Georgia State University
Department of Computer Science

CSC4330/6330 – Assignment #1
Summer 2017
Due Thursday June 15th, 11:59 pm

All answers must be computer-printed, except for diagrams. Use your own words; do not copy material verbatim from a web site or other source.

1) Java uses a right brace to mark the end of all compound statements. What are the arguments for and against this design?

2) What a role does the symbol table play in a complier.

3) On page 12, Sebesta mentions that the word static has two meanings in C, depending on the context in which it is used. What other meanings are there for static in both C and C++?

4) Draw a diagram showing the internal representation of the following Lisp list**:**

(A B (C (D)) E)

- Your diagram should resemble those in the figure on page 48 of Sebesta.

5) The following PDF file is "A Lisp Primer for C and Java Programmers". Using this reference, write a Lisp program that have the same effect as the following C program:

```
int x=3;
int y=2;
myfunc(x,y);
int myfunc(int x,y)
        {
          return x + y
         }
```

Then show any notable differences between the two functions in terms of type declaration, syntax, etc.

6) The following class contains several errors that violate the rules of Java:

```
1.    class Thermometer {
2.      private int temperature

3.      public Thermometer(int degrees) {
4.        temperature = degrees;
5.      }

6.      public Thermometer() {
7.        temperature = 2.5;
8.      }

9.      public void makeWarmer(int degrees) {
10.       temperature =+ degrees;
11.     }

12.     public void makeCooler(int degrees) {
13.       temperature -= degrees;
14.     }

15.     public getTemperature() {
16.       return temperature;
17.     }

18.   }
```

Describe each error and specify whether it is (a) lexical, (b) syntactic, or (c) semantic. Use the numbers shown to identify the line on which each error occurs. The class may also contain programming errors that do not violate the rules of Java and will not be detected by a Java compiler. You should ignore these errors. **(We are going to cover this topic on Monday, Chapter 3)**

7) For each one of the following statements about Java, indicate whether or not it is also true for Smalltalk. If a statement is not true for Smalltalk, explain why not.

(a) Java is normally implemented using a hybrid implementation system.
(b) Data in Java is divided into two categories: primitive types and reference types.
(c) Variables in Java must have a declared type.
(d) Java relies on garbage collection to reclaim memory occupied by objects that are no longer in use.
(e) Java's classes are part of a single class hierarchy.
(f) Java supports only single inheritance, not multiple inheritance.

8) How many lexemes does the following Java code contain?

```
1. public class CountDigits {
2.   public static void main(String[] args) {
3.     SimpleIO.prompt("Enter an integer: ");
4.     String userInput = SimpleIO.readLine();
5.     int number = Integer.parseInt(userInput);

6.     int numDigits = 0;
7.     do{
8.           number += 10;
9.           numDigits++;
10.        } while (numDigits < 5)

11.    System.out.println("The number " + userInput + " has " +
12.                       numDigits + " digits");
13.  }
14. }
```

Give the number of lexemes on each line (using the line numbers shown) as well as the total number of lexemes. **(We are going to cover this topic on Monday, Chapter 3)**

Submission Instructions:

- **Make sure to justify all answers – show all work.**
- The Assignment must be submitted electronically through ICollege/D2L.
- Upload the answers in a pdf file to ICollege/D2L in the respective assignment dropbox.
- All work must be neat and legible. Illegible work will receive no credit. This includes work where the print contrast or darkness are too faint
- The work that you turn in must be your own --- copying is not allowed for any assignments.
- Using another student's work as your own, allowing another student to use your work as their own, is academic misconduct and is not tolerated.