Lembar Kerja Mahasiswa
Mata Kuliah Pengolahan Citra Digital Praktik (203311-20)
Program Studi Informatika
Fakultas Sains & Teknologi – Universitas Teknologi Yogyakarta

Identitas Mahasiswa

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Kelompok Prak	**Kel. I**

Soal 1.

Berdasarkan demo di kelas, buatlah aplikasi berbasis GUI untuk salah satu dari 3 operasi dasar yang disampaikan :

1. Operasi Negative citra
2. Operasi Penjumlahan dan pengurangan Citra dengan Citra
3. Operasi Perkalian dan pembagian citra dengan skalar

Untuk tugas kali ini Anda dapat membuat layout GUI Anda sendiri. Buatlah layout GUI yang menarik dan tetap mudah digunakan.

Hasil Script

//tuliskan script python Anda di sini

```
# 5200411488 - Arieska Restu Harpian Dwika

import cv2
import numpy as np
import matplotlib.pyplot as plt
import matplotlib.image as mpimg
from tkinter import *
from tkinter import filedialog
from ttkbootstrap import Style
from tkinter import ttk
import tkinter as tk
import os
from PIL import Image, ImageTk
```

```
def setOriginal1(img):
    imgTk = ImageTk.PhotoImage(img)
    lblOriImg1.configure(image=imgTk)
    lblOriImg1.image = imgTk
    lblOriImg1.pack()

def setOriginal2(img):
    imgTk = ImageTk.PhotoImage(img)
    lblOriImg2.configure(image=imgTk)
    lblOriImg2.image = imgTk
    lblOriImg2.pack()

def setResult(img):
    imgTk = ImageTk.PhotoImage(img)
    lblResultImg.configure(image=imgTk)
    lblResultImg.image = imgTk
    lblResultImg.pack()


def opencv2Pill(img):
    img = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
    imgPill = Image.fromarray(img)
    return imgPill


def resizeImg(img):
    width, height = 320, 240
    img = cv2.resize(img, (width, height))
    return img


def clipping(intensity):
    if intensity < 0:
        return 0
    if intensity > 255:
        return 255
```

```
    return intensity


def browseImage1():
    global fln1

    fln1 = filedialog.askopenfilename(initialdir=os.getcwd(), title="Select Image File",
                                      filetypes=(
                                          ("All Files", "*.*",),
                                          ("PNG File", "*.png"),
                                          ("JPG File", "*.jpg"))
                                      )

    img = opencv2Pill(resizeImg(cv2.imread(fln1)))
    setOriginal1(img)


def browseImage2():
    global fln2

    fln2 = filedialog.askopenfilename(initialdir=os.getcwd(), title="Select Image File",
                                      filetypes=(
                                          ("All Files", "*.*",),
                                          ("PNG File", "*.png"),
                                          ("JPG File", "*.jpg"))
                                      )

    img = opencv2Pill(resizeImg(cv2.imread(fln2)))
    setOriginal2(img)


def adding():
    global fln1, fln2

    img1 = opencv2Pill(resizeImg(cv2.imread(fln1)))
    px1 = img1.load()

    img2 = opencv2Pill(resizeImg(cv2.imread(fln2)))
```

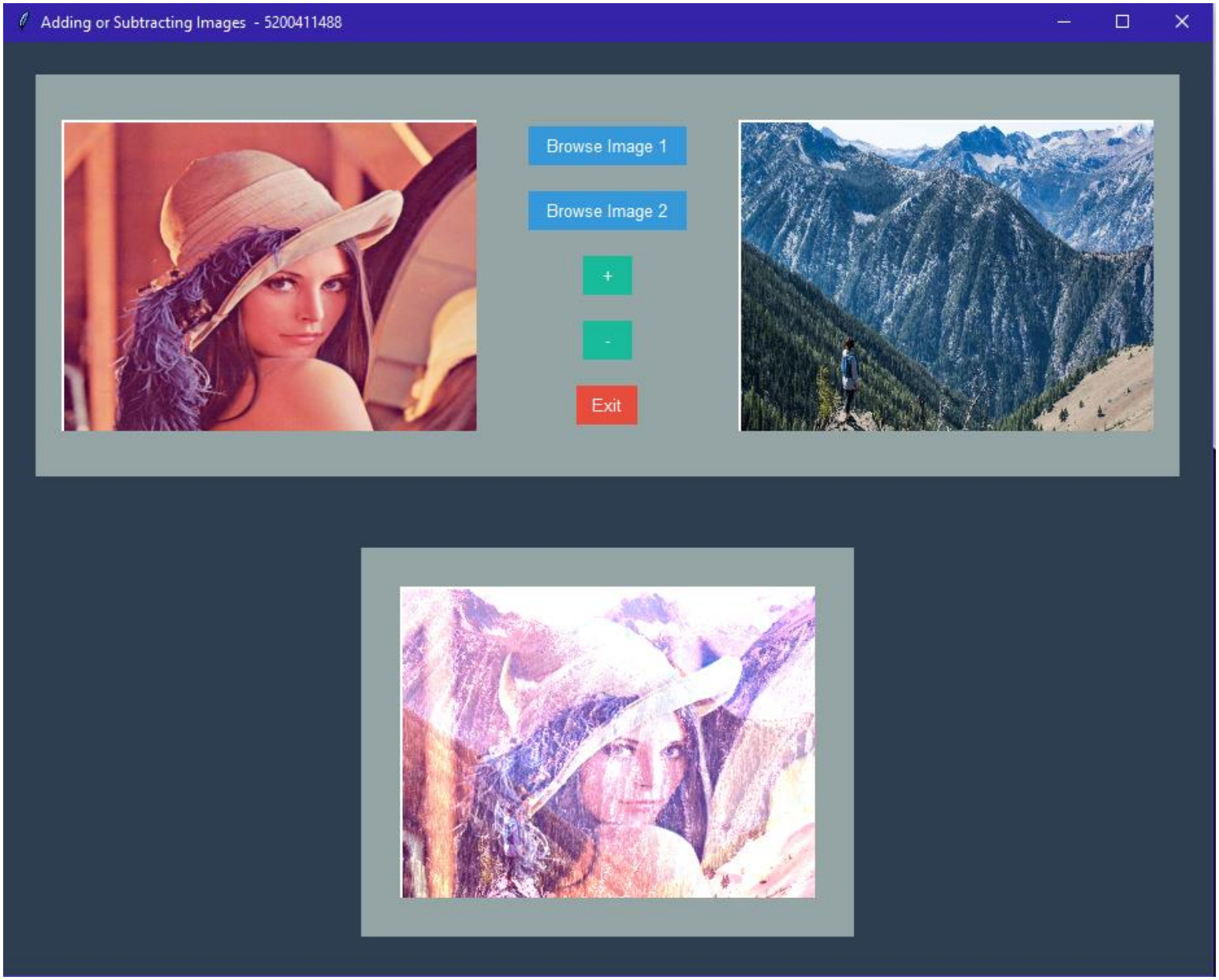
```
    px2 = img2.load()

    hor = img1.size[0]
    ver = img1.size[1]

    imgResult = Image.new("RGB", (hor, ver))
    pxResult = imgResult.load()

    for x in range(hor):
        for y in range(ver):
            r = clipping(px1[x, y][0] + px2[x, y][0])
            g = clipping(px1[x, y][1] + px2[x, y][1])
            b = clipping(px1[x, y][2] + px2[x, y][2])
            pxResult[x, y] = (r, g, b)

    setResult(imgResult)


def subtracting():
    global fln1, fln2

    img1 = opencv2Pill(resizeImg(cv2.imread(fln1)))
    px1 = img1.load()

    img2 = opencv2Pill(resizeImg(cv2.imread(fln2)))
    px2 = img2.load()

    hor = img1.size[0]
    ver = img1.size[1]

    imgResult = Image.new("RGB", (hor, ver))
    pxResult = imgResult.load()

    for x in range(hor):
        for y in range(ver):
            r = clipping(px1[x, y][0] - px2[x, y][0])
            g = clipping(px1[x, y][1] - px2[x, y][1])
```

```
            b = clipping(px1[x, y][2] - px2[x, y][2])
            pxResult[x, y] = (r, g, b)

    setResult(imgResult)



if __name__ == '__main__':
    fln1, fln2 = None, None
    style = Style()
    window = style.master


    frm = ttk.Frame(window, style='primary.TFrame')
    frm.pack_propagate(0)
    frm.pack(fill=tk.BOTH, expand=1)

    frmImgOri = ttk.Frame(frm, style='secondary.TFrame', width=900, height=500)
    frmImgOri.grid(row=0, column=0, padx=25, pady=25)

    frmImgOri1 = ttk.Frame(frmImgOri, style='info.TFrame', width=320, height=240)
    frmImgOri1.pack_propagate(0)
    frmImgOri1.pack(side="left", padx=20, pady=30)

    frmBtn = ttk.Frame(frmImgOri, style='secondary.TFrame', width=100, height=200)
    frmBtn.pack(side="left", padx=20, pady=30)

    frmImgOri2 = ttk.Frame(frmImgOri, style='info.TFrame', width=320, height=240)
    frmImgOri2.pack_propagate(0)
    frmImgOri2.pack(side="left", padx=20, pady=30)

    frmImgRes = ttk.Frame(frm, style='secondary.TFrame', width=320, height=240)
    frmImgRes.pack_propagate(0)
    frmImgRes.grid(row=1, column=0, padx=15, pady=30)

    frmImgResult = ttk.Frame(frmImgRes, style='info.TFrame', width=320, height=240)
    frmImgResult.pack_propagate(0)
    frmImgResult.grid(row=1, column=0, padx=30, pady=30)
```

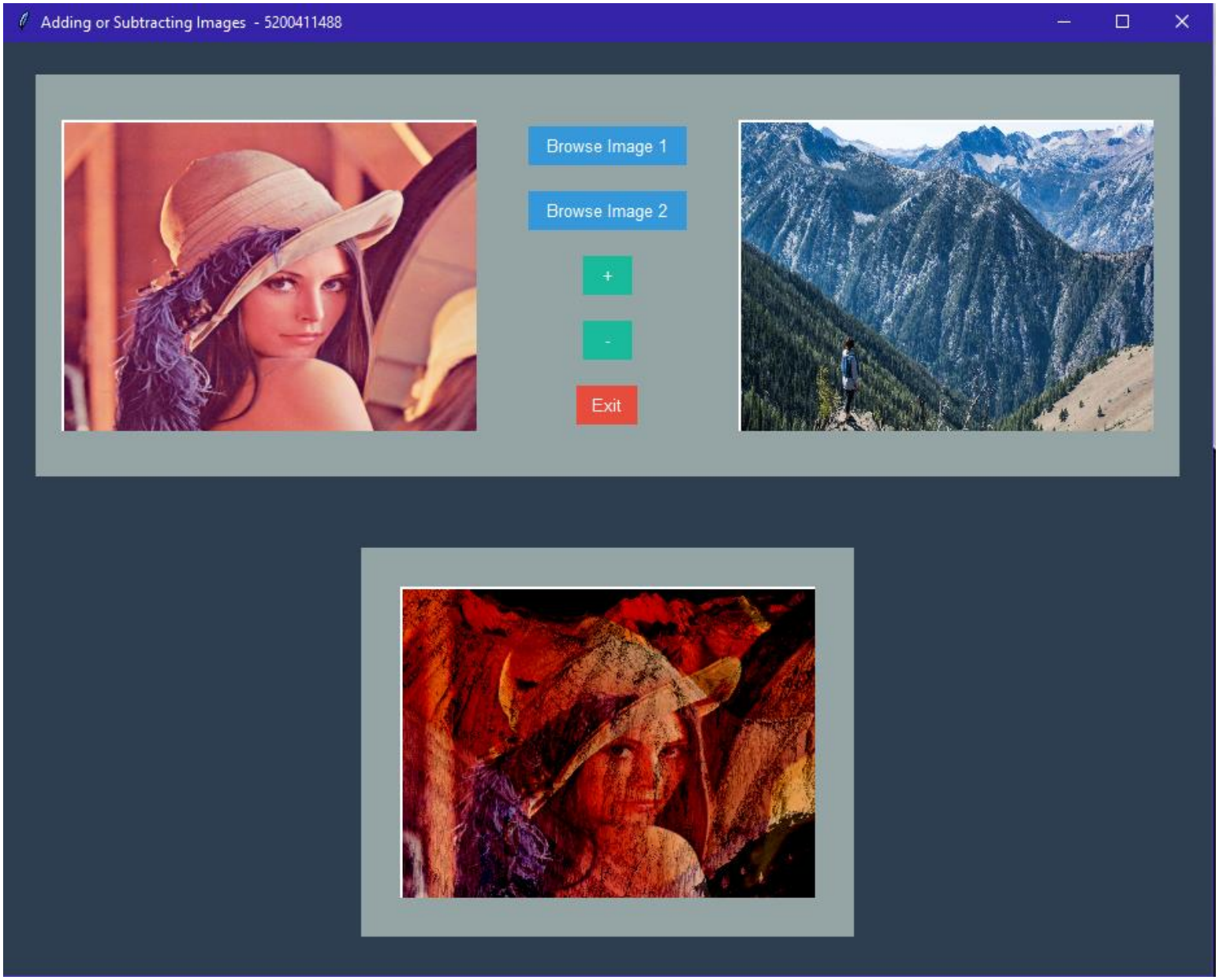
```python
btnBrowse1 = ttk.Button(frmBtn, text='Browse Image 1', style='info.TButton', cursor="hand2", width=14, command=browseImage1)
btnBrowse1.pack(side='top', pady=10)

btnBrowse2 = ttk.Button(frmBtn, text='Browse Image 2', style='info.TButton', cursor="hand2", width=14, command=browseImage2)
btnBrowse2.pack(side='top', pady=10)

btnAdding = ttk.Button(frmBtn, text='+', style='success.TButton', cursor="hand2", width=2, command=adding)
btnAdding.pack(side='top', pady=10)

btnSubtract = ttk.Button(frmBtn, text='-', style='success.TButton', cursor="hand2", width=2, command=subtracting)
btnSubtract.pack(side='top', pady=10)

btnExit = ttk.Button(frmBtn, text='Exit', style='danger.TButton', cursor="hand2", command=lambda: exit())
btnExit.pack(side='top', pady=10)

lblOriImg1 = ttk.Label(frmImgOri1)
lblOriImg2 = ttk.Label(frmImgOri2)
lblResultImg = ttk.Label(frmImgResult)


window.title("Adding or Subtracting Images  - 5200411488")
# window.geometry("1280x720")
# window.resizable(0, 0)
window.mainloop()
```

Hasil Running Aplikasi

//paste-kan tampilan aplikasi Anda di sini



Gambar 1 Penjumlahan dua buah citra



Gambar 2 Pengurangan dua buah citra

Soal 2.

Berdasarkan sintaks demo di kelas berikut:

```
import cv2

# Reading image file
img = cv2.imread('./photos/data/mountain.jpg')
cv2.imshow('ori.jpg', img)
cv2.waitKey(0)

# Applying NumPy scalar multiplication on image
fimg = cv2.divide(img, 1.5)


# Saving the output image
cv2.imwrite('darkerLib.jpg', fimg)
img_result = cv2.imread('darkerLib.jpg')
cv2.imshow('result.jpg', img_result)


cv2.waitKey(0)
cv2.destroyAllWindows()
```

Jelaskan mengapa sintaks di atas menghasilkan gambar kebiruan seperti berikut?

Penjelasan
//tuliskan penjelasan lengkap Anda di sini (disertai bukti matriks lebih baik) Sintaks tersebut dapat menghasilkan gambar kebiruan karena operasi yang dilakukan di fungsi cv2.divide() pada baris ke-9. Fungsi cv2.divide() melakukan pembagian per elemen dari dua buah citra atau citra dengan skalar. Citra yang dimasukkan ke dalam fungsi cv2.divide(), akan diambil channel warna biru dan dikalikan dengan skalar yang dimasukkan ke parameter fungsi tersebut. Sedangkan untuk channel warna lainnya akan bernilai nol.