R- Date and Time

R- There are many options in R to handle Dates and Times.

R- handles date and time in three classes:

- as.Date
- POSIXlt
- POSIXct
- chron
- Lubridate package

Page

Built-in function

as.Date (without times)

POSIX - Portable operating system interface - primarily on UNIX. (allow for dates and time with time zones)

chron - (allows for dates and time)

R- Date and Time

For handling dates with out times

as.Date- is the best choice

```
> as.Date('1/15/2001',format='%m/%d/%Y')
[1] "2001-01-15"
> as.Date('April 26, 2001',format='%B %d, %Y')
[1] "2001-04-26"
> as.Date('22JUN01',format='%d%b%y')
[1] "2001-06-22"
```

Code	Value
%d	day of month (decimal number)
%m	month (decimal number)
%Y	Year (4 digits)
%B	Month (full name)
%y	Year (2 digits)
%b	Month (abbreviated name)

Specify format if input dates are not in standard format

R- Date and Time

as.Date-

```
>  bdays = c(CRRao=as.Date('1920-09-10'),
+              PCMahalanobis=as.Date('1893-06-29'),
+              Cramer=as.Date('1893-09-25'),
+              KRParthasarathy=as.Date('1936-06-25')
+              )
>  weekdays(bdays)
          CRRao   PCMahalanobis          Cramer
       "Friday"     "Thursday"         "Monday"
KRParthasarathy
     "Thursday"
>  months(bdays)
          CRRao   PCMahalanobis          Cramer
    "September"         "June"    "September"
KRParthasarathy
         "June"
```

- week days
- months

two in built functions in R that will provide day of the week and name of the month.

R- Date and Time

as.Date-

```
> datef1<- as.Date("02/08/2021", format = "%m/%d/%Y")
> datef1
[1] "2021-02-08"
> datef2 <- as.Date("February 8, 2021", format = "%B %d, %Y")
> datef2
[1] "2021-02-08"
```

Computations with dates

- Specify format of date

R- Date and Time

datef1 = 2021-02-08

as.Date-

```
> datef2 <- as.Date("October 8, 2021", format = "%B %d, %Y")
> datef1-datef2
Time difference of -242 days
> difftime(datef1, datef2, units = "weeks")
Time difference of -34.57143 weeks
> difftime(datef1, datef2, units = "days")
Time difference of -242 days
> difftime(datef1, datef2)
Time difference of -242 days
> datef2+10
[1] "2021-10-18"
> datef1-10
[1] "2021-01-29"
```

- Subtraction

  Specifies difference in days.

built-in function

difftime

Specify units that you prefer to calculate difference.

- add days to dates.

R- Date and Time

as.Date-

```
> three.days <- as.Date(c("2020-07-22", "2019-04-20", "2022-10-06"))
> three.days
[1] "2020-07-22" "2019-04-20" "2022-10-06"
> diff(three.days)
Time differences in days
[1] -459 1265
```

- Create a vector of dates

and

- find interval differences between them.

R- Date and Time

datef1 = 2021-02-08

as.Date-

```
> Seven <- seq(datef1, length = 7, by = "week")
> Seven
> Seven <- seq(datef1, length = 7, by = 14)
> Seven
> Seven <- seq(datef1, length = 7, by = "2 weeks")
> Seven
```

produce 7 dates that differ by a week, starting from datef1

produce 7 dates that differ by 14 days, starting from datef1

produce 7 dates that differ by two weeks, starting from datef1

R- Date and Time

as.Date-

```
> ?strptime
```

strptime in conjunction with a package called stringr is very useful.

- Combine dates and times with sting manipulation

R- Date and Time

ct ≡ calendar time

For handling dates with times

POSIXct- is the best choice

```
> Time1 <- as.POSIXct("2023-07-24 23:55:26")
> Time1
[1] "2023-07-24 23:55:26 IST"
> Time2 <- as.POSIXct("25072023 08:32:07", format = "%d%m%Y %H:%M:%S")
> Time2
[1] "2023-07-25 08:32:07 IST"
```

POSIXct

- handles dates and times
- also takes care of time zones

accurate representation of time.

Time zone is that of system time

R- Date and Time

Time1 : "2023-07-24 23:55:26 IST"

Time2 : "2023-07-25 08:32:07 IST"

Specify timezones

POSIXct-

```
> Time3 <- as.POSIXct("2020-01-01 11:42:03", tz = "GMT")
> Time3
[1] "2020-01-01 11:42:03 GMT"
> Time2 > Time1
[1] TRUE
> Time2 - Time1
Time difference of 8.611389 hours
> Time1 + 30
[1] "2023-07-24 23:55:56 IST"
> Time1 - 30
[1] "2023-07-24 23:54:56 IST"
```

Compute with dates and times

adds 30 seconds

R- Date and Time

POSIXct-

```
> as.POSIXct("2021-03-10 08:32:07") - as.POSIXct("2023-03-09 23:55:26")
Time difference of -729.6412 days
> Sys.time()
[1] "2022-02-08 09:54:51 IST"
> unclass(Time1)
[1] 1690223126
attr(,"tzone")
[1] ""
> difftime(Time1, as.POSIXct("1970-01-01 00:00:00", tz = "UTC"), units = "secs")
Time difference of 1690223126 secs
```

Use as.

to do Computations

adjust for day light savings time.

internal

- integer representation
- difference from

Use difftime

R- Date and Time

POSIXlt-

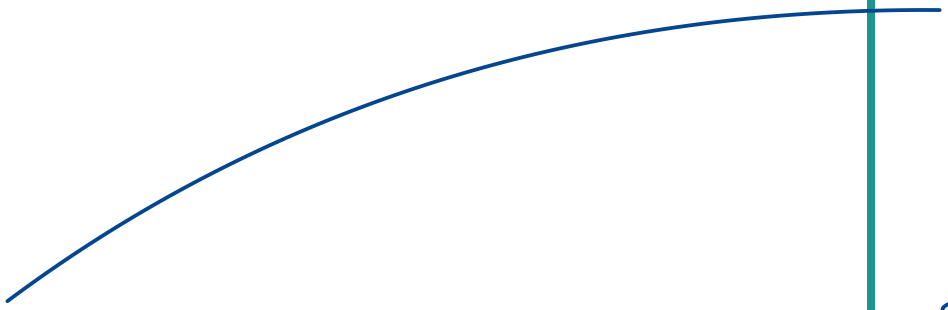
```
> Time1.lt <- as.POSIXlt("2022-07-24 23:55:26")
> Time1.lt
[1] "2022-07-24 23:55:26 IST"
```

- lt - local time
- objects are stored as lists

R- Date and Time

POSIXlt-

```
> unclass(Time1.lt)
$sec
[1] 26

$min
[1] 55

$hour
[1] 23

$mday
[1] 24

$mon
[1] 6

$year
[1] 122

$wday
[1] 0

$yday
[1] 204

$isdst
[1] 0

$zone
[1] "IST"

$gmtoff
[1] NA
> unlist(Time1.lt)
   sec    min   hour   mday    mon   year   wday   yday
  "26"   "55"   "23"   "24"    "6"  "122"    "0"  "204"
 isdst   zone gmtoff
   "0"  "IST"     NA
```



unclass } - to strip
unlist

specific units from
date and time

R- Date and Time

POSIXlt-

```
> Time1.lt$sec
[1] 26
> Time1.lt$wday
[1] 0
> trunc(Time1.lt, "days")
[1] "2022-07-24 IST"
> trunc(Time1.lt, "mins")
[1] "2022-07-24 23:55:00 IST"
```