



3. [10 pts] Suppose the user ran the program at right and typed 5 when prompted.

- a. Show the sequence of values taken by the variables num, i, and k.

num  
i  
k

- b. What does the program print?

```
import csbsju.cs150.*;

public class Mystery3 {
    public static void run() {
        IOWindow io = new IOWindow();
        io.print("? ");
        int num = io.readInt();
        int i = 1;
        int k = 0;
        while(i < num) {
            i = i + 1;
            k = k + i;
        }
        io.println(num + k);
    }
}
```

4. [10 pts] Suppose the user ran the program at right and typed 5 when prompted. What does the program print?

```
import csbsju.cs150.*;

public class Mystery4 {
    public static void run() {
        IOWindow io = new IOWindow();
        io.print("? ");
        int num = io.readInt();
        int i = 1;
        String k = "0";
        while(i < num) {
            i = i + 1;
            k = k + i;
        }
        io.println(num + k);
    }
}
```

5. [10 pts] At right, complete the program so that it reads a number from the user and prints the positive multiples of 3 that are less than that number. For example, a user who runs the program and types 15 should see the following.

? 15  
3  
6  
9  
12

```
import csbsju.cs150.*;

public class MultiplesOfThree {
    public static void run() {
        IOWindow io = new IOWindow();

    }
}
```

6. [10 pts] At right, complete the program so that it reads a line from the user and then prints the characters of that string, one character per line. For example, a user who runs the program and types "P Engel" should see the following

```
? P Engel
P
```

```
E
n
g
e
l
```

```
import csbsju.cs150.*;

public class WritingDown {
    public static void run() {
        IOWindow io = new IOWindow();

    }
}
```

7. [15 pts] Suppose we had in our library an IntegerSet class with the following methods.

```
IntegerSet()
```

(Constructor method) Constructs an empty set of no numbers.

```
void add(int value)
```

Inserts value into this set.

```
double getStdDev()
```

Returns the standard deviation of the values in this set.

At right, complete the program so that it reads three numbers from the user and displays the standard deviation based on the numbers. *Your program must use IntegerSet to compute the standard deviation.*

```
? 5
? 10
? 25
8.498
```

```
import csbsju.cs150.*;

public class StandardDeviation {
    public static void run() {
        IOWindow io = new IOWindow();

    }
}
```

8. [10 pts] Suppose the user ran the program at right and typed what is in boldface below.

```
3
5
2
4
1
```

What would the program then print?

```
import csbsju.cs150.*;

public class Mystery {
    public static void run() {
        IOWindow io = new IOWindow();
        int[] a = new int[5];
        int i = 0;
        while(i < 5) {
            a[i] = io.readInt();
            i++;
        }
        i = 0;
        while(i < 5) {
            i = a[i];
            io.println(i);
        }
    }
}
```

9. [10 pts] At right, complete the method so that counts how many positive numbers are in the array it is given as a parameter, and it returns this count.

```
import csbsju.cs150.*;

public class Count {
    public static int getPositiveCount(double[] data) {

    }
}
```

10. [10 pts] Suppose we had in our library a `StringUtil` class with the following class method.

```
static String reverse(String what)
    Returns a string with the same characters as
    what, except in reverse order.
```

```
import csbsju.cs150.*;

public class Palindrome {
    public static void run() {
        IOWindow io = new IOWindow();
    }
}
```

At right, complete the program so that it reads a line from the user and displays “palindrome” or “not palindrome” depending on whether that line is a palindrome. (A **palindrome** is a word that reads the same forwards and backwards, such as *civic* or *noon*, but not *bad* or *palindrome*.)

For example, if a user should see the following on running your program and typing “good doog”.

```
? good doog
palindrome
```

Your program must use `StringUtil`’s `reverse` method to accomplish this task.

11. [10 pts] Suppose we were to execute the `run` method at right. What would the program print?

```
import csbsju.cs150.*;

public class Mystery {
    public static double f(double x, double y) {
        x = x / y;
        return x;
    }
    public static void run() {
        IOWindow io = new IOWindow();
        double x = 1.0;
        double y = 2.0;
        double a = f(x, y);
        double b = f(y, x);
        io.println(a);
        io.println(b);
    }
}
```

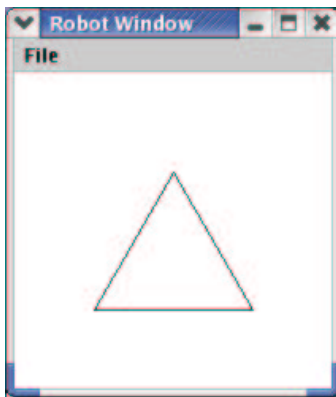
# Solutions, Exam 1, CSCI 150, Fall 2003

## Statistics

mean	87.417 (2098.000/24)
stddev	23.016
median	90.000
midrange	77.000-108.000
#1.	9.71 / 10
#2.	13.33 / 15
#3.	7.83 / 10
#4.	2.58 / 10
#5.	7.92 / 10
#6.	5.38 / 10
#7.	6.96 / 15
#8.	8.21 / 10
#9.	4.33 / 10
#10.	5.00 / 10
#11.	7.17 / 10

+ 2-point bonus

1.



2.

```
import csbsju.cs150.*;

public class Steps {
    public static void run() {
        RobotWindow win;
        win = new RobotWindow();
        win.show();

        int steps;
        steps = win.requestInt("How many steps?");

        Robot r = new Robot(win, 10, 190);
        int i;
        i = 0;
        while(i < steps) {
            r.move(20);
            r.turn(90);
            r.move(20);
            r.turn(-90);
            i++;
        }
        r.switchOff();
    }
}
```

3. a. num 5  
       i 12345  
       k 025914

b. 19

4. 502345

5. 

```
import csbsju.cs150.*;

public class MultiplesOfThree {
    public static void run() {
        IOWindow io = new IOWindow();
        io.print("? ");
        int num = io.readInt();
        int i = 3;
        while(i < num) {
            io.println(i);
            i += 3;
        }
    }
}
```

6. 

```
import csbsju.cs150.*;

public class WritingDown {
    public static void run() {
        IOWindow io = new IOWindow();
        io.print("? ");
        String line = io.readLine();
        int i = 0;
        while(i < line.length()) {
            String letter = line.substring(i, i + 1);
            io.println(letter);
            i++;
        }
    }
}
```

7. 

```
import csbsju.cs150.*;

public class StandardDeviation {
    public static void run() {
        IOWindow io = new IOWindow();
        IntegerSet set = new IntegerSet();
        int num = 0;
        while(num < 3) {
            io.print("? ");
            int num = io.readInt();
            set.add(num);
        }
        double stddev = set.getStandardDeviation();
        io.println(stddev);
    }
}
```

8. 3  
    4  
    1  
    5

9.

```
import csbsju.cs150.*;

public class Count {
    public static int getPositiveCount(double[] data) {
        int count = 0;
        int pos = 1;
        while(pos < data.length) {
            if(data[pos] > 0) {
                count++;
            }
            pos++;
        }
        return count;
    }
}
```

10.

```
import csbsju.cs150.*;

public class Palindrome {
    public static void run() {
        IOWindow io = new IOWindow();
        io.print("? ");
        String s = io.readLine();
        String r = StringUtil.reverse(s);
        if(s.equals(r)) {
            io.println("palindrome");
        } else {
            io.println("not palindrome");
        }
    }
}
```

11.  
0.5  
2.0