# Chapter 12: Date and Time

R comes with classes for dates, date-times and time differences; see `?Dates`, `?DateTimeClasses`, `?difftime` and follow the "See Also" section of those docs for further documentation. Related Docs: Dates and Date-Time Classes.

## Section 12.1: Current Date and Time

R is able to access the current date, time and time zone:

```
Sys.Date()             # Returns date as a Date object

## [1] "2016-07-21"

Sys.time()             # Returns date & time at current locale as a POSIXct object

## [1] "2016-07-21 10:04:39 CDT"

as.numeric(Sys.time()) # Seconds from UNIX Epoch (1970-01-01 00:00:00 UTC)

## [1] 1469113479

Sys.timezone()         # Time zone at current location

## [1] "Australia/Melbourne"
```

Use `OlsonNames()` to view the time zone names in Olson/IANA database on the current system:

```
str(OlsonNames())
## chr [1:589] "Africa/Abidjan" "Africa/Accra" "Africa/Addis_Ababa" "Africa/Algiers"
"Africa/Asmara" "Africa/Asmera" "Africa/Bamako" ...
```

## Section 12.2: Go to the End of the Month

Let's say we want to go to the last day of the month, this function will help on it:

```
eom <- function(x, p=as.POSIXlt(x)) as.Date(modifyList(p, list(mon=p$mon + 1, mday=0)))
```

Test:

```
x <- seq(as.POSIXct("2000-12-10"),as.POSIXct("2001-05-10"),by="months")
> data.frame(before=x,after=eom(x))
      before      after
1 2000-12-10 2000-12-31
2 2001-01-10 2001-01-31
3 2001-02-10 2001-02-28
4 2001-03-10 2001-03-31
5 2001-04-10 2001-04-30
6 2001-05-10 2001-05-31
>
```

Using a date in a string format:

```
> eom('2000-01-01')
[1] "2000-01-31"
```

## Section 12.3: Go to First Day of the Month

Let's say we want to go to the first day of a given month:

```
date <- as.Date("2017-01-20")

> as.POSIXlt(cut(date, "month"))
[1] "2017-01-01 EST"
```

## Section 12.4: Move a date a number of months consistently by months

Let's say we want to move a given date a `num`of months. We can define the following function, that uses the `mondate` package:

```
moveNumOfMonths <- function(date, num) {
    as.Date(mondate(date) + num)
}
```

It moves consistently the month part of the date and adjusting the day, in case the date refers to the last day of the month.

For example:

Back one month:

```
> moveNumOfMonths("2017-10-30",-1)
[1] "2017-09-30"
```

Back two months:

```
> moveNumOfMonths("2017-10-30",-2)
[1] "2017-08-30"
```

Forward two months:

```
> moveNumOfMonths("2017-02-28", 2)
[1] "2017-04-30"
```

It moves two months from the last day of February, therefore the last day of April.

Let's se how it works for backward and forward operations when it is the last day of the month:

```
> moveNumOfMonths("2016-11-30", 2)
[1] "2017-01-31"
> moveNumOfMonths("2017-01-31", -2)
[1] "2016-11-30"
```

Because November has 30 days, we get the same date in the backward operation, but:

```
> moveNumOfMonths("2017-01-30", -2)
[1] "2016-11-30"
> moveNumOfMonths("2016-11-30", 2)
[1] "2017-01-31"
```

Because January has 31 days, then moving two months from last day of November will get the last day of January.