

# Software Tools for Earth System Sciences

## Homework-II

01/12/2020

due date : 07/12/2020 23:59

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### Part 1 - Basic Math

- Look at Figure - “Math Eq”
- Write the solution

$$2^{2+1} - 4 + 64^{-2.25-\frac{1}{4}}$$

```
# arithmetic operators
```

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### Part 2 - Assignment

- Create a new object with one value.
- *hint* : For example, use Part 1 for value, assign it in a new variable like
- Print your new object

```
#assignment arrow  
#print()
```

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### Part 3 - Class

- Print your name as a character string.
- Print your age as a numeric type.
- Print your age as a character type.
- Try to print your name as a numeric type. (!)
- *hint* : kidding
- Check classes for all.
- What is the class of TRUE and NA ?

```
# print()
# " ... "
# class()
```

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#### Part 4 - Vector

- Create a new vector which has 4 elements with **numeric** class.
- Print your vector with **sorting**. (*decreasing = TRUE*)
- Add a new **character** element at your vector.
- Now you must have 5 elements. Learn the **length** of your vector.
- Check the class of your vector. (*Numeric or Character ?*)
- Now create another new vector, but now use **sequence** function.

```
# combine them
# my_new_vector <-
# sort
# length()
# seq()
```

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#### Part 5 - Matrice

- Create a new **matrice** with 4 rows and 5 columns, using **random** variables. (*random for the uniform distribution*)
- Select the grid (or cell) located in 2nd row and 3rd columns. (*indexing*)
- Change it with **TRUE**. (*assignment*)
- Check the **dimension**, **structure**, **length** and **class** of your **matrice**
- BONUS: Print values **which** is greater than or equal to 5 in your **matrice**.

```
# runif()
# matrix()
# indexing with []
# length()
# dim()
# str()
# class()
# which()
# >=
```

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#### Part 6 - Array

- Create a new **vector** which has 4 elements, **character**.
- Create a new **matrice** with 2 rows and 4 columns, **numeric**.
- Combine them, and create a new **array** with 3 rows, 4 columns and 2 layers. (*first row must be vector, second and third rows must be matrix for each layer*)

- *hint* : you can use *repetations* function
- Try to add **+2** for each values of 2nd layer of **array**.
- Check the **dimension**, **structure**, **length** and **class** of your array.

```
# vector()
# matrix()
# array()
# length()
# dim()
# str()
# length()
# class()
```

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## Part 7 - Data Frame

- Create a new **vector** which has 4 elements, **numerical**.
- Create a new **vector** which has 4 elements, **logical**.
- Create a new **matrice** which has 4 rows and 2 columns, **numerical**.
- Create a **data frame** which has 4 rows and 4 columns with your numerical and logical vectors, and numreical matrice.
- Check the **class** and **structure** of your new data.
- Take the first column and assign it as a new variable. *(It will look like a vector)*
- *hint* : you can use *\$* symbol
- **Plot** this vector.
- BONUS: Find values **which** is lower than 20 and change them with **NA**. *(now your vector has changed)*
- Print and Plot this new vector.

```
# my_data <-
# class()
# my_data$
# plot()
# which()
# <20
```

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Use the Ninova Message Board for questions or problems

*Emir*