1 Introduction

The purpose of this assignment is for you to learn how to use the BCEL Java bytecode editor.

Make sure that you have downloaded the smark2, smextern, and smbcel2 directories from the cvs server:

```bash
cvs -d :ext:YourLogin@cvs.cs.arizona.edu:/cvs/cvs/wmark 
    checkout smark2 smextern smbcel2
```

smextern contains the BCEL.jar library that you will need to compile and run any program that uses BCEL. smbcel2 only contains one file, List.java, that reads in a Java class file, parses it using BCEL, and prints out the contents in a very simple format. smark2/doc contains the most recent version of the SandMark documentation. Build manual.ps by typing

```
make
make again
make again
```

Up-to-date information on BCEL should be in one of the appendices.

2 Assignment

For this assignment you will write a program that does the following:

1. Open a Java class file using BCEL. The name of the file should be given on the command line.

2. Add a new method

   ```java
   public static void sm$method() {
   ...
   }
   ```

   to the class file.

3. Pick a random method already in the class and add a call from the beginning of this method to sm$method:
public ... foo( ... ) {
    sm$method();
    ...
}

4. Add some random code to the body of sm$method. The generated code should pass the verifier and should execute without causing an error. It doesn’t have to do anything intelligent.

5. Write out the modified class file. If the original was named x.class, then the modified one should be named x.new.class.

You decide yourself how complex the new, random, code should be. For example, you might generate a method as simple as the following

```
public static void sm$method() {
    int x = <some random value>;
    int y = <some random value>;
    int z = x <some random binary operator> y;
    System.out.println(z);
}
```

or you could do something much more creative.

3 Adminstrivia

This assignment is due Thursday, February 1. It is worth 5% of your final grade. To submit, you should add the code to the smbcel2 cvs directory. Assume your login is carl. Do the following:

```
cd smbcel2
mkdir carl
cvs add carl
cd carl
cp <wherever>/Carl.java, <wherever>/Test.java, <wherever>/Makefile, <wherever>/README .
cvs add Carl.java, Test.java, Makefile
cvs commit
```

<wherever>/Carl.java, <wherever>/Test.java, etc., are the files that you wrote for the assignment.

This is an individual assignment! Don’t read the code already submitted by others! You may, of course, ask for assistance from other students.

Please! Since all of you can read the cvs directory don’t upload your code until the evening of February 1!

Once the deadline is past you are, of course, free to read others’ code. In fact, this is the whole idea with this assignment: the code you write will become part of the SandMark code-base for everyone to learn from.

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