INTERNATIONALIZATION

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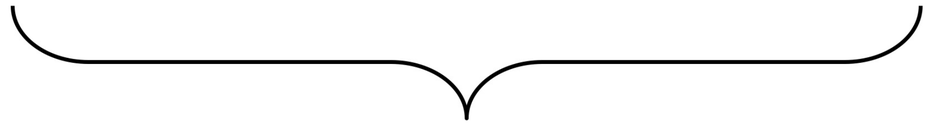
AGENDA

- Internationalization
- The Locale Class
- Formatting and Parsing Numbers
- Character Sets and Conversions
- Resource Bundles

i  nternationalisation

18 letters

i18n

JAVA I18N

- Use Unicode in strings and GUI
- Provide the `Locale` class
  - Encapsulate information about a specific locale (language and country)
- `ResourceBundle` class separates locale-specific information in a text file
  - Status messages, Error messages, GUI component labels, etc.

THE LOCALE CLASS

- A `Locale` object represents a specific geographical, political, or cultural region
  - You can use `Locale` to adapt information to the user
  - An operation that requires a `Locale` to perform its task is called locale-sensitive
  - For example formatting dates and numbers are locale-sensitive operations

CREATING A LOCALE

- Use the constructors in Locale class:

```
Locale(String language)
Locale(String language,
    String country)
```

- Examples:

```
Locale bgLocale =
    new Locale("bg");
Locate caLocate =
    new Locale("fr", "CA");
```

- Use the predefined locales:

```
Locale deLocale = Locale.GERMANY;
```

DEFAULT LOCALE

- Obtaining the currently active (default) locale in the JVM:

```
Locale currentLocale = Locale.getDefault();
```

- Examples:

```
Locale currentLocale = Locale.getDefault();
System.out.println(
    currentLocale.getDisplayCountry());
```

- Change the JVM's default locale:

```
Locale.setDefault(Locale.GERMANY);
```

USING LOCALES

- Locales are used by other types that are locale-sensitive
- Examples (NumberFormat, DateFormat):

```
NumberFormat.getInstance(Locale);
NumberFormat.getIntegerInstance(Locale);
NumberFormat.getCurrencyInstance(Locale);
NumberFormat.getPercentInstance(Locale);

DateFormat.getDateInstance(Locale);
DateFormat.getTimeInstance(Locale);
DateFormat.getDateTimeInstance(Locale);
```

THE NUMBERFORMAT CLASS

- The most important methods:

```
NumberFormat.
    getInstance(locale);
NumberFormat.
    getIntegerInstance(locale);
NumberFormat.
   getCurrencyInstance(locale);

format(long|double);
parse(String) -> Number;
```

- Example

```
NumberFormat bgFormat =
    NumberFormat.
    getCurrencyInstance(
    new Locale("bg","BG"));
System.out.println(
    bgFormat.format(28.50));
// лв.28,5
```

PARSING NUMBERS

- To parse numbers use the NumberFormat.parse(…) method:
- This method may throw a ParseException if the argument passed is not valid!

EXAMPLE

```
NumberFormat usNumberFormat = NumberFormat
        .getNumberInstance(Locale.US);
String num = "1,292,812.00";
System.out.println("Original number: " + num);
try {
    Long parsed = (Long) usNumberFormat.parse(num);
    System.out.println("Parsed number: " + parsed);
} catch (ParseException pe) {
    pe.printStackTrace();
}
```

CHARACTER SETS

- Character sets are string encoding schemas (also called encodings)
- UTF-8 and UTF-16 are universal character sets (for all languages)
- Some character sets are specific to some languages and alphabets

Language	Locale	Default Charset
Bulgarian	bg	windows-1251
English	en	iso-8859-1
German	de	iso-8859-1
Japanese	ja	euc-jp

CONVERTING BETWEEN STRING AND SEQUENCE OF BYTES

- To convert a string to a sequence of bytes in given encoding use:

```
String.getBytes(String charsetName)   byte[]
```

- To construct a string by given sequence of bytes in known encoding use:

```
new String(byte[] bytes, String charsetName)
```

- If encoding is not specified, the default is used:

```
java.nio.charset.Charset.defaultCharset().name()
```

EXAMPLE

```
String str = "Gochev <-> Гочев";
System.out.printf(str);
byte[] encoded = str.getBytes("ascii");
String decoded = new String(encoded, "ascii");
System.out.printf(decoded);
// Gochev <-> ??????
```

- Some letters can not be represented in ASCII encoding and are lost

RESOURCE BUNDLES

- The `ResourceBundle` class
  - Contains locale specific objects such as messages
  - Allows your programs to be be easily localized, or translated, into different languages
  - Make your application language independent

EXAMPLE

```
String baseName = "MyResources";
try {
    ResourceBundle rb = ResourceBundle.getBundle(baseName,
        Locale.FRENCH); // specify French
    key = "hello";
    greeting = rb.getString(key); // Bonjour
    System.out.println(greeting);
    key = "bye";
    greeting = rb.getString(key); // Au Revoir
    System.out.println(greeting);
} catch(MissingResourceException e) {
    e.printStackTrace();
}
```