comparison operator encoding

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

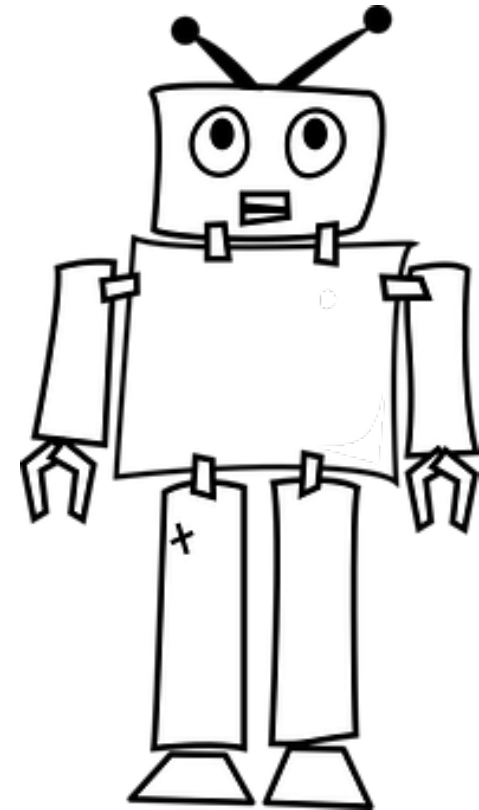
Operator	Encoding
>	&gt;
<	&lt;
>=	&gt;=
<=	&lt;=

# 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>`

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>
```



# 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"

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua.

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Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua

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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:

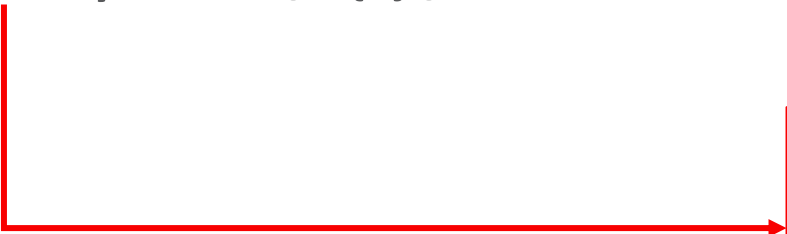
component: "System.Output"

properties:

**text:** "<#list data.value?keys as k> \"\${k}\" has a value of \"\${data.value[k]}\"\\n</#list>"

transitions:

return: "done"



"FirstName" has a value of "John"  
"LastName" has a value of "Doe"  
"RegistrationId" has a value of "1234"

# Commonly used directives

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

# Example of using a switch statement

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

Type a value between 1 - 12



```
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"
```

Leafs show their best colors in October

10

# Integrated Cloud

## Applications & Platform Services



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# Oracle Digital Assistant Hands-On

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TBD