V&V프로젝트 발표-2 (B5)

2nd System Testing & Static Analysis

공민정, 이규은, 김태형, 최지현

INDEX

수정 전

UseCase	2. ModeConfiguration
Actor	User
Description	- LCD화면에 교체 가능한 모드 4개를 출력해 준다. - 사용자가 선택한 버튼에 매칭된 모드를 기존에 사용하고 있던 모드와 교체한다.

모호한 표현이나 설명

수정 후

UseCase	2. ModeConfiguration
Actor	User
Description	- 시스템에는 기본으로 내장된 6개의 모드가 존재한다. - 이 중 4개의 모드만 사용자는 사용할 수 있다. - 6개의 모드 중 사용하고 있지 않는 교체 가능한 모드 2개를 LCD화면에 출력해 준다. - 사용자가 선택한 버튼에 매칭된 모드를 기존에 사용하고 있던 모드와 교체한다.

의미가 명확하게 수정 됨

UseCase	25. DecideAndBackToAlarmMode
Actor	User
Type	Evident
Pre – Requisites	AddAlarm 버튼을 누른다.
Typical Courses of Events	(U) User (S)System 1. (U) DecideAndBackToAlarmMode버튼을 누른다. 2. (S) 최종적으로 설정한 알람을 추가해준다. 3. (S) 알람 목록이 보여지는 초기화면으로 돌아간다.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

Actor에 맞지 않는 설명

Type	Evident
Pre – Requisites	AddAlarm 버튼을 누른다.
Typical Courses of Events	(U) User (S)System 1. (U) 사용자가 좌측 하단(C 버튼)을 누른다. 2. (S) 최종적으로 설정한 알람을 추가해준다. 3. (S) 알람 목록이 보여지는 초기화면으로 돌아간다.
Alternative Courses of Events	N/A
Exceptional Courses of Events	N/A

Actor에 맞게 적절히 수정 됨

Group, Category Setting

Group	Category	Values	Property, constraints
Mode	MainScreen	Test MainScreen.	[property MainScreen]
	Time	Test Time	[property Time]
	Timer	Test Timer	[property Timer]
	StopWatch	Test StopWatch	[property Stopwatch]
	Alarm	Test Alarm	[property Alarm]
	GlobalTime	Test GlobalTime	[property Global]
	Theme	Test Theme	[property Theme]
	ModeConfig	Test ModeConfig	[property Modeconfig]

Group	Category	Values	Property, constraints
Post-Action	Alarm	Change displaying mode to other and wait alarm.	[if AlarmOn]
		Wait alarm.	[if AlarmOn]
	Timer	Wait until timer time done.	[if TimerOn]
		Change displaying mode to other and wait timer alarm.	[if TimerOn]
Checks	Time	check valid time and changing time unit.	[if Watching]
	Alarm	Check valid alarm list	[if Alarm]
		Valid beep and stop beep.	[if AlarmOn || TimerOn]
	Theme	Check Theme function validation.	[if Theme]
Button	ALL	Check any button work as spec.	

Group	Category	Values	Property, constraints
Actions	Timer	Activate timer	[if Time] [property TimerOn]
		Activate and pause timer	if Timer] [property Watching]
	Stopwatch	Activate stopwatch	[if Stopwatch] [property StopwatchOn, Watching]
		Activate and pause stopwatch	[if Stopwatch] [property Watching]
		reset stopwatch	[if Stopwatch]
	Alarm	see next alarm	[if Alarm]
		reset alarm	[if Alarm]
		activate alarm	[if Alarm] [property AlarmOn]
		Change activate alarm	[if Alarm] [property AlarmOn]
	Global	change time zone	[if Global]
	Theme	Change Theme.	[if Theme]
	MainScreen	Move mode.	[if MainScreen]
	ModeConfig	Change using mode	[if Modeconfig]

Test Cases

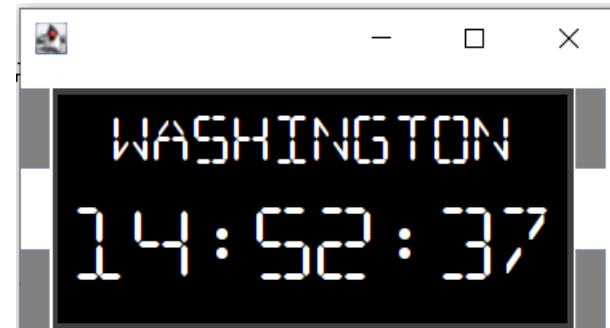| #	Key	Mode	Actions	Post-Act	Checks	Pass/Fail
1	1.12.0.0.1.	Test MainScreen	move mode	<n/a>	<n/a>	Pass
2	2.0.0.0.1.	Test time	<n/a>	<n/a>	<n/a>	Pass
3	3.1.3.3.1.	Test timer	activate timer	wait until time done	valid beep and stop beep	Pass
4	3.1.4.3.1.	Test timer	activate timer	move to other mode and wait timer	valid beep and stop beep	Pass
5	3.2.0.1.1.	Test timer	activate and pause timer	<n/a>	check valid time and changing time unit	Pass
6	4.3.0.1.1.	Test stopwatch	activate stopwatch	<n/a>	check valid time and changing time unit	Pass
7	4.4.0.1.1.	Test stopwatch	activate and pause stopwatch	<n/a>	check valid time and changing time unit	Pass
8	4.5.0.0.1.	Test stopwatch	reset stopwatch	<n/a>	<n/a>	Pass

#	Key	Mode	Action		Check	Pass/Fail
9	5.6.0.2.1.	Test Alarm	see next alarm	<n/a>	check valid alarm list	Pass
10	5.7.0.2.1.	Test Alarm	reset alarm	<n/a>	check valid alarm list	Pass
11	5.8.1.2.1.	Test Alarm	activate alarm		check valid alarm list	Pass
12	5.8.1.3.1.	Test Alarm	activate alarm	wait until time done	valid beep and stop beep	Pass
13	5.8.2.2.1.	Test Alarm	activate alarm		check valid alarm list	Pass
14	5.8.2.3.1.	Test Alarm	activate alarm	wait until time done	valid beep and stop beep	Pass
15	5.9.1.2.1.	Test Alarm	change active alarm	Change displaying mode to other and wait alarm	check valid alarm list	Pass
16	5.9.1.3.1.	Test Alarm	change active alarm	Change displaying mode to other and wait alarm	valid beep and stop beep	Pass
17	5.9.2.2.1.	Test Alarm	change active alarm	wait alarm	check valid alarm list	Pass
18	5.9.2.3.1.	Test Alarm	change active alarm	wait until time done	valid beep and stop beep	Pass
19	6.10.0.0.1.	Test global time	Change my time zone	<n/a>	<n/a>	Pass
20	7.11.0.4.1.	Test Theme	change theme	<n/a>	Check vaild Theme	Pass
21	8.13.0.0.1.	Test Modeconfig	change using mode	<n/a>	<n/a>	Pass

Pass rate = 21/21 (100.0%)

Previous Failed Case

```
Test Case 19          (Key = 6.10.0.0.1.)
  Mode          :   Test global time
  Actions       :   Change my time zone
  Post-action   :   <n/a>
  Checks        :   <n/a>
  Button        :   check any button work well
```


세계시간 모드의 초 부분이 23초 다음 24초 대신 0 초로 바뀌고
35초에서 36초 대신 0초로 바뀌어 정상적으로 증가하지 않음을
확인함.

정상적으로 수정되었음을 확인.

Test Cases

#	Key	Mode	Actions	Post-Act	Checks	Pass/Fail
1	1.12.0.0.1.	Test MainScreen	move mode	<n/a>	<n/a>	Pass
2	2.0.0.0.1.	Test time	<n/a>	<n/a>	<n/a>	Pass
3	3.1.3.3.1.	Test timer	activate timer	wait until time done	valid beep and stop beep	Pass
4	3.1.4.3.1.	Test timer	activate timer	move to other mode and wait timer	valid beep and stop beep	Pass
5	3.2.0.1.1.	Test timer	activate and pause timer	<n/a>	check valid time and changing time unit	Pass
6	4.3.0.1.1.	Test stopwatch	activate stopwatch	<n/a>	check valid time and changing time unit	Pass
7	4.4.0.1.1.	Test stopwatch	activate and pause stopwatch	<n/a>	check valid time and changing time unit	Pass
8	4.5.0.0.1.	Test stopwatch	reset stopwatch	<n/a>	<n/a>	Pass

#	Key	Mode	Actions	Post-Act	Checks	Pass/Fail
9	5.6.0.2.1.	Test Alarm	see next alarm	<n/a>	check valid alarm list	Pass
10	5.7.0.2.1.	Test Alarm	reset alarm	<n/a>	check valid alarm list	Pass
11	5.8.1.2.1.	Test Alarm	activate alarm		check valid alarm list	Pass
12	5.8.1.3.1.	Test Alarm	activate alarm	wait until time done	valid beep and stop beep	Pass
13	5.8.2.2.1.	Test Alarm	activate alarm		check valid alarm list	Pass
14	5.8.2.3.1.	Test Alarm	activate alarm	wait until time done	valid beep and stop beep	Pass
15	5.9.1.2.1.	Test Alarm	change active alarm	Change displaying mode to other and wait alarm	check valid alarm list	Pass
16	5.9.1.3.1.	Test Alarm	change active alarm	Change displaying mode to other and wait alarm	valid beep and stop beep	Pass
17	5.9.2.2.1.	Test Alarm	change active alarm	wait alarm	check valid alarm list	Pass
18	5.9.2.3.1.	Test Alarm	change active alarm	wait until time done	valid beep and stop beep	Pass
19	6.10.0.0.1.	Test global time	Change my time zone	<n/a>	<n/a>	Pass
20	7.11.0.4.1.	Test Theme	change theme	<n/a>	Check vaild Theme	Pass
21	8.13.0.0.1.	Test Modeconfig	change using mode	<n/a>	<n/a>	Pass

Pass rate = 21/21 (100.0%)

Pairwise Set

mode: time, timer, stopwatch, alarm, global time, theme, modeconfig
running: stop, running
beep: stop, ringing
action: list, on, off, add, pause, record, reset,
setTime, next, prev, set, select left, select right

IF [mode] = "time" THEN [action] IN {"on", "off", "setTime"};
IF [mode] = "timer" THEN [action] IN {"on", "off", "pause","reset","setTime"};
IF [mode] = "stopwatch" THEN [action] IN {"on", "off", "pause","record", "reset"};
IF [mode] = "alarm" THEN [action] IN {"list", "on", "off","add", "pause","reset","setTime"};
IF [mode] = "modeconfig" THEN [action] IN {"select left", "select right"};
IF [mode] = "theme" THEN [action] IN {"next", "prev", "set"};

Pairwise Cases

Case	mode	running	beep	action	Pass/Fail
1	alarm	stop	ringing	on	Pass
2	global time	stop	stop	set	Pass
3	global time	running	ringing	off	Pass
4	stopwatch	running	stop	off	Pass
5	global time	stop	stop	reset	Pass
6	stopwatch	stop	ringing	record	Pass
7	stopwatch	running	ringing	reset	Pass
8	alarm	running	stop	reset	Pass
9	global time	running	stop	list	Pass
10	global time	stop	stop	pause	Pass
11	alarm	stop	ringing	list	Pass
12	timer	running	ringing	reset	Pass
13	global time	stop	stop	add	Pass
14	time	stop	stop	setTime	Pass
15	time	running	stop	on	Pass
16	stopwatch	running	stop	on	Pass
17	time	stop	ringing	off	Pass
18	global time	running	stop	prev	Pass
19	timer	stop	ringing	pause	Pass
20	global time	stop	ringing	select right	Pass
21	alarm	running	ringing	add	Pass
22	timer	running	stop	on	Pass
23	alarm	running	ringing	pause	Pass
24	global time	stop	stop	select left	Pass
25	global time	stop	stop	on	Pass
26	global time	stop	ringing	next	Pass
27	modeconfig	running	stop	select right	Pass
28	modeconfig	stop	ringing	select left	Pass
29	alarm	running	ringing	setTime	Pass
30	timer	running	stop	off	Pass
31	stopwatch	running	ringing	pause	Pass
32	global time	running	stop	record	Pass
33	timer	running	ringing	setTime	Pass
34	theme	running	ringing	set	Pass
35	theme	stop	ringing	prev	Pass
36	global time	running	stop	setTime	Pass
37	alarm	running	ringing	off	Pass
38	modeconfig	running	stop	select left	Pass
39	theme	running	stop	next	Pass

Pass rate = 39/39 (100.0%)

Testing Cases

Test	Num	Description	P/F
Time	1-1	시간이 정상적으로 흐르는 지 확인.	P
	1-2	버튼을 눌렀을 때 스펙에 적힌대로 작동하는지 확인.	P
	1-3	좌 하단 버튼을 눌렀을 때 메인 화면모드로 나오는 지 확인.	P
Timer	2-1	시간이 다 되었을 때 알람이 울리는 지 확인.	P
	2-2	시간 설정이 정상적으로 되는지 확인.	P
	2-3	다른 화면에서도 알람이 울리는 지 확인	P
Alarm	3-1	설정한 시간이 되었을 때 알람이 울리는 지 확인	P
	3-2	여러 개의 알람을 설정하여도 잘 동작하는 지 확인	P
	3-3	여러 개의 알람을 초기화, 생성해도 오작동이 없는지 확인	P
Stopwatch	4-1	시간 증가가 정상적인지 확인.	P
	4-2	Pause 등 상호작용을 거쳐도 정상적으로 작동하는 지 확인.	P
GlobalTime	5-1	시간 증가가 정상적인지 확인	P
	5-2	도시별 시간 변환이 정상적으로 작동하는지 확인	P
	5-3	도시 유지 기능이 제대로 작동하는지 확인	P
Theme	6-1	테마 변환이 되는지 확인	P
	6-2	테마 변환이 유지되는지 확인	P

Pass rate = 16/16 (100.0%)

Over all

22 🐛 New Bugs   Reliability Ⓔ

29 🔒 New Vulnerabilities   Security Ⓑ

0   🛡 New Security Hotspots ⓘ   — Reviewed   Security Review Ⓐ

69d Added Debt   3.3k ☢ New Code Smells   Maintainability Ⓔ

∨ Type **BUG**	Clear
🐛 Bug	22
🔒 Vulnerability	29
☢ Code Smell	3.3k

Ctrl + click to add to selection

∨ Severity

❗ Blocker	7	🔽 Minor	2
🔼 Critical	0	ⓘ Info	0
🔺 Major	13		

∨ Type **VULNERABILITY**	Clear
🐛 Bug	22
🔒 Vulnerability	29
☢ Code Smell	3.3k

Ctrl + click to add to selection

∨ Severity

❗ Blocker	0	🔽 Minor	29
🔼 Critical	0	ⓘ Info	0
🔺 Major	0		

∨ Type **CODE SMELL**	Clear
🐛 Bug	22
🔒 Vulnerability	29
☢ Code Smell	3.3k

Ctrl + click to add to selection

∨ Severity

❗ Blocker	29	🔽 Minor	2.1k
🔼 Critical	56	ⓘ Info	41
🔺 Major	1k		

03   Static Analysis

Over all

22 🐞 New Bugs   Reliability   **E**

29 🔒 New Vulnerabilities   Security   **B**

0 🛡 New Security Hotspots ❓   — Reviewed   Security Review   **A**

69d Added Debt   3.3k ☢ New Code Smells   Maintainability   **E**

˅ Type **BUG**		**Clear**
🐞 Bug		22
🔒 Vulnerability		29
☢ Code Smell		3.3k

Ctrl + click to add to selection

˅ Severity

❗ Blocker	7	⬇ Minor	2
⬆ Critical	0	ℹ Info	0
⬆ Major	13		

˅ Type **VULNERABILITY**		**Clear**
🐞 Bug		22
🔒 Vulnerability		29
☢ Code Smell		3.3k

Ctrl + click to add to selection

˅ Severity

❗ Blocker	0	⬇ Minor	29
⬆ Critical	0	ℹ Info	0
☢ Major	0		

˅ Type **CODE SMELL**		**Clear**
🐞 Bug		22
🔒 Vulnerability		29
☢ Code Smell		3.3k

Ctrl + click to add to selection

˅ Severity

❗ Blocker	29	⬇ Minor	2.1k
⬆ Critical	56	ℹ Info	41
⬆ Major	1k		

Error examples

Bug(Major) - **Either re-interrupt this method or rethrow the "InterruptedException".**

- 원인 : 쓰레드에서 발생한 exception은 단순 logging 처리로 끝나면 안되고,
  exception을 throw하거나 re-inturrupt 해야 한다는 경고문.
  -> Thread.currentThread().interrupt(); 문을 추가하여 re-interrupting을 권장함.

Vulnerability(Minor) - **Make this "public static instance" field final**
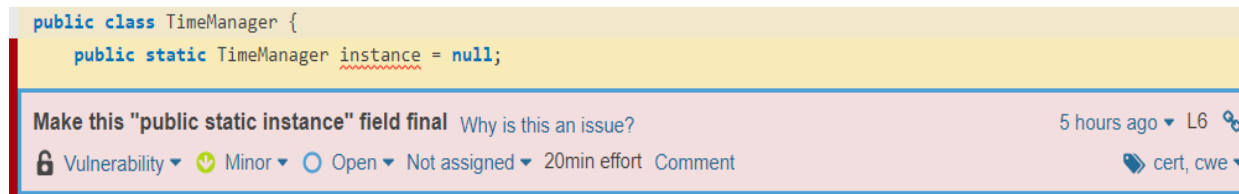
어느 객체에서도 instance의 값을 변경할 수 있으므로 위험함을 경고하는 에러.
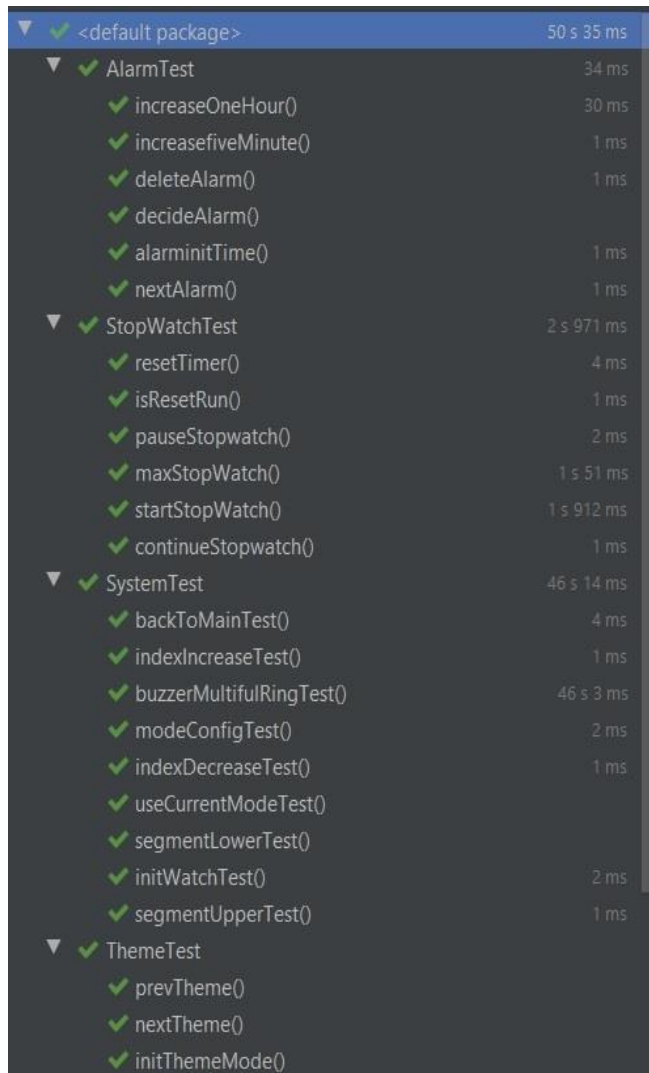-> 해당 문제를 해결하는 싱글턴 패턴은 링크를 참조하면 좋을 것으로 보입니다.

1. Coverage

Element	Class, %	Method, %	Line, %
Alarm	100% (1/1)	37% (3/8)	50% (8/16)
AlarmMode	62% (5/8)	47% (17/36)	55% (62/112)
ButtonActionCallback			
Buzzer	100% (4/4)	90% (9/10)	79% (38/48)
CurrentTimeMode	100% (2/2)	72% (8/11)	79% (23/29)
MethodCallback			
Mode			
ModeManager	100% (3/3)	91% (22/24)	87% (95/108)
ModeManagerInteracter	100% (1/1)	100% (7/7)	100% (17/17)
Segment	100% (1/1)	80% (8/10)	92% (25/27)
StandardCallback			
StopWatchMode	100% (14/14)	65% (29/44)	75% (88/117)
System	0% (0/1)	0% (0/10)	0% (0/18)
Theme	100% (1/1)	100% (4/4)	100% (8/8)
ThemeMode	100% (1/1)	53% (7/13)	73% (30/41)
Time	100% (1/1)	47% (11/23)	59% (62/104)
TimeManager	100% (1/1)	100% (5/5)	100% (9/9)
TimerMode	100% (14/14)	63% (30/47)	66% (95/143)
WatchGUI	0% (0/7)	0% (0/14)	0% (0/105)
World	100% (1/1)	100% (1/1)	100% (4/4)
WorldTimeMode	100% (2/2)	52% (9/17)	61% (47/76)
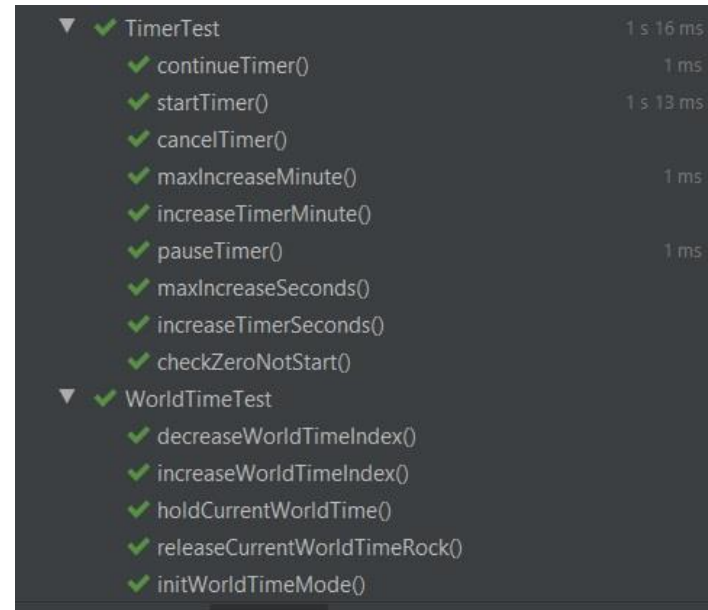
- GUI, Callback 클래스를 제외한 대부분의 Class 에 대해 50% 이상의 Method Coverage를 보였다.

- Time, Alarm Class의 Cover되지 않은 일부 Method를 위한 UnitTest 작성이 필요해보임.

Test Pass Rate

- 작성된 모든 Test Case에 대해 Pass 하였다.

- Test Pass Rate : 100.0%

감사합니다!