OPERATING SYSTEMS
PROGRAMMING ASSIGNMENT 1 | UNIX SHELL SCRIPTING
HARD DEADLINE: **23:59, 6th March**
CODE REVIEW: **7th March**

1. **Finding the maximum and minimum of N integers**
   - Generate N random integers in the range [0, 10^7] and save them to a file
   - Now create P processes such that each process will work on only N/P of the integers from the file (each integer can be processed by one process only)
   - Once each process completes execution, it will return the maximum and minimum integers from among the numbers allocated to it to a combiner process
   - Now this combiner processes will compute the maximum and minimum integers from among all the local maximum and minimum integers.
   - **(a)** Use the given values of N (N=10^3, 10^4, 10^5, 10^6) while keeping P constant at 5. Time how long it takes for your script to run for each run. **[5 points]**
   - **(b)** Now increase the number of processes P (P=5, 10, 25, 50, 100) while keeping the value of N constant at 10^5. Time how long it takes for your script to run for each run. **[5 points]**
   - **SUBMISSION GUIDELINES**
     1) Submit a log file that contains the time for all runs.
     Name of Run: Constant P or Constant N (Value of P or N)
     Value of N or P: _____
     Time Taken: _____
     Filename Format: Q1_TimeLog.txt
     2) Submit your script for each case
     Filename Format: Q1a & Q1b (No file-extension)

2. **Implement the "Replace all" feature that you find in MS-Word using the sed command**
   - **(a)** Given an input file, replace every occurrence of the keyword "apple" in your input file to "orange". **[5 points]**
   - **(b)** On the same input file, replace every third occurrence of the keyword "apple" by "lemon". **[5 points]**
   - **SUBMISSION GUIDELINES**
     1) Submit your script for each case
     Filename Format: Q2a & Q2b (No file-extension)

3. **Find the frequency of occurrence of specific keywords in a file. The keywords will be provided as input in a file. [5 points]**

- **SUBMISSION GUIDELINES**
  1) Submit your script
  Filename Format: Q3 (No file-extension)

4. **Printing specific lines from a file [5 points]**
   - **(a)** Print every third line of an input file
   - **(b)** Now print every third line of the given input file only if it has the string “ABC”
   - **(c)** Now print every third line of the input file only the line has an even number of words
   - **SUBMISSION GUIDELINES**
     1) Submit your scripts
     Filename Format: Q4a, Q4b, Q4c (No file-extension)

5. **Using regular expressions, check if an input email address is in a valid format [10 points]**
   - This should recognize any valid format. Think about Ashoka E-Mail IDs. It should work for any kind of ID.
     Some examples of valid formats:
     _____@_____._____
     _____._____@_____._____
     _____._____@_____._____.__
   - **SUBMISSION GUIDELINES**
     1) Submit your script
     Filename Format: Q5 (No file-extension)

Overall Submission Guidelines

1. Make a .zip file of all your files (follow the naming convention specified)
   Filename: **GroupNumber.zip**
2. Submit this zip file on Google Classroom only
3. Don’t try to invoke any high level programming language. This should be done entirely using unix shell commands.