SQA Assignment 2 - Spring 2017

Due: Monday, March 6, 2017 (beginning of class)

Problem Descriptions:

The purpose of this assignment is to reinforce the lecture material on structural testing, independent paths, and path predicates. For each of the source code fragments below in problems 1 through 4:

(1) calculate V(G)

(2) construct a set of independent paths through the source code fragment

(3) construct a path predicate for each independent path.

You must use line numbers to describe the independent paths and use Boolean conditions from the source code to describe the path predicates. Example of response format is shown in Figure 1.

Example:

```
1   if (a<10) //C1
2       x++;
3   else if (b>15) //C2
4       y++;
5   z++;
```

V(G) = 3

Path #	Path	C1	C2
(1)	1-2-5	T	X
(2)	1-3-5	F	F
(3)	1-3-4-5	F	T

Legend: T = true, F = false, X = irrelevant

Figure 1. Example showing response format

Problem 1:

```
1   void Q1() {
2           s1();
3           if( c1 ) {
4                   s2();
5           }
6           if( c2 ) {
7                   for (int  i= 0; c3; i++)  {
8                       s3();
9                       if( c4 )  {
10                              s4();
11                      }
12                      else {
13                              s5();
14                      }
15                  }
16                  s6();
17          }
18          else {
19                    s7();
20          }
21          s8();
22  }
```

Problem 2:

```
1   void Q2() {
2           s1();
3           do {
4                   s2();
5                   if( c1 ) {
6                           s3();
7                   }
8                   else {
9                           s4();
10                          }
11          } while ( c2 )
12          s5();
13          if( c3 || c4 ) {
14                          s6();
15          }
16          else {
17                  if( c5 && c6 ) {
18                          s7();
19                  }
20          }
21          s8();
22  }
```

Problem 3:

```
1   void Q3() {
2           if ( c1 )  {
3                   s1();
4                   if (( c2 && c3) || c4 )  {
5                         s2();
6                   }
7                   else {
8                         if ( c5 )  {
9                                 s3();
10                        }
11                        s4();
12                  }
13                  s5();
14          }
15          else {
16                  if( c6 ) {
17                      s6();
18                  }
19                  else {
20                      s7();
21                  }
22           }
23          s8();
24  }
```

Problem 4:

```
1   void Q4()  {
2           s1();
3           if( c1 ) {
4               s2();
5           }
6           else {
7               s3();
8               while ( c2 )  {
9                       s4();
10                      if( c3 )  {
11                          s5();
12                      }
13                      else {
14                          if ( c4 )  {
15                              s6();
16                          }
17                          else  {
18                              s7();
19                          }
20                          s8();
21                      }
22                      s9();
23                  }
24          }
25          s10();
26  }
```