

Unit Testing Plan

for CoffeeMachine System

- Test Plan
- Test Design Specification
- Test Cases Specification

Project Team

Team 3

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1 Introduction

1.1 Objectives

본 문서는 2016년 건국대학교의 소프트웨어공학 개론 강의의 실습과제를 설명한다. 실습 과제는 coffee machine을 소프트웨어로 구성된 가상의 시스템으로 구현하는 것이다

1.2 Background

* Coffee machine 설명

Unit Test는 시스템을 구성하는 단위별로 나누어서 그 단위별로 Test하는 것이며, 요구 사항을 기준으로 입력과 출력을 정의하며 그 의도대로 올바른 결과가 나오는지 Test하는 것이다

1.3 Scope

Coffee machine System은 사용자의 요청에 따라 machine의 상태를 체크한 후 커피를 추출한다. 2016SE 수업을 통해 진행하게 될 프로젝트는 coffee machine을 가상 시스템으로 구현하는 것으로, coffee machine은 자신의 상태를 관리하여 사용자에게 알려주고, 사용자로부터 명령 및 입력 내용을 받아 출력을 만들어내는 역할을 한다. 모든 시스템은 SW 만으로 구현한다. HW가 필요한 부분은 SW모듈을 만들어 가상의 HW를 구현한다.



1.4 Project plan

1.5 Configuration management plan

Coffee Machine System의 Program Source Code 및 Unit Test를 위한 Test Code는 Cygwin 환경에서 이루어지며, Program Source Code 및 Test Code의 변경 및 수정 사항은 지속적으로 통합되고 Test된다

1.6 References

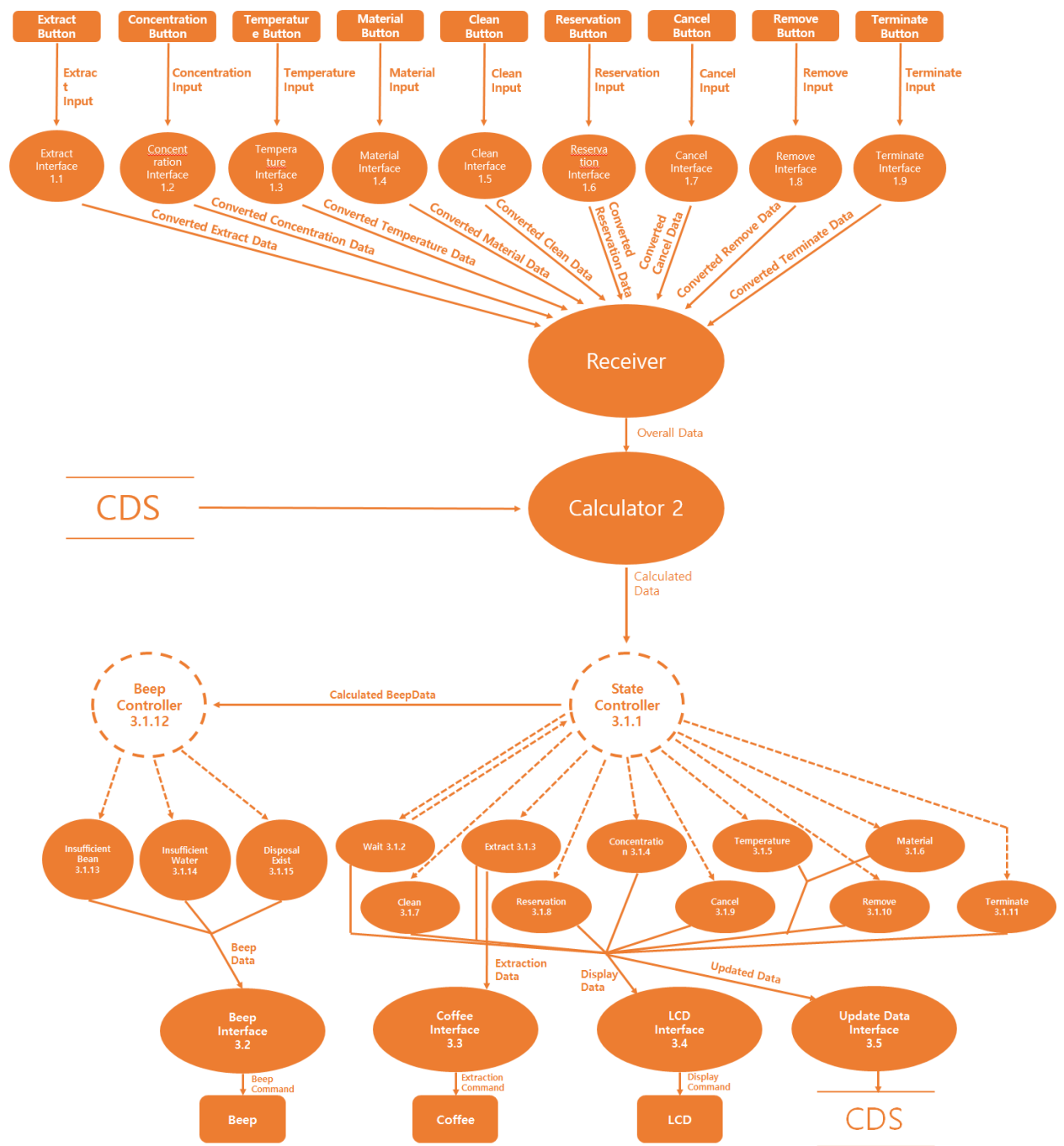
[2016SE_B][T3]SRA ver 5.0

[2016SE_B][T3]SDA ver 4.0

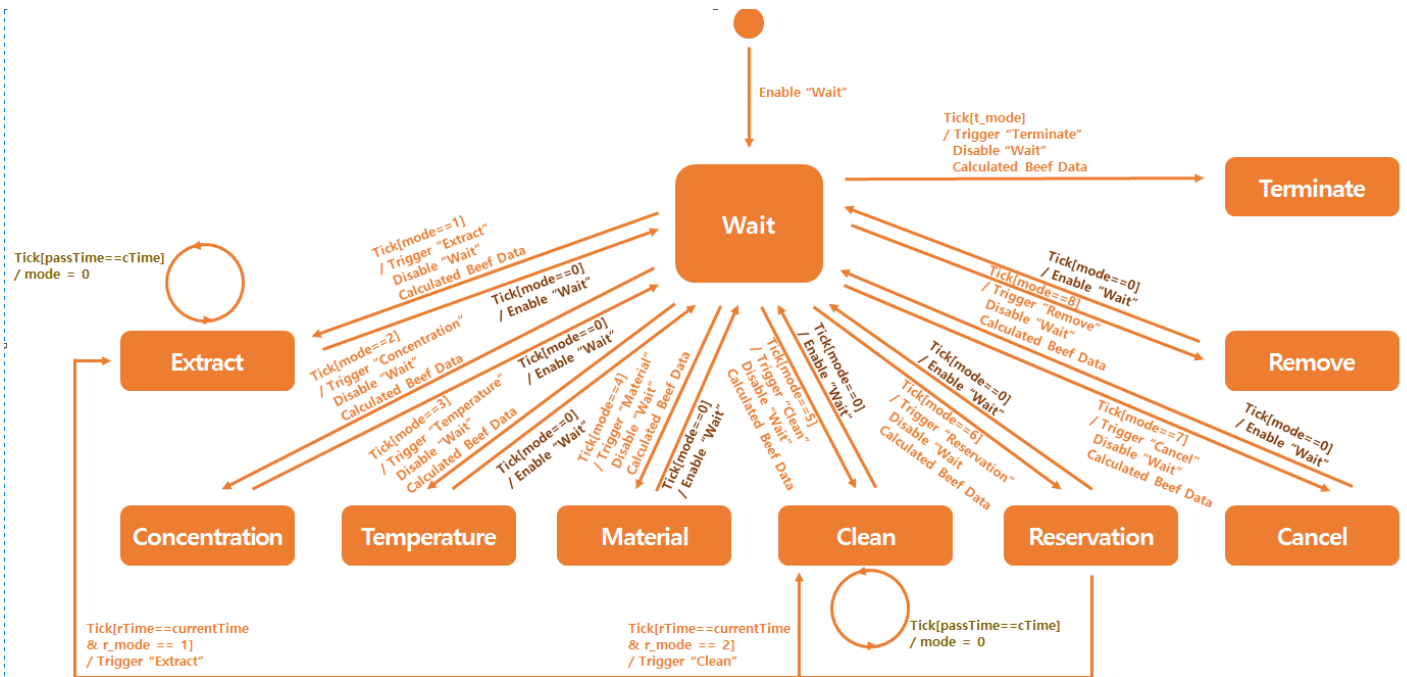
2 Test items

Coffee Machine System을 구성하는 최소 단위의 모듈들이 Unit Test의 대상이 된다. 각 모듈들이 요구사항을 만족하는 지를 Test하며, Test item은 다음 자료 들로부터 작성되었다.

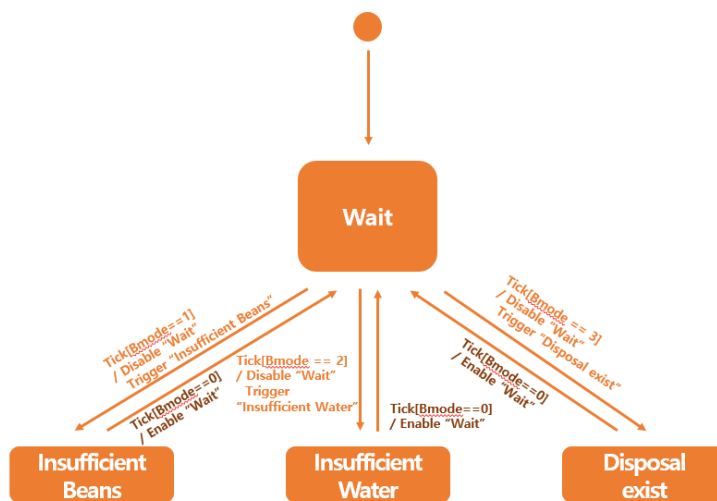
(1) Overall Coffee Machine modules([2016SE_B][T3]SRA ver 4.0 참조)



(2) State Controller 3.1.1 State Transition Diagram



(3) Beef Controller 3.1.12 State Transition Diagram



3 Features to be tested

(1) Process in SRA : 각 프로세스가 가지고 있는 요구사항을 만족하는 지를 Test한다.

- Coffee Machine System

(2) Modules in SDS : 각 모듈이 가지고 있는 데이터 인터페이스를 Test한다.

- Coffee Machine System(<Table1 Testing Process(DFD) 리스트>의 Process name 참조)

< Table1 Testing Process(DFD) 리스트 >

ID	Name	Description
2	Calculator	Receiver로부터 받아온 데이터와 Current Data Storage로부터 받아온 데이터를 계산하여 Calculated Data를 Main Controller에 보낸다.
3.1.1	State Controller	Calculator에서 받아온 데이터를 조건에 맞는 Process를 실행시킨다.
3.1.2	Wait	Mode==0일 때 실행된다. LCD에 정보를 출력하고, Current Data Storage에 Updated Current Data를 갱신시킨다.
3.1.3	Extract	Mode==1일 때 실행된다. 분쇄나 가열이 필요한 경우 온도와 커피가루 유무에 따라 Calculated Data 구조체 내부의 cTime 변수의 값을 증가시키고, LCD에 정보를 출력하고, Current Data Storage에 Updated Current Data를 갱신시킨다.
3.1.4	Concentration	Mode==2일 때 실행된다. LCD에 정보를 출력하고, Current Data Storage에 Updated Current Data를 갱신시킨다.
3.1.5	Temperature	Mode==3일 때 실행된다. LCD에 정보를 출력하고, Current Data Storage에 Updated Current Data를 갱신시킨다.
3.1.6	Material	Mode==4일 때 실행된다. LCD에 정보를 출력하고, Current Data Storage에 Updated Current Data를 갱신시킨다.
3.1.7	Clean	Mode==5일 때 실행된다. LCD에 정보를 출력하고, Current Data Storage에 Updated Current Data를 갱신시킨다.
3.1.8	Reservation	Mode==6일 때 실행된다. LCD에 정보를 출력한다.
3.1.9	Cancel	Mode==7일 때 실행된다. LCD에 정보를 출력한다.
3.1.10	Remove	Mode==8일 때 실행된다. LCD에 정보를 출력하고, Current Data Storage에 Updated Current Data를 갱신시킨다.
3.1.11	Terminate	Mode==9일 때 실행된다. 커피 머신 LCD에 정보를 출력한다.

3.1.12	Beep Controller	받아온 데이터로 조건에 맞는 Process를 실행시킨다.
3.1.13	Insufficient Been	Bmode == 1일 때 실행된다. LCD에 정보를 출력하고, 경보음을 울린다.
3.1.14	Insufficient Water	Bmode == 2일 때 실행된다. LCD에 정보를 출력하고, 경보음을 울린다.
3.1.15	Disposal Exist	Bmode == 3일 때 실행된다. LCD에 정보를 출력하고, 경보음을 울린다.

4 Features not to be tested

(3) Process in SRA : 외부 장치 드라이버, 단순 데이터 전달 프로세스 등은 Test에서 제외한다.

- Coffee Machine System

(4) Modules in SDS

- Coffee Machine System(<Table2 No-Testing Process(DFD) 리스트>의 Process name 참조)

<Table2 No-Testing Process(DFD) 리스트>

ID	Name	Description
1.1	Extract Interface	Extract Input을 받아 Receiver로 Converted Extract Data를 보낸다.
1.2	Concentration Interface	Concentration Input 을 받아 Calculator 로 Converted Concentration Data를 보낸다.
1.3	Temperature Interface	Temperature Input 을 받아 Calculator 로 Converted Temperature Data를 보낸다
1.4	Material Interface	Material Input 을 받아 Calculator 로 Converted Material Data를 보낸다
1.5	Clean Interface	Clean Input 을 받아 Calculator 로 Converted Clean Data를 보낸다.
1.6	Reservation Interface	Reservation Input 을 받아 Calculator 로 Converted Reservation Data를 보낸다.
1.7	Cancel Interface	Cancel Input 을 받아 Calculator 로 Converted Cancel Data를 보낸다.
1.8	Remove Interface	Remove Input 을 받아 Calculator 로 Converted Remove Data를 보낸다.

1.9	Terminate Interface	Terminate Input 을 받아 Calculator 로 Converted Terminate Data를 보낸다.
1.10	Receiver	Converted Extract Data, Converted Concentration Data, Converted Temperature Data, Converted Material Data, Converted Clean Data, Converted Reservation Data, Converted Cancel Data, Converted Remove Data, Converted Terminate Data를 받아 취합하여 Overall Data로 Calculator에 보낸다.
3.2	Beep Interface	Beep Data 를 받아 Beep 로 Beep Command를 보낸다.
3.3	Coffee Interface	Extraction Data 를 받아 Coffee 로 Extraction Command를 보낸다.
3.4	LCD Interface	Display Data 를 받아 LCD 로 Display Command 를 보낸다.
3.5	Updated Interface	Updated Data 를 받아 Current Data Storage로 보낸다.

5 Approach

Coffee Machine System의 Program Source Code 및 Unit Test 를 위한 Test Code는 Cygwin(gcc) 환경에서 이루어지며 Program Source Code의 변경 및 수정 사항은 지속적으로 통합되고 테스트된다.

6 Item pass/fail criteria

각 모듈은 요구사항을 모두 만족하여야 한다. 입력 값에 따른 출력 값의 결과가 같아야 한다.

7 Unit test design specification

7.1 Test design specification identifier

TEAM3_CMS_0_000_000

7.2 Features to be tested

< Table1 Testing Process(DFD) 리스트 > 참조

7.3 Approach refinements

Coffee Machine System의 각 모듈이 요구사항을 만족하는 지를 확인하기 위하여, 요구 사항에 정의된 내용에 기반하여 Test Case를 작성한다. 그 이외의 예외 상황에 대해서

는 Test Case를 작성하지 않는다.

7.4 Test identification

< Table3 Test Design Identification >

Identifier	Feature(Process DFD)	Valid / Invalid value
TEAM3_CMS_0_000_000	2 Calculator	select(Overall Data) : 1 convertedExtractData(Overall Data) : True wait(current Data) : True disposal(current Data) : True material.water(current Data) : 150 concentration(current Data) : 200 material.powder(current Data) : True material.bean(current Data) : 10
TEAM3_CMS_0_000_001	2 Calculator	select(Overall Data) : 1 convertedExtractData(Overall Data) : True wait(current Data) : True disposal(current Data) : False material.water(current Data) : 150 concentration(current Data) : 200 material.powder(current Data) : True material.bean(current Data) : 10
TEAM3_CMS_0_000_002	2 Calculator	select(Overall Data) : 1 convertedExtractData(Overall Data) : True wait(current Data) : True disposal(current Data) : False material.water(current Data) : 250 concentration(current Data) : 200 material.powder(current Data) : True material.bean(current Data) : 10
TEAM3_CMS_0_000_003	2 Calculator	select(Overall Data) : 1 convertedExtractData(Overall Data) : True wait(current Data) : True disposal(current Data) : False

		material.water(current Data) : 250 concentration(current Data) : 200 material.powder(current Data) : False material.bean(current Data) : 10
TEAM3_CMS_0_000_004	2 Calculator	select(Overall Data) : 1 convertedExtractData(Overall Data) : True wait(current Data) : True disposal(current Data) : False material.water(current Data) : 250 concentration(current Data) : 200 material.powder(current Data) : False material.bean(current Data) : 5
TEAM3_CMS_0_000_005	2 Calculator	select(Overall Data) : 2 wait(current Data) : True converted Concentration Data (Overall Data) : 200
TEAM3_CMS_0_000_006	2 Calculator	select(Overall Data) : 3 wait(current Data) : True converted Temperature Data (Overall Data) : True
TEAM3_CMS_0_000_007	2 Calculator	select(Overall Data) : 4 wait(current Data) : True convertedMaterialData.m_mode (Overall Data) : 1 convertedMaterialData.bean (Overall Data) : 50 material.bean (current Data) : 40
TEAM3_CMS_0_000_008	2 Calculator	select(Overall Data) : 4 wait(current Data) : True convertedMaterialData.m_mode (Overall Data) : 1 convertedMaterialData.bean (Overall Data) : 50 material.bean (current Data) : 60
TEAM3_CMS_0_000_009	2 Calculator	select(Overall Data) : 4 wait(current Data) : True convertedMaterialData.m_mode

		(Overall Data) : 2 material.powder (current Data) : False
TEAM3_CMS_0_000_010	2 Calculator	select(Overall Data) : 4 wait(current Data) : True convertedMaterialData.m_mode (Overall Data) : 2 material.powder (current Data) : True
TEAM3_CMS_0_000_011	2 Calculator	select(Overall Data) : 4 wait(current Data) : True convertedMaterialData.m_mode (Overall Data) : 3 convertedMaterialData.water (Overall Data) : 500 material.water (current Data) : 400
TEAM3_CMS_0_000_012	2 Calculator	select(Overall Data) : 4 wait(current Data) : True convertedMaterialData.m_mode (Overall Data) : 3 convertedMaterialData.water (Overall Data) : 500 material.water (current Data) : 600
TEAM3_CMS_0_000_013	2 Calculator	select(Overall Data) : 5 wait(current Data) : True convertedCleanData(Overall Data) : True material.water (current Data) : 600
TEAM3_CMS_0_000_014	2 Calculator	select(Overall Data) : 5 wait(current Data) : True convertedCleanData(Overall Data) : True material.water (current Data) : 400
TEAM3_CMS_0_000_015	2 Calculator	select(Overall Data) : 6 wait(current Data) : True convertedReservationData.extract (Overall Data) : True convertedReservationData.r_mode (Overall Data) : 1 disposal(current Data) : True

		material.water(current Data) : 150 concentration(current Data) : 200 material.powder(current Data) : True material.bean(current Data) : 10
TEAM3_CMS_0_000_016	2 Calculator	select(Overall Data) : 6 wait(current Data) : True convertedReservationData.extract (Overall Data) : True convertedReservationData.r_mode (Overall Data) : 1 disposal(current Data) : False material.water(current Data) : 150 concentration(current Data) : 200 material.powder(current Data) : True material.bean(current Data) : 10
TEAM3_CMS_0_000_017	2 Calculator	select(Overall Data) : 6 wait(current Data) : True convertedReservationData.extract (Overall Data) : True convertedReservationData.r_mode (Overall Data) : 1 convertedReservationData.time.hour (Overall Data) : 10 convertedReservationData.time.minute (Overall Data) : 10 convertedReservationData.time.second (Overall Data) : 10 disposal(current Data) : False material.water(current Data) : 250 concentration(current Data) : 200 material.powder(current Data) : True material.bean(current Data) : 10
TEAM3_CMS_0_000_018	2 Calculator	select(Overall Data) : 6 wait(current Data) : True convertedReservationData.extract (Overall Data) : True

		<p>convertedReservationData.r_mode (Overall Data) : 1</p> <p>convertedReservationData.time.hour (Overall Data) : 10</p> <p>convertedReservationData.time.minute (Overall Data) : 10</p> <p>convertedReservationData.time.second (Overall Data) : 10</p> <p>disposal(current Data) : False</p> <p>material.water(current Data) : 250</p> <p>concentration(current Data) : 200</p> <p>material.powder(current Data) : False</p> <p>material.bean(current Data) : 10</p>
TEAM3_CMS_0_000_019	2 Calculator	<p>select(Overall Data) : 6</p> <p>wait(current Data) : True</p> <p>convertedReservationData.extract (Overall Data) : True</p> <p>convertedReservationData.r_mode (Overall Data) : 1</p> <p>disposal(current Data) : False</p> <p>material.water(current Data) : 250</p> <p>concentration(current Data) : 200</p> <p>material.powder(current Data) : False</p> <p>material.bean(current Data) : 5</p>
TEAM3_CMS_0_000_020	2 Calculator	<p>select(Overall Data) : 6</p> <p>wait(current Data) : True</p> <p>convertedReservationData.clean (Overall Data) : True</p> <p>convertedReservationData.r_mode (Overall Data) : 2</p> <p>convertedReservationData.time.hour (Overall Data) : 10</p> <p>convertedReservationData.time.minute (Overall Data) : 10</p> <p>convertedReservationData.time.second (Overall Data) : 10</p> <p>material.water(current Data) : 600</p>

TEAM3_CMS_0_000_021	2 Calculator	select(Overall Data) : 6 wait(current Data) : True convertedReservationData.clean (Overall Data) : True convertedReservationData.r_mode (Overall Data) : 2 convertedReservationData.time.hour (Overall Data) : 10 convertedReservationData.time.minute (Overall Data) : 10 convertedReservationData.time.second (Overall Data) : 10 material.water(current Data) : 400
TEAM3_CMS_0_000_022	2 Calculator	select(Overall Data) : 7 wait(current Data) : True convertedCancelData (overall Data) : True
TEAM3_CMS_0_000_023	2 Calculator	select(Overall Data) : 8 wait(current Data) : True convertedRemoveData(Overall Data) : True disposal(current Data) : True
TEAM3_CMS_0_000_024	2 Calculator	select(Overall Data) : 8 wait(current Data) : True convertedRemoveData(Overall Data) : True disposal(current Data) : False
TEAM3_CMS_0_000_025	2 Calculator	select(Overall Data) : 9 wait(current Data) : True convertedTerminateData(Overall Data) : True
TEAM3_CMS_0_001_000	3.1.1 State Controller	mode(calculated Data) : 0 wait(current Data) : True index(Test) : 11
TEAM3_CMS_0_001_001	3.1.1 State Controller	mode(calculated Data) : 1 wait(current Data) : True wait(calculated Data) : False index(Test) : 11

TEAM3_CMS_0_001_002	3.1.1 State Controller	mode(calculated Data) : 2 wait(current Data) : True wait(calculated Data) : False index(Test) : 11
TEAM3_CMS_0_001_003	3.1.1 State Controller	mode(calculated Data) : 3 wait(current Data) : True wait(calculated Data) : False index(Test) : 11
TEAM3_CMS_0_001_004	3.1.1 State Controller	mode(calculated Data) : 4 wait(current Data) : True wait(calculated Data) : False index(Test) : 11
TEAM3_CMS_0_001_005	3.1.1 State Controller	mode(calculated Data) : 5 wait(current Data) : True wait(calculated Data) : False index(Test) : 11
TEAM3_CMS_0_001_006	3.1.1 State Controller	mode(calculated Data) : 6 wait(current Data) : True wait(calculated Data) : False reservation.r_mode(calculated Data) : 1 reservation.extract(calculated Data) : True index(Test) : 11
TEAM3_CMS_0_001_007	3.1.1 State Controller	mode(calculated Data) : 6 wait(current Data) : True wait(calculated Data) : False reservation.r_mode(calculated Data) : 2 reservation.clean(calculated Data) : True index(Test) : 11
TEAM3_CMS_0_001_008	3.1.1 State Controller	mode(calculated Data) : 7 wait(current Data) : True wait(calculated Data) : False index(Test) : 11
TEAM3_CMS_0_001_009	3.1.1 State Controller	mode(calculated Data) : 8 wait(current Data) : True

		wait(calculated Data) : False index(Test) : 11
TEAM3_CMS_0_001_010	3.1.1 State Controller	mode(calculated Data) : 9 wait(current Data) : True wait(calculated Data) : False index(Test) : 11
TEAM3_CMS_0_001_011	3.1.1 State Controller	mode(calculated Data) : 10 wait(current Data) : True wait(calculated Data) : False index(Test) : 11
TEAM3_CMS_0_001_012	3.1.1 State Controller	mode(calculated Data) : 1 wait(current Data) : False wait(calculated Data) : False index(Test) : 11
TEAM3_CMS_0_001_013	3.1.1 State Controller	mode(calculated Data) : 9 wait(current Data) : True wait(calculated Data) : True index(Test) : 11
TEAM3_CMS_0_001_014	3.1.1 State Controller	mode(calculated Data) : 9 wait(current Data) : False wait(calculated Data) : True index(Test) : 11
TEAM3_CMS_0_002_000	3.1.2 Wait	wait(current Data) : True mode(current Data) : 0
TEAM3_CMS_0_003_000	3.1.3 Extract	temperature(current Data) : False water(current Data.material) : 100 bean(current Data.material) : 90 powder (current Data.material) : True disposal(current Data) : False water(calculated Data) : 50 bean(calculated Data.material) : 80 powder(calculated Data.material) : True disposal(calculated Data) : True

		test : 0
TEAM3_CMS_0_003_001	3.1.3 Extract	temperature(current Data) : False powder(calculated Data.material) : False test : 0
TEAM3_CMS_0_003_002	3.1.3 Extract	temperature(current Data) : True powder(calculated Data.material) : False test : 0
TEAM3_CMS_0_003_003	3.1.3 Extract	temperature(current Data) : True powder(calculated Data.material) : True test : 0
TEAM3_CMS_0_004_000	3.1.4 Concentration	concentration(Calculated Data) : 100
TEAM3_CMS_0_005_000	3.1.5 Temperature	temperature(calculated Data) : False
TEAM3_CMS_0_005_001	3.1.5 Temperature	temperature(calculated Data) : True
TEAM3_CMS_0_006_000	3.1.6 Material	m_mode(calculated Data) : 1 bean(calculated Data.material) : 50
TEAM3_CMS_0_006_001	3.1.6 Material	m_mode(calculated Data) : 2 powder(calculated Data.material) : True
TEAM3_CMS_0_006_002	3.1.6 Material	m_mode(calculated Data) : 2 powder(calculated Data.material) : False
TEAM3_CMS_0_006_003	3.1.6 Material	m_mode(calculated Data) : 3 water(calculated Data.material) : 500
TEAM3_CMS_0_007_000	3.1.7 Clean	water(calculated Data.material) : 200 material.water(current Data) : 500 Test : 0
TEAM3_CMS_0_008_000	3.1.8 Reservation	hour(calculated Data.reservation.time) : 현재 시 minute(calculated Data.reservation.time) : 현재 분 second(calculated Data.reservation.time) : 현재 초+5

		r_mode(calculated Data.reservation) : 1 Test : 0
TEAM3_CMS_0_008_001	3.1.8 Reservation	hour(calculated Data.reservation.time) : 현재 시 minute(calculated Data.reservation.time) : 현재 분 second(calculated Data.reservation.time) : 현재 초+5 r_mode(calculated Data.reservation) : 2 Test : 0
TEAM3_CMS_0_009_000	3.1.9 Cancel	hour(calculated Data.reservation.time) : 12 minute(calculated Data.reservation.time) : 34 second(calculated Data.reservation.time) : 56 r_mode(calculated Data.reservation) : 1
TEAM3_CMS_0_010_000	3.1.10 Remove_	disposal(current Data) : True
TEAM3_CMS_0_011_000	3.1.11 Terminate	wait(calculated Data) : true mode(calculated Data) : 9
TEAM3_CMS_0_012_000	3.1.12 Beep Controller	b_mode(current Data) : 1 wait(current Data) : True
TEAM3_CMS_0_012_001	3.1.12 Beep Controller	b_mode(current Data) : 2 wait(current Data) : True
TEAM3_CMS_0_012_002	3.1.12 Beep Controller	b_mode(current Data) : 3 wait(current Data) : True
TEAM3_CMS_0_012_003	3.1.12 Beep Controller	b_mode(current Data) : 3 wait(current Data) : False
TEAM3_CMS_0_012_004	3.1.12 Beep Controller	b_mode(current Data) : 4 wait(current Data) : True
TEAM3_CMS_0_013_000	3.1.13 Insufficient	Size : 500

	Been	Length : 500
TEAM3_CMS_0_014_000	3.1.14 Insufficient Water	Size : 500 Length : 1000
TEAM3_CMS_0_015_000	3.1.15 Disposal Exist	Size : 500 Length : 500

7.5 Feature pass/fail criteria

최초 입력에 대해 범위 이상의 값과 범위 이하의 값을 한번씩 입력해보고, 그 뒤는 선행 프로세스의 구조상 이외의 값이 나올 수 없으므로 범위 이상의 값과 범위 이하의 값에 대해 테스트 하지 않음.

8 Unit test case specification

8.1 Test case specification identifier

< Table4 Test Design Identification >

Identifier	Input Specification	Output Specification
TEAM3_CMS_0_000_000	select(Overall Data) : 1 convertedExtractData(Overall Data) : True wait(current Data) : True disposal(current Data) : True material.water(current Data) : 150 concentration(current Data) : 200 material.powder(current Data) : True material.bean(current Data) : 10	mode(calculated Data) : 1 wait(calculated Data) : True b_mode(calculated Data) : 3
TEAM3_CMS_0_000_001	select(Overall Data) : 1 convertedExtractData(Overall Data) : True wait(current Data) : True disposal(current Data) : False	wait(calculated Data) : True material.water(calculated Data) : -50 material.powder(calculated Data) : TRUE

	material.water(current Data) : 150 concentration(current Data) : 200 material.powder(current Data) : True material.bean(current Data) : 10	material.bean(calculated Data) : 0
TEAM3_CMS_0_000_002	select(Overall Data) : 1 convertedExtractData(Overall Data) : True wait(current Data) : True disposal(current Data) : False material.water(current Data) : 250 concentration(current Data) : 200 material.powder(current Data) : True material.bean(current Data) : 10	material.water(calculated Data) : 50 material.powder(calculated Data) : True material.bean(calculated Data) : 0 disposal(calculated Data) : True wait(calculated Data) : False mode(calculated Data) : 1
TEAM3_CMS_0_000_003	select(Overall Data) : 1 convertedExtractData(Overall Data) : True wait(current Data) : True disposal(current Data) : False material.water(current Data) : 250 concentration(current Data) : 200 material.powder(current Data) : False material.bean(current Data) : 10	material.water(calculated Data) : 50 material.powder(calculated Data) : FLASE material.bean(calculated Data) : 0 disposal(calculated Data) : True wait(calculated Data) : False mode(calculated Data) : 1
TEAM3_CMS_0_000_004	select(Overall Data) : 1 convertedExtractData(Overall Data)	material.water(calculated Data) : 50 material.powder(calculated

	: True wait(current Data) : True disposal(current Data) : False material.water(current Data) : 250 concentration(current Data) : 200 material.powder(current Data) : False material.bean(current Data) : 5	Data) : FLASE material.bean(calculated Data) : -5 b_mode(calculated Data) : 1 wait(calculated Data) : True mode(calculated Data) : 1
TEAM3_CMS_0_000_005	select(Overall Data) : 2 wait(current Data) : True converted Concentration Data (Overall Data) : 200	wait(calculated Data) : False concentration(calculated Data) : 200 mode(calculated Data) : 2
TEAM3_CMS_0_000_006	select(Overall Data) : 3 wait(current Data) : True converted Temperature Data (Overall Data) : True	wait(calculated Data) : False temperature(calculated Data) : True mode(calculated Data) : 3
TEAM3_CMS_0_000_007	select(Overall Data) : 4 wait(current Data) : True convertedMaterialData.m_mo de (Overall Data) : 1 convertedMaterialData.bean (Overall Data) : 50 material.bean (current Data) : 40	wait(calculated Data) : False material.bean(calculated Data) : 90 mode(calculated Data) : 4
TEAM3_CMS_0_000_008	select(Overall Data) : 4 wait(current Data) : True convertedMaterialData.m_mo de (Overall Data) : 1 convertedMaterialData.bean (Overall Data) : 50 material.bean (current Data) :	wait(calculated Data) : True

	60	
TEAM3_CMS_0_000_009	select(Overall Data) : 4 wait(current Data) : True convertedMaterialData.m_mode (Overall Data) : 2 material.powder (current Data) : False	wait(calculated Data) : False material.powder(calculated Data) : True mode(calculated Data) : 4
TEAM3_CMS_0_000_010	select(Overall Data) : 4 wait(current Data) : True convertedMaterialData.m_mode (Overall Data) : 2 material.powder (current Data) : True	wait(calculated Data) : True mode(calculated Data) : 4
TEAM3_CMS_0_000_011	select(Overall Data) : 4 wait(current Data) : True convertedMaterialData.m_mode (Overall Data) : 3 convertedMaterialData.water (Overall Data) : 500 material.water (current Data) : 400	wait(calculated Data) : False material.bean(calculated Data) : 900 mode(calculated Data) : 4
TEAM3_CMS_0_000_012	select(Overall Data) : 4 wait(current Data) : True convertedMaterialData.m_mode (Overall Data) : 3 convertedMaterialData.water (Overall Data) : 500 material.water (current Data) : 600	wait(calculated Data) : True mode(calculated Data) : 4
TEAM3_CMS_0_000_013	select(Overall Data) : 5 wait(current Data) : True convertedCleanData(Overall Data) : True material.water (current Data) :	wait (calculated Data) : False material.water(calculated Data) : 100 mode(calculated Data) : 5

	600	
TEAM3_CMS_0_000_014	select(Overall Data) : 5 wait(current Data) : True convertedCleanData(Overall Data) : True material.water (current Data) : 400	wait (calculated Data) : True mode(calculated Data) : 5
TEAM3_CMS_0_000_015	select(Overall Data) : 6 wait(current Data) : True convertedReservationData.extr act (Overall Data) : True convertedReservationData.r_m ode (Overall Data) : 1 disposal(current Data) : True material.water(current Data) : 150 concentration(current Data) : 200 material.powder(current Data) : True material.bean(current Data) : 10	wait (calculated Data) : True mode(calculated Data) : 6
TEAM3_CMS_0_000_016	select(Overall Data) : 6 wait(current Data) : True convertedReservationData.extr act (Overall Data) : True convertedReservationData.r_m ode (Overall Data) : 1 disposal(current Data) : False material.water(current Data) : 150 concentration(current Data) : 200 material.powder(current	wait (calculated Data) : True mode(calculated Data) : 6

	Data) : True material.bean(current Data) : 10	
TEAM3_CMS_0_000_017	select(Overall Data) : 6 wait(current Data) : True convertedReservationData.extr act (Overall Data) : True convertedReservationData.r_m ode (Overall Data) : 1 convertedReservationData.tim e.hour (Overall Data) : 10 convertedReservationData.tim e.minute (Overall Data) : 10 convertedReservationData.tim e.second (Overall Data) : 10 disposal(current Data) : False material.water(current Data) : 250 concentration(current Data) : 200 material.powder(current Data) : True material.bean(current Data) : 10	wait(calculated Data): False disposal(calculated Data) : True material.bean (calculated Data) : 10 material.water (calculated Data) : 50 material.powder (calculated Data) : False reservation.r_mode (calculated Data) : 1 reservation.extract (calculated Data) : True reservation.time.hour (calculated Data) : 10 reservation.r_time.hour (calculated Data) : 10 reservation.r_time.hour (calculated Data) : 10 mode(calculated Data) : 6
TEAM3_CMS_0_000_018	select(Overall Data) : 6 wait(current Data) : True convertedReservationData.extr act (Overall Data) : True convertedReservationData.r_m ode (Overall Data) : 1	wait(calculated Data): False disposal(calculated Data) : True material.bean (calculated Data) : 0 material.water (calculated Data) : 50 material.powder (calculated Data) : False

	<p>convertedReservationData.time.hour (Overall Data) : 10</p> <p>convertedReservationData.time.minute (Overall Data) : 10</p> <p>convertedReservationData.time.second (Overall Data) : 10</p> <p>disposal(current Data) : False</p> <p>material.water(current Data) : 250</p> <p>concentration(current Data) : 200</p> <p>material.powder(current Data) : False</p> <p>material.bean(current Data) : 10</p>	<p>reservation.r_mode (calculated Data) : 1</p> <p>reservation.extract (calculated Data) : True</p> <p>reservation.time.hour (calculated Data) : 10</p> <p>reservation.r_time.hour (calculated Data) : 10</p> <p>reservation.r_time.hour (calculated Data) : 10</p> <p>mode(calculated Data) : 6</p>
TEAM3_CMS_0_000_019	<p>select(Overall Data) : 6</p> <p>wait(current Data) : True</p> <p>convertedReservationData.extract (Overall Data) : True</p> <p>convertedReservationData.r_mode (Overall Data) : 1</p> <p>disposal(current Data) : False</p> <p>material.water(current Data) : 250</p> <p>concentration(current Data) : 200</p> <p>material.powder(current Data) : False</p> <p>material.bean(current Data) : 5</p>	<p>wait (calculated Data) : True</p> <p>mode(calculated Data) : 6</p>
TEAM3_CMS_0_000_020	<p>select(Overall Data) : 6</p> <p>wait(current Data) : True</p>	<p>wait(calculated Data) : False</p> <p>material.water(calculated Data)</p>

	<p>convertedReservationData.clean (Overall Data) : True</p> <p>convertedReservationData.r_mode (Overall Data) : 2</p> <p>convertedReservationData.time.hour (Overall Data) : 10</p> <p>convertedReservationData.time.minute (Overall Data) : 10</p> <p>convertedReservationData.time.second (Overall Data) : 10</p> <p>material.water(current Data) : 600</p>	<p>: 100</p> <p>reservation.r_mode (calculated Data) : 2</p> <p>reservation.clean (calculated Data) : True</p> <p>reservation.time.hour (calculated Data) : 10</p> <p>reservation.r_time.hour (calculated Data) : 10</p> <p>reservation.r_time.hour (calculated Data) : 10</p> <p>mode(calculated Data) : 6</p>
TEAM3_CMS_0_000_021	<p>select(Overall Data) : 6</p> <p>wait(current Data) : True</p> <p>convertedReservationData.clean (Overall Data) : True</p> <p>convertedReservationData.r_mode (Overall Data) : 2</p> <p>convertedReservationData.time.hour (Overall Data) : 10</p> <p>convertedReservationData.time.minute (Overall Data) : 10</p> <p>convertedReservationData.time.second (Overall Data) : 10</p> <p>material.water(current Data) : 400</p>	<p>wait(calculated Data) : True</p> <p>reservation.r_mode (calculated Data) : 2</p> <p>reservation.clean (calculated Data) : False</p> <p>reservation.time.hour (calculated Data) : 0</p> <p>reservation.r_time.hour (calculated Data) : 0</p> <p>reservation.r_time.hour (calculated Data) : 0</p> <p>mode(calculated Data) : 6</p>
TEAM3_CMS_0_000_022	<p>select(Overall Data) : 7</p> <p>wait(current Data) : True</p> <p>convertedCancelData</p>	<p>wait(calculated Data) : False</p> <p>mode(calculated Data) : 7</p>

	(overall Data) : True	
TEAM3_CMS_0_000_023	select(Overall Data) : 8 wait(current Data) : True convertedRemoveData(Overall Data) : True disposal(current Data) : True	wait(calculated Data) : False disposal(calculated Data) : False mode(calculated Data) : 7
TEAM3_CMS_0_000_024	select(Overall Data) : 8 wait(current Data) : True convertedRemoveData(Overall Data) : True disposal(current Data) : False	wait(calculated Data) : True disposal(calculated Data) : False mode(calculated Data) : 8
TEAM3_CMS_0_000_025	select(Overall Data) : 9 wait(current Data) : True convertedTerminateData(Overall Data) : True	wait(calculated Data) : False mode(calculated Data) : 9
TEAM3_CMS_0_001_000	mode(calculated Data) : 0 wait(current Data) : True index(Test) : 11	index(Test) : 0 = Call Wait
TEAM3_CMS_0_001_001	mode(calculated Data) : 1 wait(current Data) : True wait(calculated Data) : False index(Test) : 11	index(Test) : 1 = Call extract
TEAM3_CMS_0_001_002	mode(calculated Data) : 2 wait(current Data) : True wait(calculated Data) : False index(Test) : 11	index(Test) : 2 = Call concentration
TEAM3_CMS_0_001_003	mode(calculated Data) : 3 wait(current Data) : True wait(calculated Data) : False index(Test) : 11	index(Test) : 3 = Call temperature
TEAM3_CMS_0_001_004	mode(calculated Data) : 4 wait(current Data) : True wait(calculated Data) : False index(Test) : 11	index(Test) : 4 = Call material
TEAM3_CMS_0_001_005	mode(calculated Data) : 5	index(Test) : 5

	wait(current Data) : True wait(calculated Data) : False index(Test) : 11	= Call clean
TEAM3_CMS_0_001_006	mode(calculated Data) : 6 wait(current Data) : True wait(calculated Data) : False reservation.r_mode(calculated Data) : 1 reservation.extract(calculated Data) : True index(Test) : 11	index(Test) : 6 = Call reservation
TEAM3_CMS_0_001_007	mode(calculated Data) : 6 wait(current Data) : True wait(calculated Data) : False reservation.r_mode(calculated Data) : 2 reservation.clean(calculated Data) : True index(Test) : 11	index(Test) : 6 = Call reservation
TEAM3_CMS_0_001_008	mode(calculated Data) : 7 wait(current Data) : True wait(calculated Data) : False index(Test) : 11	index(Test) : 7 = Call Cancel
TEAM3_CMS_0_001_009	mode(calculated Data) : 8 wait(current Data) : True wait(calculated Data) : False index(Test) : 11	index(Test) : 8 = Call Remove
TEAM3_CMS_0_001_010	mode(calculated Data) : 9 wait(current Data) : True wait(calculated Data) : False index(Test) : 11	index(Test) : 9 = Call Terminate
TEAM3_CMS_0_001_011	mode(calculated Data) : 10 wait(current Data) : True wait(calculated Data) : Flase	index(Test) : -1 =어떠한 함수도 Call하지 않음

	index(Test) : 11	
TEAM3_CMS_0_001_012	mode(calculated Data) : 1 wait(current Data) : False wait(calculated Data) : Flase index(Test) : 11	index(Test) : -1 =어떠한 함수도 Call하지 않음
TEAM3_CMS_0_001_013	mode(calculated Data) : 9 wait(current Data) : True wait(calculated Data) : True index(Test) : 11	index(Test) : -1 =어떠한 함수도 Call하지 않음
TEAM3_CMS_0_001_014	mode(calculated Data) : 9 wait(current Data) : False wait(calculated Data) : True index(Test) : 11	index(Test) : -1 =어떠한 함수도 Call하지 않음
TEAM3_CMS_0_002_000	wait(current Data) : True mode(current Data) : 0	condition(display Data) : Waiting wait(display Data) : True mode(display Data) : 0
TEAM3_CMS_0_003_000	temperature(current Data) : False water(current Data.material) : 100 bean(current Data.material) : 90 powder (current Data.material) : True disposal(current Data) : False water(calculated Data) : 50 bean(calculated Data.material) : 80 powder(calculated Data.material) : True disposal(calculated Data) : True test : 0	test : 20 water(current Data.material) : 50 bean(current Data.material) : 80 powder(current Data.material) : True disposal(current Data) : True test : 20
TEAM3_CMS_0_003_001	temperature(current Data) : False	Test : 15

	powder(calculated Data.material) : False test : 0	
TEAM3_CMS_0_003_002	temperature(current Data) : True powder(calculated Data.material) : False test : 0	Test : 25
TEAM3_CMS_0_003_003	temperature(current Data) : True powder(calculated Data.material) : True test : 0	Test : 15
TEAM3_CMS_0_004_000	concentration(Calculated Data) : 100	concentration(display Data) : 100
TEAM3_CMS_0_005_000	temperature(calculated Data) : True	temperature(display Data) : Hot
TEAM3_CMS_0_005_001	temperature(calculated Data) : Flase	temperature(display Data) : Ice
TEAM3_CMS_0_006_000	m_mode(calculated Data) : 1 bean(calculated Data.material) : 50	bean(display Data) : 50 bean(current Data.material) : 50
TEAM3_CMS_0_006_001	m_mode(calculated Data) : 2 powder(calculated Data.material) : True	powder(display Data) : O powder(current Data.material) : True
TEAM3_CMS_0_006_002	m_mode(calculated Data) : 2 powder(calculated Data.material) : False	powder(display Data) : X powder(current Data.material) : False
TEAM3_CMS_0_006_003	m_mode(calculated Data) : 3 water(calculated Data.material) : 500	water(display Data) : 500 Water(current Data.material) : 500
TEAM3_CMS_0_007_000	water(calculated Data.material) : 200	material.water(current Data) : 200

	material.water(current Data) : 500 Test : 0	Test : 10
TEAM3_CMS_0_008_000	hour(calculated Data.reservation.time) : 현재 시 minute(calculated Data.reservation.time) : 현재 분 second(calculated Data.reservation.time) : 현재 초+5 r_mode(calculated Data.reservation) : 1 Test : 0	Test : 15 r_mode(calculated Data.reservation) : 0
TEAM3_CMS_0_008_001	hour(calculated Data.reservation.time) : 현재 시 minute(calculated Data.reservation.time) : 현재 분 second(calculated Data.reservation.time) : 현재 초+5 r_mode(calculated Data.reservation) : 2 Test : 0	Test : 25 r_mode(calculated Data.reservation) : 0
TEAM3_CMS_0_009_000	hour(calculated Data.reservation.time) : 12 minute(calculated Data.reservation.time) : 34 second(calculated Data.reservation.time) : 56 r_mode(calculated	hour(calculated Data.reservation.time) : -1 minute(calculated Data.reservation.time) : -1 second(calculated Data.reservation.time) : -1 r_mode(calculated

	Data.reservation) : 1	Data.reservation) : 0
TEAM3_CMS_0_010_000	disposal(current Data) : True	check_clean(display Data) : X
TEAM3_CMS_0_011_000	wait(calculated Data) : true mode(calculated Data) : 9	wait(current Data) : true mode(current Data) : 9
TEAM3_CMS_0_012_000	b_mode(current Data) : 1 wait(current Data) : True	Call Insufficient Bean
TEAM3_CMS_0_012_001	b_mode(current Data) : 2 wait(current Data) : True	Call Insufficient Water
TEAM3_CMS_0_012_002	b_mode(current Data) : 3 wait(current Data) : True	Call Disposal Powder
TEAM3_CMS_0_012_003	b_mode(current Data) : 3 wait(current Data) : False	Beep Controller Error
TEAM3_CMS_0_012_004	b_mode(current Data) : 4 wait(current Data) : True	Beep Controller Error
TEAM3_CMS_0_013_000	Size : 500 Length : 500	Beep 발생
TEAM3_CMS_0_014_000	Size : 500 Length : 1000	Beep 발생
TEAM3_CMS_0_015_000	Size : 500 Length : 500	Beep 발생

8.2 Test items

< Table3 Test Design Identification > 참조

8.3 Input specifications

< Table4 Test Case Identification > 참조

8.4 Output specifications

< Table4 Test Case Identification > 참조

9 Testing tasks

< Table5 Testing tasks & Schedule >

Task	Predecessor task	Special skills	Effort	Finish date
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(1) Unit Test Plan 작성	T3.2016.CM.SRS 작성 T3.2016.CM.SDS 작성 T3.2016.CM.SDA 작성 CM 구현			
(2) Test design specification	Task1			
(3) Test case specification	Task2			
(4) Test Execution	Task3	Test code 작성 Test tools에 대한 이해		
(5) Test result report	Task4			

10 Environmental needs

Coffee Machine System의 Unit Test를 위한 환경적 요구사항은 다음과 같다.

(1) Hardware & Platform

GCC compiler/linker

(2) CTIP(Continuous Testing & Integrated Platform) Environment

Cygwin

11 Unit Test deliverables

12 Schedules

< Table5 Testing tasks & Schedule > 참조