Dates

Introduction to `lubridate`

`lubridate` is a popular R package that makes it easy to work with date-times. It provides a wide range of functions and methods to parse, manipulate, and format date-time objects. This tutorial will cover some of the fundamental aspects of using lubridate for working with date and time data in R.

Creating Date-Time Objects

1. `ymd():` is a function used to create a date object from year, month, and day components.

```
my_date <- "2023-09-15"
class(my_date)                    Output:
my_date <- ymd(my_date)
class(my_date)                    Output:
```

2. `mdy():` is a function used to create a date object in a month-day-year format.

```
my_date2 <- "12-14-2023"
my_date2 <- mdy(my_date2)
my_date2
```
Output:

3. `ymd_hms():` creates a date-time object with hours, minutes, and seconds.

```
my_datetime <- "2023-09-15 14:30:45"
my_datetime <- ymd_hms(my_datetime)
```

Extracting Components

4. Extracting Year, Month, Day, etc.

```
my_date <- ymd("2024-10-30")
```

Extract year

```
year(my_date)
```                     **Output:**

Extract month

```
month(my_date)
```                   **Output:**

Extract day

```
day(my_date)
```                      **Output:**


Extract day of the week (Sunday: 1, Monday: 2, etc.)

```
wday(my_date)
```                    **Output:**


Example with a Dataframe

dwts_dates

Name	Birth	Wedding
Derek	1985-05-17	08-26-2023
Mark	1986-05-24	11-25-2016
Lindsay	1994-01-11	06-18-2015


```
class(dwts_dates$Name)
```              **Output:**

```
class(dwts_dates$Birth)
```             **Output:**

```
class(dwts_dates$Wedding)
```           **Output:**

```
dwts_dates <- dwts_dates %>%
  mutate(Birth = ymd(Birth),
         Wedding = mdy(Wedding))
```

Name	Birth	Wedding
Derek	1985-05-17	2023-08-26
Mark	1986-05-24	2016-11-25
Lindsay	1994-01-11	2015-06-18

```
class(dwts_dates$Name)          Output:

class(dwts_dates$Birth)         Output:

class(dwts_dates$Wedding)       Output:
```

```
dwts_info <- dwts_dates %>%
  mutate(Year = year(Birth),
         Day = day(Wedding),
         Month = month(Wedding),
         Day_Week = wday(Wedding))
```

Name	Birth	Wedding				
Derek	1985-05-17	2023-08-26				
Mark	1986-05-24	2016-11-25				
Lindsay	1994-01-11	2015-06-18				

Arithmetic with Date-Times

5. Adding Days

```r
my_date <- ymd("2024-10-30")
new_date <- my_date + days(7)  # Add 7 days to my_date
new_date
```
Output:

6. Finding Time Difference

```r
my_date <- ymd("2024-10-30")
my_date2 <- ymd("2024-11-06")
```


Find the time difference between my_date and my_datetime
```r
diff <- my_date2 - my_date
diff
```
Output:

Use difftime when the date includes time
```r
time1 <- ymd_hms("2023-09-15 08:30:00")
time2 <- ymd_hms("2023-09-15 12:45:30")
```


- *To calculate the time difference in seconds*
```r
difftime(time2, time1, units = "secs")
```
Output:


```r
as.numeric(difftime(time2, time1, units = "secs"))
```
Output:

- *Calculate the time difference in hours*

```
difftime(time2, time1, units = "hours")
```

Output:


```
as.numeric(difftime(time2, time1, units = "hours"))
```

Output:

7. Finding Intervals. `lubridate` provides functions to find intervals between two date-time objects. For example, you can use `interval()` to create a time interval between two date-times:

```
start_time <- ymd_hms("2023-09-15 08:30:00")
end_time <- ymd_hms("2023-09-15 12:45:30")
```


```
interval(start_time, end_time)
```

Output:

Formatting Dates

8. Using `format()`: you can format date-time objects for display


```
my_date <- ymd("2024-10-30")
```


```
format(my_date, format = "%A")  # %A - The day of the week (i.e, Friday)
```

Output:

```
format(my_date, format = "%a") # %a - The day of the week truncated (i.e, Fri)
```

Output:

```
format(my_date, format = "%B")  # %B - The full name of the month (i.e September)
```

Output:

```r
format(my_date, format = "%b")  # %b - The name of the month truncated (i.e., Sep)
```
Output:

```r
format(my_date, format = "%D")  # %D - The date in month/day/year format.
```
Output:

```r
format(my_date, format = "%d") # %d - The number of the day
```
Output:

```r
format(my_date, format = "%Y") # %Y - The year with four digits
```
Output:

```r
format(my_date, format = "%y") # %y - The year with two digits
```
Output:

```r
format(my_date, format = "%m")  # %m - The number of the month
```
Output:

Suppose you want it to be "Friday, September 15, 2023"

```r
format(my_date, format = "%A, %B %d, %Y")
```
Output: