MIDTERM ESSAY

Applied Probability and Statistics for IT

# Requirements

**Part 1:** Survey all functions of the Statistics library in Python. Correspondingly, each function needs to be explained about its usage, input parameters, meaning of returned results, and example code.

<https://docs.python.org/3/library/statistics.html>

**Part 2:** Survey about Histogram equalization and Histogram matching algorithms for image processing.

- Survey about the problem, histogram approach, formula (mathematical expression), algorithm, ...

- Write an illustrative program.

# Regulations

Students need to submit a document file and 3 sourcecode files.

* The document file is in Word format (.doc/docx), named by your StudentID, eg. 52000000.docx, using our faculty’s format, from 15 to 30 pages. English is required for high-quality 100% English classes only. The structure of this document should be:
  + Chapter 1: Statistics library in Python
    - Overview about statistics library in Python
    - Each function needs to be explained about its usage, input parameters, meaning of returned results, and example code.
    - Give your own example code. Take screenshots for their running.
  + Chapter 2: Histogram equalization algorithm
    - State the problem, constrains/conditions (if any), method/algorithm,
    - Examples,
    - Your comment, analysis, evaluation...
  + Chapter 3: Histogram matching algorithm
    - State the problem, constrains/conditions (if any), method/algorithm,
    - Examples,
    - Your comment, analysis, evaluation...
  + Chapter 4: Implementation
    - DO NOT just copy your code in this chapter.
    - Instruction for building and running your sourcecode.
    - Screencaptures of your experimental results.
  + References
    - Use the faculty’s format.
* There are 1 Python sourcecode file for each requirement. The sourcecode files are named by your StudentID, eg. 52000000\_Part1.py, 52000000\_Part2.py, 52000000\_Part3.py.
  + In part 2, you can use libraries for supportive functions only (load image, save image, …).
* Compress all files into a rar/zip file named by your StudentID, eg. 52000000.rar.
* Format violations will cost from 10% to 50% of your total scores.
* You should solve and submit this report to your eLearning systems within 14 days, from the beginning of October 27th 2023 to the end of November 9th 2023. Late submissions are not accepted. Submissions via email are not accepted.
* This is an individual midterm report. Any case of plagiarism will get 0.

# Rubric

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Criteria |  | Scale | | | Self-  evalutaion | Reason |
|  | Score  /10 | 0 score | 1/2 score | Full  score |  |  |
| Chapter 1 | 1 | Do  nothing  or  wrongly. | Not enough  details, no  example, no  comment. | Detailed  explanation,  good  examples and  comments. |  |  |
| Chapter 2 | 2 | Do  nothing  or  wrongly. | Not enough  details, no  example, no  comment. | Detailed  explanation,  good  examples and  comments. |  |  |
| Chapter 3 | 2 | Do  nothing  or  wrongly. | Not enough  details, no  example, no  comment. | Detailed  explanation,  good  examples and  comments. |  |  |
| Chapter 4 | 1 | Do  nothing  or  wrongly. | Not enough  details. | Detailed  explanation. |  |  |
| References | 1 | No  reference. | Wrong  format. | Right format. |  |  |
| Sourcecode Part 1 | 1 | Error. | Doesn't provide a representation of the various parameters. | Correct and  comprehensively encompass all the various parameters. |  |  |
| Sourcecode Part 2 | 1 | Error. | - Correct but  bad  performance.  - Use built-in functions. | - Correct and  good  performance.  - The function is self-defined based on theory. |  |  |
| Sourcecode Part 3 | 1 | Error. | - Correct but  bad  performance.  - Use built-in functions. | - Correct and  good  performance.  - The function is self-defined based on theory. |  |  |
| **Total** | 10 | Result | | |  |  |