

Software Unit Test for Digital Watch System

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Introduction

- Objective
 - 본 문서는 소프트웨어 공학 개론 A반 T4 팀이 개발한 Digital watch system을 위한 문서이다.
- Reference
 - SRS Ver. DS-2012.DWS.SRS-2.1 (2012-08-17)
 - A. T4 SASD Ver 3.0

Test plan for Controllers

Identifier	Controller	State	Input	Expected Output
UT.000.000	1.5.1 Button Controller	initialization	D	Button->button == D
UT.000.001		D button	C && !D	Button->button == C
UT.000.002		C Button	B && !C && !D	Button->button == B
UT.000.003		A Button	A && !B && !C && !D	Button->button == A
UT.000.004	2.1.1 Mode Controller	Timekeeping Mode	C mode.top_mode = STOPWATCH; mode.middle_mode = COMMON;	mode->top_mode = TIMEKEEPING; mode->middle_mode = COMMON; mode->bottom_mode = NIL;
UT.000.025		Stopwatch Mode	C mode->middle_mode = COMMON; Mode->top_mode = TIMEKEEPING	mode->top_mode = STOPWATCH; mode->middle_mode = STOP; mode->bottom_mode = STOPWATCH_STOP;
UT.000.005	2.2.1.1 Timekeeping Controller	Common Mode	A	Mode->middle_mode == TIME_SETTING
UT.000.006		Time Setting Mode	A	Mode->middle_mode == COMMON

Test plan for Controllers

Identifier	Controller	State	Input	Expected Output
UT.000.007	2.2.2.1 Stopwatch Controller	Stop	B && middle_mode == STOP	mode_button->mode->middle_mode == START
UT.000.008		Running	A && middle_mode == RUNNING && bottom_mode == STOPWATCH_PAUSE	mode_button->mode->middle_mode == STOP; mode_button->mode-> bottom_mode == STOPWATCH_RESET
UT.000.009		Running	B && middle_mode == RUNNING && bottom_mode == STOPWATCH_RUN	mode_button->mode->middle_mode == PAUSE
UT.000.010		Running	B && middle_mode == RUNNING && bottom_mode == STOPWATCH_LAPTIME	mode_button->mode->middle_mode == RUNNING; mode_button->mode-> bottom_mode == STOPWATCH_RUN
UT.000.011		Running	A && middle_mode == RUNNING && (bottom_mode == STOPWATCH_RUN bottom_mode == STOPWATCH_LAPTIME)	mode_button->mode->middle_mode == LAPTIME; mode_button->mode-> bottom_mode == NIL;
UT.000.012		Running	B && middle_mode == RUNNING && bottom_mode == STOPWATCH_PAUSE	mode_button->mode->middle_mode == RESUME

Test plan for Controllers

Identifier	Controller	State	Input	Expected Output
UT.000.013	2.2.1.3.1 Time setting Mode Controller	Second	B	datetime->second +=1;
UT.000.014		Second	C	mode_button->mode-> bottom_mode == HOUR
UT.000.015		Hour	B	datetime->hour +=1;
UT.000.016		Hour	C	mode_button->mode-> bottom_mode == MINUTE
UT.000.017		Minute	B	datetime->minute +=1;
UT.000.018		Minute	C	mode_button->mode-> bottom_mode == YEAR
UT.000.019		Year	B	datetime->year +=1;
UT.000.020		Year	C	mode_button->mode-> bottom_mode == MONTH
UT.000.021		Month	B	datetime->month +=1;
UT.000.022		Month	C	mode_button->mode-> bottom_mode == DAY
UT.000.023		Day	B	datetime->day +=1;
UT.000.024		Day	C	mode_button->mode-> bottom_mode == SECOND

Test plan for Data processes

Identifier	Process	Input	Expected Output
UT.001.000	2.1.2 Time Keeping Mode	Enable / Disable (True / False)	TK mode & button (?) mode->top_mode = TIMEKEEPING; mode->middle_mode = COMMON; mode->bottom_mode = NIL;
UT.001.001	2.1.3 Stopwatch Mode	Enable / Disable (True / False)	SW mode & button (?) mode->top_mode = STOPWATCH; mode->middle_mode = STOP; mode->bottom_mode = STOPWATCH_STOP;
UT.001.002	2.2.1.2 Common Mode	Enable / Disable (True / False)	DateTime (?) mode->middle_mode = COMMON; mode->bottom_mode = NIL;
UT.001.003	2.2.2.2 Start	Trigger (True / False)	Laptime (Structure) (?) mode_button->mode->middle_mode = START;
UT.001.004	2.2.2.3 Pause	Trigger (True / False)	Laptime (Structure) mode_button->mode->middle_mode = PAUSE;

입출력과 직접적으로 관련된 Data Process (1.5.2 – 1.5.5, 3.1 – 3.3)는 제외하였습니다.
2.2.1.3.2 – 2.2.1.3.7 Data Process는 상위 Controller에서 테스트를 할 수 있기
때문에 제외하였습니다.

Test plan for Data processes

Identifier	Process	Input	Expected Output
UT.001.005	2.2.2.4 Resume	Trigger (True / False)	LapTime (Structure) mode_button->mode->middle_mode = RESUME;
UT.001.006	2.2.2.5 Reset	Trigger (True / False)	LapTime (Structure) mode_button->mode->middle_mode = STOP; mode->bottom_mode = STOPWATCH_RESET;
UT.001.007	2.2.2.6 LapTime	Trigger (True / False)	LapTime (Structure) mode_button->mode->middle_mode = LAPTIME; mode->bottom_mode = NIL;
UT.001.008	2.2.2.7 Rerunning	Trigger (True / False)	LapTime (Structure) mode_button->mode->middle_mode = RUNNING; mode->bottom_mode = STOPWATCH_RUN;
UT.001.009	2.2.2.8 Running	Enable/Disable (True / False)	LapTime (Structure) mode_button->mode->middle_mode = RUNNING;

Test Result

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

Automated Test Run Results

Running Suite Controllers							
		Running test DWS_UTC_000_000 ...		Passed			
		Running test DWS_UTC_000_001 ...		Passed			
		Running test DWS_UTC_000_002 ...		Passed			
		Running test DWS_UTC_000_003 ...		Passed			
		Running test DWS_UTC_000_004 ...		Passed			
		Running test DWS_UTC_000_005 ...		Passed			
		Running test DWS_UTC_000_006 ...		Passed			
		Running test DWS_UTC_000_007 ...		Passed			
		Running test DWS_UTC_000_008 ...		Passed			
		Running test DWS_UTC_000_009 ...		Passed			
		Running test DWS_UTC_000_010 ...		Passed			
		Running test DWS_UTC_000_011 ...		Passed			
		Running test DWS_UTC_000_012 ...		Passed			
		Running test DWS_UTC_000_013 ...		Failed			
File Name	C:\Users\SubW.hudson\Jobs\Wjeba\workspace\src\WTest1.c			Line Number		212	
Condition	datetime.second == 2						
		Running test DWS_UTC_000_014 ...		Passed			
		Running test DWS_UTC_000_015 ...		Failed			
File Name	C:\Users\SubW.hudson\Jobs\Wjeba\workspace\src\WTest1.c			Line Number		248	
Condition	datetime.hour == 2						
		Running test DWS_UTC_000_016 ...		Passed			
		Running test DWS_UTC_000_017 ...		Failed			
File Name	C:\Users\SubW.hudson\Jobs\Wjeba\workspace\src\WTest1.c			Line Number		285	
Condition	datetime.minute == 2						
		Running test DWS_UTC_000_018 ...		Passed			
		Running test DWS_UTC_000_019 ...		Failed			
File Name	C:\Users\SubW.hudson\Jobs\Wjeba\workspace\src\WTest1.c			Line Number		322	
Condition	datetime.year == 2015						
		Running test DWS_UTC_000_020 ...		Passed			
		Running test DWS_UTC_000_021 ...		Failed			
File Name	C:\Users\SubW.hudson\Jobs\Wjeba\workspace\src\WTest1.c			Line Number		360	
Condition	datetime.month == 2						
		Running test DWS_UTC_000_022 ...		Passed			
		Running test DWS_UTC_000_023 ...		Failed			
File Name	C:\Users\SubW.hudson\Jobs\Wjeba\workspace\src\WTest1.c			Line Number		396	
Condition	datetime.day == 2						
		Running test DWS_UTC_000_024 ...		Failed			
File Name	C:\Users\SubW.hudson\Jobs\Wjeba\workspace\src\WTest1.c			Line Number		411	
Condition	mode.bottom_mode == SECOND						
		Running test DWS_UTC_000_025 ...		Failed			
File Name	C:\Users\SubW.hudson\Jobs\Wjeba\workspace\src\WTest1.c			Line Number		67	
Condition	mode.top_mode == STOPWATCH && mode.middle_mode == STOP && mode.bottom_mode == STOPWATCH_STOP						
Running Suite Data Processes							
		Running test DWS_UTC_001_000 ...		Passed			
		Running test DWS_UTC_001_001 ...		Passed			
		Running test DWS_UTC_001_002 ...		Passed			
		Running test DWS_UTC_001_003 ...		Passed			
		Running test DWS_UTC_001_004 ...		Passed			
		Running test DWS_UTC_001_005 ...		Passed			
		Running test DWS_UTC_001_006 ...		Passed			
		Running test DWS_UTC_001_007 ...		Passed			
		Running test DWS_UTC_001_008 ...		Passed			
		Running test DWS_UTC_001_009 ...		Passed			
Cumulative Summary for Run							
Type	Total	Run	Succeeded	Failed	Inactive		
Suites	2		NA	0	0		
Test Cases	36	36	28	8	0		
Assertions	36	36	28	8	n/a		

Test Result

- Comments
 - Failed Test Case
 - 1차 Test 결과에서 Fail로 결과가 나온 UT.000.004, UT.000.025는 수정하였습니다.
 - SRA에 명세 되어 있는 Spec. 을 그대로 구현하지 않으셨습니다.

Appendix

- 말씀드린 내용에 대해서 아직 잘 이해하고 계시지 못한 것 같습니다.
 - SRA에서는 2.2.1.3.1 인 Time Setting Mode Controller가 각 Data process (2.2.1.3.2 – 2.2.1.3.7)을 호출하고, 호출된 Data process는 Date Time을 수정하도록 되어있습니다.
 - 헌데, 실제 작성된 소스코드는 Current Time (2.3.1)에서 마치 Controller 처럼 각 함수를 호출하여 1씩 더하도록 되어있습니다.
 - 또한, SRA내에 있는 Process Description에 각 Data process가 어떠한 데이터를 데이터 몇으로 변하게 하는지에 대한 자세한 내용이 첨부 되어 있어야 합니다.
 - 이 외에도 거의 모든 소스코드가 함수명만 SRA와 같을 뿐, SRA와는 전혀 다르게 작성되어 있습니다.

Appendix

- 아래와 같은 Description에는 Second에 대한 Event가 무엇인지 알 수가 없습니다.
- 이 외에도 모든 Process Description이 구체적인 input/output 데이터가 명시되어 있지 않습니다.

Reference No.	2.2.1.3.2
Name	Second_Plus
Input	Enable/Disable (True/False)
Output	DateTime (Structure)
Description	Enable을 입력 받은 경우 Second에 대한 Event를 출력한다.