TOPIC 1 EXERCISES

For each exercise, assume that all variables have been declared to have data type **int**. If you are asked to write a program, be sure to include comments. In the exercises, when we give a complete Java program, we usually omit comments.

Tracing Exercises

1. For each of the following series of Java statements, trace what happens as the section of code is run. That is, show what value is stored in each variable as each step is executed.

```
(a)   y = 2;                          (b)   numb = 5;
      x = y + 1;                            cbnumb = numb * numb * numb;
      y = y + 1;                            sqnumb = numb * numb;
      x = 4;

(c)   w = 6;                          (d)   rate = 7;
      w = w + 1;                            time = 5;
      q = 2 * w;                            junk = rate - time;
                                            dist = rate * time;

(e)   for (x = 6; x <= 10; x = x + 1)
            y = x * 2;

(f)   s = 0;
      for (i = 1; i <= 5; i = i + 1)
            s = s + i;
```

2. For each of the following Java programs, show what is printed.

```
(a) public class prob1_2a {
        public static void main(String[] args)
        {
          int x,y;

          y = 2;
          x = y + 1;
          System.out.println(x + " " + y);
          y = y + 2;
          x = 5;
          System.out.println(x + " " + y);
        }
    }

(b) public class prob1_2b {
        public static void main(String[] args)
        {
          int numb,cbnumb;

          numb = 4;
          cbnumb = numb * numb * numb;
          System.out.println(numb + " " + cbnum + " " + numb*numb);
        }
    }
```

```
(c) public class prob1_2c {
       public static void main(String[] args)
       {
           int w,q;

           w = 6;
           w = w + 3;
           q = 4 * w;
           System.out.println(w + " " + q);
       }
   }

(d) public class prob1_2d {
       public static void main(String[] args)
       {
           int rate,time,dist,junk;

           rate = 7;
           time = 3;
           junk = rate + time;
           dist = rate * time;
           System.out.println(rate + " " + time + " " + junk + " " + dist);
       }
   }

(e) public class prob1_2e {
       public static void main(String[] args)
       {
           int x,y;

           for (x = 6; x <= 10; x++)
           {
               y = x * 5;
               System.out.println(x + " " + y);
           }
           x = 8;
           System.out.println(x + " " + y);
       }
   }

(f) public class prob1_2f {
       public static void main(String[] args)
       {
           int i,s;

           s = 0;
           for (i = 1; i <= 7; i++)
               s = s + i;
           System.out.println(s);
       }
   }
```

3. Each part of this question contains two similar series of statements. However, there is a significant difference in each part between the two series. Trace each part step by step and show what is printed. Be sure that you understand the difference between (i) and (ii) in each part.

```
(a)  (i)  numb = 9;                        (ii)  numb = 9;
          System.out.println(2*numb);            numb = 2 * numb;
          System.out.println(numb);              System.out.println(numb);

(b)  (i)  numb = 3;                        (ii)  numb = 3;
          System.out.println(numb);              numb = numb + 1;
          numb = numb + 1;                       System.out.println(numb);

(c)  (i)  x = 5;                           (ii)  x = 5;
          x = x + 1;                             y = x;
          y = x;                                 x = x + 1;
          System.out.println(x + " " + y); System.out.println(x + " " + y);
```

Analysis Exercises

4. Here is a list of possible names for variables in Java. Which are legal names for your particular compiler? Which are illegal names? If a name is illegal, explain why (e.g., it starts with an illegal character).

```
(a)  beginend                          (b)  space1999
(c)  1999_space                        (d)  p qrs
(e)  IBM                               (f)  i.b.m.
(g)  iNtEL                             (h)  5
(i)  one_2                             (j)  2one
(k)  help+me                           (l)  abc...xyz     (with ... in the name)
(m)  for                               (n)  fore
(o)  zyxwvutsrqponmlkjihgfedcba        (p)  upto
(q)  downto                            (r)  legal
(s)  legal?                            (t)  #1
(u)  number1                           (v)  _a
(w)  a_                                (x)  FOR
(y)  1x                                (z)  x1
```

5. The program below has many errors in it. Try to find and correct all of them. Some of them are foolish, like leaving off a semicolon. Others are things like misspelled words, and so on. An error in a program is called a **bug**. Getting a program to work correctly by making sure there are no mistakes in it is called **debugging**. You will learn much more about debugging as you write more programs.

```
/* comant is ok {;
public classy prob1_5 {
   publicity static void mainly(String[] args) {
        ints x,y;

        x + 1 = 4;
        y = y + 1;
        x = 3y + 5x
        System.out.printit(X << " " << Y);
   }
}
```