K. J. Somaiya College of Engineering, Mumbai-77
(A Constituent College of Somaiya Vidyavihar University)
Department of Science and Humanities

Python Mini Project Report

Password Manager

Members:

Roll Number	Name
Shivom Karnad	16010121081
Ayush Khandare	16010121084
Kedar Kulkarni	16010121096

Description:

Password Manager is a simple but very handy tool to generate strong randomly generated passwords with a user defined criteria and store them in an encrypted hidden file only accessible if correct master username and password are entered correctly.

System Architecture:

In total the program is divided into two parts to make it easier to bug fix and understand. The parts being main.py and UI.py (UI.py cannot be renamed without changing main.py).

main.py contains the inner working of the code. All the file handling, encryption, decryption, password generation and management is handled in main. It consists of a total of 7 functions, each tasked with one aspect of the program.

UI.py is a User Interface only file. It has a total of 6 major functions which handle the 6 different types of UI windows that the program cycles through as needed. The entire UI is made with the help of tkinter and only serves as a module to be imported into main.

main-UI integration is handled in the main.py file itself in the various functions. It can be said that the UI.py is an extension of main.py as in, UI.py functions take the inputs from the user and then pass it onto the main.py functions. For every main.py function that requires a user input, there is a UI.py function that is called to do the same.

Working:

On first boot, the program takes master username and password from the user. These are to be then encrypted and stored in a hidden file “master.txt” for verifying subsequent launches of the program.

On reruns, the program then collects the master username and password entered during the first boot from the “master.txt” file and then decrypt it. It then collects the user-input username and password and verifies with the master. If they do not match, the program will give a small alert to notify the user of the wrong credentials.

Upon verifying the credentials, the user is greeted with a display with 3 options. The options being:

1. To create and store a new password
2. To display all the passwords created previously
3. Save and Exit

“Save and Exit” being the simplest of the three shuts down the program but only after displaying a “Have a good day!” message. It must be noted that this message will pop up if the user shuts down the program with the “X” button on the any of the windows as well.

Choosing the “Create a new password” option takes the user to another window which takes the requirements of the password. Then, a character set is generated according to the user requirement. One letter of the password is picked from every character type set to ensure that the final password contains all the types. The character type sets being:

1. ascii lowercase characters
2. ascii uppercase characters
3. ascii digits
4. Some special characters

Rest of the password is randomly picked from the entire character set. This is then scrambled to create a truly (artificially) random password.

The password is then displayed onto a new window where the user gets the choice to keep the current generated password or to generate a new one. If the user decides to keep the password, user then has to input a caption for the password. The password along with its caption is then encrypted and stored in “random_passwords.txt” file which is then hidden. Otherwise, the user is sent back to enter requirements to regenerate the password.

Choosing the “Show saved passwords” option will display all the passwords in a new window. The contents of the “random_passwords.txt” are scanned and complied into a list of passwords and their respective captions. This list is then color coded and displayed in a listbox, complete with a scroll bar.

For a more technical working, comments are added in the code to help explain some of the intricate details.

Features:

1. Exception Handling
2. Random Password Generator
3. Random Password Manager
4. Simple Encryption (Fixed Key)
5. Login Verification
6. Crash and bug resistant

Packages Used:

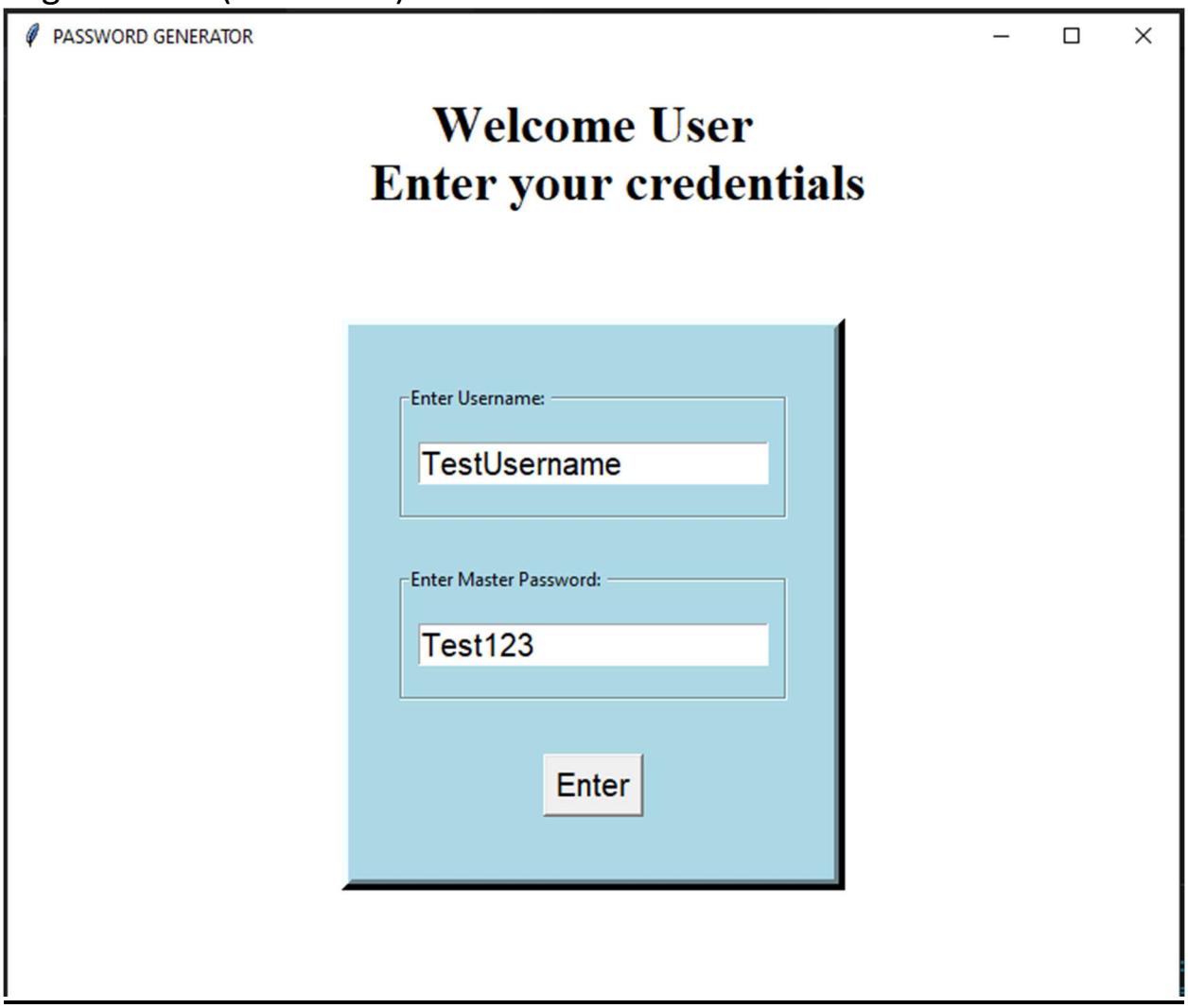
1. **tkinter** : to create all the UI elements
2. **random** : to generate random passwords
3. **string** : for ascii character sets and digits
4. **os** : for file handling
5. **base64** : for simple encryption

Contributions:

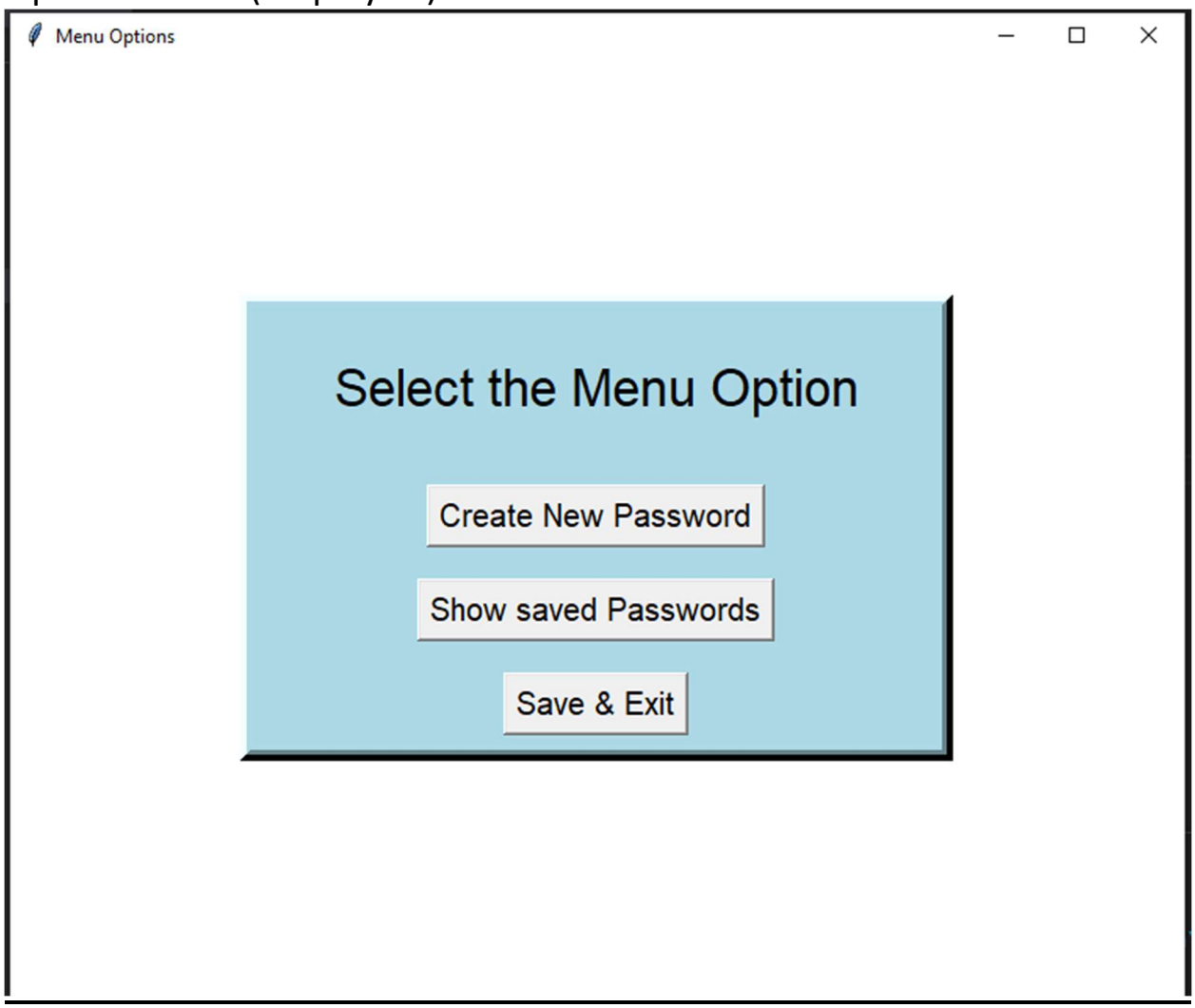
1. **Shivom Karnad** : Worked on Encryption, file handling and UI
2. **Ayush Khandare** : Worked on UI and adding features
3. **Kedar Kulkarni** : Worked on logic, exception handling and integration

Outputs:

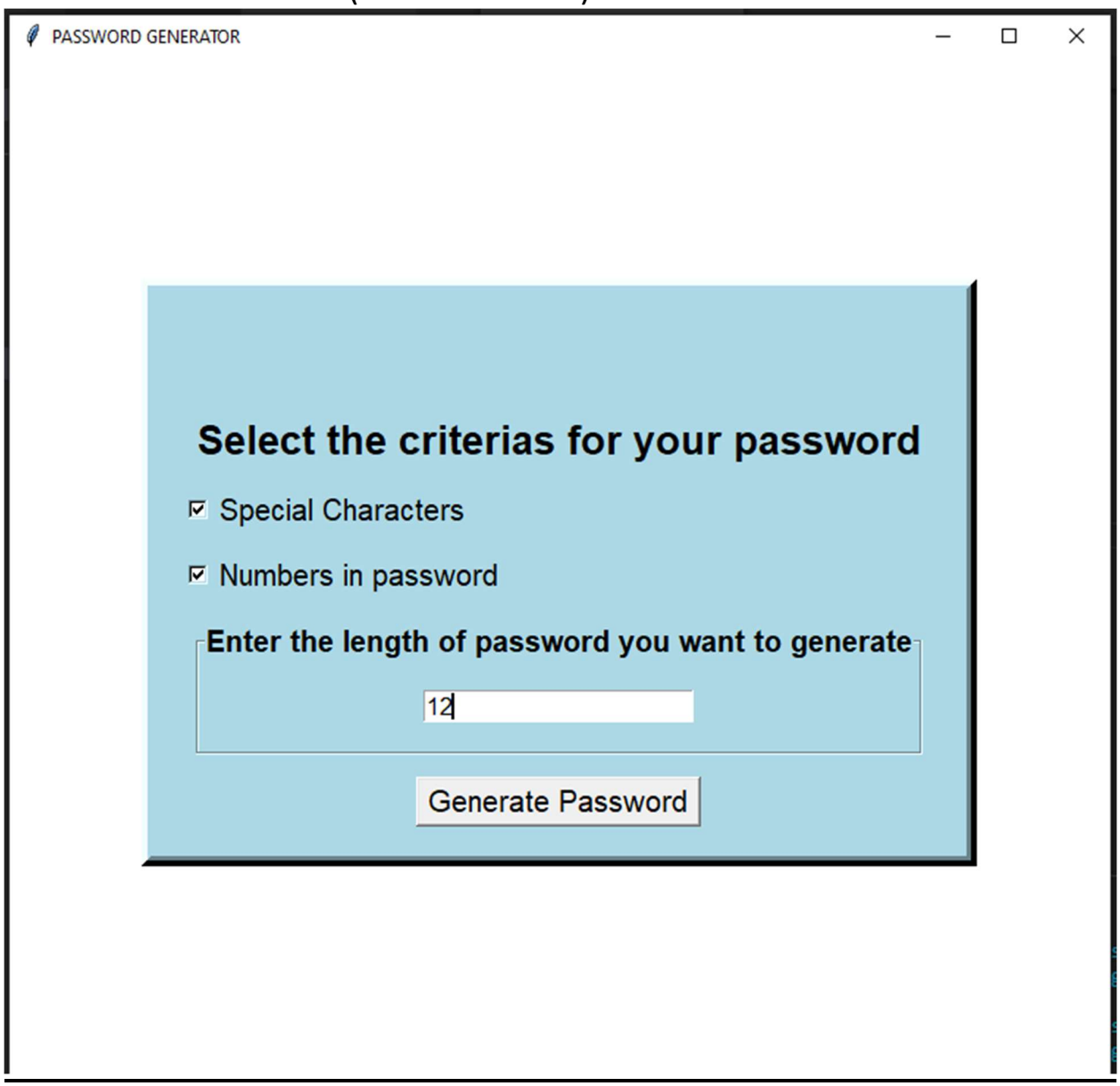
Login Screen (Master UI)



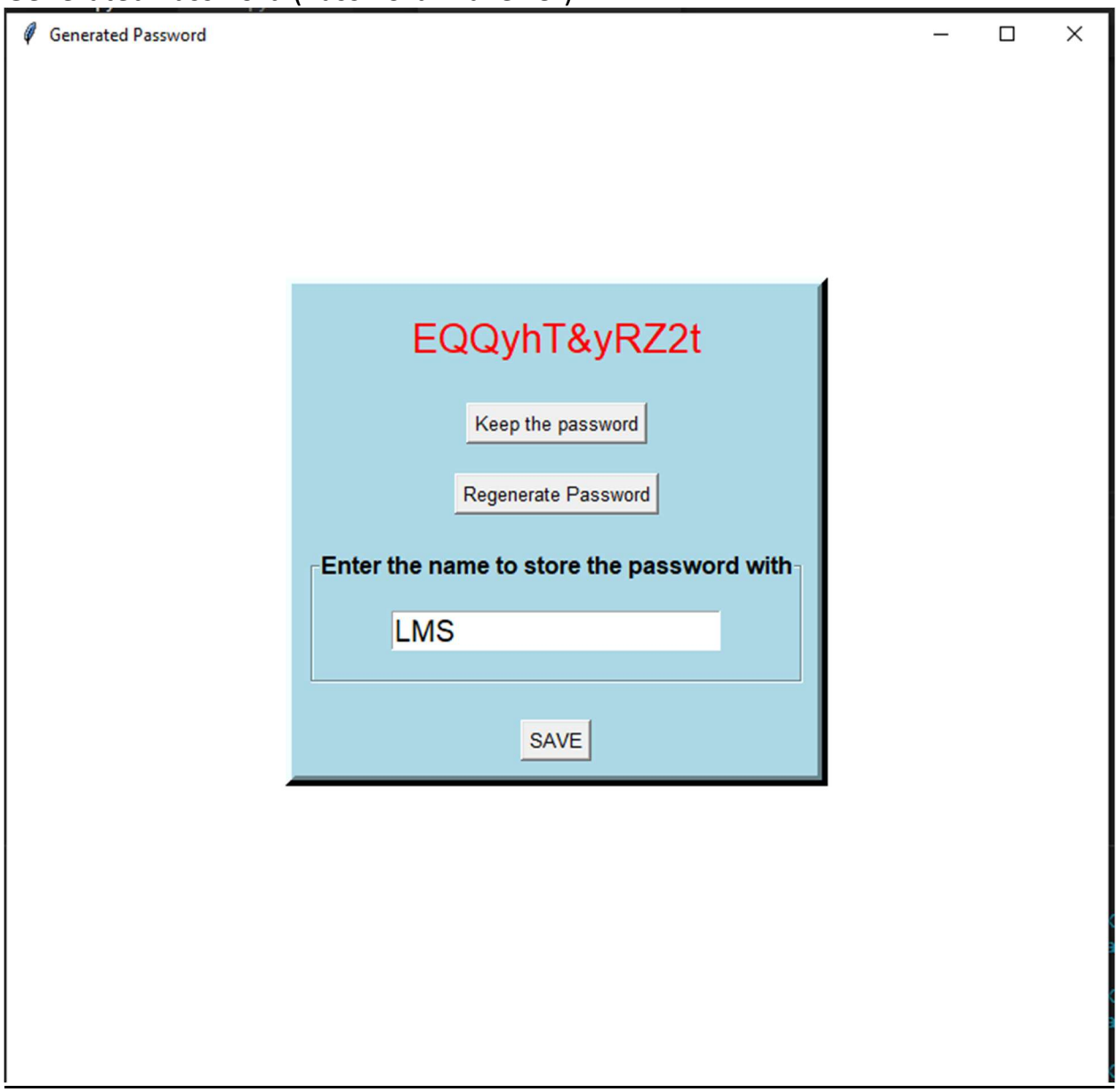
Options Menu (Display UI)



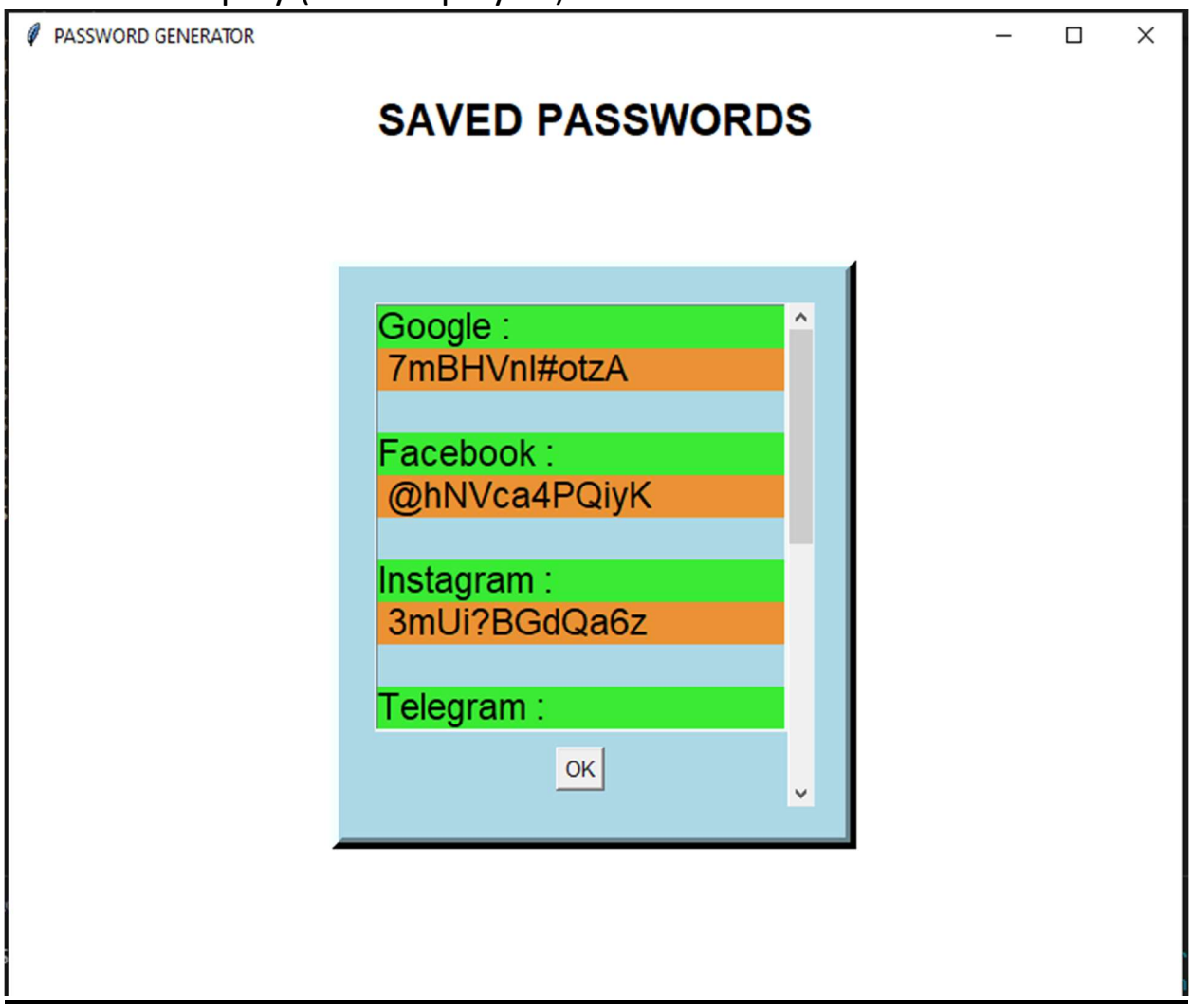
Password Parameters (Parameters UI)



Generated Password (Password Maker UI)



Password Display (Pwd Display UI)



Save and Exit (Alert UI)

Code:

#main.py

```
import string #for ascii letters and digits
import random #for random password generation
import base64 #for base64 encoding and decoding
import os #for deleting unrequired files and hiding certain others
import UI #User Interface


def pwd_gen(length, special, digits, toggle):
    pwd= [] #temporary var to store password
    #Entire character set
    chars = "".join(string.ascii_letters) #all aplhabets upper and lower
    if digits: #toggle for digits
        chars = chars.join(string.digits) #add digits to character set
        pwd.append(random.choice(string.digits)) #choose one random digit
    if special: #toggle for special characters
        chars = chars.join("!@#$%^&*?_") #add special characters to character set
        pwd.append(random.choice("!@#$%^&*?_")) #choose one random special
character
    pwd.append(random.choice(string.ascii_uppercase)) #picking one lowercase
letter
    pwd.append(random.choice(string.ascii_lowercase)) #picking one uppercase
letter

    #Making random password
    for i in range(length-toggle): #picking the rest of the password
        pwd.append(random.choice(chars))
    #Shuffling password
    pwd_shuff = "" #temporary var to store scrambled password
    for i in range(length):
        n = random.randint(0,length-i)-1 #randomly pick one index
        pwd_shuff += pwd[n] #add the character at that index
        del(pwd[n]) #delete that index
    return pwd_shuff


def parameters():
    #Exception Handling format
    while True:
        toggle = 0 #a variable to set characterset
```

```
        try:
            #Toggle for special characters
            special, digits, length = UI.parameters_UI() #get requirements for
password
            if special: #if user wants special characters
                toggle += 1 #increase types of characters used by 1
            if digits: #if user wants digits
                toggle += 1 #increase types of characters used by 1
            length = int(length) #to check if length is an integer
            if length > 20: #if length is greater than 20
                UI.alert_UI("Length cannot be greater than 20!")
                continue #restarts loop
            if length <= toggle+2: #is length is less than minimum length to
cover all character types
                UI.alert_UI(f"Length should be greater than {toggle+2}!")
                continue #restarts loop
        except ValueError: #if anything other than an integer is input
            UI.alert_UI("Please Enter an Integer value!")
            continue #restarts loop
        break #if everything is correct
    return length, special, digits, toggle


def pwd_maker():
    while True:
        length, special, digits, toggle = parameters() #taking password criteria
        password = pwd_gen(length, special, digits, toggle+2) #generating
password
        caption = UI.pwd_maker_UI(password) #get caption and display password
        if type(caption) == str: #if caption is entered
            if caption.find(":") != -1: #if ":" in caption
                UI.alert_UI("':' is an Invalid Input!")
                continue #since ":" can break display as it uses .split(":")
            break #correct caption
    final_password = f"{caption} : {password}" #save format
    final_password = encrypt(final_password) #encryption
    os.system("attrib -h random_passwords.txt")
    with open(f"random_passwords.txt","a") as f:
        f.write(f"{final_password}\n") #storing excrpyted password
    os.system("attrib +h random_passwords.txt")


def pwd_display(): #displaying passwords
    try:
        caption, password = [], [] #temporary lists
```

```
        with open("random_passwords.txt","r") as f:
            for line in f.readlines(): #taking single line from file
                line = line.replace("\n","") #to avoid errors
                line = decrypt(line)
                contents = line.split(":") #split with respect to ":"
                caption.append(contents[0]) #before ":" = username
                password.append(contents[1]) #after ":" = password
        UI.pwd_display_UI(caption, password) #display
    except FileNotFoundError: #if not passwords were created thusfar
        UI.alert_UI("No passwords were created!")


def encrypt(string_sample): #base64 encryprion
    string_bytes = string_sample.encode("ascii") #convert string into its ascii
value
    base64_bytes = base64.b64encode(string_bytes) #convert ascii value into
base64 binary
    base64_string = base64_bytes.decode("ascii") #convert base64 binary back into
encoded ascii
    return base64_string #return encoded base64


def decrypt(base64_string): #base64 decryption
    base64_bytes = base64_string.encode("ascii") #convert encoded ascii into
base64 binary
    string_bytes = base64.b64decode(base64_bytes) #convert base64 binary into
ascii value
    string_sample = string_bytes.decode("ascii") #convert ascii value into string
    return string_sample #return decoded string


def master():
    try:
        with open("master.txt","r") as f:
            master = [] #temporary list
            for line in f.readlines():
                master.append(decrypt(line)) #adds lines of master.txt in master
list
            try:
                username = master[0].replace("\n","") #retrieves username
                master_password = master[1].replace("\n","") #and password
            except IndexError: #incase master file contents were deleted
                os.remove("random_passwords.txt")
                os.remove("master.txt")
                quit()
```

```
            try:
                input_username, input_password = UI.master_UI() #take input
credentials
            except NameError: #if user closes window without any inputs
                UI.alert_UI("Have a good day!")
                quit()
            if master_password == input_password and username == input_username:
#valid credentials
                return False, username #stop loop
            else: #input password is not the same as master
                UI.alert_UI("Incorrect Password!")
                return True, username #reloop

    except FileNotFoundError:
        with open("master.txt","w") as f: #on first boot/ master file was deleted
            username, master_password = UI.master_UI()
            f.write(f"{encrypt(username)}\n") #write username
            f.write(encrypt(master_password)) #write password
            os.system("attrib +h master.txt") #hides master file
            if os.path.exists("random_passwords.txt"): #incase master file was
deleted
                os.remove("random_passwords.txt") #passwords will be deleted
        return False, username #reloop


run = True #variable to control while loop
while run:
    run, username = master() #run master until correct credentials are entered

while True: #loop until program is closed

    u = UI.display_UI() #call display
    if u == 0: #if window was closed without any inputs
        UI.alert_UI("Have a good day!")
        quit()
    if u==1: #create new password
        pwd_maker()
    elif u==2: #display saved passwords
        pwd_display()
    elif u==3: #save and exit
        UI.alert_UI("Have a good day!")
        quit()
```

#UI.py

```
from tkinter import *


def parameters_UI():
    ###main window
    root = Tk()
    root.geometry('750x700')
    root.title("PASSWORD GENERATOR")
    root.minsize(550, 550)
    root.configure(bg = 'white')


    ###Bg Image
    '''photo = Image.open('Password generator/4.jpg')
    picture = ImageTk.PhotoImage(photo)
    pict = Label(image = picture)
    pict.place(x = 0, y = 0, relwidth=1, relheight=1)'''


    ###Frame for criterias
    frame = LabelFrame(root, padx = 20, pady = 20, bg = '#ADD8E6', relief =
RAISED, borderwidth=7)
    frame.pack(pady=150)

    ###Heading for criterias
    criteria = Label(frame, text = '\n\nSelect the criterias for your password',
font = 'helvetica 20 bold', fg = 'black', bg = '#ADD8E6')
    criteria.pack()

    ###Checkbox Command
    def checkbox():
        response_special.config(text = var.get())
        response_digits.config(text = var1.get())
        global inp
        inp = len_entry.get(1.0, "end-1c")
        root.destroy()


    ###Checkbox variable
    var = StringVar(value = 'No Characters')
    var1 = StringVar(value = 'No digits')
```

```
    ###Creating Checkboxes
    special_char = Checkbutton(frame, text = 'Special Characters', variable=var,
onvalue="Include Char",offvalue='No Characters', font = 'helvetica 15', bg =
'#ADD8E6')
    special_char.pack(anchor = 'nw', pady = 10)

    digits = Checkbutton(frame, text = 'Numbers in password', onvalue="Include
digits", offvalue="No digits", variable=var1, font = 'helvetica 15', bg =
'#ADD8E6')
    digits.pack(anchor = 'nw')

    response_special = Label(root)
    #response_special.place(x = 30, y = 450)

    response_digits = Label(root)
    #response_digits.place(x = 30, y = 480)

    #Creating Length Criteria
    length = LabelFrame(frame, text = 'Enter the length of password you want to
generate', bg = '#ADD8E6', font = 'helvetica 15 bold')
    length.pack(anchor = 'nw', pady = 15, padx = 10)
    len_entry = Text(length, height = 1, width = 20, font = 20)
    len_entry.pack(pady = 20, padx = 10)


    ###Creating Generate Button
    generate = Button(frame, text = 'Generate Password', font = 'helvatica 15',
command = checkbox)
    generate.pack()
    root.mainloop()

    if var.get() == 'No Characters':
        spchar = False
    else:
        spchar = True
    if var1.get() == 'No digits':
        num = False
    else:
        num = True
    return spchar, num, inp



def master_UI():
    #widget is created
```

```
window = Tk()
window.geometry('750x600')
window.title("PASSWORD GENERATOR")
window.minsize(550, 550)
window.configure(bg='white')

# title
title = Label(window, text='''Welcome User
Enter your credentials
''', font='Times 25 bold',bg='white', pady=20, fg='black')
title.pack()

frame = LabelFrame(window, padx=20, pady=20, bg='#ADD8E6',
                relief=RAISED, borderwidth=7)
frame.pack(padx=30, pady=10)

def close():
    global usr
    global pwd
    usr = username.get()
    pwd = password.get()
    window.destroy()
# username
details = LabelFrame(frame, text='Enter Username: ', bg='#ADD8E6')
username = Entry(details, font='helvetica 15')
details.pack(pady=15, padx=10)
username.pack(pady=20, padx=10)

# master password
details = LabelFrame(frame, text='Enter Master Password: ', bg='#ADD8E6')
password = Entry(details, font='helvetica 15')
details.pack(pady=15, padx=10)
password.pack(pady=20, padx=10)

enter = Button(frame, text = 'Enter', font = 'helvetica 15', command = close)
enter.pack(pady = 20)

window.mainloop()
try:
    return usr, pwd
except NameError:
    alert_UI("Have a good day!")
    quit()
```

```
def display_UI():
    root = Tk()
    root.geometry('750x600')
    root.title("Menu Options")
    root.configure(bg = 'white')

    frame = LabelFrame(root, bg = '#ADD8E6', relief=RAISED, borderwidth=7)
    frame.pack(pady=150)

    global a
    a = 0

    def create():
        global a
        a = 1
        root.destroy()

    def show():
        global a
        a = 2
        root.destroy()

    def save_exit():
        global a
        a = 3
        root.destroy()

    option = Label(frame, text = 'Select the Menu Option', font = 'helvetica 25',
fg = 'black', bg = '#ADD8E6')
    option.pack(padx = 50, pady = 30)

    create = Button(frame, text = 'Create New Password', font = 'helvetica 15',
command=create)
    create.pack(pady = 10)

    show = Button(frame, text='Show saved Passwords', font='helvetica 15',
command=show)
    show.pack(pady = 10)

    save_exit = Button(frame, text = 'Save & Exit', font = 'helvetica 15',
command = save_exit)
    save_exit.pack(pady = 10)

    root.mainloop()
    return a
```

```
def pwd_display_UI(caption, password):
    tags = caption
    passwords = password

    window = Tk()
    window.geometry('750x600')
    window.title("PASSWORD GENERATOR")
    window.minsize(550, 550)
    window.configure(bg='white')

    def ok_button():
        window.destroy()

    title = Label(window, text="SAVED PASSWORDS", bg = "white",
                font="helvetica 20 bold")
    title.pack(pady=20)

    frame = LabelFrame(window, padx=20, pady=20, bg='#ADD8E6',
                    relief=RAISED, borderwidth=7)
    frame.pack(pady=50, padx=50)

    scrollbar = Scrollbar(frame)
    scrollbar.pack(side=RIGHT, fill=Y)

    disp = Listbox(frame, bg='#ADD8E6', font='helvetica 17',
                yscrollcommand=scrollbar.set)

    for i in range(len(passwords)):
        disp.insert(END, tags[i] + ':')
        disp.itemconfig(END, bg='#3aeb34')
        disp.insert(END, passwords[i])
        disp.itemconfig(END, bg='#eb9334')
        disp.insert(END, "")
        disp.pack()

    ok_button = Button(frame, text = 'OK', font = 'helvetica 10', command =
ok_button)
    ok_button.pack(pady = 10, padx=20)

    window.mainloop()


def pwd_maker_UI(password):
```

```
    global regen
    regen = 0
    root = Tk()
    root.geometry('750x700')
    root.title('Generated Password')
    root.configure(bg = 'white')

    def keep_pw():
        def save_button():
            global input_tag
            input_tag = entrybox.get()
            if input_tag == "":
                input_tag = ""
            else:
                root.destroy()

        sitename = LabelFrame(frame, text = 'Enter the name to store the password
with', bg = '#ADD8E6', font = 'helvetica 12 bold')
        sitename.pack(pady = 15, padx = 10)
        entrybox = Entry(sitename, font = 'helvetica 15')
        entrybox.pack(pady = 20, padx = 10)
        ok_button = Button(frame, text = 'SAVE', font = 'helvetica 10', command =
save_button)
        ok_button.pack(pady = 10, padx=20)

    def regenerate():
        global regen
        regen = 1
        root.destroy()

    frame = LabelFrame(root, bg = '#ADD8E6', relief=RAISED, borderwidth=7)
    frame.pack(pady = 150)

    pw_display = Label(frame, text = password, font = 'helvetica 20', bg =
'#ADD8E6', fg = 'red')
    pw_display.pack(pady = 15, padx = 50)

    keep = Button(frame, text = 'Keep the password', font = 'helvetica 10',
command = keep_pw)
    keep.pack(pady = 10)

    regenerate = Button(frame, text = 'Regenerate Password', font = 'helvetica
10', command = regenerate)
    regenerate.pack(pady = 10)
```

```
    root.mainloop()
    if regen == 1:
        return False
    if regen == 0:
        try:
            return input_tag
        except NameError:
            alert_UI("Have a good day!")
            quit()


def alert_UI(message):
    root = Tk()
    root.geometry('350x100')
    root.title("")
    root.configure(bg = "white")

    def ok_button():
        root.destroy()

    invalid = Label(text=f'\n{message}', bg = 'white', font = 'helvetica 16')
    invalid.pack()

    text = "OK"
    if message == "Have a good day!":
        text = "Thank you!"

    ok_button = Button(text = f"{text}", font = 'helvetica 10', command =
ok_button)
    ok_button.pack(pady = 10, padx=20)

    root.mainloop()
```

Also Available on GitHub:

https://github.com/Bad-Astronomer/FY-PythonProject