

Ontology-based Expert System for a Generic Drug Production of Pharmaceutical Dosage Forms

Test Plan

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Chapter | 1 Introduction

1.1 Objectives

The objectives of the test plan of Ontology Base Expert System For Generic drug Production of Pharmaceutical Dosage Form is to establish test plan of the unit testing and system testing and make sure that the bugs or the defects are discovered and fixed. The unit testing covers all of the implemented methods in Ontology Base Expert System for Generic drug Production of Pharmaceutical Dosage Form. The system testing covers the user requirements.

1.2 Scope

This test plan describes the unit testing activities to detect the defects on the system and describes the system testing activities for testing a completely integrated system to verify that it meets the user requirements.

1.3 Acronyms

OEGP	Ontology-based Expert System for a Generic Drug Production of Pharmaceutical Dosage Forms
PDPO	Pharmaceutical Dosage Form Production Ontology
URS	User Requirement Specification
SRS	System Requirement Specification
CD	Class diagram
CD-CI	Class diagram For Client Side
CD-SV	Class diagram For Server Side.
SQD	Sequence Diagram
SQD-CI	Sequence Diagram For Client Side
SQD-SV	Sequence Diagram For Server Side
UI	User interface
SDD	Software Design Document
UTC-CI	Unit Test Case For Client Side
UTC-SV	Unit Test Case For Server Side

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Chapter | 2 Test Plan and Test Procedure

2.1 Test Objective

The objectives of testing Emergency Information on Mobile project are:

- All bugs or defects are detected.
- Those bugs or defects are fixed.
- Functions and user interface covered the requirements.
- All functions and features must be there.

2.2 Scope of testing

OEGP will test by white-box testing techniques that are unit testing and system testing and record the test results in the test record.

2.3 Purpose of Test Plan and Test Procedure

In this document consist of test plan and test procedure of progress report II. So the OEGP can review the test in the project.

2.4 Test Duration

Progress	Date and Duration
Progress Report I	Perform date: 10/03/14 -11/07/14 Duration: 124 days
Progress Report II	Perform date: 22/07/14 – 29/10/14 Duration: 100 days

2.5 Test Responsibility

Item	Responsibility
Unit test of server part (web application)	Narongrit Saisuwan
Unit test of mobile part (mobile application)	Panupak Wichaidit
Record unit test of server part	Narongrit Saisuwan
Record unit test of mobile part	Panupak Wichaidit

2.6 Test Strategy

OEGP will be follow by:

- Design test case for each feature.
- Prepare test data for each feature.
- Determine expected results.
- Perform testing on individual features.
- Result of testing will be recorded.
- All test files will be stored in the project repository.

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2.7 Result of Testing

In the test record the test result will separate into two parts, which are:

1. Actual output: The actual outputs that are performed by each test case.
2. Pass, Fail, N/A criteria:
 - 2.1 **Pass:** The result of actual is same like expected result.
 - 2.2 **Fail:** the result of actual result is not same like expected result.
 - 2.3 **N/A:** the result of actual result is not available.

2.8 Test Environment

2.8.1 Hardware

Computers

- **Apple Macbook Pro mid 2013**
 - Processor: Intel® Core™ i7-3520M CPU @ 2.90GHz 2.90GHz
 - RAM: 8.00 GB
 - Operating System: Windows 7 Ultimate
- **Dell Inspiron n5110**
 - Processor: Intel® Core™ i5-2410M CPU @ 2.30GHz 2.30GHz
 - RAM: 4.00 GB
 - Operating System: Windows 8.1 Professional

2.9 Software

- IntelliJ IDEA
- Eclipse
- Google chrome
- Karma
- Jasmine

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Chapter | 3 Unit Test

3.1 Unit Test Case for Client Side (UTC-CI)

3.1.1 SubstanceCtrl Class

3.1.1.1 Unit Test Case for Client Side 01 (UTC-CI -01)

addNewSubstance(substance : Substance): Substance

Substance object value= (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String iconicity)

Object Name	Substance object
substance3	("3","substancename2","watersolubility2",{ "stability1","stability2"},3.4,4.6, "solidstate2","hygroscopicity2","particlesize2","alcoholSolubility2", "flowability2",4,"saltfrom2",5.34,"iconicity2")
substance4	("4","substancename3","watersolubility3",{ "stability3","stability4"},6.32,7.67, "solidstate3","hygroscopicity3","particlesize3","alcoholSolubility3", "flowability3",4,"saltfrom3",5.90,"iconicity3")

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Test Case

Case No.	Description	Input data	Expect Result
		Substance object	Substance object
1	Test add substance object which is correct the formal of substance object.	(null,"substancename","watersolubility",{ "stability1","stability2"},3.4,4.6,"solidstate","hygroscopicity","particlesize","alcohoso lubility2", "flowability2",4,"saltfrom2",5.34,"iconicity2")	(not null,"substancename2","watersolubility2",{ "stability1","stability2"}, 3.4,4.6, "solidstate2","hygroscopicity2","particlesize2","alcohoso lubility2", "flowability2",4,"saltfrom2",5.34,"iconicity2")
2	Test add substance object which is correct the formal of substance object.	(null,"substancename1","watersolubility1",{ "stability3","stability4"},6.32,7.67,"solidstate1","hygroscopicity1","particlesize1","alcoh osolubility1", "flowability1",4.34,"saltfrom1",5.90,"iconicity1")	(not null,"substancename1","watersolubility1",{ "stability3","stability4"},6 .32,7.67, "solidstate1","hygroscopicity1","particlesize1","alcohoso lubility1", "flowability1",4.34,"saltfrom1",5.90,"iconicity1")
3	Test add substance object which is contained in the database already.	("3","substancename2","watersolubility2",{ "stability1","stability2"},3.45,4.32,"solidstate2","hygroscopicity2","particlesize2","alcoh osolubility2", "flowability2",4.3,"saltfrom2",5.45,"iconicity2")	null
4	Test add substance object which is contained in the database already.	("4","substancename3","watersolubility3",{ "stability3","stability4"},6.56,7.32,"solidstate3","hygroscopicity3","particlesize3","alcoh osolubility3", "flowability3",4.56,"saltfrom3",5,"iconicity3")	null

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3.1.1.2 Unit Test Case for Client Side 02 (UTC-CI -02)

updateSubstance(substance : Substance): Substance

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String iconicity)

Test data

Object Name	Substance object
substance1	("3","substancename","watersolubility",{ "stability1","stability2"},3.12,4.21,"solidstate","hygroscopicity","particlesize","alcoholsolubility","flowability",4.34,"saltfrom",5.22,"iconicity")
substance2	("4","substancename1","watersolubility1",{ "stability3","stability4"},5.09,7.23,"solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1","flowability1",5.34,"saltfrom1",8.67,"iconicity1")

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Test Case

Case No.	Description	Input data	Expect Result
		Substance object	Substance object
1	Test update substance object which is correct the formal of substance object and contained in the database.	("3","substance","watersolubility",{stability1,"stability2"},3.34,4.56,"solidstate","hygroscopicity","particlesize","alcohol solubility2","flowability",4.67,"saltfrom",5.12,"iconicity")	("3","substance","watersolubility",{stability1,"stability2"},3.34,4.56,"solidstate","hygroscopicity","particlesize","alcohol solubility2","flowability",4.67,"saltfrom",5.12,"iconicity")
2	Test update substance object which is correct the formal of substance object and contained in the database.	("4","substance1","watersolubility3",{stability3,"stability4"},5.32,7.56,"solidstate3","hygroscopicity3","particlesize3","alcohol solubility3","flowability3",5.89,"saltfrom1",8.32,"iconicity3")	("4","substance1","watersolubility3",{stability3,"stability4"},5.32,7.56,"solidstate3","hygroscopicity3","particlesize3","alcohol solubility3","flowability3",5.89,"saltfrom1",8.32,"iconicity3")
3	Test update substance object which is not contained in the database.	("1","substance4","watersolubility4",{stability1,"stability2"},3,4,"solidstate4","hygroscopicity4","particlesize4","alcohol solubility4","flowability4",4,"saltfrom4",5,"iconicity4")	null
4	Test update substance object which is not contained in the database.	("2","substance5","watersolubility5",{stability1,"stability2"},3,4,"solidstate5","hygroscopicity5","particlesize5","alcohol solubility5","flowability5",5,"saltfrom5",5,"iconicity5")	null

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3.1.1.3 Unit Test Case for Client Side 03 (UTC-CI -03)

deleteSubstance(substance : Substance): Substance

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String iconicity)

Test data

Object Name	Substance object
substance1	("3","substancename","watersolubility",{ "stability1","stability2"},3.43,4.67,"solidstate","hygroscopicity","particlesize","alcoholSolubility","flowability",4.78,"saltform",5.10,"iconicity")
substance2	("4","substancename1","watersolubility1",{ "stability3","stability4"},5.55,7.54,"solidstate1","hygroscopicity1","particlesize1","alcoholSolubility1","flowability1",5.90,"saltform1",8.45,"iconicity1")

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Test Case

Case No.	Description	Input data	Expect Result
		Substance object	Substance object
1	Test delete substance object which is contained in database.	("3","substancename","watersolubility",{ "stability1","stability2"},3.43,4.67,"solidstate","hygroscopicity","particlesize","alcoholsolubility","flowability",4.78,"saltfrom",5.10,"iconicity")	("3","substancename","watersolubility",{ "stability1","stability2"},3.43,4.67,"solidstate","hygroscopicity","particlesize","alcoholsolubility","flowability",4.78,"saltfrom",5.10,"iconicity")
2	Test delete substance object which is contained in database.	("4","substancename1","watersolubility1",{ "stability3","stability4"},5.55,7.54,"solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1","flowability1",5.90,"saltfrom1",8.45,"iconicity1")	("4","substancename1","watersolubility1",{ "stability3","stability4"},5.55,7.54,"solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1","flowability1",5.90,"saltfrom1",8.45,"iconicity1")
3	Test delete substance object which is not contained in database.	("1","substancename2","watersolubility2",{ "stability1","stability2"},3.45,4.45,"solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2","flowability2",4.78,"saltfrom2",5.86,"iconicity2")	null
4	Test delete substance object which is not contained.	("2","substancename3","watersolubility3",{ "stability1","stability2"},3.34,4.56,"solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3","flowability3",4.56,"saltfrom2",5.56,"iconicity3")	null

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3.1.1.4 Unit Test Case for Client Side 04 (UTC-CI -04)

getSubstanceList : Substance[]

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String iconicity)

Test data

Object Name	Substance object
substance1	("3","substancename","watersolubility",{ "stability1","stability2"},3.56,4.34,"solidstate","hygroscopicity","particlesize","alcoholSolubility","flowability",4.45,"saltfrom",5.56,"iconicity")
substance2	("4","substancename1","watersolubility1",{ "stability3","stability4"},5.56,7.78,"solidstate1","hygroscopicity1","particlesize1","alcoholSolubility1","flowability1",5.56,"saltfrom1",8.78,"iconicity1")

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case	Description	Expect result
		List of substance object
1	Test get all substance list	{ substance1,substance2}

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3.1.2 ExcipientCtrl Class

3.1.2.1 Unit Test Case for Client Side 05 (UTC-CI -05)

addNewExcipient(excipient : Excipient): Excipient

Excipient object value = value (String id , Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substancename1","watersolubility1",{ "stability1","stability2"},3,4,"solidstate1","hygroscopicity1","particlesize1","alcohosolubility1","flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substancename2","watersolubility2",{ "stability3","stability4"},5,7,"solidstate2","hygroscopicity2","particlesize2","alcohosolubility2","flowability2",5,"saltfrom2",8,"iconicity2")
Substance3	("3","substancename3","watersolubility3",{ "stability5","stability5"},6,9,"solidstate3","hygroscopicity3","particlesize3","alcohosolubility3","flowability3",2,"saltfrom3",6,"iconicity3")
Substance4	("4","substancename4","watersolubility4",{ "stability6","stability6"},12,4,"solidstate4","hygroscopicity4","particlesize4","alcohosolubility4","flowability4",7,"saltfrom4",9,"iconicity4")
Object Name	Substance Function
substanceFunction1	("functionName1", "functionTyp1", 1, 11)
substanceFunction2	("functionName2", "functionTyp2", 2, 12)
substanceFunction3	("functionName3", "functionTyp3", 3, 13)
substanceFunction4	("functionName4", "functionTyp4", 4, 14)
Object Name	Excipient object
Excipient3	("3", substance3, { substanceFunction1, substanceFunction2}, 3)
Excipient4	("4", substance4, { substanceFunction3, substanceFunction4}, 4)

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Test Case

Case No.	Description	Input data	Expect Result
		Excipient object	Excipient object
1	Test excipient which is correct the formal excipient object.	(null,substance1,{substanceFunction1, substanceFunction1} , 1)	(not null, substance1 , { substanceFunction1, substanceFunction3} , 1)
2	Test add excipient which is correct the formal of excipient object.	(null, substance2 , { substanceFunction2, substanceFunction4} , 2)	(not null, substance4 , { substanceFunction2, substanceFunction4} , 2)
3	Test add excipient object which is contained in the database already.	("3", substance3 , { substanceFunction1, substanceFunction2} , 3)	null
4	Test add excipient object which is contained in the database already.	("4", substance4, { substanceFunction3, substanceFunction4} , 4)	null

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3.1.2.2 Unit Test Case for Client Side 06 (UTC-CI -06)

updateExcipient(excipient : Excipient) : Excipient

Excipient object value = value (String id , Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String ionicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{ "stability1","stability2"},3,4,"solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1","flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substance2","watersolubility2",{ "stability3","stability4"},5,7,"solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2","flowability2",5,"saltfrom2",8,"iconicity2")
Substance3	("3","substance3","watersolubility3",{ "stability5","stability5"},6,9,"solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3","flowability3",2,"saltfrom3",6,"iconicity3")
Substance4	("4","substance4","watersolubility4",{ "stability6","stability6"},12,4,"solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4","flowability4",7,"saltfrom4",9,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1", "functionTyp1", 1, 11)
substanceFunction2	("functionName2", "functionTyp2", 2, 12)
substanceFunction3	("functionName3", "functionTyp3", 3, 13)
substanceFunction4	("functionName4", "functionTyp4", 4, 14)
Object Name	Excipient object
excipient1	("3", substance3, { substanceFunction1, substanceFunction2}, 3)
excipient2	("4", substance4, { substanceFunction3, substanceFunction4}, 4)

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Test Case

Case No.	Description	Input data	Expect Result
		Excipient object	Excipient object
1	Test update excipient which is correct the formal of object excipient and contained in the database.	("3" , substance1 , { substanceFunction1, substanceFunction2} , 5)	("3" , substance1 , { substanceFunction1, substanceFunction2} , 5)
2	Test update excipient which is correct the formal of excipient object and contained in the database.	("4" , substance2, { substanceFunction3, substanceFunction4} , 7)	("4" , substance2, { substanceFunction3, substanceFunction4} , 7)
3	Test update excipient which is not contained in the database.	("1" , substance1 , { substanceFunction1, substanceFunction2} , 4)	Null
4	Test update excipient which is not contained in the database.	("2" , substance2 , { substanceFunction3, substanceFunction4} , 9)	null

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3.1.2.3 Unit Test Case for Client Side 07 (UTC-CI -07)

deleteExcipient (excipient : Excipient):Excipient

Excipient object value = value (String id , Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String ionicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{ "stability1","stability2"},3,4,"solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1","flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substance2","watersolubility2",{ "stability3","stability4"},5,7,"solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2","flowability2",5,"saltfrom2",8,"iconicity2")
Substance3	("3","substance3","watersolubility3",{ "stability5","stability5"},6,9,"solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3","flowability3",2,"saltfrom3",6,"iconicity3")
Substance4	("4","substance4","watersolubility4",{ "stability6","stability6"},12,4,"solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4","flowability4",7,"saltfrom4",9,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1", "functionTyp1", 1, 11)
substanceFunction2	("functionName2", "functionTyp2", 2, 12)
substanceFunction3	("functionName3", "functionTyp3", 3, 13)
substanceFunction4	("functionName4", "functionTyp4", 4, 14)
Object Name	Excipient object
excipient1	("3", substance3, { substanceFunction1, substanceFunction2}, 3)
excipient2	("4", substance4, { substanceFunction3, substanceFunction4}, 4)

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Test Case

Case No.	Description	Input data	Expect Result
		Excipient object	Excipient object
1	Test delete excipient which is contained in database .	("3" , substance3 , { substanceFunction1, substanceFunction2} , 3)	(null, substance3 , {substanceFunction1, substanceFunction2} , 3)
2	Test delete excipient which is contained in database.	("4" , substance4, { substanceFunction3, substanceFunction4} , 4)	(null , substance4, {substanceFunction3, substanceFunction4} , 4)
3	Test delete excipient which is not contained in database.	("1" , substance1, { substanceFunction3, substanceFunction4} , 5)	null
4	Test delete excipient which is not contained in database.	("2" , substance2, { substanceFunction1, substanceFunction2} , 7)	null

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3.1.2.4 Unit Test Case for Client Side 08 (UTC-CI -08)

getAllExcipient () : Excipient []

Excipient object value = value (String id , Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test Data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{ "stability1","stability2"},3,4,"solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1","flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substance2","watersolubility2",{ "stability3","stability4"},5,7,"solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2","flowability2",5,"saltfrom2",8,"iconicity2")
Substance3	("3","substance3","watersolubility3",{ "stability5","stability5"},6,9,"solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3","flowability3",2,"saltfrom3",6,"iconicity3")
Substance4	("4","substance4","watersolubility4",{ "stability6","stability6"},12,4,"solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4","flowability4",7,"saltfrom4",9,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1", "functionTyp1", 1, 11)
substanceFunction2	("functionName2", "functionTyp2", 2, 12)
substanceFunction3	("functionName3", "functionTyp3", 3, 13)
substanceFunction4	("functionName4", "functionTyp4", 4, 14)
Object Name	Excipient object
excipient1	("3", substance3, { substanceFunction1, substanceFunction2}, 3)
excipient2	("4", substance4, { substanceFunction3, substanceFunction4}, 4)

Test Case

case	Description	Expect result
		excipient object List
1	Test get all excipient list.	{ excipient1,excipient2}

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3.1.2.5 Unit Test Case for Client Side 09 (UTC-CI -09)

getSubstaneList() : Substance []

Excipient object value = value (String id , Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double mocularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{ "stability1","stability2"},3,4,"solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1","flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substance2","watersolubility2",{ "stability3","stability4"},5,7,"solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2","flowability2",5,"saltfrom2",8,"iconicity2")
Substance3	("3","substance3","watersolubility3",{ "stability5","stability5"},6,9,"solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3","flowability3",2,"saltfrom3",6,"iconicity3")
Substance4	("4","substance4","watersolubility4",{ "stability6","stability6"},12,4,"solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4","flowability4",7,"saltfrom4",9,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1", "functionTyp1", 1, 11)
substanceFunction2	("functionName2", "functionTyp2", 2, 12)
substanceFunction3	("functionName3", "functionTyp3", 3, 13)
substanceFunction4	("functionName4", "functionTyp4", 4, 14)
Object Name	Excipient object
excipient1	("3", substance3, { substanceFunction1, substanceFunction2}, 3)
excipient2	("4", substance4, { substanceFunction3, substanceFunction4}, 4)

Test case

case	Description	Expect result
		substance object List
1	Test get all substance list.	{ substance1, substance2, substance3, substance4}

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3.1.2.6 Unit Test Case for Client Side 10 (UTC-CI -10)

getCurrentSubstanceFnList() : SubstanceFunction []

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

Test data

Object Name	SubstanceFunction
substanceFunction1	("functionName1", "functionTyp1", 1, 11)
substanceFunction2	("functionName2", "functionTyp2", 2, 12)
substanceFunction3	("functionName3", "functionTyp3", 3, 13)
substanceFunction4	("functionName4", "functionTyp4", 4, 14)

Test Case

case	Description	Expect result
		substanceFunction object List
1	Test get all substanceFunction list.	{ substanceFunction1, substanceFunction2, substanceFunction3, substanceFunction4}

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3.1.3 FormulationCtrl Class

3.1.3.1 Unit Test Case for Client Side 11 (UTC-CI -11)

addFormulation(formulation : Formulation) : Formulation

Formulation object value = value (String id, String name, String type, double usedWeight, List<Excipient> api)

Excipient object value = value (String id, Substance substance, List<SubstanceFunction> substanceFunctions, double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{ "stability1","stability2"},3,4,"solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1","flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substance2","watersolubility2",{ "stability3","stability4"},5,7,"solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2","flowability2",5,"saltfrom2",8,"iconicity2")
Substance3	("3","substance3","watersolubility3",{ "stability5","stability5"},6,9,"solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3","flowability3",2,"saltfrom3",6,"iconicity3")
Substance4	("4","substance4","watersolubility4",{ "stability6","stability6"},12,4,"solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4","flowability4",7,"saltfrom4",9,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1", "functionTyp1", 1, 11)
substanceFunction2	("functionName2", "functionTyp2", 2, 12)
substanceFunction3	("functionName3", "functionTyp3", 3, 13)
substanceFunction4	("functionName4", "functionTyp4", 4, 14)
Object Name	Excipient object
excipient1	("1", substance1, { substanceFunction1, substanceFunction3}, 1)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4}, 2)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3}, 2)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4}, 2)
Object Name	formulation object
formulation3	("3", "name3", "type3", 3, {excipient1,excipient2})
formulation4	("4", "name4", "type4", 4, {excipient3,excipient4})

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Test Case

Case No.	Description	Input data	Expect Result
		Formulation object	Formulation object
1	Test add formulation object which is correct the formal of formulation object.	(null , "name1", "type1", 1, {excipient1,excipient2})	(not null , "name1", "type1", 1, {excipient1,excipient2})
2	Test add formulation which is correct the formal of formulation object.	(null , "name4", "type4", 4, {excipient3,excipient4})	(not null, "name4", "type4", 4, {excipient3,excipient4})
3	Test add formulation object which is contained in the database already.	("3" , "name3", "type3", 3, {excipient1,excipient2})	null
4	Test add formulation object which is contained in the database already.	("4" , "name4", "type4", 4, {excipient3,excipient4})	null

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3.1.3.2 Unit Test Case for Client Side 12 (UTC-CI -12)

updateFormulation(formulation : Formulation) : Formulation

Formulation object value = value (String id , String name , String type, double usedWeight, List<Excipient> api)

Excipient object value = value (String id , Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String ionicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{ "stability1","stability2"},3,4,"solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1","flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substance2","watersolubility2",{ "stability3","stability4"},5,7,"solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2","flowability2",5,"saltfrom2",8,"iconicity2")
Substance3	("3","substance3","watersolubility3",{ "stability5","stability5"},6,9,"solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3","flowability3",2,"saltfrom3",6,"iconicity3")
Substance4	("4","substance4","watersolubility4",{ "stability6","stability6"},12,4,"solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4","flowability4",7,"saltfrom4",9,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1", "functionTyp1", 1, 11)
substanceFunction2	("functionName2", "functionTyp2", 2, 12)
substanceFunction3	("functionName3", "functionTyp3", 3, 13)
substanceFunction4	("functionName4", "functionTyp4", 4, 14)
Object Name	Excipient object
excipient1	("1", substance1, { substanceFunction1, substanceFunction3}, 1)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4}, 2)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3}, 2)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4}, 2)
Object Name	formulation object
formulation3	("3", "name3", "type3", 3, {excipient1,excipient2})
formulation4	("4", "name4", "type4", 4, {excipient3,excipient4})

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Test Case

Case No.	Description	Input data	Expect Result
		formulation object	formulation object
1	Test update formulation object which is correct the formal of formulation object.	("3" , "name1", "type1", 1, {excipient3,excipient4})	("3" , "name1", "type1", 1, {excipient3,excipient4})
2	Test update formulation object which is correct the formal of formulation object.	("4" , "name2", "type2", 2, {excipient1,excipient2})	("4" , "name2", "type2", 2, {excipient1,excipient2})
3	Test update formulation object which is not contained in the database.	("1" , "name1", "type1", 1, {excipient1,excipient2})	null
4	Test update formulation object which is not contained in the database.	("2" , "name2", "type2", 2, {excipient3,excipient4})	null

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3.1.3.3 Unit Test Case for Client Side 13 (UTC-CI -13)

deleteFormulation(formulation : Formulation) : Formulation

Formulation object value = value (String id , String name , String type, double usedWeight, List<Excipient> api)

Excipient object value = value (String id , Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String ionicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{ "stability1","stability2"},3,4,"solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1","flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substance2","watersolubility2",{ "stability3","stability4"},5,7,"solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2","flowability2",5,"saltfrom2",8,"iconicity2")
Substance3	("3","substance3","watersolubility3",{ "stability5","stability5"},6,9,"solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3","flowability3",2,"saltfrom3",6,"iconicity3")
Substance4	("4","substance4","watersolubility4",{ "stability6","stability6"},12,4,"solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4","flowability4",7,"saltfrom4",9,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1", "functionTyp1", 1, 11)
substanceFunction2	("functionName2", "functionTyp2", 2, 12)
substanceFunction3	("functionName3", "functionTyp3", 3, 13)
substanceFunction4	("functionName4", "functionTyp4", 4, 14)
Object Name	Excipient object
excipient1	("1", substance1, { substanceFunction1, substanceFunction3}, 1)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4}, 2)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3}, 2)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4}, 2)
Object Name	formulation object
formulation3	("3", "name3", "type3", 3, {excipient1,excipient2})
formulation4	("4", "name4", "type4", 4, {excipient3,excipient4})

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Test Case

Case No.	Description	Input data	Expect Result
		formulation object	formulation object
1	Test delete formulation object which is contained in database and correct format formulation object.	("3" , "name3" , "type3" , 3, {excipient1,excipient2})	("3" , "name3" , "type3" , 3, {excipient1,excipient2})
2	Test delete formulation object which is contained in database and correct format formulation object.	("4" , "name4" , "type4" , 4, {excipient3,excipient4})	("4" , "name4" , "type4" , 4, {excipient3,excipient4})
3	Test delete formulation object which is not contained in database.	("1" , "name1" , "type1" , 1, {excipient1,excipient1})	null
4	Test delete formulation object which is not contained in database.	("2" , "name2" , "type2" , 2, {excipient3,excipient4})	null

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3.1.3.4 Unit Test Case for Client Side 14 (UTC-CI -14)

geFormulationList() : Formulation []

Formulation object value = value (String id , String name , String type, double usedWeight, List<Excipient> api)

Excipient object value = value (String id , Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String ionicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{ "stability1","stability2"},3,4,"solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1","flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substance2","watersolubility2",{ "stability3","stability4"},5,7,"solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2","flowability2",5,"saltfrom2",8,"iconicity2")
Substance3	("3","substance3","watersolubility3",{ "stability5","stability5"},6,9,"solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3","flowability3",2,"saltfrom3",6,"iconicity3")
Substance4	("4","substance4","watersolubility4",{ "stability6","stability6"},12,4,"solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4","flowability4",7,"saltfrom4",9,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1", "functionTyp1", 1, 11)
substanceFunction2	("functionName2", "functionTyp2", 2, 12)
substanceFunction3	("functionName3", "functionTyp3", 3, 13)
substanceFunction4	("functionName4", "functionTyp4", 4, 14)
Object Name	Excipient object
excipient1	("1", substance1, { substanceFunction1, substanceFunction3}, 1)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4}, 2)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3}, 2)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4}, 2)
Object Name	formulation object
formulation3	("3", "name3", "type3", 3, {excipient1,excipient2})
formulation4	("4", "name4", "type4", 4, {excipient3,excipient4})

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Test Case

case	Description	Expect result
		List of formulation object
1	Test get all formulation object list.	{formulation1,formulation2}

3.1.3.5 Unit Test Case for Client Side 15 (UTC-CI -15)

getExcipientList () : Excipient []

Excipient object value = value (String id , Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molecularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test Data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{ "stability1","stability2"},3,4,"solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1","flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substance2","watersolubility2",{ "stability3","stability4"},5,7,"solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2","flowability2",5,"saltfrom2",8,"iconicity2")
Substance3	("3","substance3","watersolubility3",{ "stability5","stability5"},6,9,"solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3","flowability3",2,"saltfrom3",6,"iconicity3")
Substance4	("4","substance4","watersolubility4",{ "stability6","stability6"},12,4,"solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4","flowability4",7,"saltfrom4",9,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1", "functionTyp1", 1, 11)
substanceFunction2	("functionName2", "functionTyp2", 2, 12)
substanceFunction3	("functionName3", "functionTyp3", 3, 13)
substanceFunction4	("functionName4", "functionTyp4", 4, 14)
Object Name	Excipient object
excipient1	("3", substance3, { substanceFunction1, substanceFunction2}, 3)
excipient2	("4", substance4, { substanceFunction3, substanceFunction4}, 4)

Test Case

case	Description	Expect result
		excipient object List
1	Test get all excipient list.	{ excipient1,excipient2}

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3.1.4 ReformulationCtrl Class

3.1.4.1 Unit Test Case for Client Side 16 (UTC-CI -16)

getFormulationList() : Formulation []

ReformulationHistory object value = value(String id , List<ReformulatedProduction> reformulatedProductionList , Date date , User user)

ReformulatedProduction object value = value(String id , Production production , boolean accept , String inferenceEngine)

User object value =value (String id , String username , String password , String name , String address , String telno , String email , String type);

Production object value = value(String id , Formulation formulation, DFProperty dfProperty , String instruction , float formulationWeight)

DFProperty object value = value(float totalweight , int disgradationtime , float hardness , List<Double> dissolutionProfile)

Formulation object value = value (String id , String name , String type, double usedWeight, List<Excipient> api)

Excipient object value = value (String id , Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double mocularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{"stability1","stability2"},3,4,"solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1","flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substance2","watersolubility2",{"stability3","stability4"},5,7,"solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2","flowability2",5,"saltfrom2",8,"iconicity2")
Substance3	("3","substance3","watersolubility3",{"stability5","stability5"},6,9,"solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3","flowability3",2,"saltfrom3",6,"iconicity3")
Substance4	("4","substance4","watersolubility4",{"stability6","stability6"},12,4,"solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4","flowability4",7,"saltfrom4",9,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1", "functionTyp1", 1, 11)
substanceFunction2	("functionName2", "functionTyp2", 2, 12)
substanceFunction3	("functionName3", "functionTyp3", 3, 13)
substanceFunction4	("functionName4", "functionTyp4", 4, 14)
Object Name	Excipient object
excipient1	("1", substance1, { substanceFunction1, substanceFunction3}, 1)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4}, 2)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3}, 2)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4}, 2)
Object Name	formulation object
formulation1	("1", "name1", "type1", 1, {excipient1,excipient4})
formulation2	("2", "name2", "type2", 2, {excipient2,excipient4})
formulation3	("3", "name3", "type3", 3, {excipient1,excipient2})
formulation4	("4", "name4", "type4", 4, {excipient3,excipient4})

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Test Case

case	Description	Expect result
		List of formulation object
1	Test get all formulation list	{ reformulation1, reformulationHistory2, reformulationHistory3, reformulationHistory2 }

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3.1.5 ReformulationCtrl Class

3.1.5.1 Unit Test Case for Client Side 17 (UTC-CI -17)

updateReformulationHistory(reformulationHistory : ReformulationHistory) : ReformulationHistory

ReformulationHistory object value = value(String id , List<ReformulatedProduction> reformulatedProductionList , Date date , User user)

ReformulatedProduction object value = value(String id , Production production , boolean accept , String inferenceEngine)

User object value =value (String id , String username , String password , String name , String address , String telno , String email , String type);

Production object value = value(String id , Formulation formulation, DFProperty dfProperty , String instruction , float formulationWeight)

DFProperty object value = value(float totalweight , int disgradationtime , float hardness , List<Double> dissolutionProfile)

Formulation object value = value (String id , String name , String type, double usedWeight, List<Excipient> api)

Excipient object value = value (String id , Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double mocularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substancename1","watersolubility1",{ "stability1","stability2"},3,4,"solidstate1","hygroscopicity1","particlesize1","alcohosolubility1","flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substancename2","watersolubility2",{ "stability3","stability4"},5,7,"solidstate2","hygroscopicity2","particlesize2","alcohosolubility2","flowability2",5,"saltfrom2",8,"iconicity2")
Substance3	("3","substancename3","watersolubility3",{ "stability5","stability5"},6,9,"solidstate3","hygroscopicity3","particlesize3","alcohosolubility3","flowability3",2,"saltfrom3",6,"iconicity3")
Substance4	("4","substancename4","watersolubility4",{ "stability6","stability6"},12,4,"solidstate4","hygroscopicity4","particlesize4","alcohosolubility4","flowability4",7,"saltfrom4",9,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1", "functionTyp1", 1, 11)
substanceFunction2	("functionName2", "functionTyp2", 2, 12)
substanceFunction3	("functionName3", "functionTyp3", 3, 13)
substanceFunction4	("functionName4", "functionTyp4", 4, 14)
Object Name	Excipient object
excipient1	("1", substance1, { substanceFunction1, substanceFunction3}, 1)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4}, 2)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3}, 2)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4}, 2)
Object Name	formulation object
formulation1	("1", "name1", "type1", 1, {excipient1,excipient4})
formulation2	("2", "name2", "type2", 2, {excipient2,excipient4})
formulation3	("3", "name3", "type3", 3, {excipient1,excipient2})
formulation4	("4", "name4", "type4", 4, {excipient3,excipient4})

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Object Name	DFProperty object
dfProperty1	(1.11,1 , 1.11 , {3.2,4.2,5.6,6.6})
dfProperty2	(2.22,2 , 2.22 , {1.2,2.2,3.6,4.6})
dfProperty3	(3.33,3 , 3.33 , {1.6,5.2,6.6,7.8})
dfProperty4	(4.44,4 , 4.44 , {4.5,6.7,8.8,9.0})
Object Name	Production object
production1	("1" , formulation1 , dfProperty1 , "instruction1" , 1.12)
production2	("2" , formulation2 , dfProperty2 , "instruction2" , 2.23)
production3	("3" , formulation3 , dfProperty3 , "instruction3" , 3.34)
Production4	("4" , formulation4 , dfProperty4 , "instruction4" , 4.45)
Object Name	reformulationProduct object
reformulatedProduction1	("1" , production1 , true , "role base")
reformulatedProduction2	("2" , production4 , false , "case base")
reformulatedProduction3	("3" , production3 , true , "role base")
reformulatedProduction4	("4" , production4 , false , "case base")
Object Name	User object
user1	("1" , "username 1" , "password1" , "name1" , "173/1 chaing mai thailand" , "0840423850" , "example1@hotmail.com" , "admin");
user2	("1" , "username 1" , "password1" , "name1" , "173/1 chaing mai thailand" , "0840423850" , "example1@hotmail.com" , "user");
Object Name	reformulationHistory object
reformulationHistory3	("3" , {reformulatedProduction1, reformulatedProduction2}, "5/10/2014 " , user1)
reformulationHistory4	("4" , {reformulatedProduction3, reformulatedProduction4}, "7/4/2008 " , user2)

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Test Case

Case No.	Description	Input data	Expect Result
		reformulationHistory object	reformulationHistory object
1	Test update reformulationHistory object which is correct the formal of reformulationHistory object and contained in the database.	("3", {reformulatedProduction1, reformulatedProduction3},"4/11/209 ", user1)	("3", {reformulatedProduction1, reformulatedProduction3},"4/11/209 ", user1)
2	Test update reformulationHistory object which is correct the formal of reformulationHistory object and contained in the database.	("4", {reformulatedProduction2, reformulatedProduction4},"6/6/2013 ", user2)	("4", {reformulatedProduction2, reformulatedProduction4},"6/6/2013 ", user2)
3	Test update reformulationHistory object which is not contained in the database.	("1", {reformulatedProduction1, reformulatedProduction3},"4/11/209 ", user1)	null
4	Test update reformulationHistory object which is not contained in the database.	("2", {reformulatedProduction2, reformulatedProduction4},"6/6/2013 ", user2)	null

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3.1.5.2 Unit Test Case for Client Side 18 (UTC-CI -18)

deleteReformulationHistory(String id) : ReformulationHistory

ReformulationHistory object value = value(String id , List<ReformulatedProduction> reformulatedProductionList , Date date , User user)

ReformulatedProduction object value = value(String id , Production production , boolean accept , String inferenceEngine)

User object value =value (String id , String username , String password , String name , String address , String telno , String email , String type);

Production object value = value(String id , Formulation formulation, DFProperty dfProperty , String instruction , float formulationWeight)

DFProperty object value = value(float totalweight , int disgradationtime , float hardness , List<Double> dissolutionProfile)

Formulation object value = value (String id , String name , String type, double usedWeight, List<Excipient> api)

Excipient object value = value (String id , Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double mocularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substancename1","watersolubility1",{ "stability1","stability2"},3,4,"solidstate1","hygroscopicity1","particlesize1","alcohosolubility1","flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substancename2","watersolubility2",{ "stability3","stability4"},5,7,"solidstate2","hygroscopicity2","particlesize2","alcohosolubility2","flowability2",5,"saltfrom2",8,"iconicity2")
Substance3	("3","substancename3","watersolubility3",{ "stability5","stability5"},6,9,"solidstate3","hygroscopicity3","particlesize3","alcohosolubility3","flowability3",2,"saltfrom3",6,"iconicity3")
Substance4	("4","substancename4","watersolubility4",{ "stability6","stability6"},12,4,"solidstate4","hygroscopicity4","particlesize4","alcohosolubility4","flowability4",7,"saltfrom4",9,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1", "functionTyp1", 1, 11)
substanceFunction2	("functionName2", "functionTyp2", 2, 12)
substanceFunction3	("functionName3", "functionTyp3", 3, 13)
substanceFunction4	("functionName4", "functionTyp4", 4, 14)
Object Name	Excipient object
excipient1	("1", substance1, { substanceFunction1, substanceFunction3}, 1)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4}, 2)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3}, 2)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4}, 2)
Object Name	formulation object
formulation1	("1", "name1", "type1", 1, {excipient1,excipient4})
formulation2	("2", "name2", "type2", 2, {excipient2,excipient4})
formulation3	("3", "name3", "type3", 3, {excipient1,excipient2})

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formulation4	("4" , "name4" , "type4" , 4 , {excipient3,excipient4})
Object Name	DFProperty object
dfProperty1	(1.11,1 , 1.11 , {3.2,4.2,5.6,6.6})
dfProperty2	(2.22,2 , 2.22 , {1.2,2.2,3.6,4.6})
dfProperty3	(3.33,3 , 3.33 , {1.6,5.2,6.6,7.8})
dfProperty4	(4.44,4 , 4.44 , {4.5,6.7,8.8,9.0})
Object Name	Production object
production1	("1" , formulation1 , dfProperty1 , "instruction1" , 1.12)
production2	("2" , formulation2 , dfProperty2 , "instruction2" , 2.23)
production3	("3" , formulation3 , dfProperty3 , "instruction3" , 3.34)
Production4	("4" , formulation4 , dfProperty4 , "instruction4" , 4.45)
Object Name	reformulationProduct object
reformulatedProduction1	("1" , production1 , true , "role base")
reformulatedProduction2	("2" , production4 , false , "case base")
reformulatedProduction3	("3" , production3 , true , "role base")
reformulatedProduction4	("4" , production4 , false , "case base")
Object Name	User object
user1	("1" , "username 1" , "password1" , "name1" , "173/1 chaing mai thailand" , "0840423850" , "example1@hotmail.com" , "admin");
user2	("1" , "username 1" , "password1" , "name1" , "173/1 chaing mai thailand" , "0840423850" , "example1@hotmail.com" , "user");
Object Name	reformulationHistory object
reformulationHistory3	("3" , {reformulatedProduction1, reformulatedProduction2}, "5/10/2014 " , user1)
reformulationHistory4	("4" , {reformulatedProduction3, reformulatedProduction4}, "7/4/2008 " , user2)

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Test Case

Case No.	Description	Input data	Expect Result
		Id	reformulationHistory object
1	Test delete reformulationHistory object which is contained in database and correct format reformulationHistory object.	"3"	("3", {reformulatedProduction1, reformulatedProduction2},"5/10/2014", user1)
2	Test delete reformulationHistory object which is contained in database and correct format reformulationHistory.	"4"	("4", {reformulatedProduction3, reformulatedProduction4},"7/4/2008", user2)
3	Test delete reformulationHistory object which is not contained in database or incorrect format reformulationHistory object.	"1"	null
4	Test delete reformulationHistory object which is not contained in database or incorrect format reformulationHistory object.	"2"	null

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3.2 Unit Test Case for Server Side (UTC-SV)

3.2.1 SubstanceServiceImpl Class

3.2.1.1 Unit Test Case for Server Side 01 (UTC-SV -01)

addSubstance (substance:Substance): Substance

Test data

Substance object value= (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String iconicity)

Object Name	Substance object
substance3	("3","substancename2","watersolubility2",{"stability1","stability2"},3.43,4.56,"solidstate2","hygroscopicity2","particlesize2","alcoholSolubility2","flowability2",4.54,"saltfrom2",5.54,"iconicity2")
substance4	("4","substancename3","watersolubility3",{"stability3","stability4"},6.54,7.65,"solidstate3","hygroscopicity3","particlesize3","alcoholSolubility3","flowability3",4.54,"saltfrom3",5.54,"iconicity3")

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Test Case

Case No.	Description	Input data	Expect Result
		Substance object	Substance object
1	Test add substance object which is correct the formal of substance object.	(null,"substancename","watersolubility",{ "stability1","stability2"},3.43,4.56,"solidstate","hygroscopicity","particlesize","alcohosolubility","flowability",4.54,"saltfrom",5.54,"iconicity")	(not null,"substancename","watersolubility1",{ "stability","stability1"},3,4,"solidstate","hygroscopicity","particlesize","alcohosolubility","flowability",4,"saltfrom",5,"iconicity")
2	Test add substance object which is correct the formal of substance object.	(null,"substancename1","watersolubility1",{ "stability3","stability4"},5.54,7.54,"solidstate1","hygroscopicity1","particlesize1","alcohosolubility1","flowability1",5.43,"saltfrom1",8.43,"iconicity1")	(not null,"substancename1","watersolubility1",{ "stability3","stability4"},5.54,7.54,"solidstate1","hygroscopicity1","particlesize1","alcohosolubility1","flowability1",5.53,"saltfrom1",8.43,"iconicity1")
3	Test add substance object which is contained in the database already.	("3","substancename2","watersolubility2",{ "stability1","stability2"},3.43,4.56,"solidstate2","hygroscopicity2","particlesize2","alcohosolubility2","flowability2",4.54,"saltfrom2",5.54,"iconicity2")	null
4	Test add substance object which is contained in the database already.	("4","substancename3","watersolubility3",{ "stability3","stability4"},6.54,7.65,"solidstate3","hygroscopicity3","particlesize3","alcohosolubility3","flowability3",4.54,"saltfrom3",5.54,"iconicity3")	null

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3.2.1.2 Unit Test Case for Server Side 02 (UTC-SV -02)

updateSubstance (substance : Substance): Substance

Test data

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String iconicity)

Object Name	Substance object
substance1	("3","substancename","watersolubility",{ "stability1","stability2"},3.5,4.7,"solidstate","hygroscopicity","particlesize","alcohosolubility","flowability",4.3,"saltfrom",5.7,"iconicity")
substance2	("4","substancename1","watersolubility1",{ "stability3","stability4"},5.6,7.8,"solidstate1","hygroscopicity1","particlesize1","alcohosolubility1","flowability1",5.5,"saltfrom1",8.6,"iconicity1")

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Test Case

Case No.	Description	Input data	Expect Result
		Substance object	Substance object
1	Test update substance object which is correct the formal of substance object and contained in the database.	("3","substancename2","watersolubility2",{ "stability1","stability2"},3.6,4.8,"solidstate2","hygroscopicity2","particlesize2","alcohol solubility2", "flowability2",4.7,"saltfrom2",5.9,"iconicity2")	("3","substancename2","watersolubility2",{ "stability1","stability2"},3.6,4.8,"solidstate2","hygroscopicity2","particlesize2","alcohol solubility2", "flowability2",4.7,"saltfrom2",5.9,"iconicity2")
2	Test update substance object which is correct the formal of substance object and contained in the database.	("4","substancename3","watersolubility3",{ "stability3","stability4"},5.4,7.7,"solidstate3","hygroscopicity3","particlesize3","alcohol solubility3", "flowability3",5.3,"saltfrom1",8.5,"iconicity3")	("4","substancename3","watersolubility3",{ "stability3","stability4"},5.4,7.7,"solidstate3","hygroscopicity3","particlesize3","alcohol solubility3", "flowability3",5.3,"saltfrom1",8.5,"iconicity3")
3	Test update substance object which is not contained in the database.	("1","substancename4","watersolubility4",{ "stability1","stability2"},3.5,4.2,"solidstate4","hygroscopicity4","particlesize4","alcohol solubility4", "flowability4",4.5,"saltfrom4",5.6,"iconicity4")	null
4	Test update substance object which is not contained in the database.	("2","substancename5","watersolubility5",{ "stability1","stability2"},3.5,4.7,"solidstate5","hygroscopicity5","particlesize5","alcohol solubility5", "flowability5",5.5,"saltfrom5",5.9,"iconicity5")	null

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3.2.1.3 Unit Test Case for Server Side 03 (UTC-SV -03)

deleteSubstance (substance : Substance): Substance

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String iconicity)

Test data

Object Name	Substance object
substance1	("3","substancename","watersolubility",{ "stability1","stability2"},3.2,4.4,"solidstate","hygroscopicity","particlesize","alcoholSolubility","flowability",4.5,"saltform",5.6,"iconicity")
substance2	("4","substancename1","watersolubility1",{ "stability3","stability4"},5.5,7.7,"solidstate1","hygroscopicity1","particlesize1","alcoholSolubility1","flowability1",5.1,"saltform1",8.6,"iconicity1")

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Test Case

Case No.	Description	Input data	Expect Result
		Substance object	Substance object
1	Test delete substance object which is contained in database.	("3", "substance", "watersolubility", {"stability1", "stability2"}, 3.2, 4.4, "solidstate", "hygroscopicity", "particlesize", "alcoholubility", "flowability", 4.5, "saltfrom", 5.6, "iconicity")	(null, "substance", "watersolubility", {"stability1", "stability2"}, 3.2, 4.4, "solidstate", "hygroscopicity", "particlesize", "alcoholubility", "flowability", 4.5, "saltfrom", 5.6, "iconicity")
2	Test delete substance object which is contained in database.	("4", "substance1", "watersolubility1", {"stability3", "stability4"}, 5.5, 7.7, "solidstate1", "hygroscopicity1", "particlesize1", "alcoholubility1", "flowability1", 5.1, "saltfrom1", 8.6, "iconicity1")	(null, "substance1", "watersolubility1", {"stability3", "stability4"}, 5.5, 7.7, "solidstate1", "hygroscopicity1", "particlesize1", "alcoholubility1", "flowability1", 5.1, "saltfrom1", 8.6, "iconicity1")
3	Test delete substance object which is not contained in database.	("1", "substance2", "watersolubility2", {"stability1", "stability2"}, 3.5, 4.8, "solidstate2", "hygroscopicity2", "particlesize2", "alcoholubility2", "flowability2", 4.3, "saltfrom2", 5.5, "iconicity2")	null
4	Test delete substance object which is not contained.	("2", "substance3", "watersolubility3", {"stability1", "stability2"}, 3.5, 4.6, "solidstate3", "hygroscopicity3", "particlesize3", "alcoholubility3", "flowability3", 4.7, "saltfrom2", 5.9, "iconicity3")	null

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3.2.1.4 Unit Test Case for Server Side 04 (UTC-SV -04)

getAllSubstance: Substance[]

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String iconicity)

Test data

Object Name	Substance object
substance1	("3","substancename","watersolubility",{ "stability1","stability2"},3.4,4.1,"solidstate","hygroscopicity","particlesize","alcoholSolubility","flowability",4,"saltform",5,"iconicity")
substance2	("4","substancename1","watersolubility1",{ "stability3","stability4"},5.6,7.8,"solidstate1","hygroscopicity1","particlesize1","alcoholSolubility1","flowability1",5.5,"saltform1",8.9,"iconicity1")

Test Plan

case	Description	Expect result
		List of substance object
1	Test get all substance list	{ substance1,substance2}

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3.2.1.5 Unit Test Case for Server Side 05 (UTC-SV -05)

getSubstanceById (String id):substance

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String iconicity)

Test data

Object Name	Substance object
substance1	(1,"substancename","watersolubility",{ "stability1","stability2"},3.6,4.8,"solidstate","hygroscopicity","particlesize","alcoholSolubility","flowability",4.4,"saltform",5.7,"iconicity")
substance2	(2,"substancename1","watersolubility1",{ "stability3","stability4"},5.8,7.9,"solidstate1","hygroscopicity1","particlesize1","alcoholSolubility1","flowability1",5.3,"saltform1",8.7,"iconicity1")

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Test Case

Case No.	Description	Input data	Expect Result
		substance id	Substance object
1	Test get substance object which is contained in database by substance id.	1	(1,"substancename","watersolubility",{ "stability1","stability2"},3.6,4.8,"solidstate","hygroscopicity","particlesize","alcohosolubility","flowability",4.4,"saltfrom",5.7,"iconicity"}
2	Test get substance object which is contained in database by substance id.	2	(2,"substancename1","watersolubility1",{ "stability3","stability4"},5.8,7.9,"solidstate1","hygroscopicity1","particlesize1","alcohosolubility1","flowability1",5.3,"saltfrom1",8.7,"iconicity1"}
3	Test get substance object which is not contain in database by substance id.	3	null
4	Test get substance object which is not contain by substance id in database.	4	Null

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3.2.2 ExcipientServiceimpl Class

3.2.2.1 Unit Test Case for Server Side 06 (UTC-SV -06)

addExcipient(excipient : Excipient): Excipient

Excipient object value = value (String id,Substance substance,List<SubstanceFunction>substanceFunctions,double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molecularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substancename1","watersolubility1",{ "stability1","stability2"},3.5,4.7, "solidstate1","hygroscopicity1","particlesize1","alcohosolubility1", "flowability1",4.7,"saltfrom1",5.4,"iconicity1")
substance2	(2,"substancename2","watersolubility2",{ "stability3","stability4"},5.6,7.9, "solidstate2","hygroscopicity2","particlesize2","alcohosolubility2", "flowability2",5.2,"saltfrom2",8.5,"iconicity2")
Substance3	("3","substancename3","watersolubility3",{ "stability5","stability5"},6.7,9.9, "solidstate3","hygroscopicity3","particlesize3","alcohosolubility3", "flowability3",2.4,"saltfrom3",6.6,"iconicity3")
Substance4	("4","substancename4","watersolubility4",{ "stability6","stability6"},12.7,4.8, "solidstate4","hygroscopicity4","particlesize4","alcohosolubility4", "flowability4",7.4,"saltfrom4",9.7,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1","functionTyp1",1,11)
substanceFunction2	("functionName2","functionTyp2",2,12)
substanceFunction3	("functionName3","functionTyp3",3,13)
substanceFunction4	("functionName4","functionTyp4",4,14)
Object Name	Excipient object
Excipient3	("3", substance3 , { substanceFunction1, substanceFunction2} , 3.7)
Excipient4	("4", substance4, { substanceFunction3, substanceFunction4} , 4.7)

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Test Case

Case No.	Description	Input data	Expect Result
		Excipient object	Excipient object
1	Test excipient which is correct the formal excipient object.	(null,substance1,{substanceFunction1, substanceFunction1} , 1.5)	(not null, substance1 , { substanceFunction1, substanceFunction3} , 1.5)
2	Test add excipient which is correct the formal of excipient object.	(null, substance2 , { substanceFunction2, substanceFunction4} , 2.7)	(not null, substance4 , { substanceFunction2, substanceFunction4} , 2.7)
3	Test add excipient object which is contained in the database already.	("3", substance3 , { substanceFunction1, substanceFunction2} , 3.7)	null
4	Test add excipient object which is contained in the database already.	("4", substance4, { substanceFunction3, substanceFunction4} , 4.7)	null

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3.2.2.2 Unit Test Case for Server Side 07 (UTC-SV -07)

updateExcipient(excipient : Excipient) : Excipient

Excipient object value = value (String id,Substance substance,List<SubstanceFunction>substanceFunctions ,double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molecularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substancename1","watersolubility1",{ "stability1","stability2"},3.6,4.8, "solidstate1","hygroscopicity1","particlesize1","alcohosolubility1", "flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substancename2","watersolubility2",{ "stability3","stability4"},5.9,7.4, "solidstate2","hygroscopicity2","particlesize2","alcohosolubility2", "flowability2",5,"saltfrom2",8,"iconicity2")
Substance3	("3","substancename3","watersolubility3",{ "stability5","stability5"},6.7,9.8, "solidstate3","hygroscopicity3","particlesize3","alcohosolubility3", "flowability3",2.9,"saltfrom3",6.7,"iconicity3")
Substance4	("4","substancename4","watersolubility4",{ "stability6","stability6"},12.7,4.8, "solidstate4","hygroscopicity4","particlesize4","alcohosolubility4", "flowability4",7.7,"saltfrom4",9.4,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1","functionTyp1",1.7,11.8)
substanceFunction2	("functionName2","functionTyp2",2.1,12.7)
substanceFunction3	("functionName3","functionTyp3",3.2,13.5)
substanceFunction4	("functionName4","functionTyp4",4.6,14.8)
Object Name	Excipient object
excipient1	("3", substance3 , { substanceFunction1, substanceFunction2} , 3.6)
excipient2	("4", substance4, { substanceFunction3, substanceFunction4} , 4.7)

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Test Case

Case No.	Description	Input data	Expect Result
		Excipient object	Excipient object
1	Test update excipient which is correct the formal of object excipient and contained in the database.	("3" , substance1 , { substanceFunction1, substanceFunction2} , 5.5)	("3" , substance1 , { substanceFunction1, substanceFunction2} , 5.5)
2	Test update excipient which is correct the formal of excipientobject and contained in the database.	("4" , substance2 , { substanceFunction3, substanceFunction4} , 7.7)	("4" , substance2 , { substanceFunction3, substanceFunction4} , 7.7)
3	Test update excipient which is not contained in the database.	("1" , substance1 , { substanceFunction1, substanceFunction2} , 4)	null
4	Test update excipient which is not contained in the database.	("2" , substance2 , { substanceFunction3, substanceFunction4} , 9)	null

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3.2.2.3 Unit Test Case for Server Side 08 (UTC-SV -08)

getExcipientById(id : String) : Excipient

Excipient object value = value (String id, Substance substance, List<SubstanceFunction>substanceFunctions ,double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molarWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substancename1","watersolubility1",{ "stability1","stability2"},3.6,4.4, "solidstate1","hygroscopicity1","particlesize1","alcohosolubility1", "flowability1",4.2,"saltfrom1",5.0,"iconicity1")
substance2	(2,"substancename2","watersolubility2",{ "stability3","stability4"},5.4,7.9, "solidstate2","hygroscopicity2","particlesize2","alcohosolubility2", "flowability2",5.2,"saltfrom2",8.6,"iconicity2")
Substance3	("3","substancename3","watersolubility3",{ "stability5","stability5"},6.9,9.4, "solidstate3","hygroscopicity3","particlesize3","alcohosolubility3", "flowability3",2.6,"saltfrom3",6.7,"iconicity3")
Substance4	("4","substancename4","watersolubility4",{ "stability6","stability6"},12,4, "solidstate4","hygroscopicity4","particlesize4","alcohosolubility4", "flowability4",7,"saltfrom4",9,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1","functionTyp1",1.4,11.6)
substanceFunction2	("functionName2","functionTyp2",2.7,12.3)
substanceFunction3	("functionName3","functionTyp3",3.6,13.7)
substanceFunction4	("functionName4","functionTyp4",4.8,14.8)
Object Name	Excipient object
excipient1	("3", substance3 , { substanceFunction1, substanceFunction2} , 3.4)
excipient2	("4", substance4, { substanceFunction3, substanceFunction4} , 4.8)

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Test Case

case	Description	Input	Expect result
		Id	Excipient object
1	Test get excipient object by excipientid.	"3"	("3" , substance3 , { substanceFunction1, substanceFunction2} , 3.4)
2	Test get excipient object by excipientid.	"4"	("4" , substance4, { substanceFunction3, substanceFunction4} , 4.8)
3	Test get excipient object which is not contain in database.	1	null
4	Test get excipient object which is not contain in database.	2	null

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3.2.2.4 Unit Test Case for Server Side 09 (UTC-SV -09)

getSubstanceFunction() : SubstanceFunction []

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

Test data

Object Name	SubstanceFunction
substanceFunction1	("functionName1","functionTyp1",1,11)
substanceFunction2	("functionName2","functionTyp2",2,12)
substanceFunction3	("functionName3","functionTyp3",3,13)
substanceFunction4	("functionName4","functionTyp4",4,14)

Test Case

case	Description	Expect result
		Excipient object List
1	Test get all substanceFunction list.	{ substanceFunction1, substanceFunction2, substanceFunction3, substanceFunction4}

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3.2.2.5 Unit Test Case for Server Side 10 (UTC-SV -10)

getSubstanceForExcipient() : Substance[]

Excipient object value = value (String id, Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double molecularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{ "stability1","stability2"},3,4,"solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1","flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substance2","watersolubility2",{ "stability3","stability4"},5,7,"solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2","flowability2",5,"saltfrom2",8,"iconicity2")
Substance3	("3","substance3","watersolubility3",{ "stability5","stability5"},6,9,"solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3","flowability3",2,"saltfrom3",6,"iconicity3")
Substance4	("4","substance4","watersolubility4",{ "stability6","stability6"},12,4,"solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4","flowability4",7,"saltfrom4",9,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1","functionTyp1",1,11)
substanceFunction2	("functionName2","functionTyp2",2,12)
substanceFunction3	("functionName3","functionTyp3",3,13)
substanceFunction4	("functionName4","functionTyp4",4,14)
Object Name	Excipient object
excipient1	("3", substance3 , { substanceFunction1, substanceFunction2} , 3)
excipient2	("4", substance4, { substanceFunction3, substanceFunction4} , 4)

Test Case

case	Description	Expect result
		Excipient object List
1	Test get all substance list that.	{ substance1, substanc2, substance3, substance4}

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3.2.3 FormulationServiceimpl Class

3.2.3.1 Unit Test Case for Server Side 11 (UTC-SV -11)

addFormulation(formulation : Formulation) : Formulation

Formulation object value = value (String id, String name,String type, double usedWeight, List<Excipient>api)

Excipient object value = value (String id,Substance substance ,List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double mocularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substancename1","watersolubility1",{ "stability1","stability2"},3.4,4.5, "solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1", "flowability1",4.6,"saltfrom1",5.8,"iconicity1")
substance2	(2,"substancename2","watersolubility2",{ "stability3","stability4"},5.3,7.5, "solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2", "flowability2",5.7,"saltfrom2",8.9,"iconicity2")
Substance3	("3","substancename3","watersolubility3",{ "stability5","stability5"},6.3,9.6, "solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3", "flowability3",2.7,"saltfrom3",6.7,"iconicity3")
Substance4	("4","substancename4","watersolubility4",{ "stability6","stability6"},12.5,4.6, "solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4", "flowability4",7.7,"saltfrom4",9.8,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1","functionTyp1",1,11)
substanceFunction2	("functionName2","functionTyp2",2,12)
substanceFunction3	("functionName3","functionTyp3",3,13)
substanceFunction4	("functionName4","functionTyp4",4,14)
Object Name	Excipient object
excipient1	("1", substance1 , { substanceFunction1, substanceFunction3} , 1.5)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4} , 2.6)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3} , 2.4)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4} , 2.0)
Object Name	formulation object
formulation3	("3", "name3", "type3", 3.3,{excipient1,excipient2})
formulation4	("4", "name4", "type4", 4.4,{excipient3,excipient4})

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Test Case

Case No.	Description	Input data	Expect Result
		Formulation object	Formulation object
1	Test add formulation object which is correct the formal of formulation object.	(null,"name1", "type1", 1.5,{excipient1,excipient2})	(not null,"name1", "type1", 1.5,{excipient1,excipient2})
2	Test add formulation which is correct the formal of formulation object.	(null,"name4", "type4", 4.3,{excipient3,excipient4})	(not null,"name4", "type4", 4.3,{excipient3,excipient4})
3	Test add formulation object which is contained in the database already.	("3","name3", "type3", 3.3,{excipient1,excipient2})	null
4	Test add formulation object which is contained in the database already.	("4","name4", "type4", 4.4,{excipient3,excipient4})	null

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3.2.3.2 Unit Test Case for Server Side 12 (UTC-SV -12)]

updateFormulation(formulation : Formulation) : Formulation

Formulation object value = value (String id, String name,String type, double usedWeight, List<Excipient>api)

Excipient object value = value (String id,Substance substance,List<SubstanceFunction>substanceFunctions ,double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double mocularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{ "stability1","stability2"},3.4,4.6, "solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1", "flowability1",4.7,"saltfrom1",5.9,"iconicity1")
substance2	(2,"substance2","watersolubility2",{ "stability3","stability4"},5.4,7.7, "solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2", "flowability2",5.4,"saltfrom2",8.6,"iconicity2")
Substance3	("3","substance3","watersolubility3",{ "stability5","stability5"},6.7,9.8, "solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3", "flowability3",2.2,"saltfrom3",6.4,"iconicity3")
Substance4	("4","substance4","watersolubility4",{ "stability6","stability6"},12.5,4.6, "solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4", "flowability4",7.6,"saltfrom4",9.6,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1","functionTyp1",1.9,11.4)
substanceFunction2	("functionName2","functionTyp2",2.2,12.5)
substanceFunction3	("functionName3","functionTyp3",3.6,13.8)
substanceFunction4	("functionName4","functionTyp4",4.4,14.7)
Object Name	Excipient object
excipient1	("1", substance1, { substanceFunction1, substanceFunction3} , 1.6)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4} , 2.7)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3} , 2.3)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4} , 2.5)
Object Name	formulation object
formulation3	("3", "name3", "type3", 3.3,{excipient1,excipient2})
formulation4	("4", "name4", "type4", 4.3,{excipient3,excipient4})

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Test Case

Case No.	Description	Input data	Expect Result
		formulation object	formulation object
1	Test update formulation object which is correct the formal of formulation object.	("3" ,"name1", "type1", 1.1,{excipient3,excipient4})	("3" ,"name1", "type1", 1.1,{excipient3,excipient4})
2	Test update formulation object which is correct the formal of formulationobject.	("4" ,"name2", "type2", 2.2,{excipient1,excipient2})	("4" ,"name2", "type2", 2.2,{excipient1,excipient2})
3	Test update formulation object which is not contained in the database.	("1" ,"name1", "type1", 1.3,{excipient1,excipient2})	null
4	Test update formulation object which is not contained in the database.	("2" ,"name2", "type2", 2.4,{excipient3,excipient4})	null

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3.2.3.3 Unit Test Case for Server Side 13 (UTC-SV -13)

deleteFormulation (id:String): Formulation

Formulation object value = value (String id, String name,String type, double usedWeight, List<Excipient>api)

Excipient object value = value (String id,Substance substance ,List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double mocularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substanceName1","watersolubility1",{ "stability1","stability2"},3.5,4.7, "solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1", "flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substanceName2","watersolubility2",{ "stability3","stability4"},5.5,7.6, "solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2", "flowability2",5.6,"saltfrom2",8.7,"iconicity2")
Substance3	("3","substanceName3","watersolubility3",{ "stability5","stability5"},6.6,9.3, "solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3", "flowability3",2.6,"saltfrom3",6.7,"iconicity3")
Substance4	("4","substanceName4","watersolubility4",{ "stability6","stability6"},12.4,4.6, "solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4", "flowability4",7.7,"saltfrom4",9.5,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1", "functionTyp1", 1.3, 11.6)
substanceFunction2	("functionName2", "functionTyp2", 2.7, 12.8)
substanceFunction3	("functionName3", "functionTyp3", 3.4, 13.6)
substanceFunction4	("functionName4", "functionTyp4", 4.7, 14.4)
Object Name	Excipient object
excipient1	("1", substance1, { substanceFunction1, substanceFunction3}, 1.5)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4}, 2.6)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3}, 2.7)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4}, 2.9)
Object Name	formulation object
formulation3	("3", "name3", "type3", 3.3, {excipient1,excipient2})
formulation4	("4", "name4", "type4", 4.4, {excipient3,excipient4})

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Test Case

Case No.	Description	Input data	Expect Result
		formulation object	formulation object
1	Test delete formulation object which is contained in database and correct format formulation object.	("3", "name3", "type3", 3.3, {excipient1, excipient2})	("3", "name3", "type3", 3.3, {excipient1, excipient2})
2	Test delete formulation object which is contained in database and correct format formulation object.	("4", "name4", "type4", 4.4, {excipient3, excipient4})	("4", "name4", "type4", 4.4, {excipient3, excipient4})
3	Test delete formulation object which is not contained in database.	("1", "name1", "type1", 1.1, {excipient1, excipient1})	null
4	Test delete formulation object which is not contained in database.	("2", "name2", "type2", 2.2, {excipient3, excipient4})	null

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3.2.3.4 Unit Test Case for Server Side 14 (UTC-SV -14)

getAllFormulation() : Formulation []

Formulation object value = value (String id, String name,String type, double usedWeight, List<Excipient>api)

Excipient object value = value (String id,Substance substance,List<SubstanceFunction>substanceFunctions ,double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double mocularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substanceName1","watersolubility1",{ "stability1","stability2"},3.4,4.6, "solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1", "flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substanceName2","watersolubility2",{ "stability3","stability4"},5.5,7.2, "solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2", "flowability2",5.4,"saltfrom2",8.5,"iconicity2")
Substance3	("3","substanceName3","watersolubility3",{ "stability5","stability5"},6.6,9.8, "solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3", "flowability3",2.3,"saltfrom3",6.7,"iconicity3")
Substance4	("4","substanceName4","watersolubility4",{ "stability6","stability6"},12.5,4.8, "solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4", "flowability4",7.5,"saltfrom4",9.7,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1", "functionTyp1", 1.8, 11.6)
substanceFunction2	("functionName2", "functionTyp2", 2.6, 12.4)
substanceFunction3	("functionName3", "functionTyp3", 3.4, 13.7)
substanceFunction4	("functionName4", "functionTyp4", 4.7, 14.8)
Object Name	Excipient object
excipient1	("1", substance1, { substanceFunction1, substanceFunction3} , 1.4)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4} , 2.7)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3} , 2.9)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4} , 2.3)
Object Name	formulation object
formulation3	("3", "name3", "type3", 3, {excipient1,excipient2})
formulation4	("4", "name4", "type4", 4, {excipient3,excipient4})

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Test Case

case	Description	Expect result
		List of formulation object
1	Test get all formulation object list.	{formulation1,formulation2}

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Test data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{ "stability1","stability2"},3.6,4.8, "solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1", "flowability1",4.5,"saltfrom1",5.7,"iconicity1")
substance2	(2,"substance2","watersolubility2",{ "stability3","stability4"},5.7,7.8, "solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2", "flowability2",5.3,"saltfrom2",8.6,"iconicity2")
Substance3	("3","substance3","watersolubility3",{ "stability5","stability5"},6.7,9.3, "solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3", "flowability3",2.7,"saltfrom3",6.9,"iconicity3")
Substance4	("4","substance4","watersolubility4",{ "stability6","stability6"},12.5,4.7, "solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4", "flowability4",7.5,"saltfrom4",9.6,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1", "functionTyp1", 1.6, 11.5)
substanceFunction2	("functionName2", "functionTyp2", 2.5, 12.8)
substanceFunction3	("functionName3", "functionTyp3", 3.8, 13.4)
substanceFunction4	("functionName4", "functionTyp4", 4.8, 14.7)
Object Name	Excipient object
excipient1	("1", substance1, { substanceFunction1, substanceFunction3}, 1.5)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4}, 2.8)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3}, 2.3)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4}, 2.7)
Object Name	formulation object
formulation3	("3", "name3", "type3", 3.5, {excipient1,excipient2})
formulation4	("4", "name4", "type4", 4.6, {excipient3,excipient4})

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Test Case

case	Description	Input	Expect result
		Id	formulation object
1	Test get formulationobject by formulation id.	3	("3", "name3", "type3", 3.5,{excipient1,excipient2})
2	Test get formulation object by formulation id.	4	("4", "name4", "type4", 4.6,{excipient3,excipient4})
3	Test get formulation object which is not contain in database.	1	null

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3.2.4 ReformulationHistoryServiceimpl Class

3.2.4.1 Unit Test Case for Server Side 15 (UTC-SV -15)

createHistory(reformulationHistory : ReformulationHistory) : ReformulationHistory

ReformulationHistory object value = value(String id , List<ReformulatedProduction> reformulatedProductionList , Date date , User user)

ReformulatedProduction object value = value(String id , Production production , boolean accept , String inferenceEngine)

User object value =value (String id, String username , String password , String name , String address , String telno , String email , String type);

Production object value = value(String id , Formulation formulation,DFProperty dfProperty , String instruction , float formulationWeight)

DFProperty object value = value(float totalweight , int disgradationtime , float hardness , List<Double> dissolutionProfile)

Formulation object value = value (String id , String name , String type, double usedWeight, List<Excipient> api)

Excipient object value = value (String id , Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double mocularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{ "stability1","stability2"},3.4,4.6, "solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1", "flowability1",4.7,"saltfrom1",5.6,"iconicity1")
substance2	(2,"substance2","watersolubility2",{ "stability3","stability4"},5.5,7.5, "solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2", "flowability2",5.7,"saltfrom2",8.0,"iconicity2")
Substance3	("3","substance3","watersolubility3",{ "stability5","stability5"},6.3,9.5, "solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3", "flowability3",2.7,"saltfrom3",6.8,"iconicity3")
Substance4	("4","substance4","watersolubility4",{ "stability6","stability6"},12.5,4.6, "solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4", "flowability4",7.7,"saltfrom4",9.5,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1","functionTyp1",1.6,11.5)
substanceFunction2	("functionName2","functionTyp2",2.5,12.9)
substanceFunction3	("functionName3","functionTyp3",3.5,13.7)
substanceFunction4	("functionName4","functionTyp4",4.6,14.7)
Object Name	Excipient object
excipient1	("1", substance1, { substanceFunction1, substanceFunction3}, 1.5)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4}, 2.7)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3}, 2.2)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4}, 2.6)
Object Name	formulation object
formulation1	("1", "name1", "type1", 1.6,{excipient1,excipient4})
formulation2	("2", "name2", "type2", 2.3,{excipient2,excipient4})
formulation3	("3", "name3", "type3", 3.7,{excipient1,excipient2})
formulation4	("4", "name4", "type4", 4.9,{excipient3,excipient4})

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Object Name	DFPropertyobject
dfProperty1	(1.11,1 , 1.11 , {3.2,4.2,5.6,6.6})
dfProperty2	(2.22,2 , 2.22 , {1.2,2.2,3.6,4.6})
dfProperty3	(3.33,3 , 3.33 , {1.6,5.2,6.6,7.8})
dfProperty4	(4.44,4 , 4.44 , {4.5,6.7,8.8,9.0})
Object Name	Production object
production1	("1" , formulation1 ,dfProperty1 , "instruction1" , 1.12)
production2	("2" , formulation2 ,dfProperty2 , "instruction2" , 2.23)
production3	("3" , formulation3 ,dfProperty3 , "instruction3" , 3.34)
Production4	("4" , formulation4 ,dfProperty4 , "instruction4" , 4.45)
Object Name	reformulationProduct object
reformulatedProduction1	("1" , production1 , true , "role base")
reformulatedProduction2	("2" , production4 , false , "case base")
reformulatedProduction3	("3" , production3 , true , "role base")
reformulatedProduction4	("4" , production4 , false , "case base")
Object Name	User object
user1	("1" , "username 1" , "password1" ,"name1" ,"173/1 chaing mai thailand" , "0840423850" , "example1@hotmail.com" , "admin");
user2	("1" , "username 1" , "password1" ,"name1" ,"173/1 chaing mai thailand" , "0840423850" , "example1@hotmail.com" , "user");
Object Name	reformulationHistory object
reformulationHistory3	("3" , {reformulatedProduction1, reformulatedProduction2} ,"5/10/2014" , user1)
reformulationHistory4	("4" , {reformulatedProduction3, reformulatedProduction4} ,"7/4/2008 " , user2)

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Test Case

Case No.	Description	Input data	Expect Result
		reformulationHistory object	reformulationHistory object
1	Test addreformulationHistoryobject which is correct the formal of reformulationHistory object.	(null, {reformulatedProduction1, reformulatedProduction3},"4/11/209 ", user1)	(null, {reformulatedProduction1, reformulatedProduction3},"4/11/209 ", user1)
2	Test add reformulationHistory object which is correct the formal of reformulationHistory object.	(null, {reformulatedProduction2, reformulatedProduction4},"6/6/2013 ", user2)	(null, {reformulatedProduction2, reformulatedProduction4},"6/6/2013 ", user2)
3	Test add reformulationHistory t object which is contained in the database already.	("3", {reformulatedProduction1, reformulatedProduction2},"5/10/2014 ", user1)	null
4	Test add reformulationHistory object which is contained in the database already.	("4", {reformulatedProduction3, reformulatedProduction4},"7/4/2008 ", user2)	null

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3.2.4.2 Unit Test Case for Server Side 16 (UTC-SV -16)

updateHistory(reformulationHistory : ReformulationHistory) : ReformulationHistory

ReformulationHistory object value = value(String id , List<ReformulatedProduction> reformulatedProductionList , Date date , User user)

ReformulatedProduction object value = value(String id , Production production , boolean accept , String inferenceEngine)

User object value =value (String id, String username , String password , String name , String address , String telno , String email , String type);

Production object value = value(String id , Formulation formulation,DFProperty dfProperty , String instruction , float formulationWeight)

DFProperty object value = value(float totalweight , int disgradationtime , float hardness , List<Double> dissolutionProfile)

Formulation object value = value (String id , String name , String type, double usedWeight, List<Excipient> api)

Excipient object value = value (String id , Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double mocularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substancename1","watersolubility1",{ "stability1","stability2"},3.5,4.7, "solidstate1","hygroscopicity1","particlesize1","alcohosolubility1", "flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substancename2","watersolubility2",{ "stability3","stability4"},.5.5,7.7, "solidstate2","hygroscopicity2","particlesize2","alcohosolubility2", "flowability2",5,"saltfrom2",8,"iconicity2")
Substance3	("3","substancename3","watersolubility3",{ "stability5","stability5"},6.3,9.6, "solidstate3","hygroscopicity3","particlesize3","alcohosolubility3", "flowability3",2.5,"saltfrom3",6.7,"iconicity3")
Substance4	("4","substancename4","watersolubility4",{ "stability6","stability6"},12.7,4.7, "solidstate4","hygroscopicity4","particlesize4","alcohosolubility4", "flowability4",7.7,"saltfrom4",9,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1","functionTyp1",1,11)
substanceFunction2	("functionName2","functionTyp2",2,12)
substanceFunction3	("functionName3","functionTyp3",3,13)
substanceFunction4	("functionName4","functionTyp4",4,14)
Object Name	Excipient object
excipient1	("1", substance1 , { substanceFunction1, substanceFunction3} , 1)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4} , 2)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3} , 2)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4} , 2)
Object Name	formulation object
formulation1	("1", "name1", "type1", 1.5,{excipient1,excipient4})
formulation2	("2", "name2", "type2", 2.6,{excipient2,excipient4})
formulation3	("3", "name3", "type3", 3.7,{excipient1,excipient2})
formulation4	("4", "name4", "type4", 4.3,{excipient3,excipient4})

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Object Name	DFPropertyobject
dfProperty1	(1.11,1 , 1.11 , {3.2,4.2,5.6,6.6})
dfProperty2	(2.22,2 , 2.22 , {1.2,2.2,3.6,4.6})
dfProperty3	(3.33,3 , 3.33 , {1.6,5.2,6.6,7.8})
dfProperty4	(4.44,4 , 4.44 , {4.5,6.7,8.8,9.0})
Object Name	Production object
production1	("1" , formulation1 ,dfProperty1 , "instruction1" , 1.12)
production2	("2" , formulation2 ,dfProperty2 , "instruction2" , 2.23)
production3	("3" , formulation3 ,dfProperty3 , "instruction3" , 3.34)
Production4	("4" , formulation4 ,dfProperty4 , "instruction4" , 4.45)
Object Name	reformulationProduct object
reformulatedProduction1	("1" , production1 , true , "role base")
reformulatedProduction2	("2" , production4 , false , "case base")
reformulatedProduction3	("3" , production3 , true , "role base")
reformulatedProduction4	("4" , production4 , false , "case base")
Object Name	User object
user1	("1" , "username 1" , "password1" ,"name1" ,"173/1 chaing mai thailand" , "0840423850" , "example1@hotmail.com" , "admin");
user2	("1" , "username 1" , "password1" ,"name1" ,"173/1 chaing mai thailand" , "0840423850" , "example1@hotmail.com" , "user");
Object Name	reformulationHistory object
reformulationHistory3	("3" , {reformulatedProduction1, reformulatedProduction2},"5/10/2014 " , user1)
reformulationHistory4	("4" , {reformulatedProduction3, reformulatedProduction4},"7/4/2008 " , user2)

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Test Case

Case No.	Description	Input data	Expect Result
		reformulationHistory object	reformulationHistory object
1	Test update reformulationHistoryobject which is correct the formal of reformulationHistory object and contained in the database.	("3", {reformulatedProduction1, reformulatedProduction3},"4/11/209 ", user1)	("3", {reformulatedProduction1, reformulatedProduction3},"4/11/209 ", user1)
2	Test update reformulationHistory object which is correct the formal of reformulationHistory object and contained in the database.	("4", {reformulatedProduction2, reformulatedProduction4},"6/6/2013 ", user2)	("4", {reformulatedProduction2, reformulatedProduction4},"6/6/2013 ", user2)
3	Test update reformulationHistory object which is not contained in the database.	("1", {reformulatedProduction1, reformulatedProduction3},"4/11/209 ", user1)	null
4	Test update reformulationHistory object which is not contained in the database.	("2", {reformulatedProduction2, reformulatedProduction4},"6/6/2013 ", user2)	null

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3.2.4.3 Unit Test Case for Server Side 17 (UTC-SV -17)

removeHistory(String id) : ReformulationHistory

ReformulationHistory object value = value(String id , List<ReformulatedProduction> reformulatedProductionList , Date date , User user)

ReformulatedProduction object value = value(String id , Production production , boolean accept , String inferenceEngine)

User object value =value (String id, String username , String password , String name , String address , String telno , String email , String type);

Production object value = value(String id , Formulation formulation,DFProperty dfProperty , String instruction , float formulationWeight)

DFProperty object value = value(float totalweight , int disgradationtime , float hardness , List<Double> dissolutionProfile)

Formulation object value = value (String id , String name , String type, double usedWeight, List<Excipient> api)

Excipient object value = value (String id , Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double mocularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{ "stability1","stability2"},3,4,"solidstate1","hygroscopicity1","particlesize1","alcohosolubility1","flowability1",4,"saltfrom1",5,"iconicity1")
substance2	(2,"substance2","watersolubility2",{ "stability3","stability4"},5,7,"solidstate2","hygroscopicity2","particlesize2","alcohosolubility2","flowability2",5,"saltfrom2",8,"iconicity2")
Substance3	("3","substance3","watersolubility3",{ "stability5","stability5"},6,9,"solidstate3","hygroscopicity3","particlesize3","alcohosolubility3","flowability3",2,"saltfrom3",6,"iconicity3")
Substance4	("4","substance4","watersolubility4",{ "stability6","stability6"},12,4,"solidstate4","hygroscopicity4","particlesize4","alcohosolubility4","flowability4",7,"saltfrom4",9,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1","functionTyp1",1,11)
substanceFunction2	("functionName2","functionTyp2",2,12)
substanceFunction3	("functionName3","functionTyp3",3,13)
substanceFunction4	("functionName4","functionTyp4",4,14)
Object Name	Excipient object
excipient1	("1", substance1, { substanceFunction1, substanceFunction3}, 1.5)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4}, 2.7)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3}, 2.7)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4}, 2.8)
Object Name	formulation object
formulation1	("1", "name1", "type1", 1.5,{excipient1,excipient4})
formulation2	("2", "name2", "type2", 2.7,{excipient2,excipient4})
formulation3	("3", "name3", "type3", 3.4,{excipient1,excipient2})
formulation4	("4", "name4", "type4", 4.7,{excipient3,excipient4})

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Object Name	DFPropertyobject
dfProperty1	(1.11,1 , 1.11 , {3.2,4.2,5.6,6.6})
dfProperty2	(2.22,2 , 2.22 , {1.2,2.2,3.6,4.6})
dfProperty3	(3.33,3 , 3.33 , {1.6,5.2,6.6,7.8})
dfProperty4	(4.44,4 , 4.44 , {4.5,6.7,8.8,9.0})
Object Name	Production object
production1	("1" , formulation1 ,dfProperty1 , "instruction1" , 1.12)
production2	("2" , formulation2 ,dfProperty2 , "instruction2" , 2.23)
production3	("3" , formulation3 ,dfProperty3 , "instruction3" , 3.34)
Production4	("4" , formulation4 ,dfProperty4 , "instruction4" , 4.45)
Object Name	reformulationProduct object
reformulatedProduction1	("1" , production1 , true , "role base")
reformulatedProduction2	("2" , production4 , false , "case base")
reformulatedProduction3	("3" , production3 , true , "role base")
reformulatedProduction4	("4" , production4 , false , "case base")
Object Name	User object
user1	("1" , "username 1" , "password1" ,"name1" ,"173/1 chaing mai thailand" , "0840423850" , "example1@hotmail.com" , "admin");
user2	("1" , "username 1" , "password1" ,"name1" ,"173/1 chaing mai thailand" , "0840423850" , "example1@hotmail.com" , "user");
Object Name	reformulationHistory object
reformulationHistory3	("3" , {reformulatedProduction1, reformulatedProduction2}, "5/10/2014 " , user1)
reformulationHistory4	("4" , {reformulatedProduction3, reformulatedProduction4}, "7/4/2008 " , user2)

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Test Case

Case No.	Description	Input data	Expect Result
		reformulationHistory object	reformulationHistory object
1	Test deletereformulationHistory object which is contained in database and correct format reformulationHistory object.	("3", {reformulatedProduction1, reformulatedProduction2},"5/10/2014 ", user1)	("3", {reformulatedProduction1, reformulatedProduction2},"5/10/2014 ", user1)
2	Test deletereformulationHistoryobject which is contained in database and correct format reformulationHistory.	("4", {reformulatedProduction3, reformulatedProduction4},"7/4/2008 ", user2)	("4", {reformulatedProduction3, reformulatedProduction4},"7/4/2008 ", user2)
3	Test delete reformulationHistoryobject which is not contained in database or incorrect format reformulationHistory object.	("1", {reformulatedProduction1, reformulatedProduction3},"4/11/209 ", user1)	null
4	Test delete reformulationHistoryobject which is not contained in database or incorrect format reformulationHistoryobject.	("2", {reformulatedProduction2, reformulatedProduction4},"6/6/2013 ", user2)	null

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3.2.4.4 Unit Test Case for Server Side 18 (UTC-SV -18)

getAllHistory() : ReformulationHistory

ReformulationHistory object value = value(String id , List<ReformulatedProduction> reformulatedProductionList , Date date , User user)

ReformulatedProduction object value = value(String id , Production production , boolean accept , String inferenceEngine)

User object value =value (String id, String username , String password , String name , String address , String telno , String email , String type);

Production object value = value(String id , Formulation formulation,DFProperty dfProperty , String instruction , float formulationWeight)

DFProperty object value = value(float totalweight , int disgradationtime , float hardness , List<Double> dissolutionProfile)

Formulation object value = value (String id , String name , String type, double usedWeight, List<Excipient> api)

Excipient object value = value (String id , Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double mocularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{ "stability1","stability2"},3.5,4.7, "solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1", "flowability1",4.7,"saltfrom1",5.4,"iconicity1")
substance2	(2,"substance2","watersolubility2",{ "stability3","stability4"},5.5,7.7, "solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2", "flowability2",5.3,"saltfrom2",8.7,"iconicity2")
Substance3	("3","substance3","watersolubility3",{ "stability5","stability5"},6.5,9.6, "solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3", "flowability3",2.7,"saltfrom3",6.4,"iconicity3")
Substance4	("4","substance4","watersolubility4",{ "stability6","stability6"},12.6,4.7, "solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4", "flowability4",7.5,"saltfrom4",9.5,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1","functionTyp1",1,11)
substanceFunction2	("functionName2","functionTyp2",2,12)
substanceFunction3	("functionName3","functionTyp3",3,13)
substanceFunction4	("functionName4","functionTyp4",4,14)
Object Name	Excipient object
excipient1	("1", substance1, { substanceFunction1, substanceFunction3}, 1.6)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4}, 2.7)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3}, 2.7)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4}, 2.7)
Object Name	formulation object
formulation1	("1", "name1", "type1", 1,{excipient1,excipient4})
formulation2	("2", "name2", "type2", 2,{excipient2,excipient4})
formulation3	("3", "name3", "type3", 3,{excipient1,excipient2})
formulation4	("4", "name4", "type4", 4,{excipient3,excipient4})

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Object Name	DFPropertyobject
dfProperty1	(1.11,1 , 1.11 , {3.2,4.2,5.6,6.6})
dfProperty2	(2.22,2 , 2.22 , {1.2,2.2,3.6,4.6})
dfProperty3	(3.33,3 , 3.33 , {1.6,5.2,6.6,7.8})
dfProperty4	(4.44,4 , 4.44 , {4.5,6.7,8.8,9.0})
Object Name	Production object
production1	("1" , formulation1 ,dfProperty1 , "instruction1" , 1.12)
production2	("2" , formulation2 ,dfProperty2 , "instruction2" , 2.23)
production3	("3" , formulation3 ,dfProperty3 , "instruction3" , 3.34)
Production4	("4" , formulation4 ,dfProperty4 , "instruction4" , 4.45)
Object Name	reformulationProduct object
reformulatedProduction1	("1" , production1 , true , "role base")
reformulatedProduction2	("2" , production4 , false , "case base")
reformulatedProduction3	("3" , production3 , true , "role base")
reformulatedProduction4	("4" , production4 , false , "case base")
Object Name	User object
user1	("1" , "username 1" , "password1" ,"name1" ,"173/1 chaing mai thailand" , "0840423850" , "example1@hotmail.com" , "admin");
user2	("1" , "username 1" , "password1" ,"name1" ,"173/1 chaing mai thailand" , "0840423850" , "example1@hotmail.com" , "user");
Object Name	reformulationHistory object
reformulationHistory3	("3" , {reformulatedProduction1, reformulatedProduction2}, "5/10/2014 " , user1)
reformulationHistory4	("4" , {reformulatedProduction3, reformulatedProduction4}, "7/4/2008 " , user2)

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Test Case

case	Description	Expect result
		List of reformulationHistory object
1	Test get all reformulationHistorylist	{ reformulationHistory3, reformulationHistory3 }

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3.2.4.5 Unit Test Case for Server Side 19 (UTC-SV -19)

getHistoryById(String id) : ReformulationHistory

ReformulationHistory object value = value(String id , List<ReformulatedProduction> reformulatedProductionList , Date date , User user)

ReformulatedProduction object value = value(String id , Production production , boolean accept , String inferenceEngine)

User object value =value (String id, String username , String password , String name , String address , String telno , String email , String type);

Production object value = value(String id , Formulation formulation,DFProperty dfProperty , String instruction , float formulationWeight)

DFProperty object value = value(float totalweight , int disgradationtime , float hardness , List<Double> dissolutionProfile)

Formulation object value = value (String id , String name , String type, double usedWeight, List<Excipient> api)

Excipient object value = value (String id , Substance substance , List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double mocularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{ "stability1","stability2"},3.6,4.4, "solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1", "flowability1",4.5,"saltfrom1",5.5,"iconicity1")
substance2	(2,"substance2","watersolubility2",{ "stability3","stability4"},5.5,7.6, "solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2", "flowability2",5.6,"saltfrom2",8.6,"iconicity2")
Substance3	("3","substance3","watersolubility3",{ "stability5","stability5"},6.6,9.7, "solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3", "flowability3",2,"saltfrom3",6,"iconicity3")
Substance4	("4","substance4","watersolubility4",{ "stability6","stability6"},12,4, "solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4", "flowability4",7.5,"saltfrom4",9.7,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1","functionTyp1",1,11)
substanceFunction2	("functionName2","functionTyp2",2,12)
substanceFunction3	("functionName3","functionTyp3",3,13)
substanceFunction4	("functionName4","functionTyp4",4,14)
Object Name	Excipient object
excipient1	("1", substance1 , { substanceFunction1, substanceFunction3} , 1)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4} , 2.5)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3} , 2.7)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4} , 2.7)
Object Name	formulation object
formulation1	("1", "name1", "type1", 1.5,{excipient1,excipient4})

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formulation2	("2", "name2", "type2", 2.7,{excipient2,excipient4})
formulation3	("3", "name3", "type3", 3.8,{excipient1,excipient2})
formulation4	("4", "name4", "type4", 4.2,{excipient3,excipient4})
Object Name	DFPropertyobject
dfProperty1	(1.11,1 , 1.11 , {3.2,4.2,5.6,6.6})
dfProperty2	(2.22,2 , 2.22 , {1.2,2.2,3.6,4.6})
dfProperty3	(3.33,3 , 3.33 , {1.6,5.2,6.6,7.8})
dfProperty4	(4.44,4 , 4.44 , {4.5,6.7,8.8,9.0})
Object Name	Production object
production1	("1", formulation1 ,dfProperty1 , "instruction1" , 1.12)
production2	("2", formulation2 ,dfProperty2 , "instruction2" , 2.23)
production3	("3", formulation3 ,dfProperty3 , "instruction3" , 3.34)
Production4	("4", formulation4 ,dfProperty4 , "instruction4" , 4.45)
Object Name	reformulationProduct object
reformulatedProduction1	("1", production1 , true , "role base")
reformulatedProduction2	("2", production4 , false , "case base")
reformulatedProduction3	("3", production3 , true , "role base")
reformulatedProduction4	("4", production4 , false , "case base")
Object Name	User object
user1	("1", "username 1", "password1", "name1" ,"173/1 chaing mai thailand" , "0840423850" , "example1@hotmail.com" , "admin");
user2	("1", "username 1", "password1", "name1" ,"173/1 chaing mai thailand" , "0840423850" , "example1@hotmail.com" , "user");
Object Name	reformulationHistory object
reformulationHistory3	("3", {reformulatedProduction1, reformulatedProduction2}, "5/10/2014 " , user1)
reformulationHistory4	("4", {reformulatedProduction3, reformulatedProduction4}, "7/4/2008 " , user2)

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Test Case

case	Description	Input	Expect result
		Id	reformulationHistory
1	Test get reformulationHistory object by reformulationHistory id.	3	("3", {reformulatedProduction1, reformulatedProduction2},"5/10/2014 ", user1)
2	Test getreformulationHistory object by reformulationHistory id.	4	("4", {reformulatedProduction3, reformulatedProduction4},"7/4/2008 ", user2)
3	Test get reformulationHistorywhich is not contain in database.	1	null
4	Test get reformulationHistory which is not contain in database.	2	null

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3.2.5 InferenceEngineDirector Class

3.2.5.1 Unit Test Case for Server Side 20 (UTC-SV -20)

getReformulationResult(production : Production) : ReformulationProduct []

ReformulationHistory object value = value (String id ,List<ReformulatedProduction> reformulatedProductionList , Date date , User user)

ReformulatedProduction object value = value (String id,Production production,booleanaccept,String inferenceEngine)

User object value =value (String id, String username, String password, String name, String address, Stringtelno , String email , String type);

Production object value = value (String id, Formulation formulation,DFProperty dfProperty , String instruction , float formulationWeight)

DFProperty object value = value (float totalweight ,int disgradationtime , float hardness , List<Double> dissolutionProfile)

Formulation object value = value (String id, String name,String type, double usedWeight, List<Excipient>api)

Excipient object value = value (String id,Substance substance ,List<SubstanceFunction> substanceFunctions , double usedWeight)

Substance object value = value (String id, String name, String waterSolubility, List stability, double pka, double partitionCoefficient , String solidState , String hygroscopicity , String particleSize , String alcoholSolubility , String flowability , double density , String saltForm , double mocularWeight , String iconicity)

SubstanceFunction object value = value (String functionName, String functionTyp, double minWeight, double maxWeight)

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Test data

Object Name	Substance object
substance1	("1","substance1","watersolubility1",{ "stability1","stability2"},3.4,4.6, "solidstate1","hygroscopicity1","particlesize1","alcoholsolubility1", "flowability1",4.7,"saltfrom1",5.6,"iconicity1")
substance2	(2,"substance2","watersolubility2",{ "stability3","stability4"},5.4,7.6, "solidstate2","hygroscopicity2","particlesize2","alcoholsolubility2", "flowability2",5.6,"saltfrom2",8.7,"iconicity2")
Substance3	("3","substance3","watersolubility3",{ "stability5","stability5"},6.4,9.6, "solidstate3","hygroscopicity3","particlesize3","alcoholsolubility3", "flowability3",2.4,"saltfrom3",6.6,"iconicity3")
Substance4	("4","substance4","watersolubility4",{ "stability6","stability6"},12.7,4.4, "solidstate4","hygroscopicity4","particlesize4","alcoholsolubility4", "flowability4",7.6,"saltfrom4",9.7,"iconicity4")
Object Name	SubstanceFunction
substanceFunction1	("functionName1","functionTyp1",1,11)
substanceFunction2	("functionName2","functionTyp2",2,12)
substanceFunction3	("functionName3","functionTyp3",3,13)
substanceFunction4	("functionName4","functionTyp4",4,14)
Object Name	Excipient object
excipient1	("1", substance1, { substanceFunction1, substanceFunction3}, 1.4)
excipient2	("2", substance2, { substanceFunction1, substanceFunction4}, 2.6)
excipient3	("2", substance2, { substanceFunction2, substanceFunction3}, 2.2)
excipient4	("2", substance2, { substanceFunction2, substanceFunction4}, 2.5)
Object Name	formulation object
formulation1	("1", "name1", "type1", 1,{excipient1,excipient4})
formulation2	("2", "name2", "type2", 2,{excipient2,excipient4})
formulation3	("3", "name3", "type3", 3,{excipient1,excipient2})
formulation4	("4", "name4", "type4", 4,{excipient3,excipient4})

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Object Name	DFPropertyobject
dfProperty1	(1.11,1 , 1.11 , {3.2,4.2,5.6,6.6})
dfProperty2	(2.22,2 , 2.22 , {1.2,2.2,3.6,4.6})
dfProperty3	(3.33,3 , 3.33 , {1.6,5.2,6.6,7.8})
dfProperty4	(4.44,4 , 4.44 , {4.5,6.7,8.8,9.0})
Object Name	Production object
production1	("1" , formulation1 ,dfProperty1 , "instruction1" , 1.12)
production2	("2" , formulation2 ,dfProperty2 , "instruction2" , 2.23)
production3	("3" , formulation3 ,dfProperty3 , "instruction3" , 3.34)
Production4	("4" , formulation4 ,dfProperty4 , "instruction4" , 4.45)
Object Name	reformulationProduct object
reformulatedProduction1	("1" , production1 , true , "role base")
reformulatedProduction2	("2" , production4 , false , "case base")
reformulatedProduction3	("3" , production3 , true , "role base")
reformulatedProduction4	("4" , production4 , false , "case base")
Object Name	User object
user1	("1" , "username 1" , "password1" ,"name1" ,"173/1 chaing mai thailand" , "0840423850" , "example1@hotmail.com" , "admin");
user2	("1" , "username 1" , "password1" ,"name1" ,"173/1 chaing mai thailand" , "0840423850" , "example1@hotmail.com" , "user");
Object Name	reformulationHistory object
reformulationHistory3	("3" , {reformulatedProduction1, reformulatedProduction2}, "5/10/2014 " , user1)
reformulationHistory4	("4" , {reformulatedProduction3, reformulatedProduction4}, "7/4/2008 " , user2)

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Test Case

case	Description	Input	Expect result
		Reformulation object	List ofReformulatedProductionobject
1	Test get all reformulaProduction list	("1" , formulation1 ,dfProperty1 , "instruction1" , 1.12)	{ reformulatedProduction1, reformulatedProduction2, reformulatedProduction3 , reformulatedProduction4 }

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