

Module 3.1

Calendar

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Important Role of the Calendar

- Central to most finance calculations is the movement of money through time
- Method of counting days has an important influence on instrument's valuation
- Meticulously accounting for day count and payment frequency is very important



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Day Type

- ACT/365 – actual day count/365
- ACT/ACT – actual day count/365 or 366
- 30/360 – 30 day months/360
- ACT/360 – actual day count/360
- There are many more



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Julian Method

- Julian method converts each day to an integer and the difference between these integers give you the correct day count
- Julian methods often start on different dates, such as 12/31/1899, 1/1/1960, and 1/1/1970
- Must pay attention to the base year
- Imported Julian numbers from a spreadsheet may be based on 12/31/1899, but R uses 1/1/1960



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Julian Calculations

```
Console /QFRRepository/Ch 3 Quantitative Finance Tools/3.1 Calendar/ ↗
> InputStartMonth <- 1 # Input start and end dates
> InputStartDay <- 1
> InputStartYear <- 2020
> InputEndMonth <- 1
> InputEndDay <- 1
> InputEndYear <- 2050
> # Convert MDY to Julian: Returns a number (or vector) of type "date"
> JulianStartDate = mdy.date(InputStartMonth, InputStartDay, InputStartYear, nineteen = FALSE)
> JulianStartDate
[1] 1Jan2020
> as.integer(JulianStartDate)
[1] 21915
> class(JulianStartDate)
[1] "date"
> JulianEndDate = mdy.date(InputEndMonth, InputEndDay, InputEndYear, nineteen = FALSE)
> JulianEndDate
[1] 1Jan2050
> as.integer(JulianEndDate)
[1] 32873
```



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Julian Calculations

```
> Days = JulianEndDate - JulianStartDate # Total number of days between start and end
> class(Days) # Subtraction yields integer
[1] "integer"
> JulianStartDate; JulianEndDate; Days # Note formatting of date
[1] 1Jan2020
[1] 1Jan2050
[1] 10958
> IStartDate = as.integer(JulianStartDate) # Convert to integer
> IEndDate = as.integer(JulianEndDate)
> IDays = IEndDate - IStartDate
> IStartDate; IEndDate; Days # Note formatting of date
[1] 21915
[1] 32873
[1] 10958
> # Convert Julian to MDY
> StartDate = date.mdy(JulianStartDate) # Creates a list, month, day, year
> StartDate
$month
[1] 1
$day
[1] 1
$year
[1] 2020
```

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Summary

- Explored means to manipulate calendar dates useful for finance calculations
- Reviewed day types and Julian method for day counting
- Explored selected R code
- R code provided reviews a vast number of calendar-related calculations



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