

Regression Test 적용

2012. 12. 14

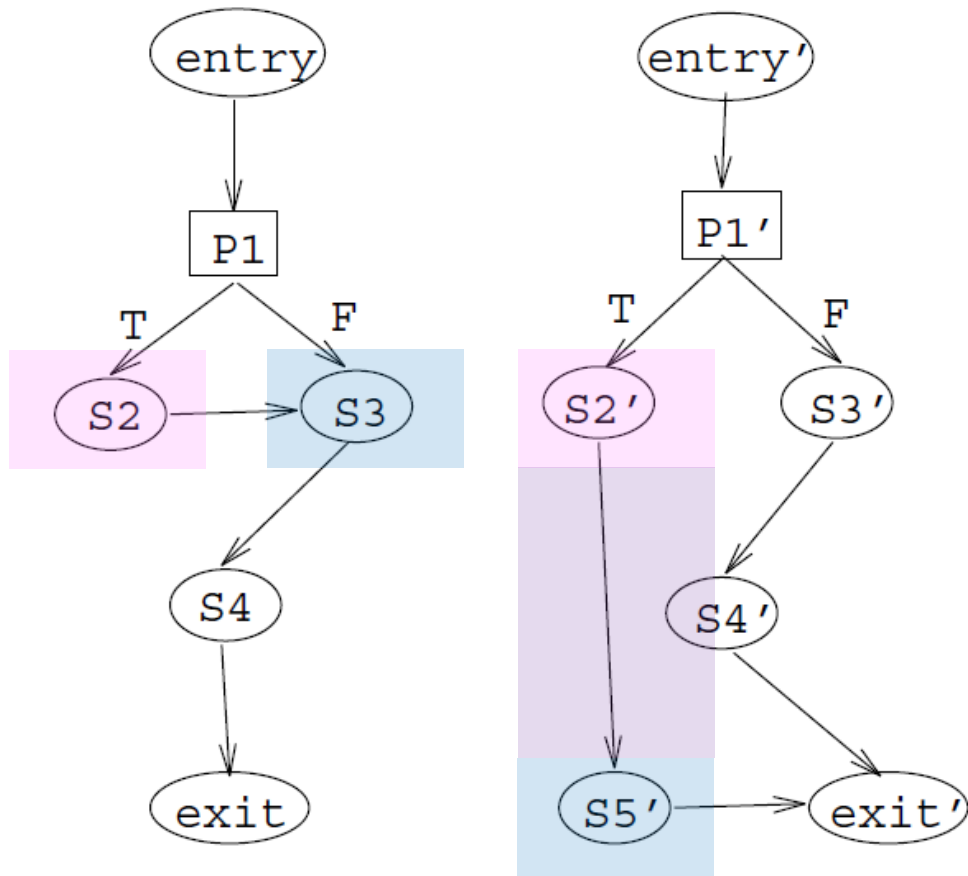
윤상현

차례

- CFG 생성
- CFG 비교
- Test Case 경로 분석
- Test Case 추가 생성

Regression test 기법

- Procedural program을 대상으로 하는 RTS (Regression Test Selection) 기법
- CFG를 기반으로 한 기법
 - Unit별로 CFG를 생성하고,
 - CFG들을 비교하여 같은 node에서 서로 다른 node로 바뀌는 edge를 찾아
 - 해당 edge를 포함하는 test case가 있으면 test를 재 수행.



CFG 생성

- 2011 소프트웨어 공학개론 실습(B10)의 CFG생성 프로그램을 사용.
- 대상 source code를 수정
 - 여백이 있으면 다른 node로 인식, 이를 제거
 - 주석 제거
 - 하나의 c파일에 여러 개의 unit이 있으면 원하는 CFG가 생성되지 않음, unit 하나당 하나의 c파일로 수정.

```

*****
Block Number : 2
Code : switch(i)
Block type : SWITCH
Connected Edge :
(Edge type-Block Number)
FALSE - 20
TRUE - 3
TRUE - 8
TRUE - 16
*****
    
```

각각의 case

대상 Unit 목록

Unit Name

Current time controller

Increase time

Mode Select

Time keep

Change time controller

Change Object

Increase Digit

Stopwatch Controller

SW increase & stop Controller

SW second change

SW minute change

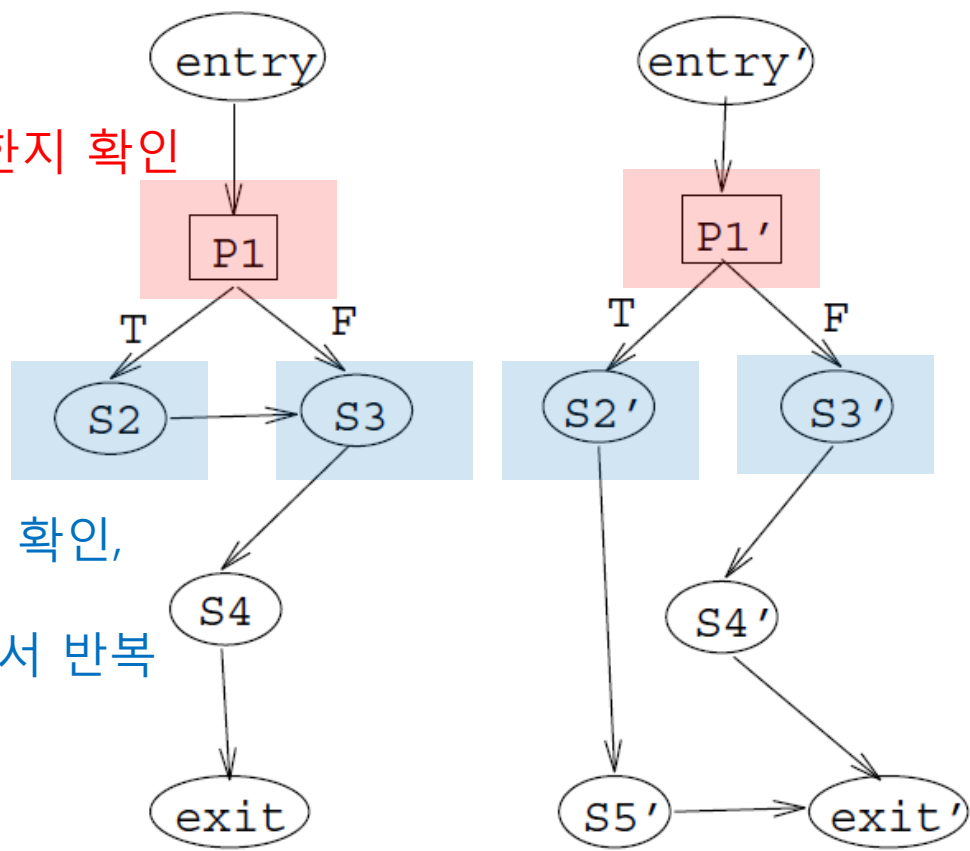
Backlight controller

- 기존 source와 수정 후 source에서 둘 다 존재하는 unit들을 선정.
- 문서와의 불일치 등으로 테스트 하지 않은 unit들은 제외
- SRS의 변화로 추가된 unit들 제외.

CFG 비교

- G와 G'에서 순차적으로 노드를 추적, 같은 노드 일 경우 edge를 검색하는 방식
 - G와 G'은 각각 기존 코드와 수정된 코드에서 만들어진 CFG

① P1과 P1'이 동일한지 확인



② P1과 P1'의 edge 확인,

① ② 를 각 node에서 반복

변화가 있는 unit 목록

Unit Name

Current time controller

Increase time

Mode Select

Time keep

Change time controller

Change Object

Increase Digit

Stopwatch Controller

SW increase & stop Controller

SW second change

SW minute change

Backlight controller

- 변화 없음
- 변화 있음
- CFG 생성 에러, 변화 없음을 확인

DWS.UTC_07.00	mode_state == SW, s_time->start_state = START, key = a	s_time->start_state=LAP
DWS.UTC_07.01	mode_state == SW, s_time->start_state= START, key = b	s_time-> start_state =STOP
DWS.UTC_07.02	mode_state == SW, s_time->start_state= START, key = c	mode_state = TK
DWS.UTC_07.03	mode_state == SW, s_time->start_state=STOP, key = a	s_time-> start_state=STOP
DWS.UTC_07.04	mode_state == SW, s_time->start_state=STOP, key = b	s_time->start_state=START
DWS.UTC_07.05	mode_state == SW, s_time->start_state=STOP, key = c	mode_state = TK
DWS.UTC_07.06	mode_state == SW, s_time->start_state=LAP, key = a	s_time->start_state=LAP
DWS.UTC_07.07	mode_state == SW, s_time->start_state=LAP, key = b	s_time->start_state=START
DWS.UTC_07.08	mode_state == SW, s_time->start_state=LAP, key = c	mode_state = TK

Appendix – CFG 결과, Current time controller

```

• *****Block Number : 0Code : function void
currenttime_controller()Block type : FUNCTIONConnected Edge : (Edge type-Block
Number)NORMAL -
1*****Block
Number : 1Code :
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
2*****Block
Number : 2Code : struct tm *tm_time;
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
3*****Block
Number : 3Code : if(start_setup==STOP)Block type : BRANCHConnected Edge : (Edge
type-Block Number)FALSE - 10TRUE -
4*****Block
Number : 4Code :
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
5*****Block
Number : 5Code : time(&now_time);
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
6*****Block
Number : 6Code : tm_time=localtime(&now_time);
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
7*****Block
Number : 7Code : get_currenttime(tm_time);
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
8*****Block
Number : 8Code : start_setup = START;
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
20*****Block
Number : 10Code : else
• Block type : BRANCHConnected Edge : (Edge type-Block Number)TRUE -
11*****Block
Number : 11Code : if(start_setup == START)
• Block type : BRANCHConnected Edge : (Edge type-Block Number)FALSE - 20TRUE -
12*****Block
Number : 12Code :
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
13*****Block
Number : 13Code : if(tick_cnt >= 100)Block type : BRANCHConnected Edge : (Edge
type-Block Number)FALSE - 20TRUE -
14*****Block
Number : 14Code :
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
15*****Block
Number : 15Code : increase_time();
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
16*****Block
Number : 16Code : tick_cnt=0;
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
20*****Block
Number : 20Code : endFBBlock type : FUNCTIONConnected Edge : (Edge type-Block
Number)*****

```

```

• *****Block Number : 0Code : function void
currenttime_controller()Block type : FUNCTIONConnected Edge : (Edge type-Block
Number)NORMAL -
1*****Block
Number : 1Code :
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
2*****Block
Number : 2Code : struct tm *tm_time;
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
3*****Block
Number : 3Code : if(start_setup==STOP)Block type : BRANCHConnected Edge : (Edge
type-Block Number)FALSE - 10TRUE -
4*****Block
Number : 4Code :
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
5*****Block
Number : 5Code : time(&now_time);
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
6*****Block
Number : 6Code : tm_time=localtime(&now_time);
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
7*****Block
Number : 7Code : get_currenttime(tm_time);
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
8*****Block
Number : 8Code : start_setup = START;
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
20*****Block
Number : 10Code : else
• Block type : BRANCHConnected Edge : (Edge type-Block Number)TRUE -
11*****Block
Number : 11Code : if(start_setup == START)
• Block type : BRANCHConnected Edge : (Edge type-Block Number)FALSE - 20TRUE -
12*****Block
Number : 12Code :
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
13*****Block
Number : 13Code : if(tick_cnt >= 100)Block type : BRANCHConnected Edge : (Edge
type-Block Number)FALSE - 20TRUE -
14*****Block
Number : 14Code :
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
15*****Block
Number : 15Code : increase_time();
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
16*****Block
Number : 16Code : tick_cnt=0;
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
20*****Block
Number : 20Code : endFBBlock type : FUNCTIONConnected Edge : (Edge type-Block
Number)*****

```

Increase_time

- ```

*****Block
k Number : 0Code : function void
increase_time()Block type :
FUNCTIONConnected Edge : (Edge type-
Block Number)NORMAL -
1*****
*****Block
Number : 1Code :

```
- ```

Block type : NORMALConnected Edge :
(Edge type-Block Number)NORMAL -
2*****
*****Block
Number : 2Code : wt.sec++;

```
- ```

Block type : NORMALConnected Edge :
(Edge type-Block Number)NORMAL -
3*****
*****Block
Number : 3Code : endFBlock type :
FUNCTIONConnected Edge : (Edge type-
Block
Number)*****

```

original

- ```

*****Block
k Number : 0Code : function void
increase_time()Block type :
FUNCTIONConnected Edge : (Edge type-
Block Number)NORMAL -
1*****
*****Block
Number : 1Code :

```
- ```

Block type : NORMALConnected Edge :
(Edge type-Block Number)NORMAL -
2*****
*****Block
Number : 2Code : wt.sec++;

```
- ```

Block type : NORMALConnected Edge :
(Edge type-Block Number)NORMAL -
3*****
*****Block
Number : 3Code : endFBlock type :
FUNCTIONConnected Edge : (Edge type-
Block
Number)*****
*****

```

modified

Mode_select

```

• *****Block Number : 0Code : function void
mode_selector(Block type : FUNCTIONConnected Edge : (Edge type-Block
Number)NORMAL -
1*****Block
Number : 1Code :
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
2*****Block
Number : 2Code :
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
3*****Block
Number : 3Code : if(mode_state == TK)Block type : BRANCHConnected Edge : (Edge
type-Block Number)FALSE - 15FALSE - 16TRUE -
4*****Block
Number : 4Code :
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
5*****Block
Number : 5Code : if(key == 'a')Block type : BRANCHConnected Edge : (Edge type-
Block Number)FALSE - 11TRUE -
6*****Block
Number : 6Code :
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
7*****Block
Number : 7Code : mode_state = CT;
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
8*****Block
Number : 8Code : key=0;
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
9*****Block
Number : 9Code : system("cls");
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
11*****Block
Number : 11Code : mode_state = SW;
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
12*****Block
Number : 12Code : key=0;
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
13*****Block
Number : 13Code : system("cls");
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
15*****Block
Number : 15Code : endFBlock type : FUNCTIONConnected Edge : (Edge type-Block
Number)*****
Block Number : 16Code : ?aBlock type : NORMALConnected Edge : (Edge type-Block
Number)*****

```

original

```

• *****Block Number : 0Code : function void
mode_selector(Block type : FUNCTIONConnected Edge : (Edge type-Block
Number)NORMAL -
1*****Block
Number : 1Code :
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
2*****Block
Number : 2Code : if(mode_state == TK)Block type : BRANCHConnected Edge : (Edge
type-Block Number)FALSE - 15FALSE - 16TRUE -
3*****Block
Number : 3Code :
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
4*****Block
Number : 4Code : if(key == 'a')Block type : BRANCHConnected Edge : (Edge type-
Block Number)FALSE - 10TRUE -
5*****Block
Number : 5Code :
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
6*****Block
Number : 6Code : mode_state = CT;
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
7*****Block
Number : 7Code : key=0;
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
8*****Block
Number : 8Code : system("cls");
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
10*****Block
Number : 10Code :
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
11*****Block
Number : 11Code : mode_state = AL;
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
12*****Block
Number : 12Code : key=0;
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
13*****Block
Number : 13Code : system("cls");
• Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
15*****Block
Number : 15Code : endFBlock type : FUNCTIONConnected Edge : (Edge type-Block
Number)*****
Block Number : 16Code : xu'aBlock type : NORMALConnected Edge : (Edge type-
Block Number)*****

```

modified

Change_object

```

• *****Block Number :
  0Code : function void change_object()Block type :
  FUNCTIONConnected Edge : (Edge type-Block
  Number)NORMAL -
  1*****
  *****Block Number : 1Code :
• Block type : NORMALConnected Edge : (Edge type-
  Block Number)NORMAL -
  2*****
  *****Block Number : 2Code :
  wt.pos++;
• Block type : NORMALConnected Edge : (Edge type-
  Block Number)NORMAL -
  3*****
  *****Block Number : 3Code :
  if(wt.pos >= 6)
• Block type : BRANCHConnected Edge : (Edge type-
  Block Number)FALSE - 6TRUE -
  4*****
  *****Block Number : 4Code : wt.pos
  = wt.pos - 6;
• Block type : NORMALConnected Edge : (Edge type-
  Block Number)NORMAL -
  6*****
  *****Block Number : 6Code :
  endFBlock type : FUNCTIONConnected Edge : (Edge
  type-Block
  Number)*****

```

original

```

• *****Block Number :
  0Code : function void change_object()Block type :
  FUNCTIONConnected Edge : (Edge type-Block
  Number)NORMAL -
  1*****
  *****Block Number : 1Code :
• Block type : NORMALConnected Edge : (Edge type-
  Block Number)NORMAL -
  2*****
  *****Block Number : 2Code :
  wt.pos++;
• Block type : NORMALConnected Edge : (Edge type-
  Block Number)NORMAL -
  3*****
  *****Block Number : 3Code :
  if(wt.pos >= 6)
• Block type : BRANCHConnected Edge : (Edge type-
  Block Number)FALSE - 6TRUE -
  4*****
  *****Block Number : 4Code : wt.pos
  = wt.pos - 6;
• Block type : NORMALConnected Edge : (Edge type-
  Block Number)NORMAL -
  6*****
  *****Block Number : 6Code :
  endFBlock type : FUNCTIONConnected Edge : (Edge
  type-Block
  Number)*****

```

modified

SW increase & stop Controller

- *****Block Number :
0Code : function void SW_IncreaseAndStop()
- Block type : FUNCTIONConnected Edge : (Edge type-Block Number)NORMAL -
1*****
*****Block Number : 1Code :
- Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
2*****
*****Block Number : 2Code :
s_time.SW_ss++;
- Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
3*****
*****Block Number : 3Code :
SW_sec_change();
- Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
4*****
*****Block Number : 4Code :
SW_min_change();
- Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
5*****
*****Block Number : 5Code :
endFBlock type : FUNCTIONConnected Edge : (Edge type-Block Number)*****

original

- *****Block Number :
0Code : function void SW_IncreaseAndStop()
- Block type : FUNCTIONConnected Edge : (Edge type-Block Number)NORMAL -
1*****
*****Block Number : 1Code :
- Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
2*****
*****Block Number : 2Code :
s_time.SW_ss++;
- Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
3*****
*****Block Number : 3Code :
SW_sec_change();
- Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
4*****
*****Block Number : 4Code :
SW_min_change();
- Block type : NORMALConnected Edge : (Edge type-Block Number)NORMAL -
5*****
*****Block Number : 5Code :
endFBlock type : FUNCTIONConnected Edge : (Edge type-Block Number)*****

modified