

# Digital Image Processing

## Group No.4

### Assignment 1 - ReadMe File

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## Question 1

The corresponding files for this question are q1.py and q1\_test.py. The user can specify different parameters asked in the question via command line interface.

- Use "python q1\_test.py -h" command for more help.

```
C:\Users\Abinash Acharya\Documents\Piazza\DS601\Assignments\HW1>python q1_test.py -h
usage: q1_test.py [-h] [--m M] [--n N] [--I I [I ...]] [--x1 X1] [--y1 Y1] [--x2 X2] [--y2 Y2] [--v V [V ...]] [--pt PT [PT ...]]

optional arguments:
  -h, --help            show this help message and exit
  --m M                Rows in 2-D Image
  --n N                Columns in 2-D Image
  --I I [I ...]        2-D matrix
  --x1 X1              x-coordinate of first point
  --y1 Y1              y-coordinate of first point
  --x2 X2              x-coordinate of second point
  --y2 Y2              y-coordinate of second point
  --v V [V ...]        Array of pixel values within V
  --pt PT [PT ...]    Path Type

C:\Users\Abinash Acharya\Documents\Piazza\DS601\Assignments\HW1>
```

- Example to run the code with specified parameters is the following command.

```
python q1_test.py -x1 3 -y1 0 -x2 1 -y2 4 -V 4 2 -pt 4 8 10.
```

Here the parameters correspond to the values specified ( $p=(3,0)$ ,  $q=(1,4)$ ,  $V = [4,2]$  and  $\text{Path\_types} = [4,8,10]$ ).

If some or all parameters are not specified, the default parameters are used which are as follows :

- (i)  $m = 5$  (No. of rows in 2-D matrix containing image)
- (ii)  $n = 5$  (No. of columns in 2-D matrix containing image)

(iii)  $I =$

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 0 | 3 | 2 | 4 |
| 4 | 3 | 4 | 0 | 2 |
| 2 | 2 | 1 | 3 | 0 |
| 2 | 4 | 0 | 2 | 3 |
| 3 | 2 | 4 | 1 | 0 |

- (iv)  $x1 = 3$  (x-coordinate of  $p$ )
  - (v)  $y1 = 0$  (y-coordinate of  $p$ )
  - (vi)  $x2 = 1$  (x-coordinate of  $q$ )
  - (vii)  $y2 = 4$  (y-coordinate of  $q$ )
  - (viii)  $V = [4,2]$  (Array  $V$ )
  - (ix)  $pt = [4,10]$  (4- path and m-path as asked in Q1)
- To give a different 2D matrix,  $I$ , through command line, specify its no. of rows and columns using parameters  $m$  and  $n$  and enter  $m \times n$  integers of the desired matrix row-by-row after  $-I$ .

## Question 2

**Dependencies - Python Imaging Library (PIL) should be installed.**

The corresponding file for this question is `q2.py`. The user can specify different parameters asked in the question via command line interface.

- Use `"python q2.py -h"` command for more help.

```
thummala@thummala-Inspiron-3576:~/DS601_DIP$ python q2.py -h
usage: q2.py [-h] [--M M] [--N N] [--border BORDER] [--n N] [--w1 W1]
            [--w2 W2] [--alpha ALPHA] [--vf VF [VF ...]] [--vb VB [VB ...]]

optional arguments:
  -h, --help            show this help message and exit
  --M M                height of Image/Canvas
  --N N                width of Image/Canvas
  --border BORDER       Border of Image
  --n N                Number of Rectangles
  --w1 W1              Range of width for rectangles (w1,w2)
  --w2 W2              Range of width for rectangles (w1,w2)
  --alpha ALPHA         height to width ratio
  --vf VF [VF ...]
  --vb VB [VB ...]
```

- Example to run the code with specified parameters is the following command.

```
python q2.py -M 400 -N 400 -border 10 -n 20 -w1 5 -w2 20 -alpha 2
-vf 0 1 -vb 129 10 255
```

Here the parameters correspond to the values specified ( $vf = [0,1]$  and  $vb = [129,10,255]$ ). This command will automatically show an image corresponding to the parameters and save it to the file "rectangle.jpg". If any parameter is not specified default will be used and all the parameters used will be printed out. The output of the above command is as follows:

```
thummala@thummala-Inspiron-3576:~/DS601_DIP$ python q2.py --M 400 --N 400 --border 10 --n 20 --w1 5 --w2 20 --alpha 2 --vf 0 1 --vb 129 10 255
Parameters used are as follows:
M 400
N 400
border 10
n 20
alpha 2
w1 5
w2 20
vf [0, 1]
vb [129, 10, 255]
```

The generated image will also be displayed.