CKME 132 Summer 2016 - Assignment #1

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This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.

Use RStudio for this assignment. Edit the file `assignment_01.Rmd` and insert your R code where wherever you see the string "INSERT YOUR ANSWER HERE"

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document.

Sample Question and Solution

Use `seq()` to create the vector $(1, 2, 3, \ldots, 10)$.

```
seq(1,10)
```

```
##  [1]  1  2  3  4  5  6  7  8  9 10
```

Question 1

a) Use the `seq()` function to create the vector $(1, 5, 9, 13, \ldots, 41)$. Note that each term in this sequence is of the form $1 + 4n$ where $n = 1, \ldots, 10$.

```
#INSERT YOUR ANSWER HERE
```

b) Use `seq()` and `c()` to create the vector $(2, 3, 4, \ldots, 10, 9, 8, \ldots, 2)$.

```
#INSERT YOUR ANSWER HERE
```

c) Use `rep()` to create the vector $(1, 2, 3, \ldots, 1, 2, 3)$ in which the sequence $(1, 2, 3)$ is repeated 5 times.

```
#INSERT YOUR ANSWER HERE
```

d) Use `rep()` to create the vector $(1, 1, \ldots, 1, 2, 2, \ldots, 2, 3, 3, \ldots, 3)$ where each number is repeated 7 times.

```
#INSERT YOUR ANSWER HERE
```

e) Use `rep()` to create the vector $(10, 20, 20, 30, 30, 30, \ldots, 100, \ldots, 100)$ where $10n$ is repeated n times.

```
#INSERT YOUR ANSWER HERE
```

Question 2

a) Compute:

$$\sum_{n=1}^{100} n$$

```
#INSERT YOUR ANSWER HERE
```

b) Compute:

$$\sum_{n=1}^{100} n^2$$

```
#INSERT YOUR ANSWER HERE
```

c) Compute:

$$\sum_{n=10}^{20} \left(\frac{2^n}{n} + \frac{3^n}{n^3} \right)$$

```
#INSERT YOUR ANSWER HERE
```

d) Compute:

$$\sum_{n=0}^{10} \frac{1}{n!}$$

Hint: Use `factorial(n)` to compute $n!$

```
#INSERT YOUR ANSWER HERE
```

e) Compute:

$$\sum_{n=1}^{20} \left(2n + \frac{1}{n^2} \right)$$

```
#INSERT YOUR ANSWER HERE
```

Question 3

a) Create an empty list `mylist`.

```
#INSERT YOUR ANSWER HERE
```

b) Add a component named `aa` whose value is 42.

```
#INSERT YOUR ANSWER HERE
```

c) Add a component named `bb` whose value is the numeric vector $(1, 2, \ldots, 10)$.

```
#INSERT YOUR ANSWER HERE
```

d) Add a component named `cc` whose value is the character vector ("Hello", "CKME 132").

```
#INSERT YOUR ANSWER HERE
```

e) Add a component named `dd` whose value is a 4x3 matrix whose elements are $(1, 2, \ldots, 12)$ in column-major order.

```
#INSERT YOUR ANSWER HERE
```

f) Print `mylist`.

```
#INSERT YOUR ANSWER HERE
```

Question 4

If you have not already done so, install the ISwR package on your computer using the command `install.packages("ISwR")`.

Loading the `ISwR` package into the current session.

```
library(ISwR)
```

a) Print the head of the `thuesen` data frame.

```
#INSERT YOUR ANSWER HERE
```

b) Compute the mean of each variable using `sapply()`, removing `NA` values.

```
#INSERT YOUR ANSWER HERE
```

c) Create a numeric vectors `n1`, `n2`, and `n3` whose elements are the integers from 1 to 20, their squares, and their cubes.

```
#INSERT YOUR ANSWER HERE
```

d) Create a new data frame `nn` from the above three vectors.

```
#INSERT YOUR ANSWER HERE
```

e) Print the tail of `nn`.

```
#INSERT YOUR ANSWER HERE
```

f) Compute the sum of each variable in `nn` using `sapply`.

```
#INSERT YOUR ANSWER HERE
```

END of Assignment #1.