Working with Date in Java 7

- **java.util.Date** – representation of the current date and time.

- **java.util.Calendar** – another object that can help extract date`s attributes – Month, Year, Hour, Day of week, etc.

```java
Date date = new Date();
System.out.println("Today is =" + date);

Calendar cal = Calendar.getInstance();
System.out.println("Calendar = " + cal.getTime());
```

```
Today is =Thu Feb 26 16:39:52 EET 2015
Calendar = Thu Feb 26 16:39:52 EET 2015
```

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Working with Date in Java 7

- Getting Date`s attributes

  - Do not use Date methods – they are deprecated

  - Use Calendar get(...)

```java
System.out.println("Day of month = " + Calendar.getInstance().get(Calendar.DAY_OF_MONTH));
System.out.println("Day of week = " + Calendar.getInstance().get(Calendar.DAY_OF_WEEK));
System.out.println("Year = " + Calendar.getInstance().get(Calendar.YEAR));
System.out.println("Month = " + Calendar.getInstance().get(Calendar.MONTH));

System.out.printf("Readable date =  %s-%s-%s",  cal.get(Calendar.DAY_OF_MONTH),
                                                cal.get(Calendar.MONTH),
                                                cal.get(Calendar.YEAR));
```

```
Day of month = 26
Day of week = 5
Year = 2015
Month = 1
Readable date =  26-1-2015
```

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Manipulating Date

- Not very cool in Java 7

```java
System.out.println("date original = " + date);
Calendar helperCal = Calendar.getInstance();
helperCal.setTime(date);
helperCal.add(Calendar.DATE, 3);
//add 2 months
helperCal.add(Calendar.MONTH, 2);
//remove 5 years
helperCal.add(Calendar.YEAR, -5);
System.out.println("date + 3 days + 2 months -5 years with calendar helper = " + helperCal.getTime());
//without Calendar object
System.out.println("date + 3 days without calendar = " + new Date(date.getTime()+3*24*60*60*1000));
System.out.println("date - 7 days  = " + new Date(date.getTime()-7*24*60*60*1000));
```

```
date original = Thu Feb 26 16:49:32 EET 2015
date + 3 days + 2 months -5 years with calendar helper = Sat May 01 16:49:32 EEST 2010
date + 3 days without calendar = Sun Mar 01 16:49:32 EET 2015
date - 7 days  = Thu Feb 19 16:49:32 EET 2015
```

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Formatting Date

- java.text.DateFormat

```java
// Make a new Date object. It will be initialized to the current time.
Date now = new Date();
// See what toString() returns
System.out.println(" 1. " + now.toString());
// Next, try the default DateFormat
System.out.println(" 2. " + DateFormat.getInstance().format(now));
// And the default time and date-time DateFormats
System.out.println(" 3. " + DateFormat.getTimeInstance().format(now));
System.out.println(" 4. " + DateFormat.getDateTimeInstance().format(now));
// Next, try the short, medium and long variants of the default time format
System.out.println(" 5. " + DateFormat.getTimeInstance(DateFormat.SHORT).format(now));
System.out.println(" 6. " + DateFormat.getTimeInstance(DateFormat.MEDIUM).format(now));
System.out.println(" 7. " + DateFormat.getTimeInstance(DateFormat.LONG).format(now));
// For the default date-time format, the length of both the
// date and time elements can be specified. Here are some examples:
System.out.println(" 8. " + DateFormat.getDateTimeInstance( DateFormat.SHORT, DateFormat.SHORT).format(now));
System.out.println(" 9. " + DateFormat.getDateTimeInstance( DateFormat.MEDIUM, DateFormat.SHORT).format(now));
System.out.println("10. " + DateFormat.getDateTimeInstance( DateFormat.LONG, DateFormat.LONG).format(now));
```

```
 1. Thu Feb 26 16:49:32 EET 2015
 2. 26.02.15 16:49
 3. 16:49:32
 4. 26.02.2015 16:49:32
 5. 16:49
 6. 16:49:32
 7. 16:49:32 EET
 8. 26.02.15 16:49
 9. 26.02.2015 16:49
10. 26 Февруари 2015 16:49:32 EET
```

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Formatting Date

- Java.text.SimpleDateFormat

```java
// Print the result of toString()
String dateString = now.toString();
System.out.println("1. " + dateString);
// Make a SimpleDateFormat for toString()'s output. This
// has short (text) date, a space, short (text) month, a space,
// 2-digit date, a space, hour (0-23), minute, second, a space,
// short timezone, a final space, and a long year.
SimpleDateFormat format = new SimpleDateFormat("EEE MMM dd HH:mm:ss zzz yyyy");
System.out.println("2. " + format.format(now));
SimpleDateFormat format2 = new SimpleDateFormat("dd:MM:YYYY HH:mm:ss");
System.out.println("3. " + format2.format(now));
```

- The expression gives you the opportunity to chose your desired format

```
1. Thu Feb 26 16:56:31 EET 2015
2. Чт II 26 16:56:31 EET 2015
3. 26:02:2015 16:56:31
```

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Working with Date in Java 8

- **java.time.LocalDate** – representation of the current date.

- **java.time.LocalTime** – representation of the current time.

- **java.time.LocalDateTime** – representation of the combination of the two above objects.

  - The Three objects provide easier ways of working with Dates and Times

Working with Date in Java 8

- Getting Date`s attributes

```java
LocalDate date = LocalDate.now();
LocalTime time = LocalTime.now();
LocalDateTime dateTime = LocalDateTime.now();
System.out.println("Today is " + date);
System.out.println("Time is " + time);
System.out.println("Time`s date and time is " + dateTime);

System.out.println("Day of month = " + date.getDayOfMonth());
System.out.println("Day of week = " + date.getDayOfWeek());
System.out.println("Day of week is also = " + date.getDayOfWeek().getValue());
System.out.println("Day of year = " + date.getDayOfYear());
System.out.println("Year = " + date.getYear());
System.out.println("Month = " + date.getMonthValue());
System.out.println("Month is also = " + date.getMonth());
```

```
Today is 2015-02-26
Time is 17:04:52.423
Time`s date and time is 2015-02-26T17:04:52.423
Day of month = 26
Day of week = THURSDAY
Day of week is also = 4
Day of year = 57
Year = 2015
Month = 2
Month is also = FEBRUARY
```

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Manipulating Date in Java 8

- Super Cool!

```java
Period fiveDays = Period.ofDays(5);
Period threeMonths = Period.ofMonths(3);

System.out.println("date + 5 days = " + date.plus(fiveDays));
System.out.println("date - 3 months = " + date.minus(threeMonths));
System.out.println("date is still unmodified! = " + date);
```

```
date + 5 days = 2015-03-03
date - 3 months = 2014-11-26
date is still unmodified! = 2015-02-26
```

```java
Duration threeHours = Duration.ofHours(3);
Duration fiveSeconds = Duration.ofSeconds(5);
System.out.println("current time = " + time);
System.out.println("time + 3 hours = " + time.plus(threeHours));
System.out.println("time - 5 seconds = " + time.minus(fiveSeconds));
```

```
current time = 17:24:40.172
time + 3 hours = 20:24:40.172
time - 5 seconds = 17:24:35.172
```

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More on Date and Time in Java 8

- http://java.dzone.com/articles/deeper-look-java-8-date-and