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Listing 1.1

```
import java.util.Scanner;
public class FirstProgram
{
    public static void main (String [] args)
    {
        System.out.println ("Hello out there.");
        System.out.println ("I will add two numbers for
you.");
        System.out.println ("Enter two whole numbers on a
line:");
        int n1, n2;
        Scanner keyboard = new Scanner (System.in);
        n1 = keyboard.nextInt ();
        n2 = keyboard.nextInt ();
        System.out.println ("The sum of those two numbers
is");
        System.out.println (n1 + n2);
    }
}
```

Listing 2.1

```
public class EggBasket
{
    public static void main (String [] args)
    {
        int numberOfBaskets, eggsPerBasket, totalEggs;
        numberOfBaskets = 10;
        eggsPerBasket = 6;
        totalEggs = numberOfBaskets * eggsPerBasket;
        System.out.println ("If you have");
        System.out.println (eggsPerBasket + " eggs per basket and");
        System.out.println (numberOfBaskets + " baskets, then");
        System.out.println ("the total number of eggs is " + totalEggs);
    }
}
```

Listing 2.2

```
import java.util.Scanner;
public class EggBasket2
{
    public static void main (String [] args)
    {
        int numberOfBaskets, eggsPerBasket, totalEggs;
        Scanner keyboard = new Scanner (System.in);
        System.out.println ("Enter the number of eggs in each
basket:");
        eggsPerBasket = keyboard.nextInt ();
        System.out.println ("Enter the number of baskets:");
        numberOfBaskets = keyboard.nextInt ();
        totalEggs = numberOfBaskets * eggsPerBasket;
        System.out.println ("If you have");
        System.out.println (eggsPerBasket + " eggs per basket and");
        System.out.println (numberOfBaskets + " baskets, then");
        System.out.println ("the total number of eggs is " + totalEggs);
        System.out.println ("Now we take two eggs out of each basket.");
        eggsPerBasket = eggsPerBasket - 2;
        totalEggs = numberOfBaskets * eggsPerBasket;
        System.out.println ("You now have");
        System.out.println (eggsPerBasket + " eggs per basket and");
        System.out.println (numberOfBaskets + " baskets.");
        System.out.println ("The new total number of eggs is " + totalEggs);
    }
}
```

Listing 2.3

```
import java.util.Scanner;
public class ChangeMaker
{
    public static void main (String [] args)
    {
        int amount, originalAmount,
        quarters, dimes, nickels, pennies;
        System.out.println ("Enter a whole number from 1
to 99.");
        System.out.println ("I will find a combination of
coins");
        System.out.println ("that equals that amount of
change.");
        Scanner keyboard = new Scanner (System.in);
        amount = keyboard.nextInt ();
        originalAmount = amount;
        quarters = amount / 25;
        amount = amount % 25;
```

```

    dimes = amount / 10;
    amount = amount % 10;
    nickels = amount / 5;
    amount = amount % 5;
    pennies = amount;
    System.out.println (originalAmount +
        " cents in coins can be given as:");
    System.out.println (quarters + " quarters");
    System.out.println (dimes + " dimes");
    System.out.println (nickels + " nickels and");
    System.out.println (pennies + " pennies");
}
}

```

Listing 2.4

```

public class StringDemo
{
    public static void main (String [] args)
    {
        String sentence = "Text processing is hard!";
        int position = sentence.indexOf ("hard");
        System.out.println (sentence);
        System.out.println ("012345678901234567890123");
        System.out.println ("The word \"hard\" starts at index "
            + position);
        sentence = sentence.substring (0, position) + "easy!";
        sentence = sentence.toUpperCase ();
        System.out.println ("The changed string is:");
        System.out.println (sentence);
    }
}

```

Listing 2.5

```

import java.util.Scanner;
public class ScannerDemo
{
    public static void main (String [] args)
    {

```

```

Scanner keyboard = new Scanner (System.in);
System.out.println ("Enter two whole numbers");
System.out.println ("separated by one or more spaces:");
int n1, n2;
n1 = keyboard.nextInt ();
n2 = keyboard.nextInt ();
System.out.println ("You entered " + n1 + " and " + n2);
System.out.println ("Next enter two numbers.");
System.out.println ("A decimal point is OK.");
double d1, d2;
d1 = keyboard.nextDouble ();
d2 = keyboard.nextDouble ();
System.out.println ("You entered " + d1 + " and " + d2);
System.out.println ("Next enter two words:");
String s1, s2;
s1 = keyboard.next ();
s2 = keyboard.next ();
System.out.println ("You entered \"" +
    s1 + "\" and \"" + s2 + "\"");
s1 = keyboard.nextLine (); //To get rid of '\n'
System.out.println ("Next enter a line of text:");
s1 = keyboard.nextLine ();
System.out.println ("You entered: \"" + s1 + "\"");
}
}

```

Listing 2.6

```

import java.util.Scanner;
public class DelimitersDemo
{
    public static void main (String [] args)
    {
        Scanner keyboard1 = new Scanner (System.in);
        Scanner keyboard2 = new Scanner (System.in);
        keyboard2.useDelimiter ("##");
        //The delimiters for keyboard1 are the whitespace
characters.
        //The only delimiter for keyboard2 is ##.
        String s1, s2;
        System.out.println ("Enter a line of text with two
words:");
        s1 = keyboard1.next ();
        s2 = keyboard1.next ();
        System.out.println ("the two words are \"" + s1 +
            "\" and \"" + s2 + "\"");
    }
}

```

```

        System.out.println ("Enter a line of text with two
words");
        System.out.println ("delimited by ##:");
        s1 = keyboard2.next ();
        s2 = keyboard2.next ();
        System.out.println ("the two words are \"" + s1 +
                "\" and \"" + s2 + "\"");
    }
}

```

Listing 2.7

```

import java.util.Scanner;

/**
Program to compute area of a circle.
Author: Jane Q. Programmer.
E-mail Address: janeq@somemachine.etc.etc.
Programming Assignment 2.
Last Changed: October 7, 2008.
*/

public class CircleCalculation
{
    public static void main (String [] args)
    {
        double radius; //in inches
        double area; //in square inches
        Scanner keyboard = new Scanner (System.in);
        System.out.println ("Enter the radius of a circle in
inches:");
        radius = keyboard.nextDouble ();
        area = 3.14159 * radius * radius;
        System.out.println ("A circle of radius " + radius + "
inches");
        System.out.println ("has an area of " + area + " square
inches.");
    }
}

```

Listing 2.8

```
import java.util.Scanner;
/**
Program to compute area of a circle.
Author: Jane Q. Programmer.
E-mail Address: janeq@somemachine.etc.etc.
Programming Assignment 2.
Last Changed: October 7, 2008.
*/
public class CircleCalculation2
{
    public static final double PI = 3.14159;
    public static void main (String [] args)
    {
        double radius; //in inches
        double area; //in square inches
        Scanner keyboard = new Scanner (System.in);
        System.out.println ("Enter the radius of a circle in
inches:");
        radius = keyboard.nextDouble ();
        area = PI * radius * radius;
        System.out.println ("A circle of radius " + radius + "
inches");
        System.out.println ("has an area of " + area + " square
inches.");
    }
}
```

Listing 2.9

```
import javax.swing.JApplet;
import java.awt.Graphics;
/**
Applet that displays a happy face.
Author: Jane Q. Programmer.
Revision of Listing 1.2.
*/
public class HappyFace extends JApplet
{
    public static final int FACE_DIAMETER = 200;
    public static final int X_FACE = 100;
    public static final int Y_FACE = 50;
    public static final int EYE_WIDTH = 10;
    public static final int EYE_HEIGHT = 20;
    public static final int X_RIGHT_EYE = 155;
    public static final int Y_RIGHT_EYE = 95;
```

```

public static final int X_LEFT_EYE = 230;
public static final int Y_LEFT_EYE = Y_RIGHT_EYE;
public static final int MOUTH_WIDTH = 100;
public static final int MOUTH_HEIGHT = 50;
public static final int X_MOUTH = 150;
public static final int Y_MOUTH = 175;
public static final int MOUTH_START_ANGLE = 180;
public static final int MOUTH_EXTENT_ANGLE = 180;
public void paint (Graphics canvas)
{
    super.paint(canvas);
    //Draw face outline:
    canvas.drawOval (X_FACE, Y_FACE, FACE_DIAMETER,
FACE_DIAMETER);
    //Draw eyes:
    canvas.fillOval (X_RIGHT_EYE, Y_RIGHT_EYE, EYE_WIDTH,
EYE_HEIGHT);
    canvas.fillOval (X_LEFT_EYE, Y_LEFT_EYE, EYE_WIDTH,
EYE_HEIGHT);
    //Draw mouth:
    canvas.drawArc (X_MOUTH, Y_MOUTH, MOUTH_WIDTH, MOUTH_HEIGHT,
        MOUTH_START_ANGLE, MOUTH_EXTENT_ANGLE);
}
}

```

Listing 2.10

```

import javax.swing.JFrame;
import java.awt.Graphics;
/**
JFrame that displays a happy face.
Author: Jane Q. Programmer.
Revision of Listing 2.9.
*/
public class HappyFaceJFrame extends JFrame
{
    public static final int FACE_DIAMETER = 200;
    public static final int X_FACE = 100;
    public static final int Y_FACE = 50;
    public static final int EYE_WIDTH = 10;
    public static final int EYE_HEIGHT = 20;
    public static final int X_RIGHT_EYE = 155;
    public static final int Y_RIGHT_EYE = 95;
    public static final int X_LEFT_EYE = 230;
    public static final int Y_LEFT_EYE = Y_RIGHT_EYE;
    public static final int MOUTH_WIDTH = 100;

```



```

public static final int MOUTH_HEIGHT = 50;
public static final int X_MOUTH = 150;
public static final int Y_MOUTH = 175;
public static final int MOUTH_START_ANGLE = 180;
public static final int MOUTH_EXTENT_ANGLE = 180;
public void paint (Graphics canvas)
{
    super.paint(canvas);
    //Draw face outline:
    canvas.drawOval (X_FACE, Y_FACE, FACE_DIAMETER, FACE_DIAMETER);
    //Draw eyes:
    canvas.fillOval (X_RIGHT_EYE, Y_RIGHT_EYE, EYE_WIDTH, EYE_HEIGHT);
    canvas.fillOval (X_LEFT_EYE, Y_LEFT_EYE, EYE_WIDTH, EYE_HEIGHT);
    //Draw mouth:
    canvas.drawArc (X_MOUTH, Y_MOUTH, MOUTH_WIDTH, MOUTH_HEIGHT,
        MOUTH_START_ANGLE, MOUTH_EXTENT_ANGLE);
}
public HappyFaceJFrame ()
{
    setSize(600,400);
    setDefaultCloseOperation(EXIT_ON_CLOSE);
}
public static void main(String[] args)
{
    HappyFaceJFrame guiWindow = new HappyFaceJFrame();
    guiWindow.setVisible(true);
}
}

```

Listing 2.11

```

import javax.swing.JOptionPane;
public class JOptionPaneDemo
{
    public static void main (String [] args)
    {
        String appleString =
            JOptionPane.showInputDialog ("Enter number of apples:");
        int appleCount = Integer.parseInt (appleString);
        String orangeString =
            JOptionPane.showInputDialog ("Enter number of oranges:");
        int orangeCount = Integer.parseInt (orangeString);
        int totalFruitCount = appleCount + orangeCount;
        JOptionPane.showMessageDialog (null,
            "The total number of fruits = " + totalFruitCount);
        System.exit (0);
    }
}

```

```
}  
}
```

Listing 2.12

```
import javax.swing.JOptionPane;  
public class ChangeMakerWindow  
{  
    public static void main (String [] args)  
    {  
        String amountString = JOptionPane.showInputDialog (  
            "Enter a whole number from 1 to 99.\n" +  
            "I will output a combination of coins\n" +  
            "that equals that amount of change.");  
        int amount, originalAmount,  
            quarters, dimes, nickels, pennies;  
        amount = Integer.parseInt (amountString);  
        originalAmount = amount;  
        quarters = amount / 25;  
        amount = amount % 25;  
        dimes = amount / 10;  
        amount = amount % 10;  
        nickels = amount / 5;  
        amount = amount % 5;  
        pennies = amount;  
        JOptionPane.showMessageDialog (null, originalAmount +  
            " cents in coins can be given as:\n" +  
            quarters + " quarters\n" +  
            dimes + " dimes\n" +  
            nickels + " nickels and\n" +  
            pennies + " pennies");  
        System.exit (0);  
    }  
}
```

Listing 3.1

```
import java.util.Scanner;  
public class BankBalance  
{
```

```

public static final double OVERDRAWN_PENALTY = 8.00;
public static final double INTEREST_RATE = 0.02; //2% annually
public static void main (String [] args)
{
    double balance;
    System.out.print ("Enter your checking account balance: $");
    Scanner keyboard = new Scanner (System.in);
    balance = keyboard.nextDouble ();
    System.out.println ("Original balance $" + balance);
    if (balance >= 0)
        balance = balance + (INTEREST_RATE * balance) / 12;
    else
        balance = balance - OVERDRAWN_PENALTY;
    System.out.print ("After adjusting for one month ");
    System.out.println ("of interest and penalties,");
    System.out.println ("your new balance is $" + balance);
}
}

```

Listing 3.2

```

import java.util.Scanner;
public class StringEqualityDemo
{
    public static void main (String [] args)
    {
        String s1, s2;
        System.out.println ("Enter two lines of text:");
        Scanner keyboard = new Scanner (System.in);
        s1 = keyboard.nextLine ();
        s2 = keyboard.nextLine ();
        if (s1.equals (s2))
            System.out.println ("The two lines are equal.");
        else
            System.out.println ("The two lines are not equal.");
        if (s2.equals (s1))
            System.out.println ("The two lines are equal.");
        else
            System.out.println ("The two lines are not equal.");
        if (s1.equalsIgnoreCase (s2))
            System.out.println (
                "But the lines are equal, ignoring case.");
        else
            System.out.println (
                "Lines are not equal, even ignoring case.");
    }
}

```

Listing 3.3

```
import java.util.Scanner;
public class Grader
{
    public static void main (String [] args)
    {
        int score;
        char grade;
        System.out.println ("Enter your score: ");
        Scanner keyboard = new Scanner (System.in);
        score = keyboard.nextInt ();
        if (score >= 90)
            grade = 'A';
        else if (score >= 80)
            grade = 'B';
        else if (score >= 70)
            grade = 'C';
        else if (score >= 60)
            grade = 'D';
        else
            grade = 'F';
        System.out.println ("Score = " + score);
        System.out.println ("Grade = " + grade);
    }
}
```

Listing 3.4

```
import java.util.Scanner;

public class BMI
{
    public static void main(String[] args)
    {
        Scanner keyboard = new Scanner(System.in);
        int pounds, feet, inches;
        double heightMeters, mass, BMI;

        System.out.println("Enter your weight in pounds.");
    }
}
```

```

pounds = keyboard.nextInt();
System.out.println("Enter your height in feet " +
    "followed by a space then additional inches.");
feet = keyboard.nextInt();
inches = keyboard.nextInt();

// Convert to meters and kilograms
heightMeters = ((feet * 12) + inches) * 0.0254;
mass = (pounds / 2.2);

// Compute BMI and output health category
BMI = mass / (heightMeters * heightMeters);
System.out.println("Your BMI is " + BMI);
System.out.print("Your risk category is " );
if (BMI < 18.5)
    System.out.println("Underweight.");
else if (BMI < 25)
    System.out.println("Normal weight.");
else if (BMI < 30)
    System.out.println("Overweight.");
else
    System.out.println("Obese.");
}
}

```

Listing 3.5

```

import java.util.Scanner;
public class MultipleBirths
{
    public static void main (String [] args)
    {
        int numberOfBabies;
        System.out.print ("Enter number of babies: ");
        Scanner keyboard = new Scanner (System.in);
        numberOfBabies = keyboard.nextInt ();
        switch (numberOfBabies)
        {
            case 1:
                System.out.println ("Congratulations.");
                break;
            case 2:
                System.out.println ("Wow. Twins.");
                break;
            case 3:
                System.out.println ("Wow. Triplets.");
        }
    }
}

```

```

        break;
    case 4:
    case 5:
        System.out.print ("Unbelievable; ");
        System.out.println (numberOfBabies + " babies.");
        break;
    default:
        System.out.println ("I don't believe you.");
        break;
    }
}
}

```

Listing 3.6

```

import javax.swing.JApplet;
import java.awt.Color;
import java.awt.Graphics;
public class YellowFace extends JApplet
{
    public static final int FACE_DIAMETER = 200;
    public static final int X_FACE = 100;
    public static final int Y_FACE = 50;
    public static final int EYE_WIDTH = 10;
    public static final int EYE_HEIGHT = 20;
    public static final int X_RIGHT_EYE = 155;
    public static final int Y_RIGHT_EYE = 95;
    public static final int X_LEFT_EYE = 230;
    public static final int Y_LEFT_EYE = Y_RIGHT_EYE;
    public static final int NOSE_DIAMETER = 10;
    public static final int X_NOSE = 195; //Center of nose will be at 200
    public static final int Y_NOSE = 135;
    public static final int MOUTH_WIDTH = 100;
    public static final int MOUTH_HEIGHT = 50;
    public static final int X_MOUTH = 150;
    public static final int Y_MOUTH = 175;
    public static final int MOUTH_START_ANGLE = 180;
    public static final int MOUTH_EXTENT_ANGLE = 180;
    public void paint (Graphics canvas)
    {
        super.paint(canvas);
        //Draw face interior and outline:
        canvas.setColor (Color.YELLOW);
        canvas.fillOval (X_FACE, Y_FACE, FACE_DIAMETER, FACE_DIAMETER);
        canvas.setColor (Color.BLACK);
        canvas.drawOval (X_FACE, Y_FACE, FACE_DIAMETER, FACE_DIAMETER);
        //Draw eyes:
    }
}

```

```
canvas.setColor (Color.BLUE);
canvas.fillOval (X_RIGHT_EYE, Y_RIGHT_EYE, EYE_WIDTH, EYE_HEIGHT);
canvas.fillOval (X_LEFT_EYE, Y_LEFT_EYE, EYE_WIDTH, EYE_HEIGHT);
//Draw nose:
canvas.setColor (Color.BLACK);
canvas.fillOval (X_NOSE, Y_NOSE, NOSE_DIAMETER, NOSE_DIAMETER);
//Draw mouth:
canvas.setColor (Color.RED);
canvas.drawArc (X_MOUTH, Y_MOUTH, MOUTH_WIDTH, MOUTH_HEIGHT,
                MOUTH_START_ANGLE, MOUTH_EXTENT_ANGLE);
```

```
}
```

```
}
```