CS 180 Problem Solving and OO Programming

Fall 2011
Recitation Week 2 [August 29-Sept 2]
Problem Set

Problem 1:

Learning objectives: (a) Understand how to use `System.out.print()` and `System.out.println()` to prompt a user for data input. (b) Understand how to use the `Scanner` object for data input from console.

Problem statement:

Trace Program 2.6 on pages 55-56 line-by-line and understand the meaning and effect of each line. Make sure you understand how (a) the `Scanner` object is created and how it's methods are used to input data and (b) to prompt the user for data.

```
1 /* Program 2.6.
2 * This program computes the distance travelled by
3 * a moving object given its speed and travel duration.
4 * Uses the Scanner class for input.
5 *
6 */
7  import java.util .*;
8  import java.lang.String;
9  import javax.swing .*;
10 public class ScannerExample {
11    // Create an object named source that will
12    // help us input data for solving this problem.
13    Scanner source = new Scanner(System.in);
14    public ScannerExample () {
15          double speed , duration;// Speed and duration.
16          double distance; // Distance to be computed.
17          // Declare user prompt strings.
18          String enterS = "Enter the speed.";
19          String enterD = "Enter duration.";
20          // Solution to sub -problem 1: Read input.
21          // Prompt the user and get speed and duration.
```

```
22          System.out.println(enterS);
23          speed = source.nextDouble ();
24          System.out.println(enterD);
25          duration = source.nextDouble ();
26          // Solution to sub -problem 2: Compute distance
            travelled.
27          distance = speed*duration;
28          // Solution to sub -problem 3: Display output.
29          System.out.println("Distance travelled: "+ distance+
            "       miles.");
30          }
31    public static void main(String [] args) {
32          new ScannerExample (); // Create ScannerExample
                                                object.
33          }
34    }
```

Problem 2:

Learning objectives: Understand how to interpret a problem statement and map the solution to Java using classes, objects, methods, variables, etc.

Problem statement:

We are required to write a Java program that creates two chemical element objects. Each chemical element object has the following attributes: name (e.g., Hydrogen), symbol (e.g. H), atomic number (e.g., 1), and atomic mass (e.g., 1.00794). For each element our program must input each of these four attributes from the console. The program must prompt the user for data and when all attributes have been input, it should create a new object for that element. Assume that we are required to read data on only two elements.

Once the objects have been created, extract all attributes of the first element that you created and display its name, symbol, atomic number and the atomic mass.

Suggested steps to solve the problem:

1. Read the statement carefully and understand the problem. Are there any ambiguities? If so resolve each ambiguity before proceeding further.
2. (a) Identify classes that are needed. Name each class. (b) Identify objects that need to be created. What name you might assign to each object? (c) Identify attributes for each object. (d) Identify methods that each object must have.
3. Write the class with its attributes and a constructor. This will require creating name and type of each attribute.
4. Write the `main()` method. Do you need to have a get and/or set method in the class you have constructed? If you, then include the needed get and set methods in the class.
5. Sometime after the recitation, enter your program into DRJava, compile, correct. Compile, an execute it to make sure it works as desired.

<End of Problems for Week 2>