Unit Test Documents

- Test Plan, Specification and Report -

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Unit Test Documents

Unit Test Plan

Purpose

- Purpose
  - DWS (Digital Watch System) 는 현재 시각을 알려주는 기능과, 그 외에 스톱워치 기능 등을 가지고 있는 시계이다. 이 시스템은 여러 개의 입력과 출력을 가지고 있으며, 반응 시간과 실행 시간 등이 시스템의 성능을 좌우하는 중요한 특성이다. Unit Test 는 시스템을 구성하는 최소 단위 모듈들을 대상으로 하는 test 이며, 각 모듈들이 가지고 있는 특성들이 요구사항을 만족하는지를 확인할 수 있는 approach 이다.

Approach

- Test Technique
  - 시스템을 구성하는 각 모듈 (Process)을 대상으로 하는 test 이다.
  - CTIP (Continuous Testing & Integration Platform) 환경에서 이루어지며, program source code/test code 의 변경 및 수정 사항은 지속적으로 통합된다.
  - Test 수행의 용이함을 위해 program source code의 일부를 수정하거나 새로운 코드를 추가(Scaffolding)할 수 있다. 이는 전체 시스템의 기능에 영향을 주지 않는 범위 내에서 행해진다.
  - 각 모듈의 기능 요구사항에 따라 Brute force 기법을 사용하여 Test Case 를 design 한다.

- Test Execution Environment
  - Windows 7 64bit
  - Eclipse IDE
  - MinGW gcc compiler for Windows
  - CTIP with CUnit

Test Item

- Test Item
  - 분석된 SASD (Structured Analysis & Structured Design)를 기반으로 하여 SA의 각 process를 하나의 unit으로 간주한다.
  - 각 unit의 기능 정의와 SD를 기반으로 하여 test 할 unit 을 선별하고, test 를 design 한다.
  - DWS 에 대한 SASD 참조

Features to be Test

- Features Not to be Test
  - HW Interface 관련 모듈
    - 3.2 Stopwatch Display
    - 3.3 Time Keeping Display
    - 3.4 Time Setting Display

Features to be Test

- Features to be Test
  - DWS 의 다음 unit 들을 test 한다.
    - 1 Input Process
    - 2.1 Input Controller
    - 2.2 Time Keeping Process
    - 2.3 Time Setting Controller
    - 2.4 Stopwatch Controller
    - 2.5 Back Light
    - 2.6 Unit Change
    - 2.7 Value Change
    - 2.8 Stopwatch Flow
    - 2.9 Laptime Save
    - 2.10 Stopwatch Reset
    - 3.1 Display Controller

Features to be Test

- Feature Pass/Fail Criteria
  - 각 프로세스의 요구사항을 만족해야 한다.

Unit Test Documents

Unit Test Specifications

Test Design Specification

1 Input Process

Identifier	Feature	Value
DWS.UTD.00	입력 Button Mode	Button 입력을 처리 이전 모드와 Button 입력에 따라 다음 모드 결정 SW 모드에서 Button 입력에 따라 상태 결정
	Button Mode Stopwatch_state	0 A, 1 B, 2 C, 3 D 0 TK, 1 TS, 2 SW Reset state, Flow state 자세한 사항은 Data Dictionary 참조

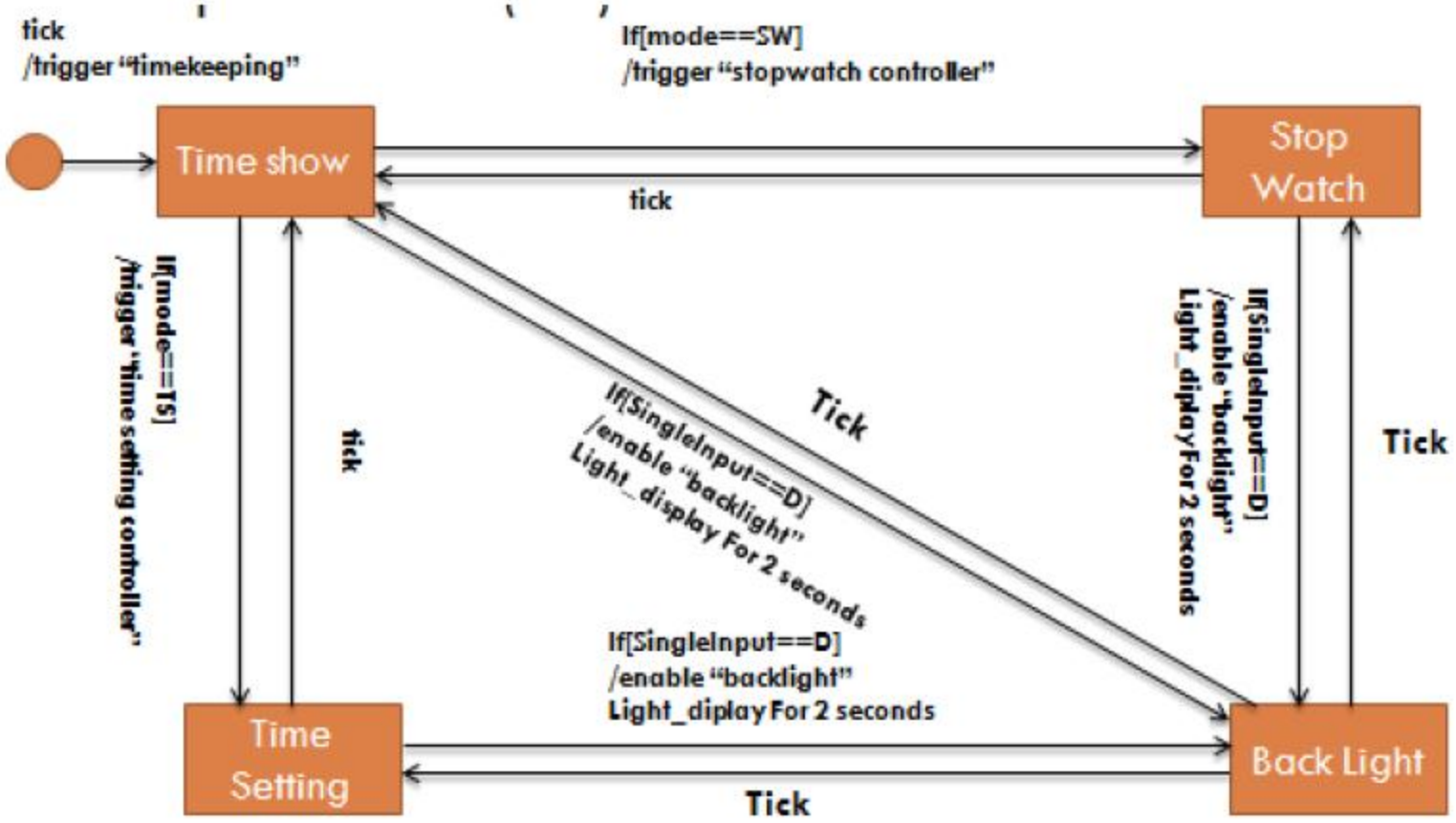
Test Design Specification

2.1 Input Controller

Identifier	Feature	Value
DWS.UTD.01	입력 Tick Single_input Mode	Mode=SW -> stopwatch_controller Mode=TS -> time_setting_controller Single_input=D -> enable backlight

Tick에 의에 동작이 이루어짐

Test Design Specification



Test Design Specification

2.2 Time Keeping Process

Identifier	Feature	Value
DWS.UTD.02	입력 Tick Time Triggered by Time setting controller	Tick 입력 마다 현재 시간을 갱신 Tick = 밀리세컨드
	출력 Time	Lap Time, Stopwatch Time, Modifying Time, Flow Time

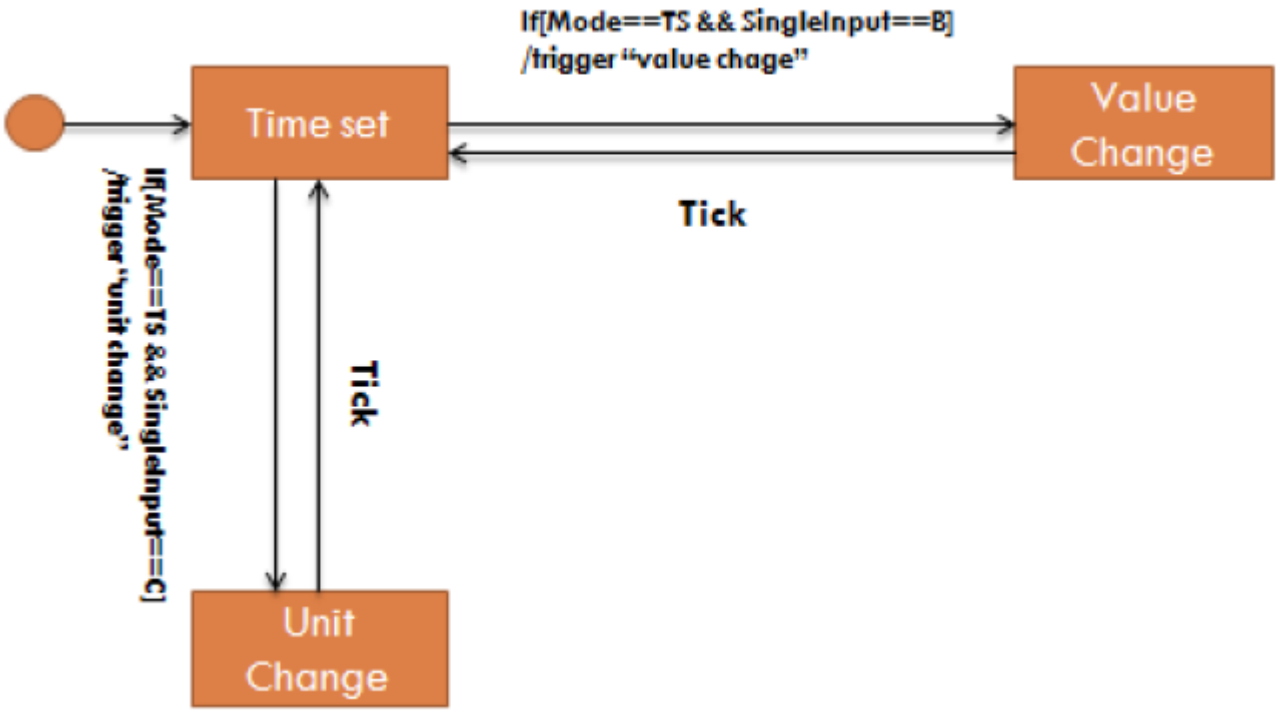
Tick에 의에 동작이 이루어짐

Test Design Specification

2.3 Time Setting Controller

Identifier	Feature	Value
DWS.UTD.03	입력 Single Input Mode Time Unit Triggered by Input Controller	모드와 single input에 따라 value_change, unit_change를 trigger

Test Design Specification

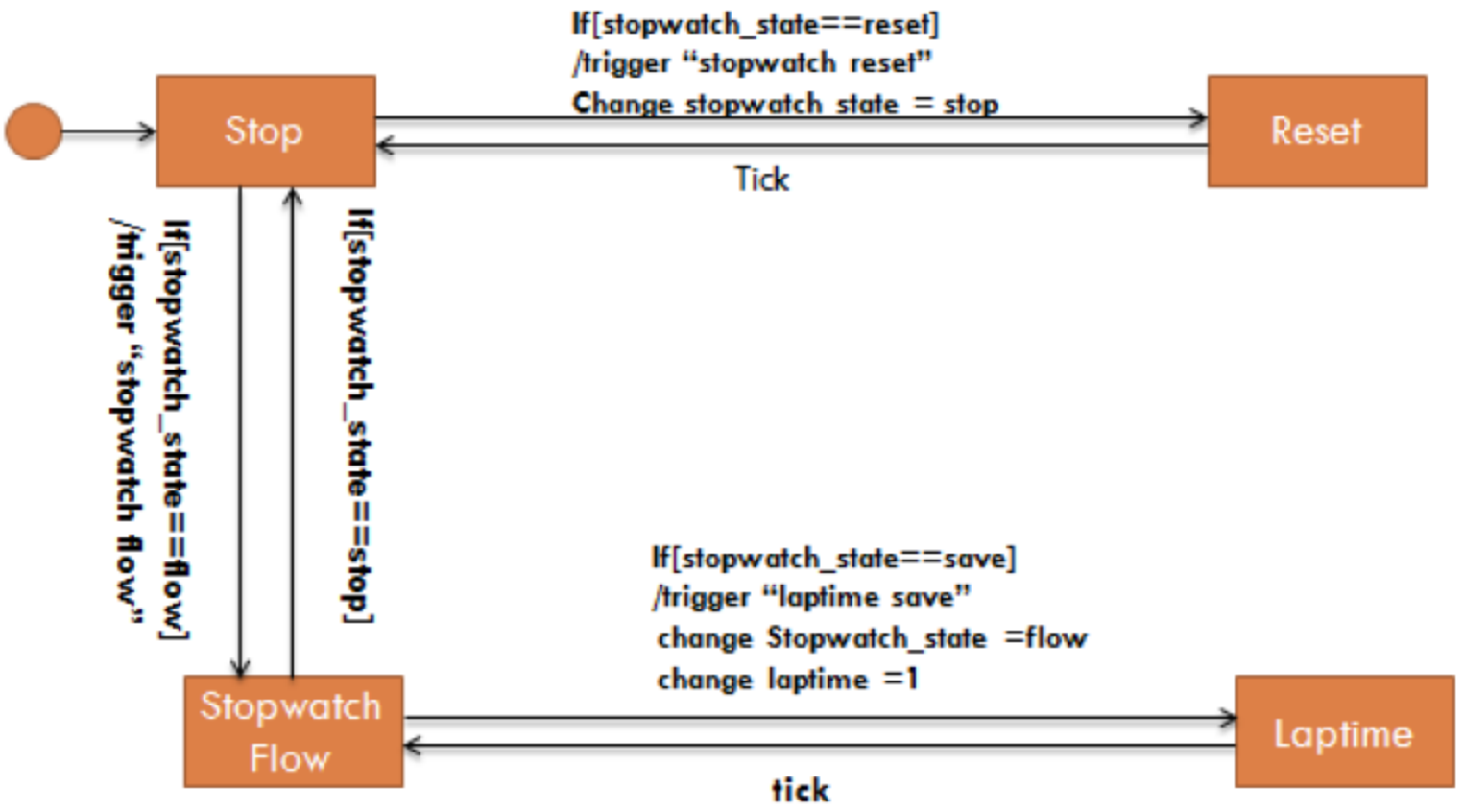


Test Design Specification

2.4 Stopwatch Controller

Identifier	Feature (Process ID)	Value
DWS.UTD.04	입력 Triggered by Input Controller Tick Time Stopwatch state	Stopwatch state를 조정하는 프로세스 (stopwatch_reset, change stopwatch state)

Test Design Specification



Test Design Specification

2.5 Back Light

Identifier	Feature	Value
DWS.UTD.05	입력 Enable/disable	Enable되면 2초간 라이트를 켠 뒤 disable

Test Design Specification

2.6 Unit Change

Identifier	Feature	Value
DWS.UTD.06	입력 Triggered by time setting controller Time Unit	시간 설정 시 설정할 유닛(초, 분, 시, 년, 월, 일)을 전환

Test Design Specification

2.7 Value Change

Identifier	Feature	Value
DWS.UTD.07	입력 Triggered by time setting controller	선택된 타임 유닛 값을 1증가시킨다. Mod 60을 취해 최대값 검사

Test Design Specification

2.8 Stopwatch Flow

Identifier	Feature	Value
DWS.UTD.08	입력 Trigger	Stopwatch 타임을 갱신 밀리세컨드 유닛이 최대 숫자를 넘을 경우 초 유닛을 증가시키고 0으로 세팅

Test Design Specification

2.9 Laptime Save

Identifier	Feature	Value
DWS.UTD.09	Trigger	현재 Stopwatch 시간을 laptime에 저장

Test Design Specification

2.10 Stopwatch Reset

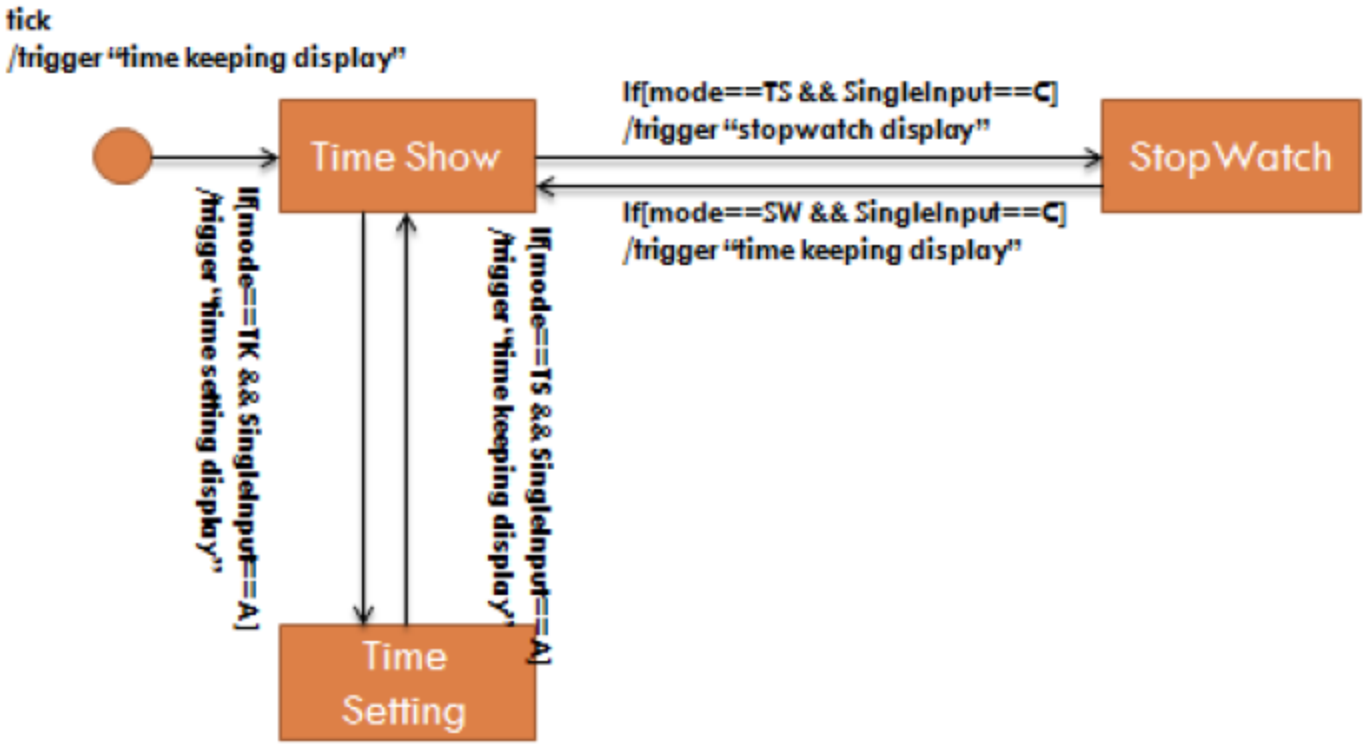
Identifier	Feature	Value
DWS.UTD.10	입력 Trigger	Stopwatch 타임을 00:00:00으로 초기화

Test Design Specification

3.1 Display Controller

Identifier	Feature	Value
DWS.UTD.11	입력 Tick Mode Time	자세한 동작은 State transition diagram 참조

Test Design Specification



Test Case Specification

Identifier	Input Specification	Output Specification
DWS.UTC.00.00	TK/A	TS
DWS.UTC.00.01	TK/C	SW
DWS.UTC.00.02	TS/A	TK
DWS.UTC.00.03	SW/A/stop	SW, reset state
DWS.UTC.00.04	SW/B/stop	SW, flow state
DWS.UTC.00.05	SW/C	TK

Test Case Specification

Identifier	Input Specification	Output Specification
DWS.UTC.01.00	Time show/mode==SW	Transition to Stop Watch Trigger stopwatch controller
DWS.UTC.01.01	Time show/mode==TS	Transition to Time Setting Trigger time setting controller
DWS.UTC.01.02	Time show/single input==D	Transition to Back Light Enable backlight
DWS.UTC.01.03	Stop Watch/-	Transition to Time show
DWS.UTC.01.04	Stop Watch/single input==D	Transition to Back Light Enable backlight
DWS.UTC.01.05	Time Setting/single input==D	Transition to Back Light Enable backlight
DWS.UTC.01.06	Time Setting/-	Transition to Time show
DWS.UTC.01.07	Back Light	?

Back Light에서의 Transition condition이 모호함

Test Case Specification

Identifier	Input Specification	Output Specification
DWS.UTC.02.00	Time.ms=0 Time.sec=0 Time.min=0 Time.hour=0 Time.date=1 Time.month=1 Time.year=2012	Time.ms=10 Time.sec=0 Time.min=0 Time.hour=0 Time.date=1 Time.month=1 Time.year=2012
DWS.UTC.02.01	Time.ms=990 Time.sec=0 Time.min=0 Time.hour=0 Time.date=1 Time.month=1 Time.year=2012	Time.ms=0 Time.sec=1 Time.min=0 Time.hour=0 Time.date=1 Time.month=1 Time.year=2012
DWS.UTC.02.02	Time.ms=990 Time.sec=59 Time.min=0 Time.hour=0 Time.date=1 Time.month=1 Time.year=2012	Time.ms=0 Time.sec=0 Time.min=1 Time.hour=0 Time.date=1 Time.month=1 Time.year=2012

Test Case Specification

Identifier	Input Specification	Output Specification
DWS.UTC.02.03	Time.ms=990 Time.sec=59 Time.min=59 Time.hour=0 Time.date=1 Time.month=1 Time.year=2012	Time.ms=0 Time.sec=0 Time.min=0 Time.hour=1 Time.date=1 Time.month=1 Time.year=2012
DWS.UTC.02.04	Time.ms=990 Time.sec=59 Time.min=59 Time.hour=23 Time.date=1 Time.month=1 Time.year=2012	Time.ms=0 Time.sec=0 Time.min=0 Time.hour=0 Time.date=2 Time.month=1 Time.year=2012 Time.day=mon
DWS.UTC.02.05	Time.ms=990 Time.sec=59 Time.min=59 Time.hour=23 Time.date=31 Time.month=1 Time.year=2012	Time.ms=0 Time.sec=0 Time.min=0 Time.hour=0 Time.date=1 Time.month=2 Time.year=2012 Time.day=tue

Test Case Specification

Identifier	Input Specification	Output Specification
DWS.UTC.02.06	Time.ms=990 Time.sec=59 Time.min=59 Time.hour=23 Time.day=31 Time.month=12 Time.year=2012	Time.ms=0 Time.sec=0 Time.min=0 Time.hour=1 Time.day=1 Time.month=1 Time.year=2013 Time.date=tue
DWS.UTC.02.07	Time.ms=990 Time.sec=59 Time.min=59 Time.hour=23 Time.day=28 Time.month=2 Time.year=2012	Time.ms=0 Time.sec=0 Time.min=0 Time.hour=0 Time.day=29 Time.month=2 Time.year=2012 Time.date=mon

Test Case Specification

Identifier	Input Specification	Output Specification
DWS.UTC.03.00	Time set TS/C	Transition to Unit Change Trigger Unit Change
DWS.UTC.03.01	Time set TS/B	Transition to Value Change Trigger value change
DWS.UTC.03.02	Unit Change	Transition to Time set
DWS.UTC.03.03	Value Change	Transition to Time set

Test Case Specification

Identifier	Input Specification	Output Specification
DWS.UTC.04.00	Stop Stopwatch_state==reset	Transition to Reset Stopwatch state = stop
DWS.UTC.04.01	Stop Stopwatch state==flow	Transition to Stopwatch Flow Stopwatch state = flow
DWS.UTC.04.02	Stopwatch Flow Stopwatch_state==save	Transition to Laptime Stopwatch state = flow Laptime = 1
DWS.UTC.04.03	Stopwatch Flow stopwatch state==stop	Transition to Stop
DWS.UTC.04.04	Reset	Transition to Stop
DWS.UTC.04.05	Laptime	Transition to Stopwatch Flow

Test Case Specification

Identifier	Input Specification	Output Specification
DWS.UTC.05.00	Enable	Light On
DWS.UTC.05.01	Enable during Back light On	Light On

Test Case Specification

Identifier	Input Specification	Output Specification
DWS.UTC.06.00	Selected unit=m_sec	Selected unit=m_min
DWS.UTC.06.01	Selected unit=m_min	Selected unit=m_hour
DWS.UTC.06.02	Selected unit=m_hour	Selected unit=m_year
DWS.UTC.06.03	Selected unit=m_year	Selected unit=m_month
DWS.UTC.06.04	Selected unit=m_month	Selected unit=m_day
DWS.UTC.06.05	Selected unit=m_day	Selected unit=m_sec

Test Case Specification

Identifier	Input Specification	Output Specification
DWS.UTC.07.00	unit=m_sec/time.sec=0	Time.sec=1
DWS.UTC.07.01	unit=m_min/time.min=0	Time.min=1
DWS.UTC.07.02	unit=m_hour/time.hour=0	Time.hour=1
DWS.UTC.07.03	unit=m_day/time.date=1	Time.date=2
DWS.UTC.07.04	unit=m_month/time.month=1	Time.month=2
DWS.UTC.07.05	unit=m_year/time.year=2012	Time.year=2013
DWS.UTC.07.06	unit=m_sec/time.sec=59	Time.sec=0
DWS.UTC.07.07	unit=m_min/time.min=59	Time.min=0
DWS.UTC.07.08	unit=m_hour/time.hour=23	Time.hour=0
DWS.UTC.07.09	unit=m_day/time.month=1/time.year=2012 time.date=31	Time.date=1
DWS.UTC.07.10	unit=m_day/time.month=2/time.year=2012 time.date=29	Time.date=1
DWS.UTC.07.11	unit=m_day/time.month=4/time.year=2012 time.date=30	Time.date=1

Test Case Specification

Identifier	Input Specification	Output Specification
DWS.UTC.07.12	unit=m_month/time.month=12	Time.month=1
DWS.UTC.07.13	unit=m_year/time.year=2099	Time.year=2012

Test Case Specification

Identifier	Input Specification	Output Specification
DWS.UTC.08.00	Time.ms=0	Time.ms=10
DWS.UTC.08.01	Time.ms=990	Time.ms=0 Time.sec=1
DWS.UTC.08.02	Time.ms=990 Time.sec=59	Time.ms=0 Time.sec=0 Time.min=1

Test Case Specification

Identifier	Input Specification	Output Specification
DWS.UTC.09.00	Stopwatch Time Time.ms=0 Time.sec=0 Time.min=0	Laptime Time.ms=0 Time.sec=0 Time.min=0
DWS.UTC.09.01	Stopwatch Time Time.ms=990 Time.sec=59 Time.min=59	Laptime Time.ms=990 Time.sec=59 Time.min=59

Test Case Specification

Identifier	Input Specification	Output Specification
DWS.UTC.10.00	Stopwatch Time Time.ms=0 Time.sec=0 Time.min=0	Stopwatch Time Time.ms=0 Time.sec=0 Time.min=0
DWS.UTC.10.01	Stopwatch Time Time.ms=990 Time.sec=59 Time.min=59	Stopwatch Time Time.ms=0 Time.sec=0 Time.min=0

Test Case Specification

Identifier	Input Specification	Output Specification
DWS.UTC.11.00	Time Show TS/C	Stop Watch Trigger stopwatch display
DWS.UTC.11.01	Time Show TK/A	Time Setting Trigger time setting display
DWS.UTC.11.02	Stop Watch SW/C	Time Show Trigger time keeping display
DWS.UTC.11.03	Time Setting TS/A	Time Show Trigger time keeping display

Unit Test Documents

Unit Test Report

Unit Test Report

CUnit - A Unit testing framework for C.
http://cunit.sourceforge.net/

Automated Test Run Results

Running Suite Input Process			
	Running test DWS.UTC.00.00 ...	Passed	
	Running test DWS.UTC.00.01 ...	Passed	
	Running test DWS.UTC.00.02 ...	Passed	
	Running test DWS.UTC.00.03 ...	Passed	
	Running test DWS.UTC.00.04 ...	Passed	
	Running test DWS.UTC.00.05 ...	Passed	
Running Suite Input Controller			
	Running test DWS.UTC.01.00 ...	Passed	
	Running test DWS.UTC.01.01 ...	Passed	
	Running test DWS.UTC.01.02 ...	Passed	
	Running test DWS.UTC.01.03 ...	Passed	
	Running test DWS.UTC.01.04 ...	Passed	
	Running test DWS.UTC.01.05 ...	Passed	
	Running test DWS.UTC.01.06 ...	Failed	
File Name	C:₩Users₩JunbeomYoo₩.hudson₩jobs₩DWS_TB5₩workspace₩src₩Unit_Test_CTIP.c	Line Number	90
Condition	0		
	Running test DWS.UTC.01.07 ...	Failed	
File Name	C:₩Users₩JunbeomYoo₩.hudson₩jobs₩DWS_TB5₩workspace₩src₩Unit_Test_CTIP.c	Line Number	96
Condition	0		
Running Suite Time Keeping Process			
	Running test DWS.UTC.02.00 ...	Passed	
	Running test DWS.UTC.02.01 ...	Passed	
	Running test DWS.UTC.02.02 ...	Passed	
	Running test DWS.UTC.02.03 ...	Passed	
	Running test DWS.UTC.02.04 ...	Passed	
	Running test DWS.UTC.02.05 ...	Passed	
	Running test DWS.UTC.02.06 ...	Passed	
	Running test DWS.UTC.02.07 ...	Failed	
File Name	C:₩Users₩JunbeomYoo₩.hudson₩jobs₩DWS_TB5₩workspace₩src₩Unit_Test_CTIP.c	Line Number	286
Condition	t.day == mon		

Unit Test Report

Running Suite Time Setting Controller			
	Running test DWS.UTC.03.00 ...	Passed	
	Running test DWS.UTC.03.01 ...	Passed	
	Running test DWS.UTC.03.02 ...	Failed	
File Name	C:₩Users₩JunbeomYoo₩.hudson₩jobs₩DWS_TB5₩workspace₩src₩Unit_Test_CTIP.c	Line Number	317
Condition	0		
	Running test DWS.UTC.03.03 ...	Failed	
File Name	C:₩Users₩JunbeomYoo₩.hudson₩jobs₩DWS_TB5₩workspace₩src₩Unit_Test_CTIP.c	Line Number	326
Condition	0		
Running Suite Stopwatch Controller			
	Running test DWS.UTC.04.00 ...	Passed	
	Running test DWS.UTC.04.01 ...	Passed	
	Running test DWS.UTC.04.02 ...	Passed	
	Running test DWS.UTC.04.03 ...	Passed	
	Running test DWS.UTC.04.04 ...	Failed	
File Name	C:₩Users₩JunbeomYoo₩.hudson₩jobs₩DWS_TB5₩workspace₩src₩Unit_Test_CTIP.c	Line Number	358
Condition	0		
	Running test DWS.UTC.04.05 ...	Failed	
File Name	C:₩Users₩JunbeomYoo₩.hudson₩jobs₩DWS_TB5₩workspace₩src₩Unit_Test_CTIP.c	Line Number	364
Condition	0		
Running Suite Back Light			
	Running test DWS.UTC.05.00 ...	Failed	
File Name	C:₩Users₩JunbeomYoo₩.hudson₩jobs₩DWS_TB5₩workspace₩src₩Unit_Test_CTIP.c	Line Number	375
Condition	0		
	Running test DWS.UTC.05.01 ...	Failed	
File Name	C:₩Users₩JunbeomYoo₩.hudson₩jobs₩DWS_TB5₩workspace₩src₩Unit_Test_CTIP.c	Line Number	379
Condition	0		

Unit Test Report

Running Suite Unit Change			
	Running test DWS.UTC.06.00 ...	Failed	
File Name	C:₩Users₩JunbeomYoo₩.hudson₩jobs₩DWS_TB5₩workspace₩src₩Unit_Test_CTIP.c	Line Number	386
Condition	unit == m_min		
	Running test DWS.UTC.06.01 ...	Failed	
File Name	C:₩Users₩JunbeomYoo₩.hudson₩jobs₩DWS_TB5₩workspace₩src₩Unit_Test_CTIP.c	Line Number	392
Condition	unit == m_hour		
	Running test DWS.UTC.06.02 ...	Failed	
File Name	C:₩Users₩JunbeomYoo₩.hudson₩jobs₩DWS_TB5₩workspace₩src₩Unit_Test_CTIP.c	Line Number	398
Condition	unit == m_year		
	Running test DWS.UTC.06.03 ...	Passed	
	Running test DWS.UTC.06.04 ...	Passed	
	Running test DWS.UTC.06.05 ...	Passed	
Running Suite Value Change			
	Running test DWS.UTC.07.00 ...	Passed	
	Running test DWS.UTC.07.01 ...	Passed	
	Running test DWS.UTC.07.02 ...	Passed	
	Running test DWS.UTC.07.03 ...	Passed	
	Running test DWS.UTC.07.04 ...	Passed	
	Running test DWS.UTC.07.05 ...	Passed	
	Running test DWS.UTC.07.06 ...	Passed	
	Running test DWS.UTC.07.07 ...	Passed	
	Running test DWS.UTC.07.08 ...	Passed	
	Running test DWS.UTC.07.09 ...	Passed	
	Running test DWS.UTC.07.10 ...	Passed	
	Running test DWS.UTC.07.11 ...	Passed	
	Running test DWS.UTC.07.12 ...	Passed	
	Running test DWS.UTC.07.13 ...	Failed	
File Name	C:₩Users₩JunbeomYoo₩.hudson₩jobs₩DWS_TB5₩workspace₩src₩Unit_Test_CTIP.c	Line Number	521
Condition	t.year == 2012		
Running Suite Stopwatch Flow			
	Running test DWS.UTC.08.00 ...	Passed	
	Running test DWS.UTC.08.01 ...	Passed	
	Running test DWS.UTC.08.02 ...	Passed	

Unit Test Report

Running Suite Laptime Save			
	Running test DWS.UTC.09.00 ...	Passed	
	Running test DWS.UTC.09.01 ...	Passed	
Running Suite Stopwatch Reset			
	Running test DWS.UTC.10.00 ...	Passed	
	Running test DWS.UTC.10.01 ...	Passed	
Running Suite Display Controller			
	Running test DWS.UTC.11.00 ...	Failed	
File Name	C:₩Users₩JunbeomYoo₩.hudson₩jobs₩DWS_TB5₩workspace₩src₩Unit_Test_CTIP.c	Line Number	594
Condition	display_controller_trigger == sw_display		
	Running test DWS.UTC.11.01 ...	Failed	
File Name	C:₩Users₩JunbeomYoo₩.hudson₩jobs₩DWS_TB5₩workspace₩src₩Unit_Test_CTIP.c	Line Number	601
Condition	display_controller_trigger == ts_display		
	Running test DWS.UTC.11.02 ...	Failed	
File Name	C:₩Users₩JunbeomYoo₩.hudson₩jobs₩DWS_TB5₩workspace₩src₩Unit_Test_CTIP.c	Line Number	608
Condition	display_controller_trigger == tk_display		
	Running test DWS.UTC.11.03 ...	Failed	
File Name	C:₩Users₩JunbeomYoo₩.hudson₩jobs₩DWS_TB5₩workspace₩src₩Unit_Test_CTIP.c	Line Number	615
Condition	display_controller_trigger == tk_display		

Cumulative Summary for Run					
Type	Total	Run	Succeeded	Failed	Inactive
Suites	12	12	- NA -	0	0
Test Cases	65	65	48	17	0
Assertions	133	133	116	17	n/a

Unit Test Report

- 전체 65개의 Unit Test Case
  - 성공: 48
  - 실패: 9
  - 테스트 불가: 8

Identifier	Process Name
DWS.UTC.00.00	Input Process
DWS.UTC.00.01	Input Process
DWS.UTC.00.02	Input Process
DWS.UTC.00.03	Input Process
DWS.UTC.00.04	Input Process
DWS.UTC.00.05	Input Process
DWS.UTC.01.00	Input Controller
DWS.UTC.01.01	Input Controller
DWS.UTC.01.02	Input Controller
DWS.UTC.01.03	Input Controller
DWS.UTC.01.04	Input Controller
DWS.UTC.01.05	Input Controller
DWS.UTC.01.06	Input Controller
DWS.UTC.01.07	Input Controller

Unit Test Report

Identifier	Process Name
DWS.UTC.02.00	Time Keeping Process
DWS.UTC.02.01	Time Keeping Process
DWS.UTC.02.02	Time Keeping Process
DWS.UTC.02.03	Time Keeping Process
DWS.UTC.02.04	Time Keeping Process
DWS.UTC.02.05	Time Keeping Process
DWS.UTC.02.06	Time Keeping Process
DWS.UTC.02.07	Time Keeping Process
DWS.UTC.03.00	Time Setting Controller
DWS.UTC.03.01	Time Setting Controller
DWS.UTC.03.02	Time Setting Controller
DWS.UTC.03.03	Time Setting Controller
DWS.UTC.04.00	Stopwatch Controller
DWS.UTC.04.01	Stopwatch Controller
DWS.UTC.04.02	Stopwatch Controller
DWS.UTC.04.03	Stopwatch Controller
DWS.UTC.04.04	Stopwatch Controller
DWS.UTC.04.05	Stopwatch Controller

Unit Test Report

Identifier	Process Name
DWS.UTC.05.00	Back Light
DWS.UTC.05.01	Back Light
DWS.UTC.06.00	Unit Change
DWS.UTC.06.01	Unit Change
DWS.UTC.06.02	Unit Change
DWS.UTC.06.03	Unit Change
DWS.UTC.06.04	Unit Change
DWS.UTC.06.05	Unit Change
DWS.UTC.07.00	Value Change
DWS.UTC.07.01	Value Change
DWS.UTC.07.02	Value Change
DWS.UTC.07.03	Value Change
DWS.UTC.07.04	Value Change
DWS.UTC.07.05	Value Change
DWS.UTC.07.06	Value Change
DWS.UTC.07.07	Value Change
DWS.UTC.07.08	Value Change
DWS.UTC.07.09	Value Change

Unit Test Report

Identifier	Process Name
DWS.UTC.07.10	Value Change
DWS.UTC.07.11	Value Change
DWS.UTC.07.12	Value Change
DWS.UTC.07.13	Value Change
DWS.UTC.08.00	Stopwatch Flow
DWS.UTC.08.01	Stopwatch Flow
DWS.UTC.08.02	Stopwatch Flow
DWS.UTC.09.00	Laptime Save
DWS.UTC.09.01	Laptime Save
DWS.UTC.10.00	Stopwatch Reset
DWS.UTC.10.01	Stopwatch Reset
DWS.UTC.11.00	Display Controller
DWS.UTC.11.01	Display Controller
DWS.UTC.11.02	Display Controller
DWS.UTC.11.03	Display Controller

Test Report Summary

- 먼저, 다른 팀보다 결과가 늦은 점 사과 드리겠습니다.

- 구현 (SASD 반영 등)
  - SASD를 잘 반영하여 구현하셨습니다. 다른 팀의 경우 이것이 잘 되어 있지 않아 테스트를 하며 굉장히 고생했습니다. 소스 코드를 상당히 수정 했으니까요. 이 부분을 워낙 잘하셔서 특별히 다시 구현하시거나 할 필요는 없을 듯 합니다.
  - Controller들의 경우 State Transition System으로 정의하셨는데, 이것이 구현되어 있지 않습니다. 현재 구현대로 SA를 수정하시거나, State Transition System을 구현하셔야 할 것 같습니다.

Test Report Summary

- Test 결과
  - 조건이 0으로 되어 무조건 실패가 뜨게 되어 있는 테스트 케이스(이하 실패 테스트 케이스)들은, 테스트 데이터를 뽑아낼 수 없어 테스트 수행이 불가능한 테스트 케이스입니다.
  - Controller에서 실패 테스트 케이스가 포함되어 있는 경우는 모두 앞에서 언급한 구현 문제 때문입니다.
  - 테스트 케이스 05.~의 경우 backlight 모듈 관련 테스트로, 테스트 실행시 무한루프에 진입하여 테스트하기에 난점이 있어 실패 테스트 케이스로 두었습니다.
  - 시간 설정의 경우, 초->시->분->년->월->일->초 의 순서로 변경하게끔 SRS에 되어 있는데, Unit Change의 Process Description에는 초->분->시->년->월->일로 정의 되어 있습니다. 그런데 구현은 SRS에 맞게 되어 있어 테스트 케이스 06.00~06.02가 실패하였습니다. Process Description을 수정하시면 될 것 같습니다.
  - 2.7 Value Change의 경우 description이 모호한데, SRS에 정의되어 있는 내용을 토대로 테스트 케이스를 작성했습니다.(시, 일, 월, 년 에 대한 정의가 없음)

Test Report Summary

- 연락처
  - jhlee.dslab@gmail.com
  - 잘못된 사항이 있다면 연락 주시기 바랍니다. 확인하고 답장 드리겠습니다.