

# Coffee Machine Controller

## Unit Testing

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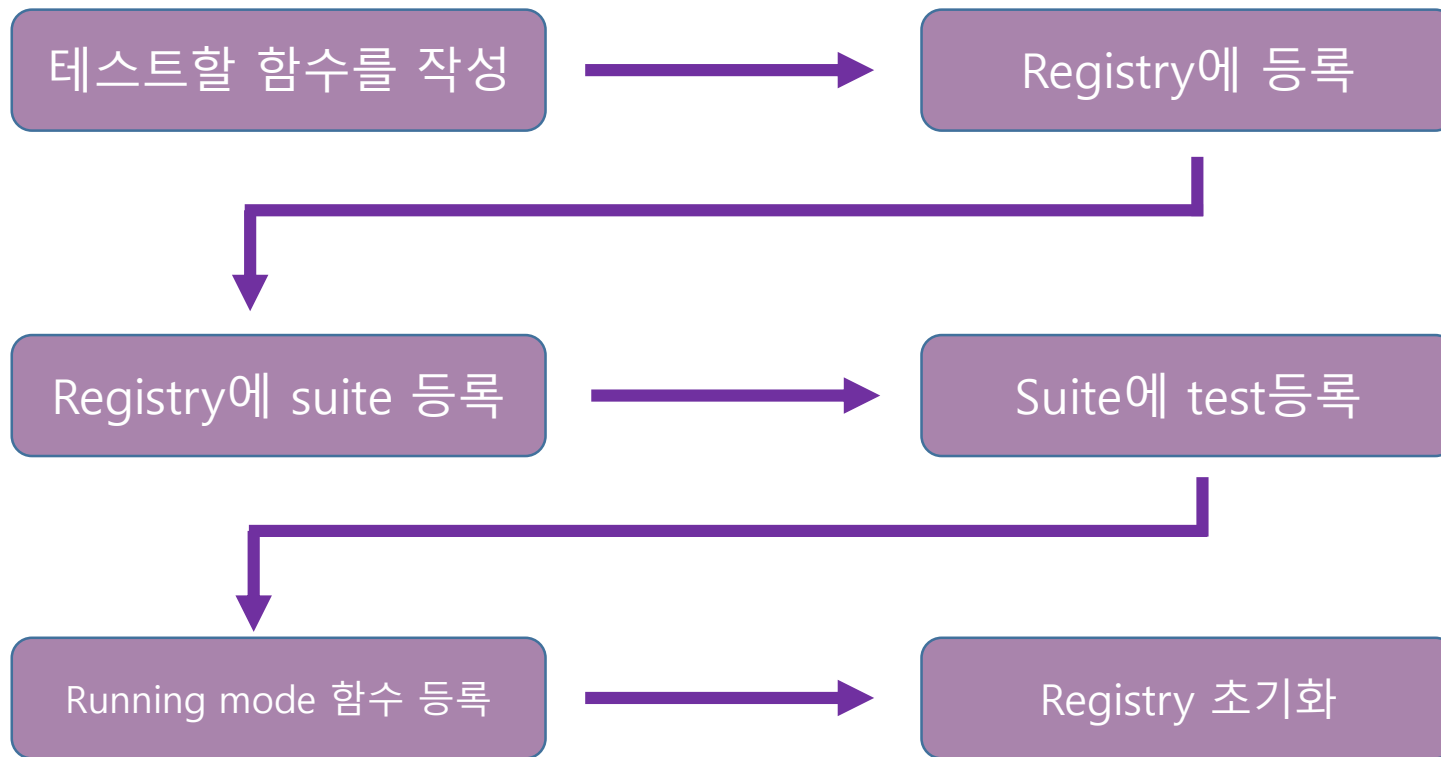
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# Test tool - CUnit

## How to use?



# Test tool - CUnit

```
24 int main() {
25     CU_pSuite pSuite = NULL;
26
27     if(CUE_SUCCESS != CU_initialize_registry()) {
28         return CU_get_error();
29     }
30
31     pSuite = CU_add_suite("Suite_1", NULL, NULL);
32     if(pSuite == NULL) {
33         CU_cleanup_registry();
34         return CU_get_error();
35     }
36
37     if((CU_add_test(pSuite, "test of add()", test_add) == NULL) ||
38        (CU_add_test(pSuite, "test of mul()", test_mul) == NULL)) {
39         CU_cleanup_registry();
40         return CU_get_error();
41     }
42
43     CU_basic_set_mode(CU_BRM_VERBOSE);
44     CU_basic_run_tests();
45     CU_cleanup_registry();
46     return CU_get_error();
47 }
```

27 ~ 29 : registry 등록

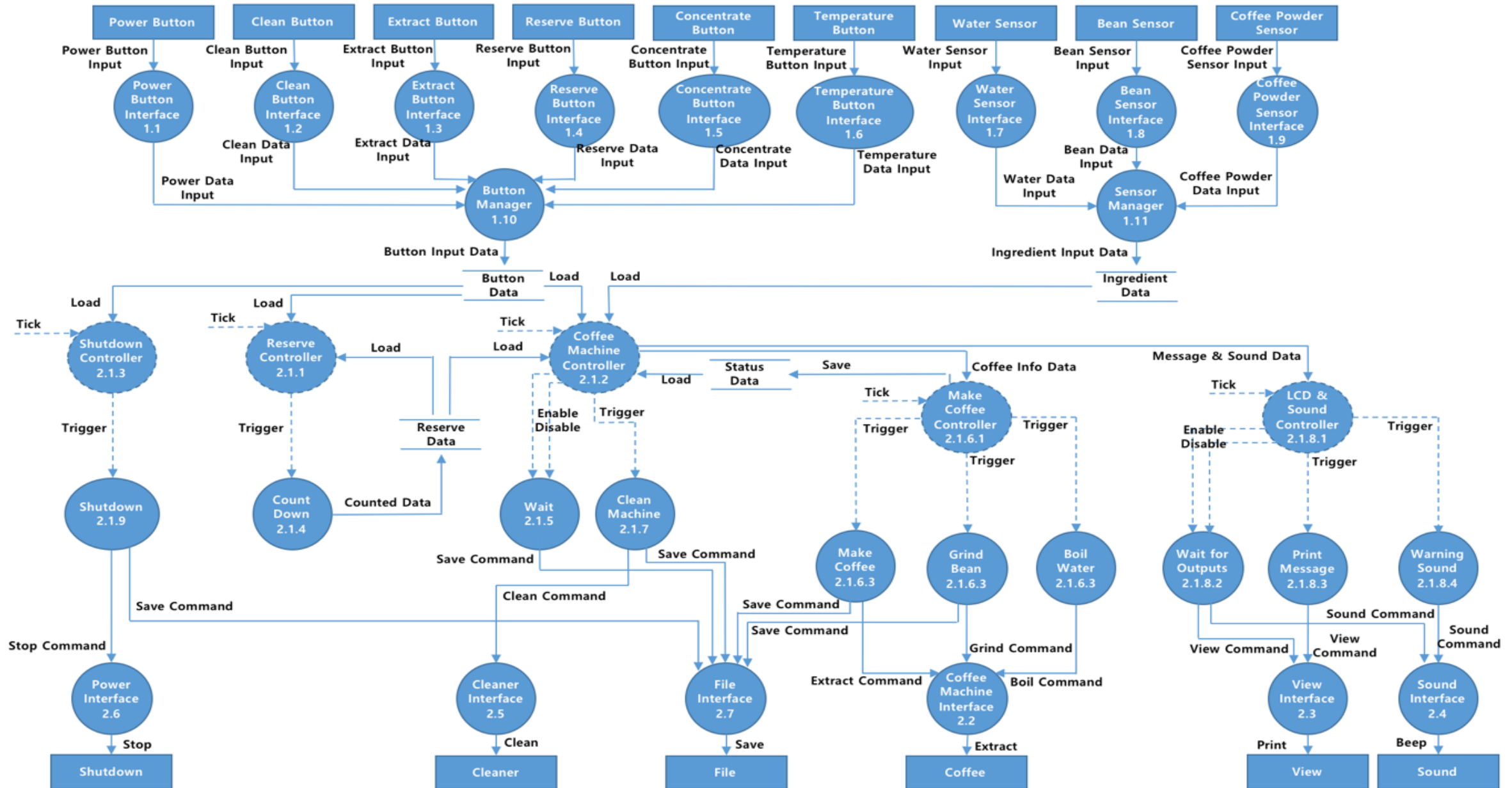
31 ~ 35 : registry에 suite 등록

37 ~ 41 : suite에 test 등록

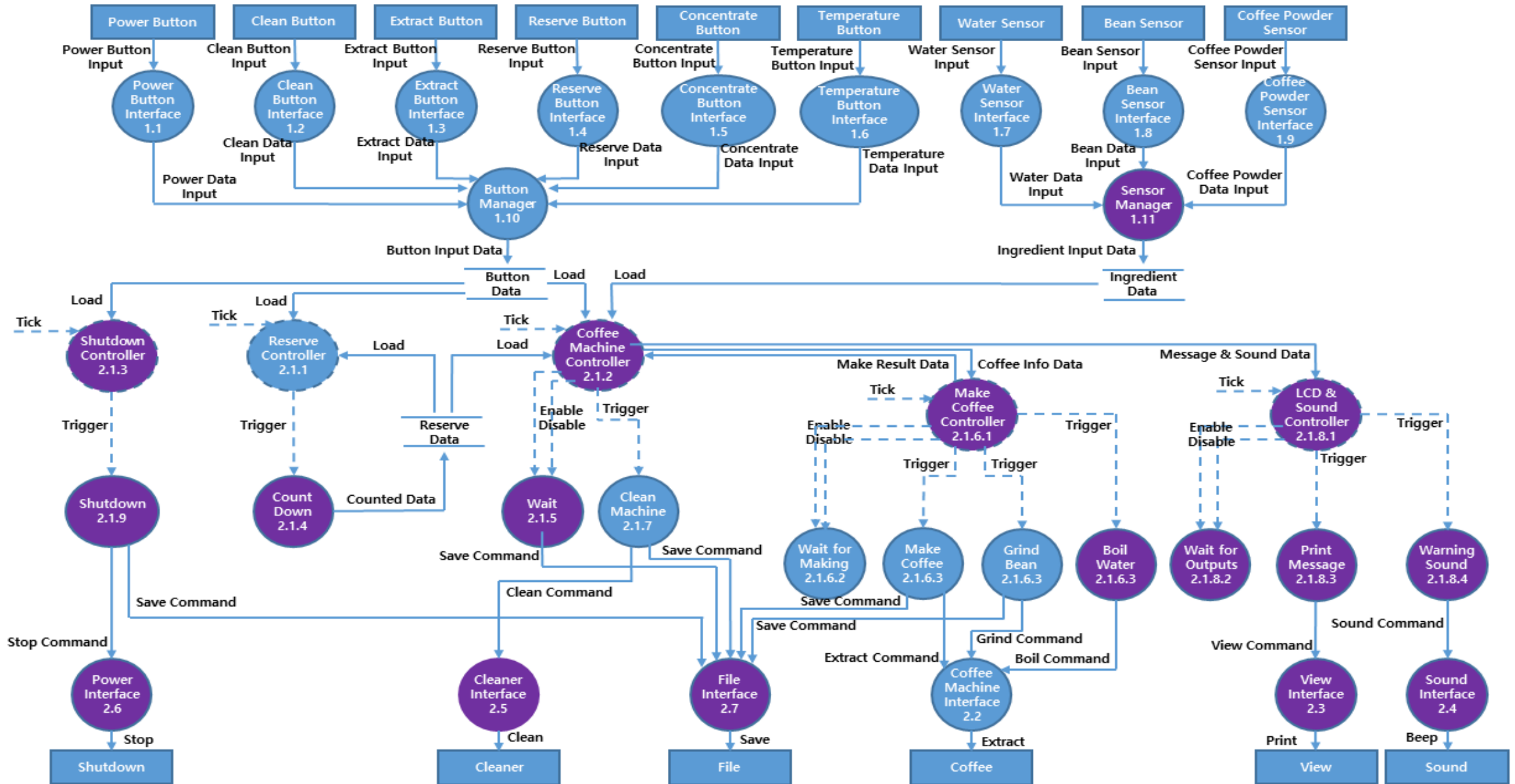
43 ~ 44 : test run

45 : registry 초기화

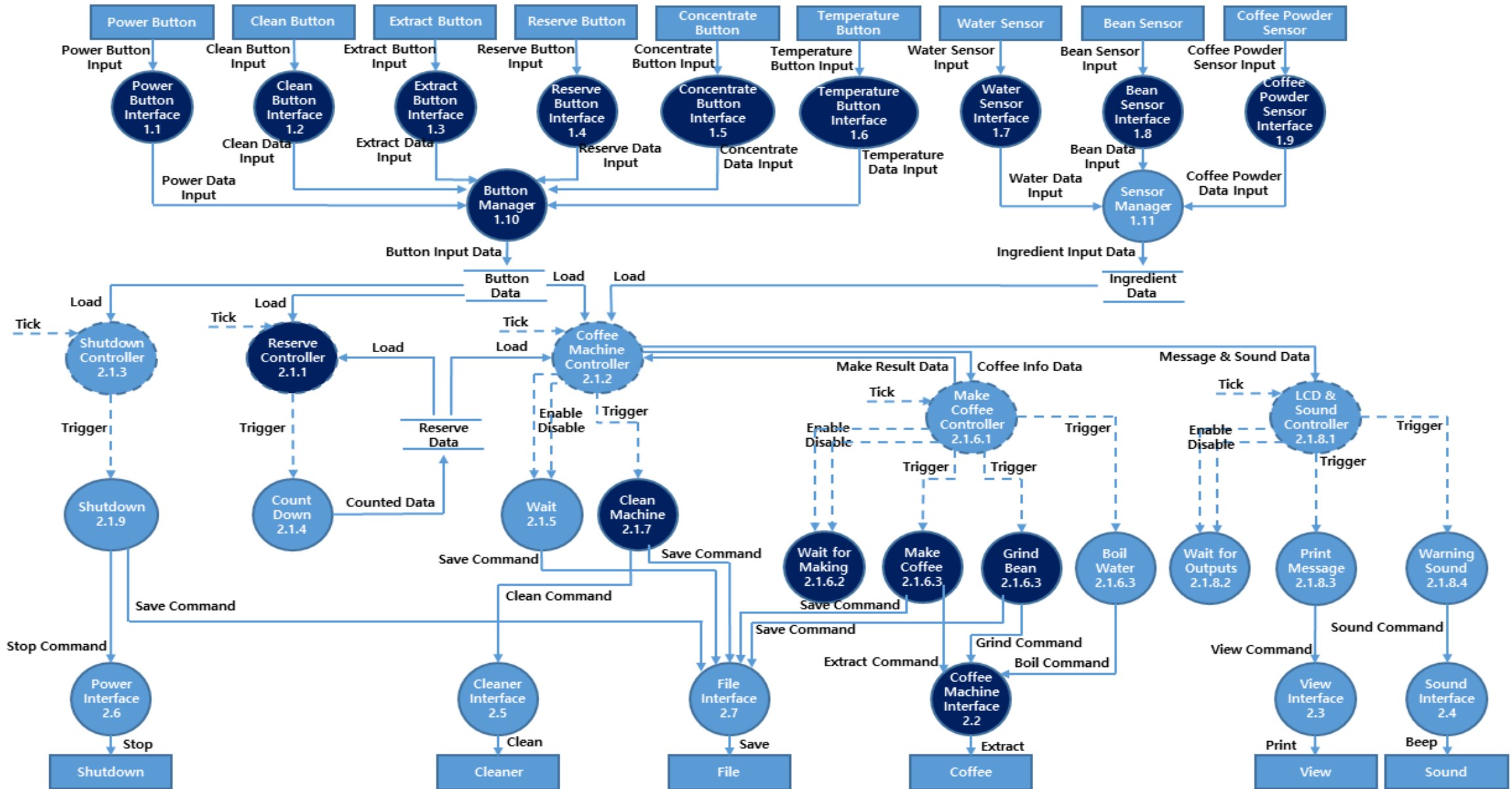
# Overall DFD



# Features not to be tested



# Features to be tested



# Test Identification

Test Case Identifier	Feature	Valid value
CMS.UTC.unit1.1	Power Button interface	Power버튼을 입력 받지 않았을 때 0을 Button Manager로 전달한다.
CMS.UTC.unit1.2	Power Button interface	Power버튼을 입력 받았을 때 Power버튼을 0으로 초기화 해준 후 1을 Button Manager로 전달한다.
CMS.UTC.unit2.1	Clean Button interface	Clean버튼을 입력 받지 않았을 때 0을 Button Manager로 전달한다.
CMS.UTC.unit2.2	Clean Button interface	Clean버튼을 입력 받았을 때 Clean버튼을 0으로 초기화 해준 후 1을 Button Manager로 전달한다.
CMS.UTC.unit3.1	Extract Button interface	Extract 버튼을 입력 받지 않았을 때 0을 Button Manager로 전달한다.
CMS.UTC.unit3.2	Extract Button interface	Extract버튼을 입력 받았을 때 Extract버튼을 0으로 초기화 해준 후 Button Manager로 전달한다.
CMS.UTC.unit4.1	Reserve Button interface	Reserve버튼중 3번 버튼이 입력 받았을 때 모든 버튼 값을 0으로 초기화하고 {0,0,1}을 Button Manager로 전달한다.
CMS.UTC.unit4.2	Reserve Button interface	Reserve버튼 중 4번 버튼이 입력 받았을 때 모든 버튼 값을 0으로 초기화하고 {0,0,-1}을 Button Manager로 전달한다.
CMS.UTC.unit4.3	Reserve Button interface	Reserve버튼 중 1번 버튼이 입력 받았을 때 1번 버튼 값을 0으로 초기화하고 {1,0,0}을 Button Manager로 전달한다.
CMS.UTC.unit4.4	Reserve Button interface	Reserve버튼 중 2번 버튼이 입력 받았을 때 2번 버튼 값을 0으로 초기화하고 {0,1,0}을 Button Manager로 전달한다.
CMS.UTC.unit4.5	Reserve Button interface	Reserve버튼이 입력 받지 않았을 때 NULL을 Button Manager로 전달한다.



# Test Identification

CMS.UTC.unit5.1	Concentrate Button interface	Concentrate버튼을 입력 받지 않았을 때 0을 Button Manager로 전달한다.
CMS.UTC.unit5.2	Concentrate Button interface	Concentrate버튼을 입력 받았을 때 1을 Button Manager로 전달한다.
CMS.UTC.unit6.1	Temperature Button interface	Temperature버튼을 입력 받지 않았을 때 0을 Button Manager로 전달한다.
CMS.UTC.unit6.2	Temperature Button interface	Temperature버튼을 입력 받았을 때 1을 Button Manager로 전달한다.
CMS.UTC.unit7.1	Button Manager	Power버튼이 입력 받은 경우에 Button Data에 1을 저장 한다.
CMS.UTC.unit7.2	Button Manager	Clean버튼이 입력 받은 경우에 Button Data에 1을 저장 한다.
CMS.UTC.unit7.3	Button Manager	Extract버튼이 입력 받은 경우에 Button Data에 1을 저장 한다.
CMS.UTC.unit7.4	Button Manager	Concentrate버튼이 입력 받은 경우 Button Data에 100이 저장 되어 있으면 Button Data에 200을 저장 한다.
CMS.UTC.unit7.5	Button Manager	Concentrate버튼이 입력 받은 경우 Button Data에 200이 저장 되어 있으면 Button Data에 300을 저장 한다.
CMS.UTC.unit7.6	Button Manager	Concentrate버튼이 입력 받은 경우 Button Data에 300이 저장 되어 있으면 Button Data에 100을 저장 한다.
CMS.UTC.unit7.7	Button Manager	Temperature버튼이 입력 받은 경우 Button Data에 0이 저장 되어 있으면 Button Data에 1을 저장 한다.
CMS.UTC.unit7.8	Button Manager	Temperature버튼이 입력 받은 경우 Button Data에 1이 저장 되어 있으면 Button Data에 0을 저장 한다.
CMS.UTC.unit7.9	Button Manager	Reserve버튼 값이 {1,x,0,0}이고 Button Data의 첫번째 값이 0일 때 Button Data의 첫번째 값에 1을 저장한다.
CMS.UTC.unit7.10	Button Manager	Reserve버튼 값이 {1,x,0,0}이고 Button Data의 첫번째 값이 1일 때 Button Data의 첫번째 값에 0을 저장한다.

# Test Identification

CMS.UTC.unit7.10	Button Manager	Reserve버튼 값이 {1,x,0,0}이고 Button Data의 첫번째 값이 1일 때 Button Data의 첫번째 값에 0을 저장한다.
CMS.UTC.unit7.11	Button Manager	Reserve버튼 값이 {0,1,0,0}이고 Button Data의 두번째 값이 0일 때 Button Data의 두번째 값에 15를 저장한다.
CMS.UTC.unit7.12	Button Manager	Reserve버튼 값이 {0,1,0,0}이고 Button Data의 두번째 값이 120일 때 Button Data의 두번째 값에 135를 저장한다.
CMS.UTC.unit7.13	Button Manager	Reserve버튼 값이 {0,1,0,0}이고 Button Data의 두번째 값이 24*60+15일 때 Button Data의 두번째 값에 0을 저장한다.
CMS.UTC.unit7.14	Button Manager	Reserve버튼 값이 {x,y,1,z}인 경우 Button Data의 세번째 값에 1을 저장한다.
CMS.UTC.unit7.15	Button Manager	Reserve버튼 값이 {x,y,0,1}인 경우 Button Data의 세번째 값에 -1을 저장한다.
CMS.UTC.unit8.1	Reserve Controller	Button Data의 값에 {0,y,1}인 경우 Reserve Data의 mode에 0, remainTime에 y, concentrate에 Button Data의 concentrate 값, temperature에 Button Data의 temperature의 값을 저장하고 Button Data의 reserveinfo 세번째 값을 0으로 초기화 한다.
CMS.UTC.unit8.2	Reserve Controller	Button Data의 값에 {0,y,1}인 경우 Reserve Data의 mode에 0, remainTime에 y를 저장하고 Button Data의 reserveInfo 세번째 값을 0으로 초기화 한다.
CMS.UTC.unit8.3	Reserve Controller	Button Data의 값에 {x,y,-1}인 경우 Reserve Data의 mode에 -1을 저장하고 Button Data의 reserveInfo의 값을 0으로 초기화 한다.
CMS.UTC.unit8.4	Reserve Controller	Button Data의 값이 {x,y,0}이고 Reserve Data의 모드가 -1이 아니고 remainTime이 0보다 클 때 remainTime에 remainTime-1한 값을 저장한다.
CMS.UTC.unit9.1	Clean Machine	Ingredient Data의 water값이 500미만이면 "Lack of Water"을 출력한다.
CMS.UTC.unit9.2	Clean Machine	Ingredient Data의 water값이 500이상이면 water값에 water-500한 값을 저장한다.

# Test Identification

CMS.UTC.unit10.1	Grind Bean	Ingredient Data의 bean값에 bean-10한 값을 저장하고 coffeePowder값에 coffeePowder+10한 값을 저장한다.
CMS.UTC.unit11.1	Make Coffee	Ingredient Data의 water값에 water-coffeeInfoData.Concentrate한 값을 저장하고 coffeePowder값에 coffeePowder-10한 값을 저장한다.
CMS.UTC.unit12.1	Coffee Machine interface	Command가 0일 때 0을 반환 한다.
CMS.UTC.unit12.2	Coffee Machine interface	Command가 1일 때 0을 반환 한다.
CMS.UTC.unit12.3	Coffee Machine interface	Command가 2일 때 0을 반환 한다.
CMS.UTC.unit12.4	Coffee Machine interface	Command가 0,1,2 모두 아닐경우 -10을 반환한다.

# Test Case Specification

Identifier	Input Specification	Output Specification
CMS_UTC.unit1.1	buttonInput.powerBtn == 0	return 0
CMS_UTC.unit1.2	buttonInput.powerBtn == 1	buttonInput.powerBtn = 0 return 1
CMS_UTC.unit2.1	buttonInput.cleanBtn == 0	return 0
CMS_UTC.unit2.2	buttonInput.cleanBtn == 1	buttonInput.cleanBtn = 0 return 1
CMS_UTC.unit3.1	buttonInput.extractBtn == 0	return 0
CMS_UTC.unit3.2	buttonInput.extractBtn == 1	buttonInput.extractBtn = 0 return 1
CMS_UTC.unit4.1	buttonInput.reserveBtn == {x,y,1,z}	buttonInput.reserveBtn = {0,0,0,0} return {0,0,1}
CMS_UTC.unit4.2	buttonInput.reserveBtn == {x,y,0,1}	buttonInput.reserveBtn = {0,0,0,0} return {0,0,-1}
CMS_UTC.unit4.3	buttonInput.reserveBtn == {1,x,0,0}	buttonInput.reserveBtn[0] = 0 return {1,0,0}
CMS_UTC.unit4.4	buttonInput.reserveBtn == {0,1,0,0}	buttonInput.reserveBtn[1] = 0 return {0,1,0}
CMS_UTC.unit4.5	buttonInput.reserveBtn == {0,0,0,0}	return NULL
CMS_UTC.unit5.1	buttonInput.concentrate == 0	return 0
CMS_UTC.unit5.2	buttonInput.concentrate == 1	buttonInput.concentrate = 0 return 1
CMS_UTC.unit6.1	buttonInput.temperature == 0	return 0
CMS_UTC.unit6.2	buttonInput.temperature == 1	buttonInput.temperature = 0 return 1

# Test Case Specification

CMS_UTC.unit7.1	buttonInput.powerBtn == 1	buttonData.powerBtn = 1
CMS_UTC.unit7.2	buttonInput.cleanBtn == 1	buttonData.cleanBtn = 1
CMS_UTC.unit7.3	buttonInput.extractBtn == 1	buttonData.extractBtn = 1
CMS_UTC.unit7.4	buttonInput.concentrate == 1 && buttonData.concentrate == 100	buttonData.concentrate = 200
CMS_UTC.unit7.5	buttonInput.concentrate == 1 && buttonData.concentrate == 200	buttonData.concentrate = 300
CMS_UTC.unit7.6	buttonInput.concentrate == 1 && buttonData.concentrate == 300	buttonData.concentrate = 100
CMS_UTC.unit7.7	buttonInput.temperature == 1 && buttonData.temperature == 1	buttonData.temperature = 0
CMS_UTC.unit7.8	buttonInput.temperature == 1 && buttonData.temperature == 0	buttonData.temperature = 1
CMS_UTC.unit7.9	buttonInput.reserveBtn == {1,x,0,0} && buttonData.reserveInfo[0] == 0	buttonData.reserveInfo[0] = 1
CMS_UTC.unit7.10	buttonInput.reserveBtn == {1,x,0,0} && buttonData.reserveInfo[0] == 1	buttonData.reserveInfo[0] = 0
CMS_UTC.unit7.11	buttonInput.reserveBtn == {0,1,0,0} && buttonData.reserveInfo[1] == 0	buttonData.reserveInfo[1] = 15
CMS_UTC.unit7.12	buttonInput.reserveBtn == {0,1,0,0} && buttonData.reserveInfo[1] == 120	buttonData.reserveInfo[1] = 135
CMS_UTC.unit7.13	buttonInput.reserveBtn == {0,1,0,0} && buttonData.reserveInfo[1] == 24*60+15	buttonData.reserveInfo[1] = 0
CMS_UTC.unit7.14	buttonInput.reserveBtn == {x,y,1,z}	buttonData.reserveInfo[2] = 1
CMS_UTC.unit7.15	buttonInput.reserveBtn == {x,y,0,1}	buttonData.reserveInfo[2] = -1
CMS_UTC.unit8.1	buttonData.reserveInfo = {0,y,1}	reserveData.mode = 0 reserveData.remainTime = y reserveData.concentrate = buttonData.concentrate reserveData.temperature = buttonData.temperature buttonData.reserveInfo[2] = 0

# Test Case Specification

CMS.UTC.unit8.2	buttonData.reserveInfo = {1,y,1}	reserveData.mode = 1 reserveData.remainTime = y buttonData.reserveInfo[2] = 0
CMS.UTC.unit8.3	buttonData.reserveInfo = {x,y,-1}	reserveData.mode = -1 buttonData.reserveInfo = {0,0,0}
CMS.UTC.unit8.4	buttonData.reserveInfo == {x,y,0} && reserveData.mode != -1 && reserveData.remainTime > 0	reserveData.remainTime -= 1
CMS.UTC.unit9.1	ingredientData.water < 500	"Lack of Water"출력
CMS.UTC.unit9.2	ingredientData.water >= 500	ingredientData.water -= 500
CMS.UTC.unit10.1	None	ingredientData.bean -= 10 ingredientData.coffeePowder += 10
CMS.UTC.unit11.1	None	ingredientData.water -= coffeeInfoData.concentrate ingredientData.coffeePowder -= 10
CMS.UTC.unit12.1	command == 0	return 0
CMS.UTC.unit12.2	command == 1	return 0
CMS.UTC.unit12.3	command == 2	return 0
CMS.UTC.unit12.4	command != 0 && command != 1 && command != 2	return -10

## Testing Result – Button Interface

```
[Baekui-MacBook-Pro-2:se baek$ gcc -o test_ButtonInterface test_ButtonInterface.c -lcunit
test_ButtonInterface.c:1:9: warning: #pragma once in main file [-Wpragma-once-outside-header]
#pragma once
    ^
1 warning generated.
[Baekui-MacBook-Pro-2:se baek$ ./test_ButtonInterface

    CUnit - A unit testing framework for C - Version 2.1-3
    http://cunit.sourceforge.net/

Suite: ButtonInterface_Suite
  Test: test of PowerBtnInter ...passed
  Test: test of CleanBtnInter ...passed
  Test: test of ExtractBtnInter ...passed
  Test: test of ReserveBtnInter ...passed
  Test: test of ConcBtnInter ...passed
  Test: test of TempBtnInter ...passed

Run Summary:
  Type      Total      Ran Passed Failed Inactive
  suites      1         1     n/a     0       0
  tests       6         6      6      0       0
  asserts    26        26     26      0     n/a

Elapsed time = 0.000 seconds
```

## Testing Result – Button Manager

```
[Baekui-MacBook-Pro-2:se baek$ gcc -o test_ButtonManager test_ButtonManager.c -lcunit
test_ButtonManager.c:1:9: warning: #pragma once in main file [-Wpragma-once-outside-header]
#pragma once
    ^
1 warning generated.
[Baekui-MacBook-Pro-2:se baek$ ./test_ButtonManager

Unit - A unit testing framework for C - Version 2.1-3
http://cunit.sourceforge.net/

Suite: ButtonManager_Suite
Test: test of ButtonManager ...passed

Run Summary:
  Type      Total      Ran Passed Failed Inactive
  suites      1         1    n/a     0       0
  tests       1         1     1     0       0
  asserts    27        27    27     0      n/a

Elapsed time = 0.000 seconds
```



# Testing Result – ReserveController

```
[Baekui-MacBook-Pro-2:se baek$ gcc -o test_ReserveController test_ReserveController.c -lcunit
test_ReserveController.c:1:9: warning: #pragma once in main file [-Wpragma-once-outside-header]
#pragma once
    ^
In file included from test_ReserveController.c:3:
In file included from ./ReserveController.h:4:
In file included from ./CoffeeMachineController.h:5:
In file included from ./MakeCoffeeController.h:5:
./CoffeeMachineInterface.h:10:13: warning: implicit declaration of function 'system' is invalid in C99 [-Wimplicit-function-declaration]
    system("clear");
    ^
2 warnings generated.
[Baekui-MacBook-Pro-2:se baek$ ./test_ReserveController

Unit - A unit testing framework for C - Version 2.1-3
http://cunit.sourceforge.net/

Suite: ReserveController_Suite
  Test: test of ReserveController ...passed

Run Summary:
  Type  Total  Ran  Passed  Failed  Inactive
  suites    1    1   n/a     0       0
  tests    1    1    1     0       0
  asserts 264 264 264     0     n/a

Elapsed time = 0.000 seconds
```

# Testing Result – CleanMachine

```

Baekui-MacBook-Pro-2:se baek$ gcc -o test_CleanMachine test_CleanMachine.c -lcunit
test_CleanMachine.c:1:9: warning: #pragma once in main file [-Wpragma-once-outside-header]
#pragma once
    ^
In file included from test_CleanMachine.c:3:
In file included from ./CoffeeMachineController.h:5:
In file included from ./MakeCoffeeController.h:5:
./CoffeeMachineInterface.h:10:13: warning: implicit declaration of function 'system' is invalid in C99 [-Wimplicit-function-declaration]
    system("clear");
    ^
2 warnings generated.
Baekui-MacBook-Pro-2:se baek$ ./test_CleanMachine

```

```

CUnit - A unit testing framework for C - Version 2.1-3
http://cunit.sourceforge.net/

```

```

Suite: CleanMachine_Suite
  Test: test of CleanMachine ...Lack of Water
Lack of Water
Lack of Water
Lack of Water
Lack of Water
Cleaning

```

Clean Machine Complete!  
passed

Run Summary:	Type	Total	Ran	Passed	Failed	Inactive
	suites	1	1	n/a	0	0
	tests	1	1	1	0	0
	asserts	8	8	8	0	n/a

Elapsed time = 0.004 seconds

## Testing Result – CoffeeMachineInterface

```
[Baekui-MacBook-Pro-2:se baek$ gcc -o test_CoffeeMachineInterface test_CoffeeMachineInterface.c -lcunit
test_CoffeeMachineInterface.c:1:9: warning: #pragma once in main file [-Wpragma-once-outside-header]
#pragma once
    ^
In file included from test_CoffeeMachineInterface.c:3:
./CoffeeMachineInterface.h:10:13: warning: implicit declaration of function 'system' is invalid in C99 [-Wimplicit-function-declaration]
    system("clear");
    ^
2 warnings generated.
```

```
Coffee Extracting Complete!
passed
```

```
Run Summary:      Type  Total   Ran  Passed  Failed  Inactive
                  suites   1     1    n/a     0       0
                  tests    1     1     1     0       0
                  asserts   5     5     5     0     n/a
```

```
Elapsed time = 0.023 seconds
```

# Testing Result – GrindBean

```
[Baekui-MacBook-Pro-2:se baek$ gcc -o test_GrindBean test_GrindBean.c -lcunit
test_GrindBean.c:1:9: warning: #pragma once in main file [-Wpragma-once-outside-header]
#pragma once
      ^
In file included from test_GrindBean.c:3:
In file included from ./MakeCoffeeController.h:5:
./CoffeeMachineInterface.h:10:13: warning: implicit declaration of function 'system' is invalid in C99 [-Wimplicit-function-declaration]
      system("clear");
      ^
2 warnings generated.
[Baekui-MacBook-Pro-2:se baek$ ./test_GrindBean

CUnit - A unit testing framework for C - Version 2.1-3
http://cunit.sourceforge.net/

Suite: GrindBean_Suite
  Test: test of GrindBean ...Grind Process will start soon.
  Remain Coffee Bean : 90
```

Bean Grinding Complete!  
passed

Run Summary:	Type	Total	Ran	Passed	Failed	Inactive
	suites	1	1	n/a	0	0
	tests	1	1	1	0	0
	asserts	1	1	1	0	n/a

Elapsed time = 0.005 seconds

# Testing Result – MakeCoffee

```

[Baekui-MacBook-Pro-2:se baek$ gcc -o test_MakeCoffee test_MakeCoffee.c -lcunit
test_MakeCoffee.c:1:9: warning: #pragma once in main file [-Wpragma-once-outside-header]
#pragma once
    ^
In file included from test_MakeCoffee.c:3:
In file included from ./MakeCoffeeController.h:5:
./CoffeeMachineInterface.h:10:13: warning: implicit declaration of function 'system' is invalid in C99 [-Wimplicit-function-declaration]
    system("clear");
    ^
2 warnings generated.
[Baekui-MacBook-Pro-2:se baek$ ./test_MakeCoffee

CUnit - A unit testing framework for C - Version 2.1-3
http://cunit.sourceforge.net/

Suite: MakeCoffee_Suite
  Test: test of MakeCoffee ...Extract Process will start soon.
Remain Water : 400

```

Coffee Extracting Complete!  
passed

Run Summary:	Type	Total	Ran	Passed	Failed	Inactive
	suites	1	1	n/a	0	0
	tests	1	1	1	0	0
	asserts	1	1	1	0	n/a

Elapsed time = 0.009 seconds

**Thank you.**