Static Code Analysis

Lab. 8 – Intraprocedural CFG
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Exercise 1:

Using prepared Java grammar file (for example the one at http://www.cs.put.poznan.pl/bbogacki/sca/3/JavaParser.jj) and JTB or JJTree library, write a program that will create CFG (Control Flow Graph) for simple java methods. For simplification, assume that the Java program consists of single class that includes single method (`main`).

The program should print out the CFG as incidence matrix, list of successors for each node or in any other commonly used notation.

Example:

For the following input stream:

```
 1 public class Lecture8 {
 2    public static void main(String[] args) {
 3        int i = 0; // s1
 4        int sum = 0; // s2
 5        while (i < 10) { // p1
 6            sum = sum + i; // s3
 7            i++; // s4
 8        }
 9        System.out.println("sum = " + sum); // s5
10    }
11 }
```

The output should be:

```
s1: s2
s2: p1
p1: s3, s5
s3: s4
s4: p1
s5:
```

Or:

S1	S2	P1	S3	S4	S5
-1	1	0	0	0	0
0	-1	1	0	0	0
0	0	-1	1	0	0
0	0	-1	0	0	1
0	0	0	-1	1	0
0	0	1	0	-1	0

Exercise 2:

Extend the program prepared for Exercise 1 to print out on screen, all postdomination relations that were found in the source file.

Example:

For the following input stream:

```
 1 public class Lecture8 {
 2    public static void main(String[] args) {
 3        int i = 0;
 4        int sum = 0;
 5        while (i < 10) {
 6            sum = sum + i;
 7            i++;
 8        }
 9        System.out.println("sum = " + sum);
10    }
11 }
```

The output should be:

```
s1: s2
s2: p1
p1: s3, s5
s3: s4
s4: p1
s5:

s1 is postdominated by s2, p1, s5
s2 is postdominated by p1, s5
p1 is postdominated by s5
s3 is postdominated by s4, p1, s5
s4 is postdominated by p1, s5
```

Exercise 3:

Extend the program prepared for Exercise 2 to print out on screen, all control dependence relations that were found in the source file.

The output should be:

```
s1: s2
s2: p1
p1: s3, s5
s3: s4
s4: p1
s5:

s1 is postdominated by s2, p1, s5
s2 is postdominated by p1, s5
p1 is postdominated by s5
s3 is postdominated by s4, p1, s5
s4 is postdominated by p1, s5

s3 is control dependent on p1
s4 is control dependent on p1
```