

LECTURE NOTES (7-9 MARCH, 2007)

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Math Class

$$ax^2 + bx + c$$

$$\text{roots} = -b \pm \frac{\sqrt{b^2 - 4ac}}{2a}$$

```
import java.util.Scanner;
public class Quadrotic
{
    public static void main (String [] args)
    {
        int a,b,c ;
        double discriminant, root1, root2 ;
        Scanner scan = new Scanner (System.in);
        System.out.print("Enter the coefficient of x square: ");
        a = scan.nextInt();
        System.out.print("Enter the coefficient of x: ");
        b = scan.nextInt();
        System.out.print("Enter the constant: ");
        c = scan.nextInt();
        discriminant = Math.pow (b,2)-(4*a*c);
        root1=(-1*b)+Math.sqrt(discriminant)/(2*a);
        root2=(-b)-Math.sqrt(discriminant)/(2*a);
        System.out.println("root1="+root1+" "+"root2="+root2);

    } //end of main()
} //end of class
```

OUTPUT of The Program

```
Enter the coefficient of x square: 3
Enter the coefficient of x: 8
Enter the constant: 4
root1= -0.6666666666666666
root2 = 2.0
```

The Number Format Class

Methods

String format (double number)

Returns a string containing the specified number formatted according to the object's pattern

Static NumberFormat getCurrencyInstance()

Returns a NumberFormat object that represents a currency format for the current use

NumberFormat getCurrencyInstance ()

Returns a NumberFormat object that represents a percentage format for the current use

```
import java.util.Scanner;
```

```
import java.text.NumberFormat;
```

```
public class Purchase
```

```
{
```

```
    public static void main (String[] args)
```

```
    {
```

```
        final double TAX_RATE = 0.06 ; //6% sales tax
```

```
        int quantity;
```

```
        double subtotal, tax, totalCost, unitPrice;
```

```
        Scanner scan = new Scanner(System.in);
```

```
        NumberFormat fmt1=NumberFormat.getCurrencyInstance();
```

```
        NumberFormat fmt2=NumberFormat.getPercentInstance();
```

```
        System.out.print("Enter the quantity: ");
```

```
        quantity = scan.nextInt();
```

```
        System.out.print("Enter the unit price: ");
```

```
        unitPrice= scan.nextInt();
```

```
        subtotal= quantity * unitPrice;
```

```
        tax= subtotal*TAX_RATE;
```

```
        totalCost= subtotal+tax;
```

```
        //print output with appropriate formatting
```

```
        System.out.println("Subtotal= "+fmt1.format(tax) +" at" +  
        +fmt2.format(TAX_RATE));
```

```
        System.out.println("Total: "+fmt1.format(totalCost));
```

```
    }
```

```
}
```

OUTPUT of The Program

Enter the quantity: 5

Enter the unit price: 3.87

Subtotal : \$1.16 at 6%

Total : \$20.51

Enumerated Types

```

enum Season { winter, spring, summer, fall}
Season time;
time= Season.spring;

public class IceCream
{
    Enum Flover{vanilla, chocolate, strawberry, fudgeRipple, coffee,
    rockyRoad, mintChocolateChip, cookieDough}

    public Static void main (String[] args)
    {
        Flavor cone1, cone2, cone3;
        cone1=Flavor.rockyRoad;
        cone2=Flavor.chocolate;
        System.out.println("cone1 value:"+cone1);
        System.out.println("cone1 ordinal:"+cone1.ordinal());

        System.out.println( );
        System.out.println("cone2 value: "+ cone2);
        System.out.println("cone2 ordinal: "+ cone2.ordinal( ));
        System.out.println("cone2 name: "+ cone2.name( ));

        cone3=cone1

        System.out.println( );
        System.out.println("cone3 value: "+ cone3);
        System.out.println("cone3 ordinal: "+ cone3.ordinal( ));
        System.out.println("cone3 name: "+ cone3.name( ));
    }
}

```

OUTPUT of The Program

```

cone1 value: rockyRoad
cone1 ordinal : 5
cone1 name: rockyRoad

```

```

cone1 value: chocolate
cone1 ordinal : 1
cone1 name: chocolate

```

```

cone1 value: rockyRoad
cone1 ordinal : 5
cone1 name: rockyRoad

```

Frames and Panels



```
import java.awt.*;
import javax.swing.*;

public class Authority
{
    //-----
    // Displays some words of wisdom.
    //-----
    public static void main (String[] args)
    {
        JFrame frame = new JFrame ("Authority");

        frame.setDefaultCloseOperation (JFrame.EXIT_ON_CLOSE);

        JPanel primary = new JPanel();
        primary.setBackground (Color.yellow);
        primary.setPreferredSize (new Dimension(250, 75));

        //last statement can be written as:
        /*Dimension prefDim = new Dimension(250,75);
        primary.setPreferredSize(prefDim);*/

        JLabel label1 = new JLabel ("Question authority,");
        JLabel label2 = new JLabel ("but raise your hand first.");

        primary.add (label1);
        primary.add (label2);

        frame.getContentPane().add(primary);
        frame.pack();
        frame.setVisible(true);
    }
}
```

Nested Panels

```
import java.awt.*;
import javax.swing.*;

public class NestedPanels
{
    //-----
    //Presents two colored panels nested within a third.
    //-----
    public static void main (String[] args)
    {
        JFrame frame = new JFrame ("Nested Panels");
        frame.setDefaultCloseOperation (JFrame.EXIT_ON_CLOSE);

        //Set up first subpanel
        JPanel subPanel1 = new JPanel();
        subPanel1.setPreferredSize (new Dimension(150, 100));
        subPanel1.setBackground (Color.green);
        JLabel label1 = new JLabel ("One");
        subPanel1.add (label1);

        //Set up second subpanel
        JPanel subPanel2 = new JPanel();
        subPanel2.setPreferredSize (new Dimension(150, 100));
        subPanel2.setBackground (Color.red);
        JLabel label2 = new JLabel ("Two");
        subPanel2.add (label2);

        //Set up primary panel
        JPanel primary = new JPanel();
        primary.setBackground (Color.blue);
        primary.add (subPanel1);
        primary.add (subPanel2);

        frame.getContentPane().add(primary);
        frame.pack();
        frame.setVisible(true);
    }
}
```

Questions:

1. Explain hierarchy of Java GUI.
2. What are component and container? Give examples.

3. Complete the following program so that panel's name is primary, it's color is cyan, it's dimension is 300 and 100 pixels (x and y)

```
import java.....*;
import javax.....*;
public class deneme
{
    public static void main(String args[])
    {
        JFrame frame = new JFrame(".....");

        frame.setDefaultCloseOperation(JFrame. ....);

        JPanel ..... = new JPanel();
        primary.setBackground(.....);
        Dimension dm= new Dimension(.....);
        primary.setPreferredSize(dm);

        JLabel label1 = new JLabel("Artik demir almak gunu gelmisse zamandan");
        JLabel label2 = new JLabel("Mechule giden bir gemi kalkar bu limandan");
        JLabel label3 = new JLabel("Hic yolcusu yokmus gibi sessizce alir yol");
        JLabel label4 = new JLabel("Sallanmaz o kalkista ne mendil ne de bir kol");

        primary.add(label1);
        primary.add(.....);
        primary.add(.....);
        primary.add(.....);

        frame.getContentPane().add(.....);
        frame.pack();
        frame.setVisible(.....);
    }
}
```

4. a) In which package is math class defined?
b) Which Math class method returns a number between 0.0 (inclusive) and 1.0 (exclusive)?
5. Do we use the new operator in the NumberFormat class? If not, what do we need instead of the new operator?
6. Declare an enumerated type that represents letter grades.(includes A⁺ , B⁻ and etc.)
7. Write an application that reads the lengths of the sides(double) of a triangle from the

user. Compute the area of the triangle using $\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$, in which s represents half of the perimeter of the triangle, and a , b , and c represent the lengths of three sides.

8. Write an application that displays a frame containing two panels. Each panel should contain two images (use four unique images—your choice). Fix the size of the first panel so that one under the other. Also add labels whatever you want to these two panels. You can use these four images: (First You should save these pictures in your class folder like tweety.gif, DaffyDuck.gif, taz.gif, coyote2.gif)



9. Why don't we create an object for Math class to use its methods?

10. What is the reason of writing "frame.setVisible(true)"? What will happen if we write false in this statement?

11. In number format class;

a) What does String format returns?

b) What does Static NumberFormat getCurrencyInstance returns?

c) What does NumberFormat getCurrencyInstance returns?

Answers:

1. Hierarchy of Java GUI depends on nesting. It means that in some structures such as panels, frames and so on carry other structures. Maybe it is represented as tree.

2. A *GUI container* is a component that is used to hold and organize other components such as frames and panels. A *GUI component* is an object that represents a screen element such as a button or a text field.

```
3. import java.awt.*;
import javax.swing.*;
public class deneme
{
```

```
    public static void main(String args[])
    {
```

```
        JFrame frame = new JFrame("deneme");
```

```
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
```

```
        JPanel primary = new JPanel();
        primary.setBackground(Color.cyan);
        Dimension dm= new Dimension(300,100);
        primary.setPreferredSize(dm);
```

```
        JLabel label1 = new JLabel("Artik demir almak gunu gelmisse zamandan");
        JLabel label2 = new JLabel("Mechule giden bir gemi kalkar bu limandan");
        JLabel label3 = new JLabel("Hic yolcusu yokmus gibi sessizce alir yol");
        JLabel label4 = new JLabel("Sallanmaz o kalkista ne mendil ne de bir kol");
```

```

        primary.add(label1);
        primary.add(label2);
        primary.add(label3);
        primary.add(label4);

        frame.getContentPane().add(primary);
        frame.pack();
        frame.setVisible(true);
    }
}

```

4. a) The Math class

is defined in the java.lang package of the Java standard class library.

b) static double random ()

5. No we don't. Instead, we request an object from one static methods that we invoke through the class name itself.

6. enum Grade {A, Aminus, Bplus, B, Bminus, Cplus, C, Cminus, Dplus, D, Dminus, F}

NOTE: '-' and '+' characters cannot be part of an identifier in Java.

7.

```

import java.util.Scanner;
import java.text.DecimalFormat;

```

```

public class computingTriangleArea
{
    public static void main(String[] args)
    {
        double s,side1,side2,side3;
        double area;

        Scanner scan=new Scanner(System.in);

        System.out.print("Please size1=");
        side1=scan.nextDouble();
        System.out.print("side2=");
        side2=scan.nextDouble();
        System.out.print("side3=");
        side3=scan.nextDouble();

        s=(side1+side2+side3)/2;
        area=Math.sqrt(s*(s-side1)*(s-side2)*(s-side3));

        //round the output to three decimal places
        DecimalFormat fmt=new DecimalFormat("0.###");

        System.out.println("The area of the triangle is:"+fmt.format(area));
    } // end of main()
} //end of class computingTriangleArea

```

8.

```
import java.awt.*;
import javax.swing.*;
```

```
public class LooneyTunes
{
    public static void main(String[] args)
    {
        JFrame frame=new JFrame("Looney Tunes");
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);

        ImageIcon icon=new ImageIcon("taz.gif");
        ImageIcon icon2=new ImageIcon("tweety.gif");
        ImageIcon icon3=new ImageIcon("coyote2.gif");
        ImageIcon icon4=new ImageIcon("DaffyDuke.gif");
        //SET UP FIRST PANEL
        JPanel panel1=new JPanel();
        panel1.setBackground(Color.cyan);
        panel1.setPreferredSize(new Dimension(300,700));
        JLabel label1=new JLabel("Taz",icon,SwingConstants.CENTER);
        label1.setHorizontalTextPosition(SwingConstants.CENTER);
        label1.setVerticalTextPosition(SwingConstants.TOP);
        panel1.add(label1);
        JLabel label2=new JLabel("Tweety",icon2,SwingConstants.CENTER);
        label2.setHorizontalTextPosition(SwingConstants.CENTER);
        label2.setVerticalTextPosition(SwingConstants.BOTTOM);
        panel1.add(label2);
        //SET UP SECOND PANEL
        JPanel panel2=new JPanel();
        panel2.setBackground(Color.yellow);
        panel2.setPreferredSize(new Dimension(500,700));
        JLabel label3=new JLabel("Coyote",icon3,SwingConstants.CENTER);
        label3.setHorizontalTextPosition(SwingConstants.CENTER);
        label3.setVerticalTextPosition(SwingConstants.TOP);
        panel2.add(label3);
        JLabel label4=new JLabel("DaffyDuke",icon4,SwingConstants.CENTER);
        label4.setHorizontalTextPosition(SwingConstants.CENTER);
        label4.setVerticalTextPosition(SwingConstants.BOTTOM);
        panel2.add(label4);
        //SET UP PRIMARY PANEL
        JPanel primary=new JPanel();
        primary.setBackground(Color.blue);
        primary.add(panel1);
        primary.add(panel2);

        frame.getContentPane().add(primary);
        frame.pack();
        frame.setVisible(true);
    }
}
//end of main()
//end of class LooneyTunes
```

9. Because all methods of the Math class are static , meaning they are invoked through the class name.

10. Because that statement makes our program visible. If we write false in that statement the program will still work but we won't be able to see.

11. a) Returns a string containing the specified number formatted according to the object's pattern.

- b) Returns a NumberFormat object that represents a currency format for the current use.
- c) Returns a NumberFormat object that represents a percentage format for the current use.