Basic Course on R: Programming Structures 1 Practical

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1 Part A: `if()`, `else`, and `ifelse()` and Vectorization

1. Write a function `evenOrOdd()` involving `if()` and `else` that takes an argument `x` and returns `"Even"` or `"Odd"` depending on whether or not `x` is divisible by 2. (*Do not* use the `ifelse()` function).

2. Is your function `evenOrOdd()` *vectorized*? Check by passing it the vector:

```
w <- c(3, 6, 6, 4, 7, 9, 11, 6)
```

3. Another way to determine if each element of a vector is even or odd is to use the `ifelse()` function, which serves as a vectorized version `if()` and `else`. Use `ifelse()` to obtain `"Even"` or `"Odd"` for each element of `w`.

2 Part B: Loops

1. How many times will `"Frisbee Sailing"` be printed to the screen in each of the following sets of commands? Try to answer without using R.

a)
```
i <- 5
while(i < 1) {
  print("Frisbee Sailing")
  i <- i + 1
}
```

b)
```
i <- 0
while(i < 5) {
  print("Frisbee Sailing")
}
```

c)
```
i <- 0
while(i < 5) {
  print("Frisbee Sailing")
  i <- i + 1
}
```

2. How many times will `"Masked Marvel"` be printed to the screen in the following set of commands? Try to answer without using R.

```
i <- 1
repeat {
  if(i > 5) break
  print("Masked Marvel")
  i <- i + 1
}
```

3. The file **kennedys.txt** has a command to create a list containing two generations of the famous Kennedy family:

```
Kennedys <- list(
    JosephJr = character(0),
    John = c("Caroline", "JohnJr", "Patrick"),
    Rosemary = character(0),
    Kathleen = character(0),
    Eunice = c("RobertIII", "Maria", "Timothy", "Mark", "Anthony"),
    Patricia = c("Christopher", "Sydney", "Victoria", "Robin"),
    Robert = c("Kathleen", "JosephII", "RobertJr", "David",
               "MaryC", "Michael", "MaryK", "Christopher",
               "Matthew", "Douglas", "Rory"),
    Jean = c("Stephen", "William", "Amanda", "Kym"),
    Edward = c("Kara", "EdwardJr", "Patrick")
)
```

Read in the file with the use of `source()` and type `ls()` to see if the list was created (type `Kennedys` to view the object).

Loop over the list of the first generation of Kennedys, keeping track of how many children each one has in a vector.

3 Part C: Logical Operators &, |, and !

1. What will be the result of the following:

```
(10 < 20 && 15 < 16) || 9 == 10
```

2. One of the following evaluates to `TRUE`, the other to `FALSE`. Which is which?

```
4 < 3 && (5 < 6 || 8 < 9)
(4 < 3 && 5 < 6) || 8 < 9
```

3. The data set below contains the systolic and diastolic blood pressure readings for 22 patients (and can be found in the file **BPressure.txt**).

PatientID	Systolic	Diastolic
CK	120	50
SS	96	60
FR	100	70
CP	120	75
BL	140	90
ES	120	70
CP	165	110
JI	110	40
MC	119	66
FC	125	76
RW	133	60
KD	108	54
DS	110	50
JW	130	80
BH	120	65
JW	134	80
SB	118	76
NS	122	78
GS	122	70
AB	122	78
EC	112	62
HH	122	82

a) Read the data from **BPressure.txt** into a data frame called `bp` using `read.table()`.

b) A person's blood pressure is classified as normal if the systolic level is below 120 and the diastolic level is below 80.Use square brackets `[ ]` to extract from `bp` the rows corresponding to patients with normal blood pressures.

c) Now use square brackets `[ ]` to extract the rows corresponding to patients whose blood pressures *aren't* normal.