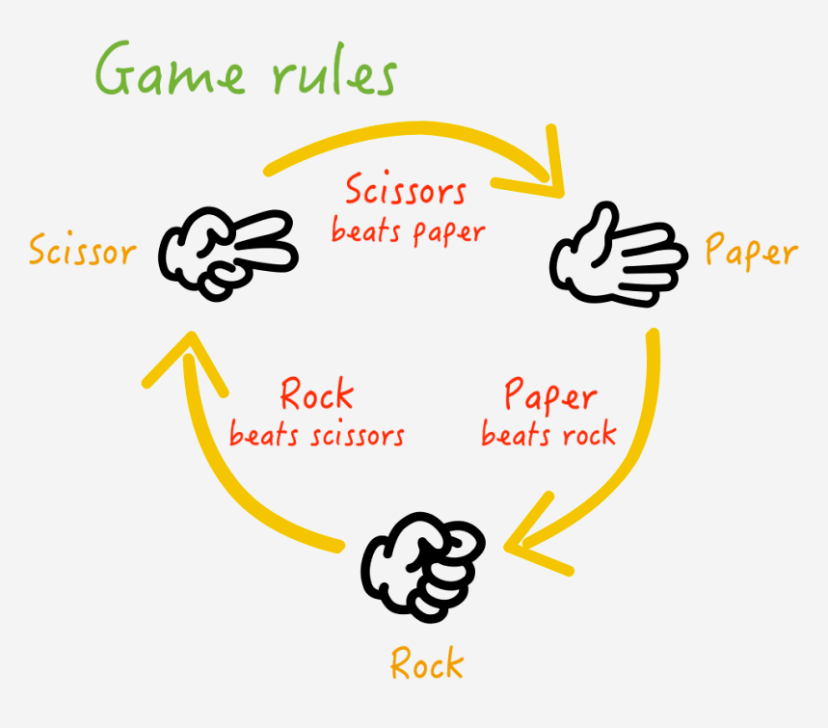
Introduction to Data Science (DAT 540)

Assignment 1

Topic: Basic Python

Deadline: 23:59, Friday, Sept. 18, 2020

Problem 1: Rock, Paper and Scissors is a very familiar game for all of us. Rules of this game is fairly simple (as depicted in image below).



Write a program (in python) which contains a function called RoPaSc(palyer_1_hand, player_2_hand), which takes inputs from

player1 and player2 and returns the winner. The program should ask for input and display the answer as follows:

Player 1: paper
Player 2: scissors
Player 2: wins.

Problem 2: Do you know that WhatsApp and other messaging services use end to end encryption of your messages, so that no intruder can make any sense out of it. The caesar cipher is one of the oldest methods to encrypt the messages and was used by Julius Caesar to communicate with his generals. The key idea is to replace each letter in the text by a letter k^{th} positions down the alphabet. For an example if k=2

Plain: data science

Cipher: fcvc uekgpeg

Write a program which reads a text file (plain.txt) and converts the text in the file into cipher text. Write the cipher text into a new text file called as cipher.txt.

The value of the k is the last digit of your birth year. For an example:

Birthday: 20-11-**1995** then k = **5**

Birthday: 31-01-**1998** then k = **8**

Problem 3: Write a program which takes a NumPy ndarray M, as input and finds the longest line of consecutive ones in the ndarray M. The sequence of consecutive ones could be horizontal, vertical, diagonal or anti-diagonal.

Example:

```
Input:[[1,1,1,0]
       [0,1,1,0],
       [0,1,1,0],
       [0,0,0,1]]
Output: 4
```

Policies:

- The outcome of the grading is either ‘Passed’ or ‘Failed’.
- You will also be evaluated on your general program design, your coding and documentation styles. We encourage you to format your code in accordance with Python style guidelines. To document your code, Markdown language is recommended.
- Deadline: 23:59, Friday, Sept. 18, 2020 (submit your assignment through Canvas)
- Source code submitted for the assignment should be your own code. If you use the codes from the internet or if you use

someone’s code without referencing, that will be treated as plagiarism and you will fail the assignment.

- Source code should be written in a Jupyter notebook file. Filename could be student’s first name, last name and name of the assignment. (For example: John.Williams.BasicPython)
- The assignment is individual and can NOT be solved in groups. Start early and don’t wait for the last minute, there won’t be any extension.
- For any queries, drop me a line at: rahul.mishra@uis.no