

-
-
-
-
-
-

가

가

II

3/4/95

1

10

“ ”

가

가

가

가

가

:

Addison-Wesley, 1996” .

www.unicode.org

.

가 ,

가

가 .

JDK

.(
.)

가
가

:

가

가 .

가 . 가 ,

123,456.78

123.456,78

, . / / . / /
/ / .

3/22/61

.

22.03.1961

.

March 22, 1961

,

22. Marz 1961

.

1961年 3月 22日

1 java.text 가 , ,

.

. 가

Locale . locale .

-
-
-

, (variant)

가 , .

language=English , location=United States.

.

language=German , location=Germany.

4 가 .(, , ,).

.

language=German , location=Switzerland.

가

(Nynorsk)

(Bokmal)

language=Norwegian , location=Norway, variant=Bokmal

가

ISO -639

가 ISO -3166

10-1 10-

2 가

: ISO -639

<http://www.ics.uci.edu/pub/ietf/http/related/iso639.txt>

ISO -3166

<http://www.niso.org/3166.html>

10-1 : ISO -639

zh

da

nl

en

fr

fi

de

el

it

ja
ko
no
pt
sp
sv
tr

10-2 : ISO -3166 가

AT
BE
CA
CN
DK
FI
DE
GB
GR
IE
IT
JP
KR
NL
NO
PT
ES
SE
CH
TW
TE
US

(German=Deutsch=de , Chinese.zhongwen=)

가 ()
Lacale

```
Locale germanGermany = new Locale("de" , "DE");  
Locale germanSwitzerland = new Locale("de" , "CH");  
Locale norwegianNorwayBokmal = new Locale("no" , "NO" , "B");
```

가

```
Locale german = new Locale("de" , " " );
```

JDK

```
Locale.CANADA  
Locale.CANADA_FRENCH  
Locale.CHINA  
Locale.FRANCE  
Locale.GERMANY  
Locale.ITALY  
Locale.JAPAN  
Locale.KOREA  
Locale.PRC  
Locale.TAIWAN  
Locale.UK  
Locale.US
```

JDK

Locale.CHINESE
Locale.ENGLISH
Locale.FRENCH
Locale.GERMAN
Locale.ITALIAN
Locale.JAPANESE
Locale.KOREAN
Locale.SIMPLIFIED_CHINESE
Locale.TRADITIONAL_CHINESE

가 .

Locale getDefault
가 . getLocale
.
.
.
.
DateFormat 가

Locale[] supportedLocales = DateFormat.getAvailableLocales();

가 , 1.1 DateFormat
.
getAvailableLocales()
.

:

가 JDK .

가 ? .
Locale 가 . 가
getDisplayName .
.

가 ,
German(Switzerland)

가

```
Locale loc = new Locale("de", "CH");
System.out.println(loc.getDisplayName(Locale.GERMAN) );
```

Deutsch(schweiz)

```
Locale
    . 가 , String      toLowerCase  toUpperCase      Locale
    .
    . 가 ,      "etoil(
)"      "ETOILE"      "ETOILE("      )"
```

```
String star = "etoile(" );
String fr = star.toUpperCase(Locale.FRANCE);
// should return "ETOILE"
String ca = star.toUpperCase(Locale.CANADA_FRENCH);
//returns "ETOILE" ( )
```

```
가 가      JDK1.3      tpUpperCase
가      Locale
가      Locale
.)
```

java.util.Locale

- static Locale getDefault()
- static void setDefault(Locale l)

- String getDisplayName()
 - String getDisplayName(Locale l)
 - String getLanguage()
ISO -639
 - String getDisplayLanguage()
 - String getDisplayLanguage(Locale l)
 - String getCountry()
ISO -3166 가
 - String getDisplayCountry()
가
 - String getDisplayCountry(Locale l)
가
 - String getVariant()
 - String getDisplayVariant()
 - String getDisplayVariant(Locale l)
 - String toString()
가
- .(, "de_CH").

java.text

- 1.
2. “ ”
- 3.

Locale NumberFormat . 3
가 : getInstance, getCurrencyInstance, getPercentInstance.

가 ,

```
Locale loc = new Locale("de", "DE");
NumberFormat currFmt = NumberFormat.getCurrencyInstance(loc);
double amt = 123456.78;
System.out.println(currFmt.format(amt));
```

123.456,78 DM

DM 가 . 가

parse . 가 , 가
. parse

```
TextField inputfield;
...
NumberFormat fmt = NumberFormat.getInstance();
// get number formatter for default locale
Number input = fmt.parse(inputfield.getText().trim());
double x = input.doubleValue();
```

parse Number . 가
가 Double Long .
Number doubleValue .

가 가 ParseException . 가 ,
.(trim .)

GetXxxInstance

NumberFormat

. NumberFormat

.

.

JDK

getAvailableLocales

.

(10-1).

.

,

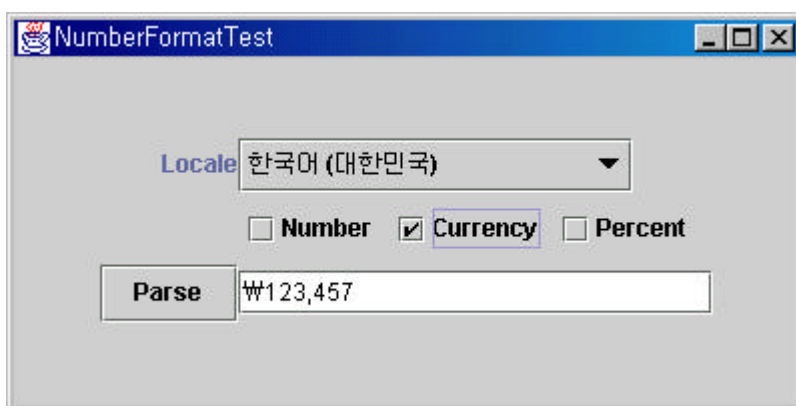
parese

format

가

“Parse error” 가

.



10-1 : NumberFormatTest

10-1

NumberFormat.getAvailableLocales

.

getDisplay()가
getDiaplayName()가
parse()가

10-1: NumberFormatTest.java

```
import java.awt.*;
import java.awt.event.*;
import java.text.*;
import java.util.*;
import javax.swing.*;

public class NumberFormatTest
{
    public static void main(String[] args)
    {
        JFrame frame = new NumberFormatFrame();
        frame.show();
    }
}

class NumberFormatFrame extends JFrame
{
    public NumberFormatFrame()
    {
        setSize(400, 200);
        setTitle("NumberFormatTest");

        addWindowListener(new WindowAdapter()
        {
            public void windowClosing(WindowEvent e)
            {
                System.exit(0);
            }
        });

        getContentPane().setLayout(new GridBagLayout());

        ActionListener listener =
            new ActionListener()
            {
                public void actionPerformed(ActionEvent event)
```

```

        {   updateDisplay();
        }
    };

JPanel p = new JPanel();
addCheckBox(p, numberCheckBox, cbGroup, listener, true);
addCheckBox(p, currencyCheckBox, cbGroup, listener, false);
addCheckBox(p, percentCheckBox, cbGroup, listener, false);

GridBagConstraints gbc = new GridBagConstraints();
gbc.fill = GridBagConstraints.NONE;
gbc.anchor = GridBagConstraints.EAST;
add(new JLabel("Locale"), gbc, 0, 0, 1, 1);
add(p, gbc, 1, 1, 1, 1);
add(parseButton, gbc, 0, 2, 1, 1);
gbc.anchor = GridBagConstraints.WEST;
add(localeCombo, gbc, 1, 0, 1, 1);
gbc.fill = GridBagConstraints.HORIZONTAL;
add(numberText, gbc, 1, 2, 1, 1);

locales = NumberFormat.getAvailableLocales();
for (int i = 0; i < locales.length; i++)
    localeCombo.addItem(locales[i].getDisplayName());
localeCombo.setSelectedItem(
    Locale.getDefault().getDisplayName());
currentNumber = 123456.78;
updateDisplay();

localeCombo.addActionListener(listener);

parseButton.addActionListener(
    new ActionListener()
    {   public void actionPerformed(ActionEvent event)
        {   String s = numberText.getText();
            try
                {   Number n = currentNumberFormat.parse(s);

```

```

        if (n != null)
        {
            currentNumber = n.doubleValue();
            updateDisplay();
        }
        else
        {
            numberText.setText("Parse error: " + s);
        }
    }
    catch(ParseException e)
    {
        numberText.setText("Parse error: " + s);
    }
}
});
}

```

```

public void add(Component c, GridBagConstraints gbc,
    int x, int y, int w, int h)
{
    gbc.gridx = x;
    gbc.gridy = y;
    gbc.gridwidth = w;
    gbc.gridheight = h;
    getContentPane().add(c, gbc);
}

```

```

public void addCheckBox(Container p, JCheckBox checkBox,
    ButtonGroup g, ActionListener listener, boolean v)
{
    checkBox.setSelected(v);
    checkBox.addActionListener(listener);
    g.add(checkBox);
    p.add(checkBox);
}

```

```

public void updateDisplay()
{
    Locale currentLocale = locales[
        localeCombo.getSelectedIndex()];
    currentNumberFormat = null;
}

```

```

        if (numberCheckBox.isSelected())
            currentNumberFormat
                = NumberFormat.getNumberInstance(currentLocale);
        else if (currencyCheckBox.isSelected())
            currentNumberFormat
                = NumberFormat.getCurrencyInstance(currentLocale);
        else if (percentCheckBox.isSelected())
            currentNumberFormat
                = NumberFormat.getPercentInstance(currentLocale);
        String n = currentNumberFormat.format(currentNumber);
        numberText.setText(n);
    }

    private Locale[] locales;

    private double currentNumber;

    private JComboBox localeCombo = new JComboBox();
    private JButton parseButton = new JButton("Parse");
    private JTextField numberText = new JTextField(30);
    private JCheckBox numberCheckBox = new JCheckBox("Number");
    private JCheckBox currencyCheckBox = new JCheckBox("Currency");
    private JCheckBox percentCheckBox = new JCheckBox("Percent");
    private ButtonGroup cbGroup = new ButtonGroup();
    private NumberFormat currentNumberFormat;
}

```

java.text.NumberFormat

- static Locale[] getAvailableLocales()
가 NumberFormat Locale
- static final NumberFormat getNumberInstance()
- static final NumberFormat getNumberInstance(Locale l)
- static final NumberFormat getCurrencyInstance()
- static final NumberFormat getCurrencyInstance(Locale l)
- static final NumberFormat getPercentInstance()
- static final NumberFormat getPercentInstance(Locale l)

● String format(double x)

● String format(long x)

● Number parse(String s)

Long

Double

가

ParseException

● void setParseIntegerOnly(boolean b)

● boolean getParseIntegerOnly()

가

가

가

● void setGroupingUsed(Boolean b)

● boolean isGroupingUsed()

가 (100,000)

가

가

● void setMinimumIntegerDigits(int n)

● int getMinimumIntegerDigits()

● void setMaximumIntegerDigits(int n)

● int getMaximumIntegerDigits()

● void setMinimumFractionDigits(int n)

● int getMinimumFractionDigits()

● void setMaximumFractionDigits(int n)

● int getMaximumFractionDigits()

,

가

, 4가

:

●

●

, ,

가

●

●

(time zone)

DateFormat

NumberFormat

getAvailableLocales

```
fmt = DateFormat.getDateInstance(dateStyle, loc);
fmt = DateFormat.getTimeInstance(timeStyle, loc);
fmt = DateFormat.getDateTimeInstance(dateStyle, timeStyle, loc);
```

:

DateFormat.DEFAULT

DateFormat.FULL(, U.S Thursday, September 18, 1997 8:42:46 A.M.
PDT)

DateFormat.LONG(, U.S September 18, 1997 8:42:46 A.M.PDT)

DateFormat.MEDIUM(, U.S Sep 18, 1997 8:42:46 A.M.)

DateFormat.SHORT(, U.S 9/18/97 8:42 A.M)

Date now = new Date();

String s = fmt.format(now);

NumberFormat

가

가

parse

. 가 ,

가

TextField inputField;

...

DateFormat fmt = DateFormat.getDateInstance(DateFormat.MEDIUM);

// get date formatter for default locale

Date input = fmt.parse(inputField.getText().trim());

가

ParseException

trim

. 가 ,

U.S

MEDIUM

Sep 18, 1997

가 ()

Sep 18 1997

9/18/97

가 .

lenient . 가 , February 30,1999

March 2, 1999

가

/ /

IllegalArgumentException

10 -2

DateFormat

(?)

가

가 ,

1997?9?19?

10 -2

“Parse

lenient”

“Parse date”

“Parse time”

가 가

EnumCombo

Short,Medium,Long

DateFormat.SHORT,

DateFormat.MEDIUM , DateFormat.LONG

.(

1 5 .)

10-2 : DateFormatTest

10-2 : DateFormatTest.java

```
import java.awt.*;

import java.awt.event.*;

import java.text.*;

import java.util.*;

import javax.swing.*;

public class DateFormatTest

{
    public static void main(String[] args)
    {
        JFrame frame = new DateFormatFrame();

        frame.show();
    }
}

class DateFormatFrame extends JFrame

{
    public DateFormatFrame()
    {
        setSize(400, 200);

        setTitle("DateFormatTest");

        addWindowListener(new WindowAdapter()
        {
            public void windowClosing(WindowEvent e)
            {
                System.exit(0);
            }
        });

        getContentPane().setLayout(new GridBagLayout());

        GridBagConstraints gbc = new GridBagConstraints();

        gbc.fill = GridBagConstraints.NONE;

        gbc.anchor = GridBagConstraints.EAST;

        add(new JLabel("Locale"), gbc, 0, 0, 1, 1);
    }
}
```

```

add(new JLabel("Date style"), gbc, 0, 1, 1, 1);
add(new JLabel("Time style"), gbc, 2, 1, 1, 1);
add(new JLabel("Date"), gbc, 0, 2, 1, 1);
add(new JLabel("Time"), gbc, 0, 3, 1, 1);
gbc.anchor = GridBagConstraints.WEST;
add(localeCombo, gbc, 1, 0, 2, 1);
add(dateStyleCombo, gbc, 1, 1, 1, 1);
add(timeStyleCombo, gbc, 3, 1, 1, 1);
add(dateParseButton, gbc, 3, 2, 1, 1);
add(timeParseButton, gbc, 3, 3, 1, 1);
add(lenientCheckbox, gbc, 0, 4, 2, 1);
gbc.fill = GridBagConstraints.HORIZONTAL;
add(dateText, gbc, 1, 2, 2, 1);
add(timeText, gbc, 1, 3, 2, 1);

locales = DateFormat.getAvailableLocales();
for (int i = 0; i < locales.length; i++)
    localeCombo.addItem(locales[i].getDisplayName());
localeCombo.setSelectedItem(
    Locale.getDefault().getDisplayName());
currentDate = new Date();
currentTime = new Date();
updateDisplay();

ActionListener listener =
    new ActionListener()
    {
        public void actionPerformed(ActionEvent event)
        {
            updateDisplay();
        }
    };

localeCombo.addActionListener(listener);
dateStyleCombo.addActionListener(listener);
timeStyleCombo.addActionListener(listener);

dateParseButton.addActionListener(

```

```

new ActionListener()
{
    public void actionPerformed(ActionEvent event)
    {
        String d = dateText.getText();

        try
        {
            currentDateFormat.setLenient
                (lenientCheckbox.isSelected());

            Date date = currentDateFormat.parse(d);
            currentDate = date;
            updateDisplay();
        }
        catch(ParseException e)
        {
            dateText.setText("Parse error: " + d);
        }
        catch(IllegalArgumentException e)
        {
            dateText.setText("Argument error: " + d);
        }
    }
});

```

```

timeParseButton.addActionListener(
    new ActionListener()
    {
        public void actionPerformed(ActionEvent event)
        {
            String t = timeText.getText();

            try
            {
                currentDateFormat.setLenient
                    (lenientCheckbox.isSelected());

                Date date = currentTimeFormat.parse(t);
                currentTime = date;
                updateDisplay();
            }
            catch(ParseException e)
            {
                timeText.setText("Parse error: " + t);
            }
            catch(IllegalArgumentException e)
            {
                timeText.setText("Argument error: " + t);
            }
        }
    }
);

```

```

    }
    });
}

```

```

public void add(Component c, GridBagConstraints gbc,
    int x, int y, int w, int h)
{
    gbc.gridx = x;
    gbc.gridy = y;
    gbc.gridwidth = w;
    gbc.gridheight = h;
    getContentPane().add(c, gbc);
}

```

```

public void updateDisplay()
{
    Locale currentLocale = locales[
        localeCombo.getSelectedIndex()];
    int dateStyle = dateStyleCombo.getValue();
    currentDateFormat
        = DateFormat.getDateInstance(dateStyle,
            currentLocale);
    String d = currentDateFormat.format(currentDate);
    dateText.setText(d);
    int timeStyle = timeStyleCombo.getValue();
    currentTimeFormat
        = DateFormat.getTimeInstance(timeStyle,
            currentLocale);
    String t = currentTimeFormat.format(currentTime);
    timeText.setText(t);
}

```

```

private Locale[] locales;

```

```

private Date currentDate;

```

```

private Date currentTime;

```

```

private DateFormat currentDateFormat;

```

```

private DateFormat currentTimeFormat;

```

```

private JComboBox localeCombo = new JComboBox();
private EnumCombo dateStyleCombo
    = new EnumCombo(DateFormat.class,
        new String[] { "Default", "Full", "Long",
            "Medium", "Short" });
private EnumCombo timeStyleCombo
    = new EnumCombo(DateFormat.class,
        new String[] { "Default", "Full", "Long",
            "Medium", "Short" });
private JButton dateParseButton = new JButton("Parse date");
private JButton timeParseButton = new JButton("Parse time");
private JTextField dateText = new JTextField(30);
private JTextField timeText = new JTextField(30);
private JTextField parseText = new JTextField(30);
private JCheckBox lenientCheckbox
    = new JCheckBox("Parse lenient", true);
}

```

```

class EnumCombo extends JComboBox
{
    public EnumCombo(Class cl, String[] labels)
    {
        for (int i = 0; i < labels.length; i++)
        {
            String label = labels[i];
            String name = label.toUpperCase().replace(' ', '_');
            int value = 0;
            try
            {
                java.lang.reflect.Field f = cl.getField(name);
                value = f.getInt(cl);
            }
            catch (Exception e)
            {
                label = "(" + label + ")";
            }
            table.put(label, new Integer(value));
            addItem(label);
        }
        setSelectedItem(labels[0]);
    }
}

```

```

    }

    public int getValue()
    {
        return ((Integer)table.get(getSelectedItem())).intValue();
    }

    private Map table = new HashMap();
}

```

java.text.DateFormat

- static Locale[] getAvailableLocales()
가 DateFormat Locale .
 - static DateFormat getInstance(int dateStyle)
 - static DateFormat getInstance(int dateStyle, Locale l)
 - static DateFormat getTimeInstance(int timeStyle)
 - static DateFormat getDateTimeInstance(int timeStyle, Locale l)
 - static DateFormat getDateTimeInstance(int dateStyle, int timeStyle)
 - static DateFormat getDateTimeInstance(int dateStyle, int timeStyle, Locale l)
- ,
 .
 : dateStyle , timeStyle
 DEFALUT,FULL,LONG,MEDIUM,SHORT
- String format(Date d)
/ .
 - Date parse(String s)
/
가 .
.
 ParseException .
 - void setLenient(boolean b)
 - boolean isLenient()

가 . Lenient February 30,1999
 March 2, 1999 . Lenient 가 .

- void setCalendar(Calendar cal)
- Calendar getCalendar()

Date , , , , , ()

- void setTimeZone(TimeZone tz)
- TimeZone getTimeZone()

가 .

- void setNumberFormat(NumberFormat f)
- NumberFormat getNumberFormat()

가 . 가 ,

가 : , , 가 . (.)

(Callation,)

String compareTo ASCII

a.compareTo(n)
 a가 b 0,

, ASCII 가 가

```

        .compareTo
        .가 ,
        .가 , 5

        compareTo

America
Angstrom ( )
ant
zebra
Zulu

America
ant
zebra
Zulu
Angstrom ( )

A . Z! A( )

A . Z! . ,

America
ant
zebra
Zulu
Angstrom ( )

, Locale
Collator
getInstance
String compareTo 가
compare

Locale loc = . . .;

```

```
Collator coll = Collator.getInstance(loc);
if(coll.compare(a,b) < 0) // a comes before b ...;
```

가 Collator 가 Comparator . Collection.sort

```
Collections.sort(strings, coll);
```

(Strength) . primary,
secondary tertiary . 가 , “A” “Z” primary
“A” “A()” secondary , “A” “a”
tertiary .

Collator.PRIMARY Primary
. Collator.SECONDARY secondary
“secondary”

```
//assuming English locale
String a = “Angstrom”;
String b =”A( )ngstrom”
Coll.setStrength(Collator.PRIMARY);
if(coll.compare(a,b) == 0) System.out.print(“same”);
else System.out.print(“different”)
// will print “same”
coll.setStrength(Colator.SECONDARY);
if(coll.compare(a,b) == 0) System.out.print(“same”);
else System.out.print(“different”)
// will print “different”
```

10-3 가 가
가

10-3 :

PRIMARY SECONDARY TERTIARY

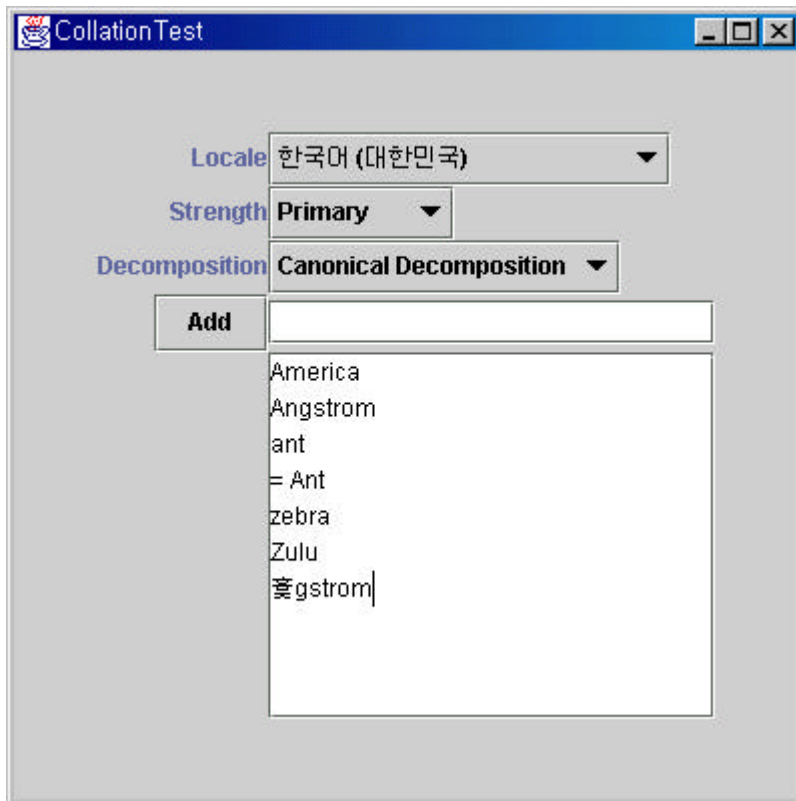
Ant,	Angstrom=Angstrom,	Angstrom,	Angstrom,
Ant,	Ant=ant	Angstrom	Angstrom
Angstrom		Ant = ant	Ant,
Angstrom			ant

```

, (decomposition mode)
“ (canonical decomposition)”
“ (No decomposition)” +
.
. (
.) “ (full decomposition)”
가 . 가 ,
- (half-width) - (full-width) 가 가
가 -
. (
.)
- -
.
. GetCollationKey
CollationKey
.

```

10-3
“Add”
,
(=



10-3: CollationTest

10-3: CollationTest.java

```
import java.io.*;
import java.awt.*;
import java.awt.event.*;
import java.text.*;
import java.util.*;
import java.util.List;
import javax.swing.*;

public class CollationTest
{
    public static void main(String[] args)
    {
        JFrame frame = new CollationFrame();
        frame.show();
    }
}
```

```
}  
}
```

```
class CollationFrame extends JFrame  
{ public CollationFrame()  
{ setSize(400, 400);  
  setTitle("CollationTest");  
  
  addWindowListener(new WindowAdapter()  
  { public void windowClosing(WindowEvent e)  
    { System.exit(0);  
    }  
  } );  
  
  getContentPane().setLayout(new GridBagLayout());  
  GridBagConstraints gbc = new GridBagConstraints();  
  gbc.fill = GridBagConstraints.NONE;  
  gbc.anchor = GridBagConstraints.EAST;  
  add(new JLabel("Locale"), gbc, 0, 0, 1, 1);  
  add(new JLabel("Strength"), gbc, 0, 1, 1, 1);  
  add(new JLabel("Decomposition"), gbc, 0, 2, 1, 1);  
  add(addButton, gbc, 0, 3, 1, 1);  
  gbc.anchor = GridBagConstraints.WEST;  
  add(localeCombo, gbc, 1, 0, 1, 1);  
  add(strengthCombo, gbc, 1, 1, 1, 1);  
  add(decompositionCombo, gbc, 1, 2, 1, 1);  
  gbc.fill = GridBagConstraints.HORIZONTAL;  
  add(newWord, gbc, 1, 3, 1, 1);  
  gbc.fill = GridBagConstraints.BOTH;  
  add(new JScrollPane(sortedWords), gbc, 1, 4, 1, 1);  
  
  locales = Collator.getAvailableLocales();  
  for (int i = 0; i < locales.length; i++)  
    localeCombo.addItem(locales[i].getDisplayName());  
  localeCombo.setSelectedItem(  
    Locale.getDefault().getDisplayName());
```

```

strings.add("America");
strings.add("ant");
strings.add("Zulu");
strings.add("zebra");
strings.add("  gstrom");
strings.add("Angstrom");
strings.add("Ant");
updateDisplay();

addButton.addActionListener(
    new ActionListener()
    {
        public void actionPerformed(ActionEvent event)
        {
            strings.add(newWord.getText());
            updateDisplay();
        }
    });

ActionListener listener =
    new ActionListener()
    {
        public void actionPerformed(ActionEvent event)
        {
            updateDisplay();
        }
    };

localeCombo.addActionListener(listener);
strengthCombo.addActionListener(listener);
decompositionCombo.addActionListener(listener);
}

public void add(Component c, GridBagConstraints gbc,
    int x, int y, int w, int h)
{
    gbc.gridx = x;
    gbc.gridy = y;
    gbc.gridwidth = w;
    gbc.gridheight = h;

```

```

        getContentPane().add(c, gbc);
    }

    public void updateDisplay()
    {
        Locale currentLocale = locales[
            localeCombo.getSelectedIndex()];

        currentCollator
            = Collator.getInstance(currentLocale);
        currentCollator.setStrength(strengthCombo.getValue());
        currentCollator.setDecomposition(
            decompositionCombo.getValue());

        Collections.sort(strings, currentCollator);

        sortedWords.setText("");
        for (int i = 0; i < strings.size(); i++)
        {
            String s = (String)strings.get(i);
            if (i > 0
                && currentCollator.compare(s, strings.get(i - 1)) == 0)
            {
                sortedWords.append("= ");
            }
            sortedWords.append(s + "\n");
        }
    }

    private Locale[] locales;
    private List strings = new ArrayList();
    private Collator currentCollator;

    private JComboBox localeCombo = new JComboBox();
    private EnumCombo strengthCombo
        = new EnumCombo(Collator.class,
            new String[] { "Primary", "Secondary", "Tertiary" });
    private EnumCombo decompositionCombo
        = new EnumCombo(Collator.class,

```



```

        new String[] { "Canonical Decomposition",
            "Full Decomposition", "No Decomposition" });
private JTextField newWord = new JTextField(20);
private JTextArea sortedWords = new JTextArea(10, 20);
private JButton addButton = new JButton("Add");
}

class EnumCombo extends JComboBox
{
    public EnumCombo(Class cl, String[] labels)
    {
        for (int i = 0; i < labels.length; i++)
        {
            String label = labels[i];
            String name = label.toUpperCase().replace(' ', '_');
            int value = 0;
            try
            {
                java.lang.reflect.Field f = cl.getField(name);
                value = f.getInt(cl);
            }
            catch (Exception e)
            {
                label = "(" + label + ")";
            }
            table.put(label, new Integer(value));
            addItem(label);
        }
        setSelectedItem(labels[0]);
    }

    public int getValue()
    {
        return ((Integer)table.get(getSelectedItem())).intValue();
    }

    private Map table = new HashMap();
}

```

java.text.Collator

- static Locale[] getAvailableLocales()

가 Collator Locale

- static Collator getInstance()
- static Collator getInstance(Locale l)
- int compare(String a, String b)
a가 b 0
- boolean equals(String a, String b)
true false
- void setStrength(int strength) / int getStrength()
- void setDecomposition(int decomp) / int getDecomposition()
가

Collator.PRIMARY,

Collator.SECONDARY, Collator.TERTIARY

Collator.NO_DECOMPOSITION, Collator.CANONICAL_DECOMPOSITION,
Collator.FULL_DECOMPOSITION

- CollationKey getCollationKey(String a)

java.text.CollationKey

- int compareTo(CollationKey b)
가 b 0

?

가

“Hello”

가

5

: H|e|l|l|o

. a(

)

가

2가

,

a (

)

(

\u00E4)

“

a

(

\u0308)

.

, 4 Ba”r 3 .

?

: . 가 ,

The quick, brown fox jump -ed over the lazy dog.

The| |quick|, | |brown| |fox| |jump -ed| |over| |the| |lazy| |dog.|

(jump -ed .)

. 가 ,

The |quick , |brown |fox |jump -|ed |over |the |lazy |dog.|

가

, ,

. 가 , Devangari

. 가 ,

(.) (?), (!) .

BreakIterator , ,

, BreakIterator

“..”

. 가 ,

The quick, brown fox jump -ed over the lazy “dog.” And then ...what happened?

The quick, brown fox jump-ed over the lazy “dog.” | And then ... what happened? |

BreakIterator

BreakIterator

4

, BreakIterator

:

Locale loc = ...;

BreakIterator wordIter = BreakIterator.getWordInstance(loc);

String msg = “The quick , brown fox”;

WordIter.setText(msg);

, first

int f = wordIter.first(); // returns 3

first

3

-

next

next

BreakIterator.DONE

. 가 ,

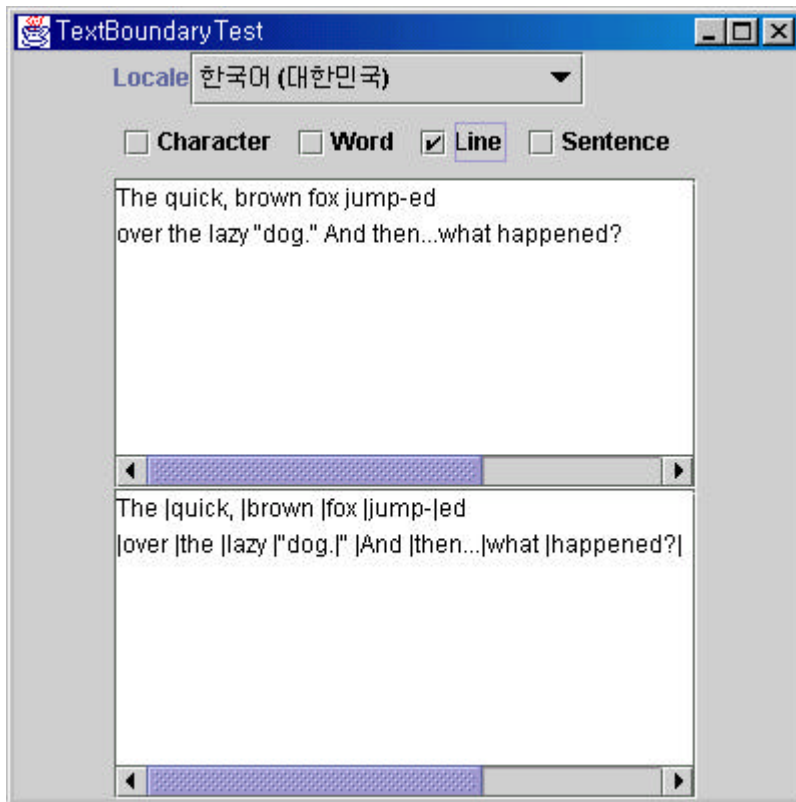
int to;

while((to=currentBreakIterator.next()) != toBreakIterator.DONE)

{ // do something with

}

(, ,).
.(10-4)



10-4 : TextBoundaryTest

10-4:TextBoundaryTest.java

```
import java.awt.*;
import java.awt.event.*;
import java.text.*;
import java.util.*;
import javax.swing.*;

public class TextBoundaryTest
{
    public static void main(String[] args)
    {
        JFrame frame = new TextBoundaryFrame();
        frame.show();
    }
}
```

```
}  
}
```

```
class TextBoundaryFrame extends JFrame  
{ public TextBoundaryFrame()  
{ setSize(400, 400);  
  setTitle("TextBoundaryTest");  
  
  addWindowListener(new WindowAdapter()  
  { public void windowClosing(WindowEvent e)  
    { System.exit(0);  
    }  
  } );  
  
  ActionListener listener =  
    new ActionListener()  
    { public void actionPerformed(ActionEvent event)  
      { updateDisplay();  
      }  
    };  
  
  JPanel p = new JPanel();  
  addCheckBox(p, characterCheckBox, cbGroup, listener, false);  
  addCheckBox(p, wordCheckBox, cbGroup, listener, false);  
  addCheckBox(p, lineCheckBox, cbGroup, listener, false);  
  addCheckBox(p, sentenceCheckBox, cbGroup, listener, true);  
  
  getContentPane().setLayout(new GridBagLayout());  
  GridBagConstraints gbc = new GridBagConstraints();  
  gbc.fill = GridBagConstraints.NONE;  
  gbc.anchor = GridBagConstraints.EAST;  
  add(new JLabel("Locale"), gbc, 0, 0, 1, 1);  
  gbc.anchor = GridBagConstraints.WEST;  
  add(localeCombo, gbc, 1, 0, 1, 1);  
  add(p, gbc, 0, 1, 2, 1);  
  gbc.fill = GridBagConstraints.BOTH;
```

```

gbc.weighty = 100;
add(new JScrollPane(inputText), gbc, 0, 2, 2, 1);
add(new JScrollPane(outputText), gbc, 0, 3, 2, 1);

locales = BreakIterator.getAvailableLocales();
for (int i = 0; i < locales.length; i++)
    localeCombo.addItem(locales[i].getDisplayNames());
localeCombo.setSelectedItem(
    Locale.getDefault().getDisplayNames());

localeCombo.addActionListener(listener);

inputText.setText("The quick, brown fox jump-ed\n"
    + "over the lazy \"dog.\" And then...what happened?");
updateDisplay();
}

public void addCheckBox(Container p, JCheckBox checkBox,
    ButtonGroup g, ActionListener listener, boolean v)
{
    checkBox.setSelected(v);
    checkBox.addActionListener(listener);
    g.add(checkBox);
    p.add(checkBox);
}

public void add(Component c, GridBagConstraints gbc,
    int x, int y, int w, int h)
{
    gbc.gridx = x;
    gbc.gridy = y;
    gbc.gridwidth = w;
    gbc.gridheight = h;
    getContentPane().add(c, gbc);
}

public void updateDisplay()

```

```

{
    Locale currentLocale = locales[
        localeCombo.getSelectedIndex()];

    BreakIterator currentBreakIterator = null;

    if (characterCheckBox.isSelected())
        currentBreakIterator
            = BreakIterator.getCharacterInstance(currentLocale);
    else if (wordCheckBox.isSelected())
        currentBreakIterator
            = BreakIterator.getWordInstance(currentLocale);
    else if (lineCheckBox.isSelected())
        currentBreakIterator
            = BreakIterator.getLineInstance(currentLocale);
    else if (sentenceCheckBox.isSelected())
        currentBreakIterator
            = BreakIterator.getSentenceInstance(currentLocale);

    String text = inputText.getText();
    currentBreakIterator.setText(text);
    outputText.setText("");

    int from = currentBreakIterator.first();
    int to;
    while ((to = currentBreakIterator.next()) !=
        BreakIterator.DONE)
    {
        outputText.append(text.substring(from, to) + "|");
        from = to;
    }
    outputText.append(text.substring(from));
}

private Locale[] locales;
private BreakIterator currentBreakIterator;

private JComboBox localeCombo = new JComboBox();
private JTextArea inputText = new JTextArea(6, 40);
private JTextArea outputText = new JTextArea(6, 40);

```



```

private ButtonGroup cbGroup = new ButtonGroup();
private JCheckBox characterCheckBox = new JCheckBox("Character");
private JCheckBox wordCheckBox = new JCheckBox("Word");
private JCheckBox lineCheckBox = new JCheckBox("Line");
private JCheckBox sentenceCheckBox = new JCheckBox("Sentence");
}

```

java.text.BreakIterator

- static Locale[] getAvailableLocals()
가 BreakIterator Locale
- static BreakIterator getCharacterInstance()
- static BreakIterator getCharacterInstance(Locale l)
- static BreakIterator getWordInstance()
- static BreakIterator getWordInstance(Locale l)
- static BreakIterator getLineInstance()
- static BreakIterator getLineInstance(Locale l)
- static BreakIterator getSentenceInstance()
- static BreakIterator getSentenceLineInstance(Locale l)

- void setText(String text)
- void setText(CharacterIterator text)
- CharacterIterator getText()

가

- int first()

- int next()

BreakIterator.DONE

- int previous()

BreakIterator.DONE

- int last()

- int current()

- int next(int n)

n

n

가

BreakIterator. | DONE

- int following(int pos)

pos

pos

BreakIterator.DONE

“On {2}, a{0} destroyed {1} houses and caused {3} of damage.”

MessageFormat

가

1. 10 {0} ..{9}.

2. MessageFormat

3.

4. format

: 1,2

MessageFormat

MessageFormat

setLocale

applyPattern

MessageFormat format = new MessageFormat("");

format.setLocale(locale);

format.applyPattern(pattern);

```
String pattern =
    "On {2}, a{0} destroyed {1} houses and caused {3} of damage."
MessageFormat msgFmt = new MessageFormat(pattern);

Object[] msgArgs = {
    "hurricane",
    new Integer(99),
    new GregorianCalendar(1999,0,1).getTime(),
    new Double(10E7)
};

String msg = msgFmt.format(msgArgs);
System.out.println(msg);
```

```

                                .   가   ,   {2}
msgArgs[2]   .   가
              Integer   Double   가
              . Format   Date
              Date(int,int,int)   Calendar   .
              Calendar   getTime(sic)   Date
```

```

:
On 1/1/99 12:00 AM, a hurricane destroyed 99 houses and caused 100,000,000
of damage.
```

```

                                "12:00 AM"
                                .
damage   .
                                가
```

- 가 .
- SetFormat setFormats .

```

        .
        ,
        ({2})
        .
        ,
        0
        .
        0 3
        가
        .
        , DateFormat.getDateInstance(loc)
        NumberFormat.getCurrencyInstance(loc)
        .
        loc
        .
        Format
        .
        MessageText
        setFormat
        Format
        .
        0
        .
        가
        ,
        0 3
        format

```

```

msgFmt.setFormat(0, DateFormat.getDateInstance(DateFormat.LONG, loc));
msgFmt.setFormat(3, NumberFormat.getCurrencyInstance(loc));
String msg = msgFmt.format(msgArgs);
System.out.println(msg);

```

.um

On January 1, 1999, a hurricane destroyed 99 houses and caused \$100,000,000 of damage.

```

,
null
.

```

```

Format argFormats[] =
{
    DateFormat.getDateInstance(DateFormat.LONG, loc),
    null,
    null,
    NumberFormat.getCurrencyInstance(loc)
};
msgFmt.setFormats(argFormats);

```

```

msgArgs  argFormats
MasArgs  {}
        . ArgFormats
        {}

```

가 . 가 . 가 ,

```
String pattern =
    "On {2}, a{0} destroyed {1} houses and caused {3} of damage."
MessageFormat msgFmt = new MessageFormat(pattern);

Format arg Formats[] =
{
    DateFormat.getDateInstance(DateFormat.LONG,loc),
    null,
    DateFormat.getTimeInstance(DateFormat.SHORT,loc),
    Null
};
msg.setFormats(argFormats);

Object[] msgArgs = {
    "hurricane",
    new Integer(99),
    new GregorianCalendar(1999,0,1).getTime(),
};
String msg = msgFmt.format(msgArgs);
System.out.println(msg);
```

:

On January 1, 1999, a hurricane touched down at 11:45 AM and destroyed 99 houses.

{2}가 .

,

. 가 , .

"On {2,date,long}, a{0} destroyed {1} houses and caused {3,number,currency} of damage."

```

        setFormat      setFormats      가
    ,
        :
    number
    time
    date
    choice

        number      ”
    integer
    currency
    long
    full
    $,##0      .(      1      3
    .)

        time      date      :
    short
    medium
    long
    full

        .( 가      SimpleDateFormat
    .)

```

java.text.messageFormat

- MessageFormat(String pattern)
- void applyPattern(String pattern)
- void setLocale(Locale loc)
- Locale getLocale()

가

applyPattern

- void setFormats(Format[] formats)
- Format[] getFormats()

가

- void setFormat(int i, Format format)
- String format(String pattern, Object[] args)

{i} args[i]

:

“On {2}, a{0} destroyed {1} houses and caused {3} of damage.”

가 {0} “earthquake”

On January 1, 1999, a earthquake destroyed ...

가 “a”

“On {2}, {0} destroyed {1} houses and caused {3} of damage.”

{0} “a hurricane” “an earthquake”

(gender)

가 . 가 ,

“{0} zerstörte am {2} {1} Häuser und richtete einen Schaden von {3} an.”

“Ein Hurrikan”, “Eine Naturkatastrophe”

{1}

{1}

1

:

On January 1, 1999, a mudslide destroyed 1 houses and ...

no houses

one house

...

. ChoiceFormat

```
double[] limits = . . . ;
String[] formatString = . . . ;
ChoiceFormat choiceFmt = new ChoiceFormat(limits,formatStrings);
Double input = . . . ;
String s = choiceFmt.format(input);
```

```
limits[i] <= input && input < limits[i+1]
```

```

formatStrings[i]가 input
limit
formatString[0]가
input limits[0]

```

```

가 , limits
double[] limits = { 0,1,2};
String[] formatStrings = {"no houses", "one house", "many houses"};

```

```
String selected = choiceFmt.format(input);
```

10-4: ChoiceFormat

```
input < 0      "no houses"
```

```
1 <= input && input < 2      "one house"
```

2 <= input “many houses”


```

-----

:          ChoiceFormat          가
          가          limits
.          가          limit
.          limit          가          limit
.          ,
Double[] limits = {1,1,2}
String[] formatStrings = { "no house" , "one house" , "many houses" };
ChoiceFormat choiceFmt = new ChoiceFormat(limits,formatStrings);

-----

, house   가 2   2   "many houses"

.

double[] limits = {0,1,2}
String[] formatStrings = { "no house" , "one house" , "{1}houses" };
ChoiceFormat choiceFmt = new ChoiceFormat(limits, formatStrings);
msgFmt.setFormat(2,choiceFmt);

.

{ 1}      ?
          "{1} houses"
          ,
          .

가          . 가 ,

String[] formatStrings
= { "no houses" , "one house" , "{1,number,integer}houses" };

choice          가
          limit

```

```

# . | . house
:
{1,choice,0#no houses|1#one house|2#{1} houses}

,
0#no houses
1#one house
2#{1} houses

1 , 1 2
2 .

-----
: , limit 가 .
limit limit ;

.
1#no houses|1#one house|2#{1} houses
. , limit limit
.

가 limit

.
no houses|1|one house|2|{1}houses
// not actual format

-----

가
.
String pattern =
"On {2,date,long}, {0} destroyed {1,choice,0#no houses|1#one house|2#{1}
houses} and caused {3,number,currency} of damage.";

,
String pattern =
"{0} zerstorte am {2,date,long} {1,choice,0#Kevin Haus|1#ein Haus|2#{1}
Hauser} und richtete einen Schaden von {3,number,currency} an.";
```

java.text.ChoiceFormat

- ChoiceFormat(String pattern)

|

limit#formatString

- ChoiceFormat(double limits[], String formatStrings[])

limit

. Limit 가

. input

formatString[i]

. i limits[i] <=

input 가

limits[1]

formatString[0]

ISO8859-1(“ANSI”

8

)

BIG5.

가

,

가

. 가 ,

가

getText

가

가

FileReader

가

! 1

InputStreamReader

InputStreamReader

1

InputStreamReader = new InputStreamReader(in, "8859_1");

,

. 가 , zh_TW

가

BIG5

가 .

가 :

- 가?
- 가?

가 가

1 PrintWriter

DataOutputStream

writeUTF

DataInputStream readUTF

:

(serialization)

가 .

가 .

가 가 .

가 ,

(

GB BIG5).

UTF

:

- :
- :UTF
- 가 :

ASCII

ASCII

“Hauser(가)”

“H \ u0084user”

JDK ASCII native2ascii

```

native2ascii -ASCII \u 4
16 native2ascii

native2ascii Myfile.java Myfile.temp

-reverse

native2ascii -reverse Myfile.java Myfile.temp

-encoding
1 12

native2ascii -encoding Cp437 Myfile.java Myfile.temp

, 가 ASCII

-ASCII
, 95 437
PC , 95 ANSI
가 JVM (NT
.) , Bar( 가) JDK
“cannot find class BΣr” 가 ,
ASCII

, 가 가 가 ,
“ (resource)”

-----
:
, ,

```

ResourceBundle getBundle

: 1 10 JAR , ,
 . Class getResource
 URL 가
 가 JAR

 , ,
 (,)
 가 ResourceBundle . ()
 .) 가
 , ProgramResource_de_DE
 가 ProgramResource_de
 ProgramResource_zh_TW
ProgramResource_zh , 가
 .
 ProgramResources_language_country
 .
 ProgramResources_language
 , ProgramResource

가

```
ResourceBundle currentResources =  
    ResourceBundle.getBundle("ProgramResources", currentLocale);  
  
getLocale            , 가, (Variant)  
  
getBundle            , 가
```

```
ProgramResources_language_country_variant  
ProgramResources_language_country  
ProgramResources_language  
ProgramResources
```

가 getBundle

가

MissingResourceException

```
getBundle 가 , , ProgramResources_de_DE,  
ProgramResources_de ProgramResources 가  
ProgramResources_de_DE 가  
getObject 가  
ProgramResources_de_DE ProgramResources_de  
ProgramResources  
L
```

가

가

가

가

(,bundle)

ResourceBundle
(lookup)

getString

String computeButtonLabel
= resource.getString("computeButton");

! getObject

Color backgroundColor
= (Color)resources.getObject("backgroundColor");
double[] paperSize
=(double[])resources.getObject("defaultPaperSize");

:

, ,

2

가

Enumeration getKeys()
Object handleGetObject(String key)

getObject getString

handleGetObject

가 ,


```

public class ProgramResource extends ResourceBundle
    // place getKeys method in common superclass
{
    public Enumeration getKeys()
    { return Collections.enumeration(Arrays.asList(keys));
    }
    private String[] keys = { "computeButton",
        "backgroundColor","defaultPaperSize"}
}

public class ProgramResource_de extends ProgramResource
{
    public Object handleGetObject(String key)
    {
        if(key.equals("computeButton")
            return "Rechnen";
        else if(key.equals("backgroundColor")
            return Color.black;
        else if(key.equals("defaultPaperSize")
            return new double[] {210.297};
    }
}

public class ProgramResource_en_US extends ProgramResource
{
    public Object handleGetObject(String key)
    {
        if(key.equals("computeButton")
            return "compute";
        else if(key.equals("backgroundColor")
            return Color.blue;
        else if(key.equals("defaultPaperSize")
            return new double[] {216.279};
    }
}

```

: ISO216 .
<http://www.cl.cam.ac.uk/~mgk25/iso-paper.html> .
 (<http://lamar.colostate.edu/~hillger>) (,)

가 . (SI)

http://ts.nist.gov/ts/htdocs/200/200/mpo_reso.htm

, .

: ListResourceBundle PropertyResourceBundle.

ListResourceBundledms

가 :

```
public class ProgramResources_language_country
    extends ListResourceBundle
{
    public Object[][] getContents() { return contents; }
    static final Object[][] contents =
    {
        // localization information goes here
    }
}
```

```
public class ProgramResources_de extends ListResourceBundle
{
    public Object[][] getContents() { return contents; }
    static final Object[][] contents =
    {
        {"computeButton" , "Rechnen"},
        {"backgroundColor", Color.black},
        {"defaultPaperSize",new double[] {210,297} }
    }
}
```

```
public class ProgramResources_en_US extends ListResourceBundle
{
    public Object[][] getContents() { return contents; }
    static final Object[][] contents =
    {
        {"computeButton" , "Compute"},
        {"backgroundColor", Color.blue},
        {"defaultPaperSize",new double[] {216,279} }
```

```

    }
}

getObject
ListResourceBundle

    ,
    2
    /
    :

computeButton=Rechnen
backgroundColor=black
defaultPaperSize=210x297

PropertyResourceBundle

InputStream in = . . . ; // open property file
PropertyResourceBundle currentResources =
    New PropertyResourceBundle(in);

    .
    ,
    .
    .(
        "210x297"
    .)

ListResourceBundle

-----
:
7 ASCII
가 \ uxxxx
가 , "colorName=Grun"( )
.
colorName=Gr \ u00FCn
native2ascii
-----
가
:
```

가? JAR
가 . , Class
getResourceAsStream .
.
in = Program.class.getResourceAsStream("programProperties_de.properties");
PropertyResourceBundle currentResources =
New PropertyResourceBundle(in);

PropertyResourceBundle 가 ResourceBundle 가
.
.
, ProgramResources_de.properties .

```

public class ProgramProperties_de extends PropertyResourceBundle
{
    public ProgramProperties_de() throws IOException
    {
        super(ProgramProperties_de.class. getResourceAsStream
            ("ProgramProperties_de.properties"));
    }
}

```

가 : ,
/
JAR

: , ,
가 .
(<http://java.sun.com/products/jdk1.3>)

java.util.ResourceBundle

- static ResourceBundle getBundle(String baseName, Locale loc)
- static ResourceBundle getBundle(String baseName)

“intl.ProgramResources”

getBundle

public

- Object getObject(String name)
- String getString(String name)
- String[] getStringArray(String name)
- Enumeration getKeys()

java.util.PropertyResourceBundle

- PropertyResourceBundle(InputStream in)

/

public class MyApplet extends JApplet implements ActionListener

```
{    public void init()
    {        JButton cancelButton = new JButton("Cancel");
        cancelButton.addActionListener(this);
        ...
    }
    public void actionPerformed(ActionEvent evt)
    {        String arg = evt.getActionCommand();
        if(arg.equals("Cancel"))
            doCancel();
        else ...
    }
}
```

```

    }
    ...
}

        .
        .
        ,
        “Abbrechen”
        .
        init
        actionPerformed
가
가
가
,
.
3가
.

1. actionPerformed
2.
3. name

```

```
public class MyApplet extends JApplet implements ActionListener
{
    public void init()
    {
        JButton cancelButton = new JButton("Cancel");
        cancelButton.addActionListener(
            new ActionListener()
            {
                public void actionPerformed(ActionEvent e)
                {
                    doCancel();
                }
            }
        );
        ...
    }
    ...
}
```

Cancel

가

```
public class MyApplet extends JApplet implements ActionListener
{
    public void init()
    {
        cancelButton = new JButton("Cancel");
        cancelButton.addActionListener(this);
        ...
    }
}

public void actionPerformed(ActionEvent evt)
{
    Object source = evt.getSource();
    if(source == cancelButton)
        doCancel();
    else ...
}

...
private JButton cancelButton;
}
```

actionPerformed

, Component (Button)

cancel "cancel1"

. (

8

.)

가

```

public class MyApplet extends JApplet implements ActionListener
{
    public void init()
    {
        JButton cancelButton = new JButton("Cancel");
        cancelButton.setName("cancel1");
        cancelButton.addActionListener(this);
        ...
    }
    public void actionPerformed(ActionEvent evt)
    {
        Component source = (Component)evt.getSource();
        if(source.getName().equals("cancel1"))
            doCancel();
        ...
    }
    ...
}

```

java.awt.Component

- void setName(String s)
- String getName()

가

가 .(10-5

)

10-5 : ()

(bar) X

가 가 . , , ,

3 (, ,).

- , .
RetireResources_de,RetireResource_zh
-RetireResources .

● . netive2ascii .

- .
- .
- MessageFormat .

- 가 .

10-5 10-8 . 10-6 10-7

● ,
가 . “missing
character” .

: 가
가
가
getLocale()

, 가 가 가 가 가
가 가 가 가 가
가 가 가

10-5: ()

10-5: ()

10-5 : Retire.java

```
import java.awt.*;
import java.awt.event.*;
import java.applet.*;
import java.util.*;
import java.text.*;
import java.io.*;
import javax.swing.*;

public class Retire extends JApplet
{
    public void init()
    {
        GridBagLayout gbl = new GridBagLayout();
        getContentPane().setLayout(gbl);

        GridBagConstraints gbc = new GridBagConstraints();
        gbc.weightx = 100;
        gbc.weighty = 0;

        gbc.fill = GridBagConstraints.NONE;
        gbc.anchor = GridBagConstraints.EAST;
        add(languageLabel, gbc, 0, 0, 1, 1);
        add(savingsLabel, gbc, 0, 1, 1, 1);
        add(contribLabel, gbc, 2, 1, 1, 1);
    }
}
```

```

add(incomeLabel, gbc, 4, 1, 1, 1);
add(currentAgeLabel, gbc, 0, 2, 1, 1);
add(retireAgeLabel, gbc, 2, 2, 1, 1);
add(deathAgeLabel, gbc, 4, 2, 1, 1);
add(inflationPercentLabel, gbc, 0, 3, 1, 1);
add(investPercentLabel, gbc, 2, 3, 1, 1);

gbc.fill = GridBagConstraints.HORIZONTAL;
gbc.anchor = GridBagConstraints.WEST;
add(localeCombo, gbc, 1, 0, 2, 1);
add(savingsField, gbc, 1, 1, 1, 1);
add(contribField, gbc, 3, 1, 1, 1);
add(incomeField, gbc, 5, 1, 1, 1);
add(currentAgeField, gbc, 1, 2, 1, 1);
add(retireAgeField, gbc, 3, 2, 1, 1);
add(deathAgeField, gbc, 5, 2, 1, 1);
add(inflationPercentField, gbc, 1, 3, 1, 1);
add(investPercentField, gbc, 3, 3, 1, 1);

computeButton.setName("computeButton");
computeButton.addActionListener(
    new ActionListener()
    {
        public void actionPerformed(ActionEvent event)
        {
            getInfo();
            updateData();
            updateGraph();
        }
    }
);
add(computeButton, gbc, 5, 3, 1, 1);

gbc.weighty = 100;
gbc.fill = GridBagConstraints.BOTH;
add(retireCanvas, gbc, 0, 4, 4, 1);
add(new JScrollPane(retireText), gbc, 4, 4, 2, 1);
retireText.setEditable(false);
retireText.setFont(new Font("Monospaced", Font.PLAIN, 10));

```

```

info.setSavings(0);
info.setContrib(9000);
info.setIncome(60000);
info.setCurrentAge(35);
info.setRetireAge(65);
info.setDeathAge(85);
info.setInvestPercent(0.1);
info.setInflationPercent(0.05);

localeCombo.addActionListener(
    new ActionListener()
    {
        public void actionPerformed(ActionEvent event)
        {
            setCurrentLocale(localeCombo.getSelectedIndex());
        }
    });

locales = new Locale[]
    { Locale.US, Locale.CHINA, Locale.GERMANY };

int localeIndex = 0; // US locale is default selection

for (int i = 0; i < locales.length; i++)
    // if current locale one of the choices, we'll select it
    if (getLocale().equals(locales[i])) localeIndex = i;

setCurrentLocale(localeIndex);
}

public void add(Component c, GridBagConstraints gbc,
    int x, int y, int w, int h)
{
    gbc.gridx = x;
    gbc.gridy = y;
    gbc.gridwidth = w;
    gbc.gridheight = h;
    getContentPane().add(c, gbc);
}

```

```
}
```

```
public void setCurrentLocale(int localeIndex)
{
    currentLocale
        = locales[localeIndex];

    localeCombo.removeAllItems();
    for (int i = 0; i < locales.length; i++)
    {
        String language = locales[i].getDisplayLanguage(currentLocale);
        localeCombo.addItem(language);
    }
    localeCombo.setSelectedIndex(localeIndex);

    res = ResourceBundle.getBundle("RetireResources",
        currentLocale);
    currencyFmt
        = NumberFormat.getCurrencyInstance(currentLocale);
    numberFmt
        = NumberFormat.getNumberInstance(currentLocale);
    percentFmt
        = NumberFormat.getPercentInstance(currentLocale);

    updateDisplay();
    updateInfo();
    updateData();
    updateGraph();
}
```

```
public void updateDisplay()
{
    languageLabel.setText(res.getString("language"));
    savingsLabel.setText(res.getString("savings"));
    contribLabel.setText(res.getString("contrib"));
    incomeLabel.setText(res.getString("income"));
    currentAgeLabel.setText(res.getString("currentAge"));
    retireAgeLabel.setText(res.getString("retireAge"));
    deathAgeLabel.setText(res.getString("deathAge"));
}
```

```

inflationPercentLabel.setText
    (res.getString("inflationPercent"));
investPercentLabel.setText
    (res.getString("investPercent"));
computeButton.setText(res.getString("computeButton"));

validate();
}

public void updateInfo()
{
    savingsField.setText(currencyFmt.format(info.getSavings()));
    contribField.setText(currencyFmt.format(info.getContrib()));
    incomeField.setText(currencyFmt.format(info.getIncome()));
    currentAgeField.setText(numberFmt.format(info.getCurrentAge()));
    retireAgeField.setText(numberFmt.format(info.getRetireAge()));
    deathAgeField.setText(numberFmt.format(info.getDeathAge()));
    investPercentField.setText(percentFmt.format(info.getInvestPercent()));

inflationPercentField.setText(percentFmt.format(info.getInflationPercent()));
}

public void updateData()
{
    retireText.setText("");
    MessageFormat retireMsg = new MessageFormat("");
    retireMsg.setLocale(currentLocale);
    retireMsg.applyPattern(res.getString("retire"));

    for (int i = info.getCurrentAge(); i <= info.getDeathAge(); i++)
    {
        Object[] args = { new Integer(i),
            new Double(info.getBalance(i)) };
        retireText.append(retireMsg.format(args) + "\n");
    }
}

public void updateGraph()
{
    retireCanvas.setColorPre((Color)res.getObject("colorPre"));

```

```

        retireCanvas.setColorGain((Color)res.getObject("colorGain"));
        retireCanvas.setColorLoss((Color)res.getObject("colorLoss"));
        retireCanvas.setInfo(info);
        repaint();
    }

    public void getInfo()
    {
        try

{
    info.setSavings(currencyFmt.parse(savingsField.getText()).doubleValue());

    info.setContrib(currencyFmt.parse(contribField.getText()).doubleValue());
        info.setIncome(currencyFmt.parse(incomeField.getText()).doubleValue());

    info.setCurrentAge(numberFmt.parse(currentAgeField.getText()).intValue());

    info.setRetireAge(numberFmt.parse(retireAgeField.getText()).intValue());
        info.setDeathAge(numberFmt.parse(deathAgeField.getText()).intValue());

    info.setInvestPercent(percentFmt.parse(investPercentField.getText()).doubleValue());

    info.setInflationPercent(percentFmt.parse(inflationPercentField.getText()).doubleValue());
        }
        catch (ParseException exception)
        {
        }
    }

    private JTextField savingsField = new JTextField(10);
    private JTextField contribField = new JTextField(10);
    private JTextField incomeField = new JTextField(10);
    private JTextField currentAgeField = new JTextField(4);
    private JTextField retireAgeField = new JTextField(4);
    private JTextField deathAgeField = new JTextField(4);

```

```

private JTextField inflationPercentField = new JTextField(6);
private JTextField investPercentField = new JTextField(6);
private JTextArea retireText = new JTextArea(10, 25);
private RetireCanvas retireCanvas = new RetireCanvas();
private JButton computeButton = new JButton();
private JLabel languageLabel = new JLabel();
private JLabel savingsLabel = new JLabel();
private JLabel contribLabel = new JLabel();
private JLabel incomeLabel = new JLabel();
private JLabel currentAgeLabel = new JLabel();
private JLabel retireAgeLabel = new JLabel();
private JLabel deathAgeLabel = new JLabel();
private JLabel inflationPercentLabel = new JLabel();
private JLabel investPercentLabel = new JLabel();

private RetireInfo info = new RetireInfo();

private Locale[] locales;
private Locale currentLocale;
private JComboBox localeCombo = new JComboBox();
private ResourceBundle res;
private NumberFormat currencyFmt;
private NumberFormat numberFmt;
private NumberFormat percentFmt;
}

```

```

class RetireInfo
{
    public double getBalance(int year)
    {
        if (year < currentAge) return 0;
        else if (year == currentAge)
        {
            age = year;
            balance = savings;
            return balance;
        }
        else if (year == age)
            return balance;
    }
}

```



```

        if (year != age + 1)
            getBalance(year - 1);
        age = year;
        if (age < retireAge)
            balance += contrib;
        else
            balance -= income;
        balance = balance
            * (1 + (investPercent - inflationPercent));
        return balance;
    }

    public double getSavings()
    {
        return savings;
    }

    public double getContrib()
    {
        return contrib;
    }

    public double getIncome()
    {
        return income;
    }

    public int getCurrentAge()
    {
        return currentAge;
    }

    public int getRetireAge()
    {
        return retireAge;
    }

    public int getDeathAge()
    {
        return deathAge;
    }

```

```
public double getInflationPercent()  
{ return inflationPercent;  
}  
  
public double getInvestPercent()  
{ return investPercent;  
}  
  
public void setSavings(double x)  
{ savings = x;  
}  
  
public void setContrib(double x)  
{ contrib = x;  
}  
  
public void setIncome(double x)  
{ income = x;  
}  
  
public void setCurrentAge(int x)  
{ currentAge = x;  
}  
  
public void setRetireAge(int x)  
{ retireAge = x;  
}  
  
public void setDeathAge(int x)  
{ deathAge = x;  
}  
  
public void setInflationPercent(double x)  
{ inflationPercent = x;  
}
```

```

public void setInvestPercent(double x)
{
    investPercent = x;
}

private double savings;
private double contrib;
private double income;
private int currentAge;
private int retireAge;
private int deathAge;
private double inflationPercent;
private double investPercent;

private int age;
private double balance;
}

class RetireCanvas extends JPanel
{
    public RetireCanvas()
    {
        setSize(400, 200);
    }

    public void setInfo(RetireInfo newInfo)
    {
        info = newInfo;
    }

    public void paint(Graphics g)
    {
        if (info == null) return;

        double minValue = 0;
        double maxValue = 0;
        int i;
        for (i = info.getCurrentAge(); i <= info.getDeathAge(); i++)
        {
            double v = info.getBalance(i);
            if (minValue > v) minValue = v;
            if (maxValue < v) maxValue = v;
        }
    }
}

```

```

    }

    if (maxValue == minValue) return;

    int barWidth = getWidth() / (info.getDeathAge()
        - info.getCurrentAge() + 1);
    double scale = getHeight() / (maxValue - minValue);

    for (i = info.getCurrentAge(); i <= info.getDeathAge(); i++)
    {
        int x1 = (i - info.getCurrentAge()) * barWidth + 1;
        int y1;
        double v = info.getBalance(i);
        int height;
        int yOrigin = (int)(maxValue * scale);

        if (v >= 0)
        {
            y1 = (int)((maxValue - v) * scale);
            height = yOrigin - y1;
        }
        else
        {
            y1 = yOrigin;
            height = (int)(-v * scale);
        }

        if (i < info.getRetireAge())
            g.setColor(colorPre);
        else if (v >= 0)
            g.setColor(colorGain);
        else
            g.setColor(colorLoss);

        g.fillRect(x1, y1, barWidth - 2, height);
        g.setColor(Color.black);
        g.drawRect(x1, y1, barWidth - 2, height);
    }
}

public void setColorPre(Color color)

```

```

    { colorPre = color;
    }

    public void setColorGain(Color color)
    { colorGain = color;
    }

    public void setColorLoss(Color color)
    { colorLoss = color;
    }

    private RetireInfo info = null;

    private Color colorPre;
    private Color colorGain;
    private Color colorLoss;
}

```

10-6: RetireResource.java

```

import java.util.*;
import java.awt.*;

public class RetireResources
    extends java.util.ListResourceBundle
{
    public Object[][] getContents() { return contents; }
    static final Object[][] contents =
    {
        // BEGIN LOCALIZE
        { "language", "Language" },
        { "computeButton", "Compute" },
        { "savings", "Prior Savings" },
        { "contrib", "Annual Contribution" },
        { "income", "Retirement Income" },
        { "currentAge", "Current Age" },
    }
}

```

```

        { "retireAge", "Retirement Age" },
        { "deathAge", "Life Expectancy" },
        { "inflationPercent", "Inflation" },
        { "investPercent", "Investment Return" },
        { "retire", "Age: {0,number} Balance: {1,number,currency}" },
        { "colorPre", Color.blue },
        { "colorGain", Color.white },
        { "colorLoss", Color.red }
        // END LOCALIZE
    };
}

```

10-7 : RetireResource_de.java

```

import java.util.*;
import java.awt.*;

public class RetireResources_de
    extends java.util.ListResourceBundle
{
    public Object[][] getContents() { return contents; }

    static final Object[][] contents =
    {
        // BEGIN LOCALIZE
        { "language", "Sprache" },
        { "computeButton", "Rechnen" },
        { "savings", "Vorherige Ersparnisse" },
        { "contrib", "J rliche Einzahlung" },
        { "income", "Einkommen nach Ruhestand" },
        { "currentAge", "Jetziges Alter" },
        { "retireAge", "Ruhestandsalter" },
        { "deathAge", "Lebenserwartung" },
        { "inflationPercent", "Inflation" },
        { "investPercent", "Investitionsgewinn" },
        { "retire", "Alter: {0,number} Guthaben: {1,number,currency}" },
        { "colorPre", Color.yellow },
        { "colorGain", Color.black },
        { "colorLoss", Color.red }
    }
}

```

```

        // END LOCALIZE
    };
}

```

10-8 : RetireResource_zh.java

```

import java.util.*;
import java.awt.*;

public class RetireResources_zh
    extends java.util.ListResourceBundle
{
    public Object[][] getContents() { return contents; }
    static final Object[][] contents =
    {
        // BEGIN LOCALIZE
        { "language", "\u8bed\u8a00" },
        { "computeButton", "\u8ba1\u7b97" },
        { "savings", "\u65e2\u5b58" },
        { "contrib", "\u6bcf\u5e74\u5b58\u91d1" },
        { "income", "\u9000\u4f11\u6536\u5165" },
        { "currentAge", "\u73b0\u5cad" },
        { "retireAge", "\u9000\u4f11\u5e74\u9f84" },
        { "deathAge", "\u9884\u671f\u5bff\u547d" },
        { "inflationPercent", "\u901a\u8d27\u81a8\u6da8" },
        { "investPercent", "\u6295\u8d44\u62a5\u916c" },
        { "retire",
            "\u5e74\u9f84: {0,number} \u603b\u7ed3: {1,number,currency}" },
        { "colorPre", Color.red },
        { "colorGain", Color.blue },
        { "colorLoss", Color.yellow }

        // END LOCALIZE
    };
}

```

java.awt.Applet

- Locale getLocale()

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