

流行病學與生物統計計算

Homework 4

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Homework4

#Q1 : Calculate factorial(10), using while() and for() respectively

```
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# while(){}

fa <- function(x) {
  if (x != round(x) || x < 0) {
    x <- "error, x should be nature number or 0"
  }else if (x == 0 || x == 1) {
    x <- 1
  }else {
    i <- x - 1
    while (i != 1) {
      x <- x * i
      i <- i - 1
    }
  }
  return(x)
}

fa(10)      # 10! = 3628800
```

```
# for(){}  
  
fac <- function(x) {  
  if (x != round(x) || x < 0) {  
    x <- "error, x should be nature number or 0"  
  }else if (x == 0 || x == 1) {  
    x <- 1  
  }else {  
    for (i in 1:(x - 1)) {  
      x <- x * i  
    }  
  }  
  return(x)  
}  
  
fac(10)    # 10! = 3628800
```

Q2 use while(){} and cat() to find missing value

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```
find_na <- function(x) {  
  done <- FALSE  
  i <- 1  
  while (!done) {  
    if (is.na(x[i] == 1)) {  
      done <- TRUE  
    }else if (i == (length(x))) {  
      i <- "NULL"  
      done <- TRUE  
    }else {  
      i <- i + 1  
    }  
  }  
  return(cat(i, "\n"))  
}  
  
x <- c(3600, 5000, 12000, NA, 1000, 2000, 600, 7500, 1800, 9000)  
find_na(x)
```

Q2 terminal

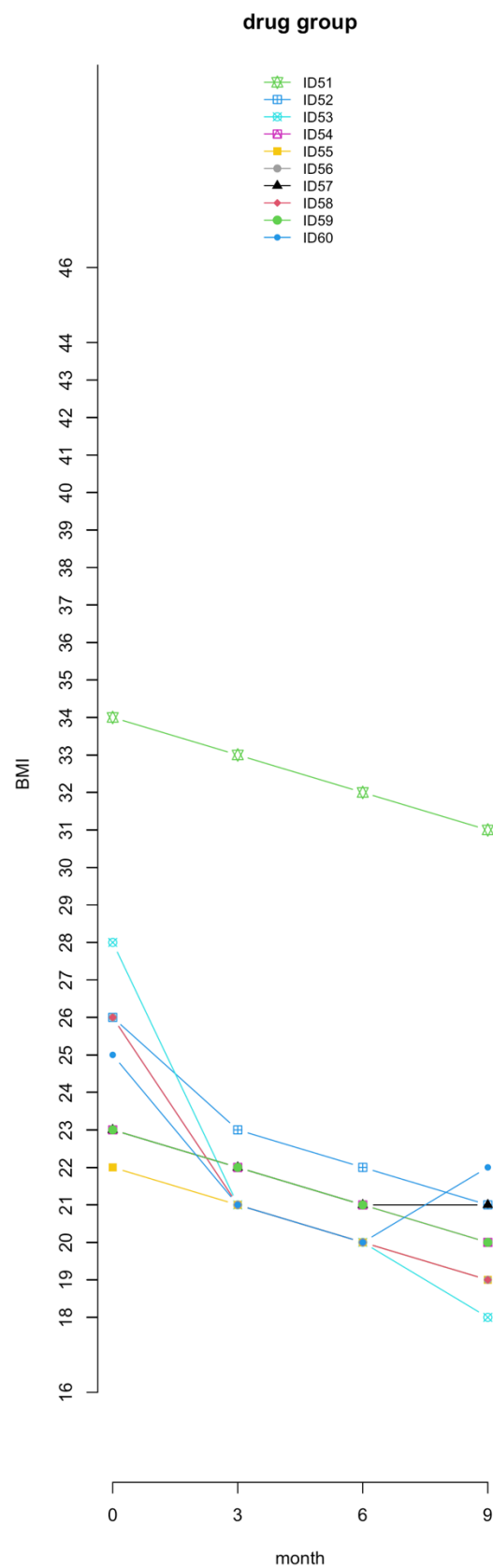
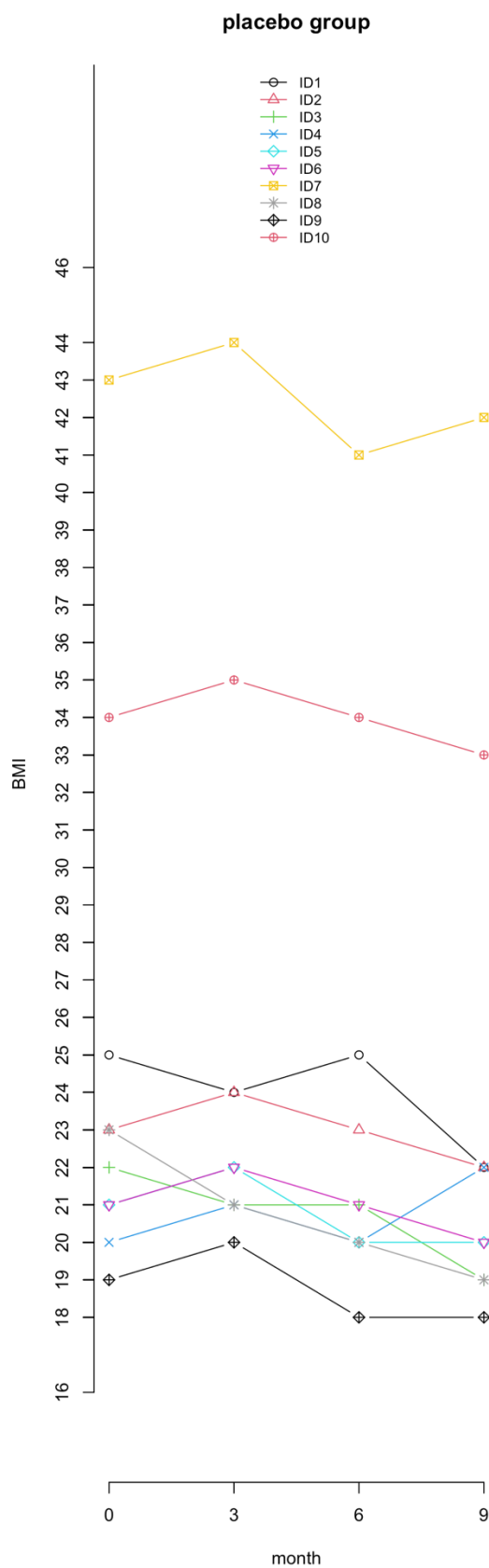
```
> find_na <- function(x) {  
+   done <- FALSE  
+   i <- 1  
+   while (!done) {  
+     if (is.na(x[i] == 1)) {  
+       done <- TRUE  
+     }else {  
+       i <- i + 1  
+     }  
+   }  
+   if (i == (length(x) + 1)) {  
+     i <- "NULL"  
+     done <- TRUE  
+   }  
+   return(cat(i, "\n"))  
+ }  
> x <- c(3600, 5000, 12000, NA, 1000, 2000, 600, 7500, 1800, 9000)  
> find_na(x)  
4  
>
```

Q3 : BMI curve ID51 - ID60

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```
BMI <- read.csv("/Users/raymond/Desktop/R/course/data/BMIrepeated.csv")
x <- seq(0, 9, by = 3)
y <- cbind(BMI$BMI0, BMI$BMI1, BMI$BMI2, BMI$BMI3)
png(filename = "hw4.3.png", width = 2000, height = 3000, res = 200)
par(mfrow = c(1, 2))
plot(x, y[1, ], type = "b",
      lwd = 1, col = 1, lty = 1, pch = 1,
      ylim = c(15, 50),
      axes = FALSE,
      xlab = "month", ylab = "BMI", main = "placebo group")
for (i in 2:10) {
  lines(x, y[i, ], lty = 1, lwd = 1, col = i, type = "b", pch = i)
}
axis(1, at = x, labels = seq(0, 9, by = 3))
axis(2, at = y)
legend("top", bty = "n",
      c("ID1", "ID2", "ID3", "ID4", "ID5", "ID6", "ID7", "ID8", "ID9", "ID10"),
      lty = 1, col = (1:10), lwd = 1, pch = (1:10), cex = 0.8, pt.cex = 1.0)

plot(x, y[51, ], type = "b",
      lwd = 1, col = 11, lty = 1, pch = 11,
      ylim = c(15, 50),
      axes = FALSE,
      xlab = "month", ylab = "BMI", main = "drug group")
for (k in 52:60) {
  lines(x, y[k, ], lty = 1, lwd = 1, col = k - 40, type = "b", pch = k-40)
}
axis(1, at = x, labels = seq(0, 9, by = 3))
axis(2, at = y)
legend("top", bty = "n",
      c("ID51", "ID52", "ID53", "ID54", "ID55", "ID56", "ID57", "ID58", "ID59",
"ID60"),
      lty = 1, col = (11:20), lwd = 1, pch = (11:20), cex = 0.8, pt.cex = 1.0)
dev.off()
```



Q4: 3D pie chart with percentage

Q4 : 3D PIE with percentage

```
library(plotrix)
par(mfrow = c(1, 1))
subject <- c(10, 12, 4, 16, 8)
lbls <- c("US", "UK", "Australia", "Germany", "France")
percent <- round((subject / sum(subject)) * 100)
lbls <- paste(lbls, percent)
lbls <- paste(lbls, "%", sep = "")
png(filename = "hw4.4.png", width = 3000, height = 2000, res = 200)
pie3D(subject, labels = lbls, explode = 0.1, col = rainbow(length(lbls))
      , main = "pie chart of countries")
dev.off()
```

pie chart of countries

