

# 디 데이 시계

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The background features a light blue surface with stationery items like pens and a paperclip. Overlaid on this are large, semi-transparent geometric shapes: a teal triangle pointing right and an orange triangle pointing left, which overlap each other in the center.

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# REVISION

# REVISION

Layer Architecture 에서 system operation을 처리하는 것이 중요합니다.

2030에서 찾아낸 System operation 에 대해 내부적으로 어떻게 object 간의 interaction 이 있을지 분석하는 것이 2040의 sequence diagram 이고,

따라서, 2030에서 만든 system operation이 sequence diagram에 나오도록 이름을 맞추어 줄 또는, system operation 을 중심으로 분석할 필요가 있습니다.

Use case 3 Set Current Time 의 경우

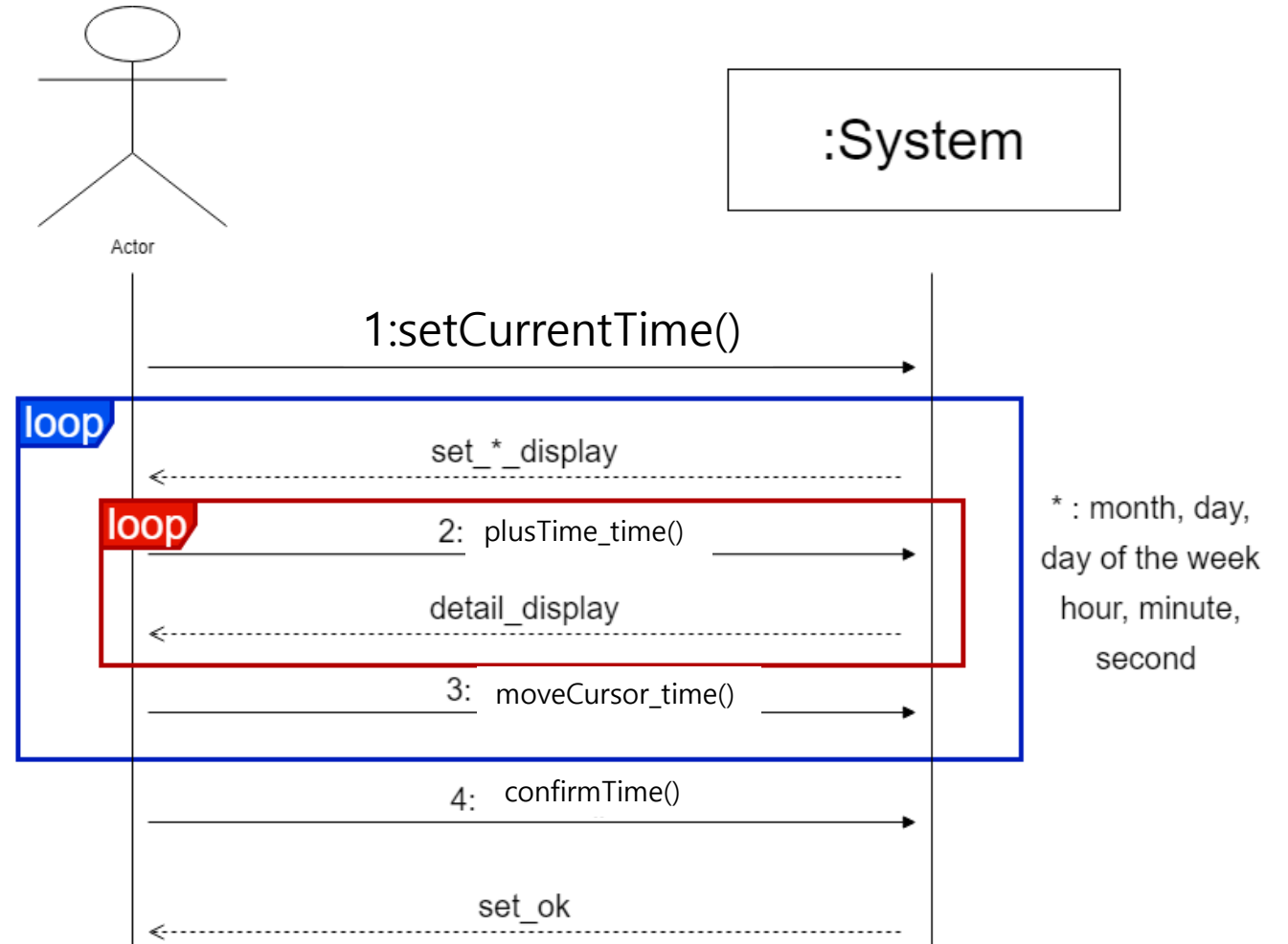
System operation 이 4개 존재하는 걸로 traceability 에 나와 있는데, 해당 system operation 이 sequence diagram 에 없습니다.

setTime(), setDetail(), setNext(), setEnd() 등을 setCurrentTime... moveCursor\_time... plusTime\_time... confirTime... 으로 하신 것 같은데... 2030 (system operation) 이나 2040 (sequence diagram) 을 잘 수정하셔야 할 것 같습니다.

# REVISION

## USE CASE: 1 Set Current Time

1. (A) Set Time에 해당하는 버튼을 클릭한다.
2. (S) 월을 설정할 수 있도록 표시한다.
3. (A) 월을 +1씩 이동하면서 월을 수정한다.
4. (A) 설정이 완료되면 다음에 해당하는 버튼을 클릭한다.
5. (S) 다음이 눌러진 횟수에 따라 월, 일, 요일, 시, 분, 초, 월 순으로 사용자가 설정 할 수 있게 표시한다.
6. (A) 모든 시간 설정이 완료되면 완료 버튼을 클릭한다.
7. (S) 현재 시간이 설정 시간으로 변경된다.



# REVISION

System Function	Essential Use Case	Operation in sequence diagram
showTimeKeeping	Show Current Time	O1, O41, O42
setCurrentTime	Set Current Time	O1, O2, O3, O4
setAlarm	Set Alarm When I Want	O9, O10, O11,O12
OnBuzzer	Sound Buzzer	O6
TurnOffBuzzer	Turn Off Buzzer	O5
Reset Alarm	Reset Alarm	O14
Show Alarm	Show Alarm	O44
getLeftTime	Buzzer Timeout	O7, O8
WatchWorldTime	Watch World Time	O46, O47
changeCountry	Change Country	O34, O35
StartStopWatch	Start StopWatch	O30
pauseStopWatch	Pause StopWatch	O31
resetStopWatch	Reset StopWatch	O32
getStopWatch	ShowStopWatch	O33

System Function	Essential Use Case	Operation in sequence diagram
getLapTime	WatchLapTime	O28
storeLapTime	StoreLapTime	O29
setDday	Set D-day	O22, O23, O25, O27
showDday	Show D-day	O45
deleteDday	Delete D-day	O26
showNextDday	Show Next D-day Calendar	O24
startTimer	Start Timer	O15, O40
setTimer	Set Timer	O16, O19, O20, O21
pauseTimer	Pause Timer	O17
stopTimer	Stop Timer	O18
getTimer	Show Timer	O40
setActiveFunction	Set Active Function	O48, O49
Change Mode	Change Mode	O43

# REVISION

O - number	Operation in sequence diagram
O1	setCurrentTime()
O2	plusTime_time()
O3	moveCursor_time()
O4	confirmTime()
O5	turnOffBuzzer()
O6	onBuzzer()
O7	getleftTime()
O8	subTimeBuzzer()
O9	moveCursor_alarm()
O10	plusTime_alarm()
O11	confirmAlarm()
O12	setAlarm()
O13	getAlarm()
O14	resetAlarm()
O15	startTimer()
O16	setTimer()
O17	pauseTimer()
O18	stopTimer()
O19	confirmTimer()
O20	moveCursor_timer()
O21	plusTimer()
O22	setDday()
O23	moveCursor_Dday()
O24	showNextDday()

O - number	Operation in sequence diagram
O25	plusDay()
O26	deleteDday()
O27	confirmDday()
O28	getLapTime()
O29	storeLapTime()
O30	startStopWatch()
O31	stopStopWatch()
O32	resetStopWatch()
O33	getStopWatch()
O34	changeCountry()
O35	confirmCountry()
O36	nextActivateFunction()
O37	confirmActive()
O38	onOffFunction()
O39	get_active()
O40	getTimer()
O41	showTimerKeeping()
O42	gettime()
O43	changeMode()
O44	showAlarm()
O45	showDday()
O46	get_key()
O47	get_value()
O48	setActivateFunction()

# REVISION

Operation in sequence diagram	M-Link
setCurrentTime()	M2, M68, M71
plusTime_time()	M8, M68, M71
moveCursor_time()	M6, M68, M71
confirmTime()	M9, M68, M71
turnOffBuzzer()	M19, M24, M68
onBuzzer()	M20
getleftTime()	M19
subTimeBuzzer()	M21
moveCursor_alarm()	M16, M17, M68, M71
plusTime_alarm()	M14, M68, M71
confirmAlarm()	M13, M68, M71
setAlarm()	M12, M68, M71
getAlarm()	M18
resetAlarm()	M15, M68, M71
startTimer()	M50, M68, M71
setTimer()	M55, M68, M71
pauseTimer()	M54, M68, M71
stopTimer()	M53, M68, M71
confirmTimer()	M58, M68, M71
moveCursor_timer()	M56, M68, M71
plusTimer()	M57, M68, M71
setDday()	M10, M68, M71
moveCursor_Dday()	M45, M68, M71
showNextDday()	M44, M68, M71


Operation in sequence diagram	M-Link
plusDday()	M46, M68, M71
deleteDday()	M43, M68, M71
confirmDday()	M47, M68, M71
getLapTime()	M37, M68, M71
storeLapTime()	M36, M68, M71
startStopWatch()	M30,M33
stopStopWatch()	M31, M68, M71
resetStopWatch()	M35, M68, M71
getStopWatch()	M32,M33,M34
changeCountry()	M25, M68, M71
confirmCountry()	M29, M68, M71
nextActivateFunction()	M60, M68, M71
confirmActive()	M67, M68, M71
onOffFunction	M66, M68, M71
get_active()	M64
getTimer()	M51
showTimerKeeping()	M1, M5,
gettime()	M5,
changeMode()	M70, M68
showAlarm()	M11
showDday()	M42,
get_key()	M28
get_value()	M26
setActivateFunction()	M59, M68, M71



# REVISION

MID	Method	Class
M1	showTimeKeeping()	TimeKeeping
M2	setCurrentTime()	
M3	addseconds()	
M4	getdday()	
M5	gettime()	
M6	moveCursortime()	
M7	getCursor()	
M8	plusTimeime()	
M9	confirmTime()	
M10	setdday()	
M11	showAlarm()	Alarm
M12	setAlarm()	
M13	confirmAlarm()	
M14	plusTimealarm()	
M15	resetAlarm()	
M16	moveCursorAlarm()	
M17	getCursor()	
M18	getAlarm()	
M19	getLeftTime()	Buzzer
M20	onBuzzer()	
M21	subTimeBuzzer()	
M22	soundBuzzer()	
M23	turnoffBuzzer()	WorldTime
M24	watchWorldTime()	
M25	changeCountry()	
M26	getValue()	
M27	nextCountry()	
M28	getKey()	
M29	confirmCountry()	StopWatch
M30	startStopWatch()	
M31	stopStopWatch()	
M32	getStopWatch()	
M33	calculatorTime()	
M34	splitElapse()	
M35	resetStopWatch()	
M36	storeLapTime()	
M37	getLapTime()	
M38	showStopWatch()	

MID	Method	Class
M38	showStopWatch()	
M39	setDday()	Dday
M40	getDday()	
M41	getCursor()	
M42	ShowDday()	
M43	deleteDday()	
M44	showNextDday()	
M45	moveCursor_Dday()	
M46	plusDday()	
M47	confirmDday()	Timer
M48	cmpday()	
M49	showTimer()	
M50	startTimer()	
M51	getTimer()	
M52	get_flag()	
M53	stopTimer()	
M54	pauseTimer()	
M55	setTimer()	
M56	moveCursor_timer()	
M57	plusTimer()	
M58	confirmTimer()	FunctionActivator
M59	setActivateFunction()	
M60	nextActivateFunction()	
M61	get_active_count()	
M62	get_modeQ()	
M63	get_position()	
M64	get_active()	
M65	get_active_name()	
M66	onOffFunction()	
M67	confirmActive()	Watch
M68	pressButton()	
M69	display()	
M70	changeMode()	Mode
M71	work()	



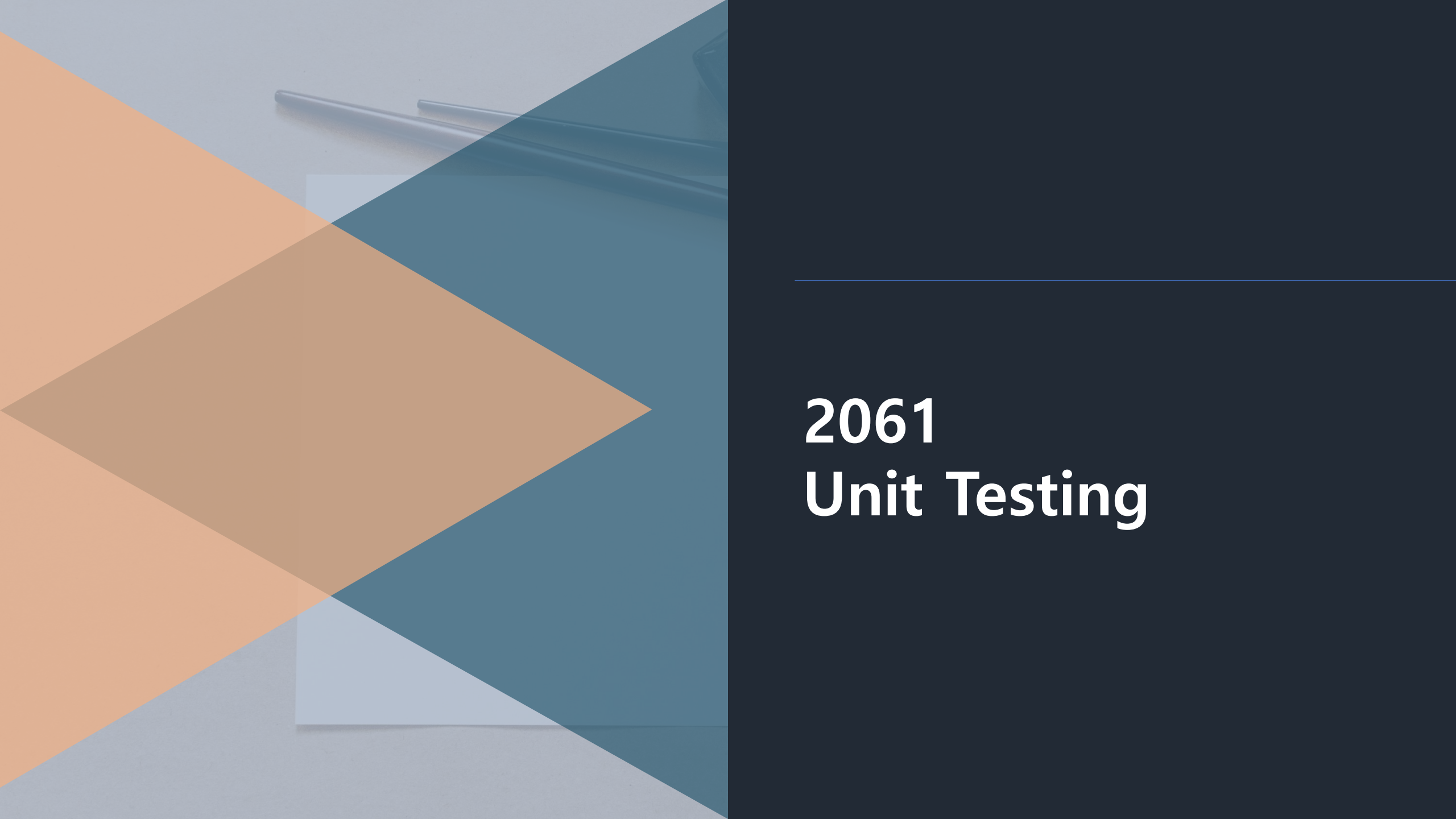
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**2055**  
**Write Unit Test**  
**Code**

# 2055 Write Unit Test Code

```
@Test
void setTimertest(){
    mTimer mtimer = new mTimer();
    JButton button = new JButton();
    button.setText("Button1");
    mtimer.work(button);
    int flag = mtimer.get_flag();
    assertEquals( expected: 1, flag);
}

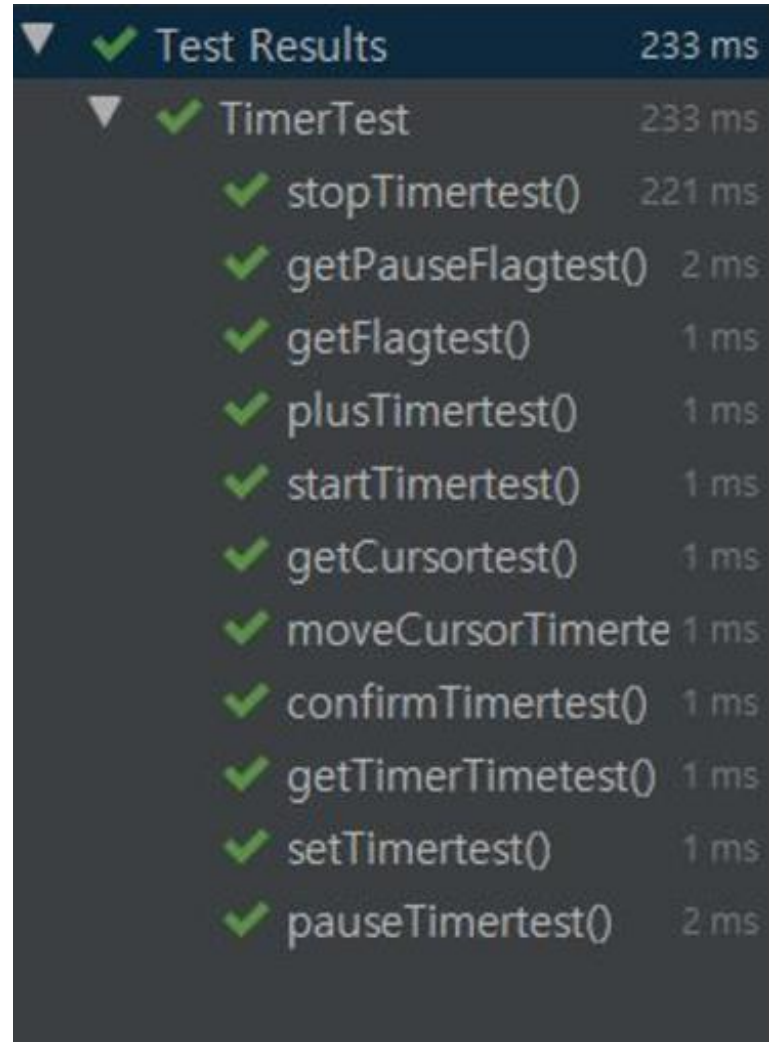
@Test
void moveCursorTimertest(){
    mTimer mtimer = new mTimer();
    JButton button = new JButton();
    button.setText("Button1");//set모드
    mtimer.work(button);
    int cur_cursor = mtimer.getCursor();
    assertEquals( expected: 3, cur_cursor);
}
```

The background features a light blue desk scene with a white notepad and two pens. Overlaid on this are large, semi-transparent geometric shapes: a large orange triangle pointing right and a large teal triangle pointing left, which overlap each other in the center.

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**2061**  
**Unit Testing**

# 2061 Unit Testing



A screenshot of a test runner interface showing the results of a unit test. The interface is dark-themed with green checkmarks indicating successful tests. The root node is 'Test Results' with a total duration of 233 ms. It contains a sub-node 'TimerTest' which also took 233 ms. Under 'TimerTest', there are 12 individual test methods, each with a green checkmark and a duration in milliseconds.

▼ ✓ Test Results	233 ms
▼ ✓ TimerTest	233 ms
✓ stopTimertest()	221 ms
✓ getPauseFlagtest()	2 ms
✓ getFlagtest()	1 ms
✓ plusTimertest()	1 ms
✓ startTimertest()	1 ms
✓ getCursortest()	1 ms
✓ moveCursorTimerte	1 ms
✓ confirmTimertest()	1 ms
✓ getTimerTimetest()	1 ms
✓ setTimertest()	1 ms
✓ pauseTimertest()	2 ms





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**2062**  
**System Testing**

# 2062 System Testing

## 2062 System Testing

Test No.	Test 항목	Description	Function
1	Show Time Test	현재 시간을 월, 일, 요일(디데이 라벨), 시, 분, 초, 연도 순서대로 화면에 표시하는지 test	showTimeKeeping
2	Show Time Test	사용자가 설정한 시간을 월, 일, 요일(디데이 라벨), 시, 분, 초, 연도 순서대로 화면에 표시하는지 test	showTimeKeeping
3	Show Time Test	현재 시간이 1초마다 1초씩 증가하는지 test	showTimeKeeping
4	Set Time Test	현재 시간 모드에서 setTime버튼을 눌렀을 때 setTime으로 진입되는지 test	setCurrentTime
5	Set Time Test	현재 시간 모드의 setTime에서 (+1)버튼을 눌렀을 때 월, 일, 요일(디데이 라벨), 시, 분, 초, 연도 중 커서가 위치한 값이 1씩 증가하는지 test	setCurrentTime
6	Set Time Test	현재 시간 모드의 setTime에서 next버튼을 눌렀을 때 커서가 다음 textview로 이동하는지 test	setCurrentTime
7	Set Alarm Test	알람 모드에서 setAlarm 버튼을 눌렀을때 setAlarm으로 진입되는지 test	setAlarm
8	Set Alarm Test	setAlarm 모드에서 버튼1를 누르면서 커서가 잘 이동하는지 test	setAlarm
9	Set Alarm Test	setAlarm 모드에서 버튼 2를 누르면 1씩 잘 증가되는지 test	setAlarm
10	Set Alarm test	setAlarm 모드에서 버튼4를 눌렀을때 데이터가 잘 저장 되었는지 테스트	setAlarm
11	Reset Alarm test	알람 모드에서 버튼4를 눌렀을때 기존 알람 데이터가 잘 지워지고 OFF로 표시 되는지 확인	ResetAlarm

# 2062 System Testing

32	Show Timer Test	타이머의 시, 분, 초가 초기값대로 화면에 표시되는지 test	getTimer
33	Show Timer Test	타이머의 시, 분, 초가 설정한 시간대로 화면에 표시되는지 test	getTimer
34	Set Timer Test	타이머 모드에서 setTimer버튼을 눌렀을 때 setTimer로 진입되는지 test	setTimer
35	Set Timer Test	타이머 모드의 setTimer에서 (+1)버튼을 눌렀을 때 시, 분, 초 중 커서가 위치한 값이 1씩 증가하는지 test	setTimer
36	Set Timer Test	타이머 모드의 setTimer에서 next버튼을 눌렀을 때 커서가 다음	setTimer

37	Start Timer Test	타이머가 지정된 시간으로부터 1초씩 감소하는지 test	startTimer
38	Pause Timer Test	타이머가 시작 된 상태에서 Pause에 해당하는 버튼을 눌렀을 때 시, 분, 초가 일시정지하는지 test	pauseTimer
39	Stop Timer Test	타이머가 시작, 혹은 Pause된 상태에서 Stop에 해당하는 버튼을 눌렀을 때 0시0분0초로 초기화되는지 test	stopTimer



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2063

# Testing Traceability Analysis

# 2063 Testing Traceability Analysis

System Function	Essential Use Case	Operation in sequence diagram
showTimeKeeping	Show Current Time	O1, O41, O42
setCurrentTime	Set Current Time	O1, O2, O3, O4
setAlarm	Set Alarm When I Want	O9, O10, O11,O12
OnBuzzer	Sound Buzzer	O6
TurnOffBuzzer	Turn Off Buzzer	O5
Reset Alarm	Reset Alarm	O14
Show Alarm	Show Alarm	O44
getLeftTime	Buzzer Timeout	O7, O8
WatchWorldTime	Watch World Time	O46, O47
changeCountry	Change Country	O34, O35
StartStopWatch	Start StopWatch	O30
pauseStopWatch	Pause StopWatch	O31
resetStopWatch	Reset StopWatch	O32
getStopWatch	ShowStopWatch	O33

System Function	Essential Use Case	Operation in sequence diagram
getLapTime	WatchLapTime	O28
storeLapTime	StoreLapTime	O29
setDday	Set D-day	O22, O23, O25, O27
showDday	Show D-day	O45
deleteDday	Delete D-day	O26
showNextDday	Show Next D-day Calendar	O24
startTimer	Start Timer	O15, O40
setTimer	Set Timer	O16, O19, O20, O21
pauseTimer	Pause Timer	O17
stopTimer	Stop Timer	O18
getTimer	Show Timer	O40
setActiveFunction	Set Active Function	O48, O49
Change Mode	Change Mode	O43



# 2063 Testing Traceability Analysis

O - number	Operation in sequence diagram
O1	setCurrentTime()
O2	plusTime_time()
O3	moveCursor_time()
O4	confirmTime()
O5	turnOffBuzzer()
O6	onBuzzer()
O7	getleftTime()
O8	subTimeBuzzer()
O9	moveCursor_alarm()
O10	plusTime_alarm()
O11	confirmAlarm()
O12	setAlarm()
O13	getAlarm()
O14	resetAlarm()
O15	startTimer()
O16	setTimer()
O17	pauseTimer()
O18	stopTimer()
O19	confirmTimer()
O20	moveCursor_timer()
O21	plusTimer()
O22	setDday()
O23	moveCursor_Dday()
O24	showNextDday()

O - number	Operation in sequence diagram
O25	plusDay()
O26	deleteDday()
O27	confirmDday()
O28	getLapTime()
O29	storeLapTime()
O30	startStopWatch()
O31	stopStopWatch()
O32	resetStopWatch()
O33	getStopWatch()
O34	changeCountry()
O35	confirmCountry()
O36	nextActivateFunction()
O37	confirmActive()
O38	onOffFunction()
O39	get_active()
O40	getTimer()
O41	showTimerKeeping()
O42	gettime()
O43	changeMode()
O44	showAlarm()
O45	showDday()
O46	get_key()
O47	get_value()
O48	setActivateFunction()

# 2063 Testing Traceability Analysis

Operation in sequence diagram	M-Link
setCurrentTime()	M2, M68, M71
plusTime_time()	M8, M68, M71
moveCursor_time()	M6, M68, M71
confirmTime()	M9, M68, M71
turnOffBuzzer()	M19, M24, M68
onBuzzer()	M20
getleftTime()	M19
subTimeBuzzer()	M21
moveCursor_alarm()	M16, M17, M68, M71
plusTime_alarm()	M14, M68, M71
confirmAlarm()	M13, M68, M71
setAlarm()	M12, M68, M71
getAlarm()	M18
resetAlarm()	M15, M68, M71
startTimer()	M50, M68, M71
setTimer()	M55, M68, M71
pauseTimer()	M54, M68, M71
stopTimer()	M53, M68, M71
confirmTimer()	M58, M68, M71
moveCursor_timer()	M56, M68, M71
plusTimer()	M57, M68, M71
setDday()	M10, M68, M71
moveCursor_Dday()	M45, M68, M71
showNextDday()	M44, M68, M71

Operation in sequence diagram	M-Link
plusDday()	M46, M68, M71
deleteDday()	M43, M68, M71
confirmDday()	M47, M68, M71
getLapTime()	M37, M68, M71
storeLapTime()	M36, M68, M71
startStopWatch()	M30,M33
stopStopWatch()	M31, M68, M71
resetStopWatch()	M35, M68, M71
getStopWatch()	M32,M33,M34
changeCountry()	M25, M68, M71
confirmCountry()	M29, M68, M71
nextActivateFunction()	M60, M68, M71
confirmActive()	M67, M68, M71
onOffFunction	M66, M68, M71
get_active()	M64
getTimer()	M51
showTimerKeeping()	M1, M5,
gettime()	M5,
changeMode()	M70, M68
showAlarm()	M11
showDday()	M42,
get_key()	M28
get_value()	M26
setActivateFunction()	M59, M68, M71

# 2063 Testing Traceability Analysis

MID	Method	Unit Test	Class
M1	showTimeKeeping()	showTimeKeepingtest	TimeKeeping
M2	setCurrentTime()	setCurrentTimetest	
M3	addseconds()	addsecondstest	
M4	getdday()	getddaytest	
M5	gettime()	gettimetest	
M6	moveCursortime()	moveCursorTimeTest	
M7	getCursor()	getCursortest	
M8	plusTimeime()	plustimetest	
M9	confirmTime()	confirmTimeTest	
M10	setdday()	setddaytest	
M11	showAlarm()		Alarm
M12	setAlarm()	testsetAlarm	
M13	confirmAlarm()	testconfirmAlarm	
M14	plusTimealarm()	testplusTime_alarm	
M15	resetAlarm()	testResetAlarm	
M16	moveCursorAlarm()	testCursor	
M17	getCursor()	testCursor	
M18	getAlarm()	testplusTime_alarm	

MID	Method	Unit Test	Class
M19	getLeftTime()	testonBuzzer	Buzzer
M20	onBuzzer()	testonBuzzer	
M21	subTimeBuzzer()	testsubTimeBuzzer	
M22	soundBuzzer()		
M23	turnoffBuzzer()	turnOffBuzzer	
M24	watchWorldTime()		WorldTime
M25	changeCountry()	changeCountrytest	
M26	getValue()	get_valuetest	
M27	nextCountry()	nextCountryTest	
M28	getKey()	get_keytest	
M29	confirmCountry()	confirmCountryTest	
M30	startStopWatch()	startStopWatchtest	StopWatch
M31	stopStopWatch()	stopStopWatchtest	
M32	getStopWatch()	getStopWatchtestinoff getStopWatchtestinon	
M33	calculatorTime()	startStopWatchtest	
M34	splitElapse()	getStopWatchtestinon	
M35	resetStopWatch()	resetStopWatchTest	
M36	storeLapTime()	storeLaptimeTest	
M37	getLapTime()	storeLaptimeTest	
M38	showStopWatch()		

# 2063 Testing Traceability Analysis

MID	Method	Unit Test	Class	
M39	setDday()	setDdaytest	Dday	
M40	getDday()			
M41	getCursor()	moveCursor_DdayTest		
M42	ShowDday()			
M43	deleteDday()	deleteDdayTest		
M44	showNextDday()	showNextDdayTest		
M45	moveCursor_Dday()	moveCursor_DdayTest		
M46	plusDday()	plusDayTest		
M47	confirmDday()	confirmDdayTest		
M48	cmpday()			
M49	showTimer()			Timer
M50	startTimer()	startTimertest		
M51	getTimer()	getTimertest		
M52	get_flag()	getFlagTest		
M53	stopTimer()	stopTimertest		
M54	pauseTimer()	pauseTimertest		
M55	setTimer()	setTimertest		
M56	moveCursor_timer()	moveCursor_timertest		
M57	plusTimer()	plusTimertest		
M58	confirmTimer()	confirmTimertest		

MID	Method	Unit Test	Class
M59	setActivateFunction()	setActiveFunctiontest	FunctionActivator
M60	nextActivateFunction()	nextActivateFunctiontest	
M61	get_active_count()	get_active_counttest	
M62	get_modeQ()	get_modeQtest	
M63	get_position()	get_position_test	
M64	get_active()	get_activetest	
M65	get_active_name()	get_active_name_test	
M66	onOffFunction()	onOffFuctionTest	
M67	confirmActive()	confirmActivateTest	
M68	pressButton()		
M69	display()		
M70	changeMode()	changeModetest	Mode
M71	work()		