Informatics Institute of Technology
Business School
Assignment Cover Sheet
DOC334

Course:	**Foundation Certificate Programme**
Unit Code and Description:	DOC334 – Computer Programming
Module Leader:	Mr. Nishan Saliya Harankahawa
Assignment Number:	1
Assignment Type:	**Individual**
Issue Date:	**11th March 2024**
Hand – in – Date:	**30th March 2024**
Deadline:	**on or before 11.59 PM (30th March 2024)**
Qualifying mark:	**40%**

The department is NOT RESPONSIBLE if an assignment is lost. To cover this eventuality, you are advised to take a photocopy/softcopy of the assignment OR to ensure you have the means of re-creating it.

1. **Procedure for Handling Work:**
   1. Follow any specific instructions given on the assignment specification.

2. **Penalties for Late Hand In:**
   - If students submit coursework late but within 24 hours of the specified deadline, the work will be marked and will then have 10% of the overall available marks deducted, to a minimum of the pass mark (40%).

   - If students submit coursework more than 24 hours after the specified deadline, the work is **not** marked and will be given a mark of **zero** for the work in question.

3. **Exceptional Factors Affecting your Performance:**
   - Students should submit written evidence to the Registrar's Department with a copy to the Module Leader of exceptional circumstances, which they consider having caused them to submit assessments late and for which they do not wish to attract any penalty. These must be handed over to the Registrar within four working days of the hand-in-date.
   - Proper use of Python 3.x coding and language constructs for a better program. You should follow good and proper programming techniques when completing this coursework.

Plagiarism

The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Plagiarism is the use of someone else's work, words, or ideas as if they were your own.

Plagiarism is a serious offense and will not be treated lightly.

Deliverables

The following should be submitted.

- A report including a description of the problem statement and the solution you have developed.
  - Make sure you have followed the good practices of report writing covered by [DOC311] Academic Skills for Higher Education module
  - Use good word processing skills learned from [DOC314] Introduction to Information Technology module
  - Screenshots of the program output in various states must be included
  - All program codes must be included in your report as text (**NOT** image screen captures)
- Test cases used to test the programs and the results must be included in your submission.
- You need to provide the PDF version of your report and a ZIPPED folder which contains the full and working Python 3.x program
  - You can put both to a single Zipped folder with your IIT student ID.
  - For example, a zipped folder called **20249999** that carries PDF report and the final full Python program
- All codes must be written in Python 3.x version
- The completed coursework must be submitted via the LMS only. **DO NOT** email it to your lecturer as you will be given **Zero marks** for that!

Assignment Brief

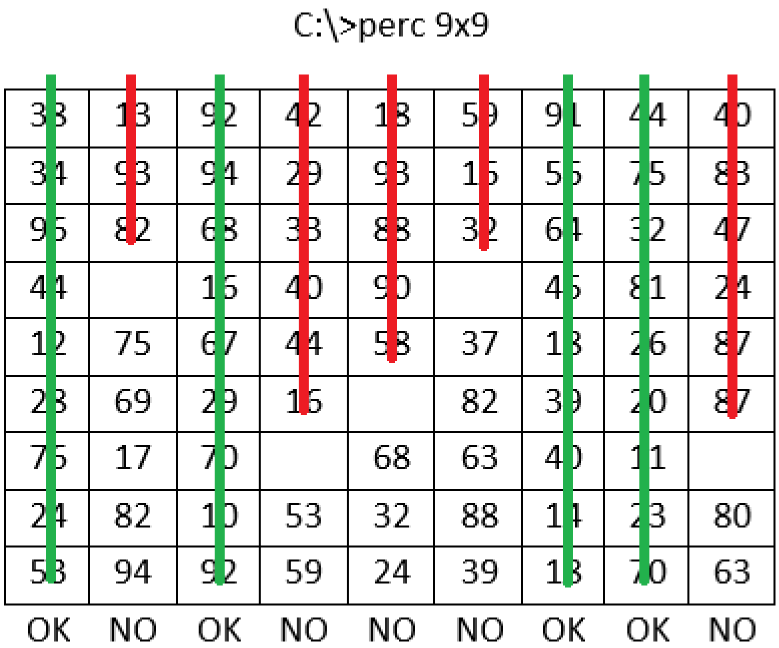
You are to create a Python program which will allow users to demonstrate a very simple percolation process.

Percolation is the process of a liquid slowly passing through a filter. This is how coffee is usually made. Your coursework is to create a program which mimics this concept.

A dynamic grid with 2 digits random numbers will be created. The grid will have some empty slots with no numbers, which again randomly generated. You program will check each column for possible percolations.

- The percolation is not possible for a column if the column consists of one or more empty spaces from top to bottom.
- The percolation is possible for a column if the entire column consists numbers from top to bottom

You must state weather percolation of a column is possible or not at the end of each column.



```
C:\>perc 9x9
```

33	13	92	42	18	59	91	44	40
34	93	94	29	93	15	55	75	83
95	82	68	33	88	32	64	32	47
44		16	40	90		45	81	24
12	75	67	44	58	37	18	26	87
23	69	29	16		82	39	20	87
75	17	70		68	63	40	11	
24	82	10	53	32	88	14	23	80
53	94	92	59	24	39	18	70	63
OK	NO	OK	NO	NO	NO	OK	OK	NO

Tasks to Complete

1. You must use proper Python 3.x program constructs such as packages, modules, functions, variables, data structures, etc. to develop this program.
    - Hint : Remember the rubrics given for mini projects during tutorial sessions
2. The grid size is dynamically passed as a command line argument to the program. If no dimensions are passed, the default dimension for the grid is 5x5. The lowest dimensions must be 3x3 while the highest dimension must be 9x9. Some possible commands would be,
    - C:\>perc 3x4
        1. The above creates a 3x4 grid
    - C:\>perc
        1. The above creates a 5x5 default grid
    - C:\perc 10x13
        1. The above will generate a proper error message to user.
3. Grid must be populated automatically with 2 digits random numbers
4. There will be some empty cells which are appearing randomly inside the grid
5. Display the status at the end of each column
    - Display OK if percolation is possible
    - Display NO if percolation is not possible
6. **DO NOT** use **NumPy** to generate the grid!
    - You will be awarded **zero** marks for using this or similar 3rd party modules!
    - You need to create your own algorithm to generate this grid
7. You can use pretty table module if you like (say to create borders around numbers to enhance the grid appearance)
8. The resulting answer must be displayed in the console as well as written to a text file so the result can be viewed later via notepad
    - Each result should go to a different text file
    - Text file name must be in the form of **Year_Month_Day_4-digit Random number.txt**
        1. For example,
            1. 2024_03_30_4568.txt
            2. 2024_04_01_6987.txt
9. A challenge activity will be to generate the grid and save the result in a HTML file so you can see the answer in a web browser.
    - You'll get extra 10 marks for completing this task
    - You need to do a bit of research to add this feature to your program; hence it's a challenge task!
    - You can follow the same naming convention that you used for the text file to name this HTML file
    - You can also use 3rd party modules to complete this challenge activity!

Sample Screens

Below are some generic sample output screens for you to get an idea. You can use them to observe how the command is given and how the output is displayed in the console.

```
C:\>perc 9x9
```

38	13	92	42	18	59	91	44	40
34	93	94	29	93	16	56	75	83
96	82	68	33	88	32	64	32	47
44		16	40	90		45	81	24
12	75	67	44	58	37	18	26	87
28	69	29	16		82	39	20	87
76	17	70		68	63	40	11	
24	82	10	53	32	88	14	23	80
53	94	92	59	24	39	18	70	63
OK	NO	OK	NO	NO	NO	OK	OK	NO

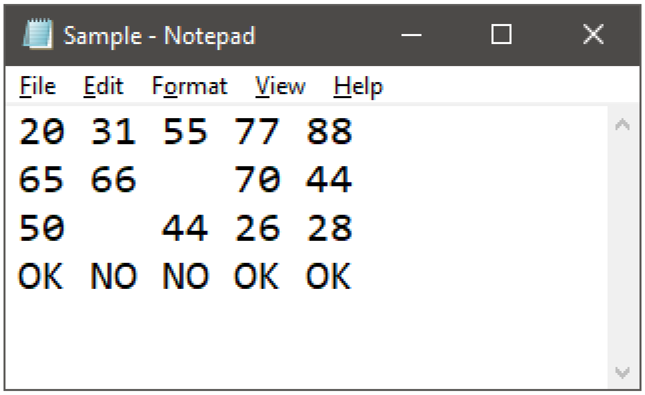
```
C:\>perc 7x4
```

40	90		45
44	58	37	18
16		82	39
	68	63	40
53	32	88	14
59	24	39	18
56	95	98	22
NO	NO	NO	OK

```
C:\>perc
```

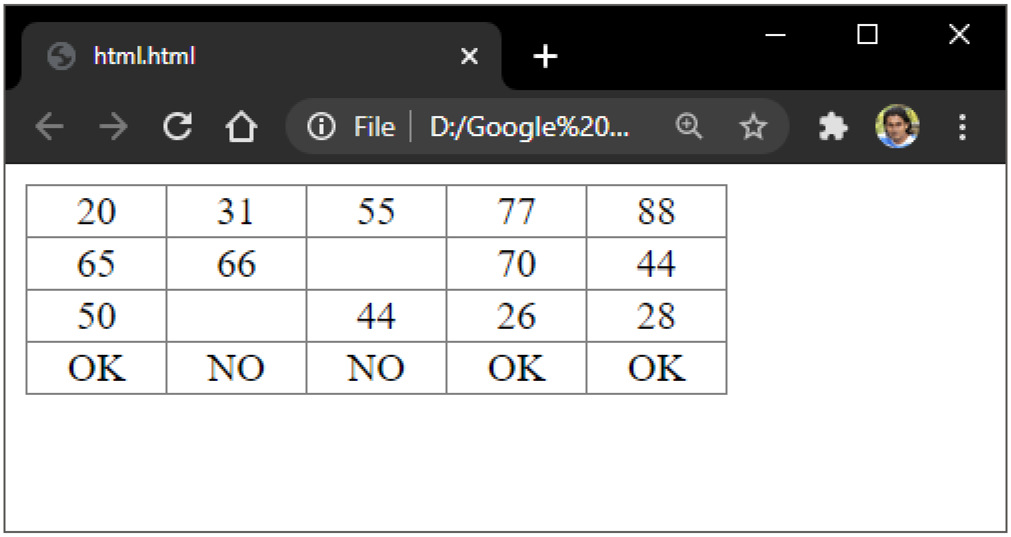
18	59	91	44	40
93	16	56	75	83
88	32	64	32	47
90		45	81	24
58	37	18	26	87
OK	NO	OK	OK	OK

How the text file **may** look like



```
20 31 55 77 88
65 66    70 44
50    44 26 28
OK NO NO OK OK
```

How the HTML file **may** look like if you complete the challenge task.



20	31	55	77	88
65	66		70	44
50		44	26	28
OK	NO	NO	OK	OK

End of Coursework