```
#=====================================================================
#  file:          c:\Projects\CBP\Rcourse\DatesRbit005.r
#  function:      Illustrate dates and datetime processing
#
#  programmer:    Elgin S. Perry, Ph. D.
#
#  date:          6/21/2014
#
#  address:       2000 Kings Landing Rd.
#                 Huntingtown,  Md.  20639
#
#  voice phone:   (410)535-2949
#  email:         EPERRY@chesapeake.net
#=====================================================================

#install.packages()
#library(lattice) #Used for contour plots [contourplot()]
#library(nlme)    #used for gam Mixed model [gamm()]
#library(MASS)    #used for glm Mixed model [glmmPQL()]
#library(mgcv)    #Wood's gam package
#library(chron)   #date functions
#library(doBy)    # Allows "BY processing similar to SAS
#library(FitAR)   #AR package from McLeod and Zhang
#library(Hmisc)   #stat function by Frank Harrell
#library(cluster) #cluster analysis routines
options(stringsAsFactors = FALSE)

#  be sure to change \ to /
ProjRoot <- 'c:/Projects/CBP/Rcourse/'
setwd(ProjRoot);

# start with some basics, the Date class

d1.char <- '2014-06-21'
d1.char
class(d1.char)
d1 <- as.Date(d1.char)
d1
class(d1)
as.numeric(d1)
as.numeric(d1.char)
# reading different date formats, see ?strptime for all date and date-time formats
d2 <- as.Date('2014-06-22',"%Y-%m-%d")
d2
d3 <- as.Date('06/23/14',"%m/%d/%y")
d3
d4 <- as.Date('23Jun2014',"%d%b%Y")
d4
# date operators  see ?Ops.Date
d2-d1
d3-d1
d1 > d2
d1 < d2


# R has two types of date objects in the base package:POSIXct and POSIXlt
dt1.char<-"2014-06-21 12:31:24"
dt1.char

dt1 <- strptime(dt1.char,"%Y-%m-%d %H:%M:%S")
dt1
unlist(dt1)

# extract an element of the POSIXlt list
```

```
doy <- dt1[[8]]
doy
#or
doy <- dt1$yday
doy

dt2.char<-"2014-06-21 12:31:34"
dt2.char

dt2 <- as.POSIXct(strptime(dt2.char,"%Y-%m-%d %H:%M:%S"))
dt2
as.numeric(dt2)
unlist(dt2)

# operators with date.time classes
class(dt1)
class(dt2)
dt2-dt1
dt2 > dt1

# creating date classes in data frames
ProjRoot <- 'c:/Projects/CBP/Rcourse/'
setwd(ProjRoot);

datafile <- paste(ProjRoot,"MAT_5day.csv",sep='');
mat <- read.table(datafile, header=TRUE, sep=",", na.strings="NA", dec=".",
strip.white=TRUE,stringsAsFactors = FALSE)
mat[1:10,]


mat$date.time <- strptime(paste(mat$Date,mat$Time),"%m/%d/%Y %H:%M")
mat[1:10,]

# extracting parts of date.time object
as.Date(mat$date.time[1:5])
months(mat$date.time[1:5])
months(mat$date.time[1:5],abbreviate=TRUE)
years(mat$date.time[1:5])

library(chron)   #date functions
years(mat$date.time[1:5])
```