

Protection of Information Based on Sensitivity and Privilege Levels

Continuous Assessment - CS3052 Computer Security

Name : R.A.D.J.N. Ranasinghe

Index Number: 190496G

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1. Program Code

```
import hashlib
import csv

#User Registration and User Login

def register():

    print("\n-----Sign Up-----\n")

    #username should not exist in the system
    username = input("Enter a UserName: ").strip()
    if isRegistered(username):
        print("!--User already exists!! Please select a different UserName--!!")
        isContinue = input("Press 'Y' to continue.. Press any other key to exit..")
        if (isContinue == 'Y' or isContinue == 'y'):
            register()
        else:
            print("!--Exiting..GoodBye--!!")
    else:

        userType = input("Select a user type\n1:PATIENT\n2:STAFF\n\n(1/2)?:".strip()
        if(userType == "1" or userType == "2"):
            if(userType == "1"):
                userType = "Patient"
                priviledgeLevel = 4

                #personal details are collected if user is a patient
                name = input("Enter the name: ").strip()
                while (True):
                    gender = input("Enter the gender(F/M): ").strip()
                    if (gender in ["F","f"]):
                        gender = "Female"
                        break
                    elif(gender in ["M","m"]):
                        gender = "Male"
                        break
                    else:
                        print("!--Please select a valid gender--!!\n")
                while(True):
                    try:
                        age = int(input("Enter the age: ").strip())
                        if age >0:
                            break
                        else:
                            print("!--Age should be a positive integer--!!")
                    except:
                        print("!--Please enter a valid age--!!")
                elif(userType == "2"):
                    staffType = input("Select staff type\n1:DOCTOR\n2:NURSE\n3:LAB
ASSISTANT\n\n(1/2/3)?:".strip()
                    if (staffType == "1"):
                        priviledgeLevel = 1
                        userType = "Doctor"
                    elif (staffType == "2"):
                        priviledgeLevel = 2
                        userType = "Nurse"
                    elif (staffType == "3"):
                        priviledgeLevel = 3
                        userType = "LabAssistant"
                    else:
                        print("!--INVALID ENTRY--!!")
                        return

                password = input("Enter a password: ")
                hashedPassword = hashlib.md5(password.encode('utf8')).hexdigest()

                with open("UserDetails.csv", "a", newline="") as file:
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        fileWriter = csv.writer(file, delimiter=",")
        fileWriter.writerow([username, hashedPassword, userType, priviledgeLevel])

    if(userType == "Patient"):
        with open("PersonalDetails.csv", "a", newline="\n") as file:
            fileWriter = csv.writer(file, delimiter=",")
            fileWriter.writerow([username, name, gender, age])

    print("\n!--Registration Successfull--!!\n")
else:
    print("\n!--INVALID ENTRY--!!")

def isRegistered(username):
    file = open("UserDetails.csv", "r", encoding="utf8")
    fileReader = csv.DictReader(file)
    for row in fileReader:
        if row['UserName'] == username:
            return True
    else:
        return False

def login():

    loginAttempt = 0
    isValidUser = False
    isLogged = False
    isExit = False

    print("\n-----Login-----\n")

    while (loginAttempt < 3):
        username = input("Enter your UserName: ").strip()

        isValidUser = isRegistered(username)

        if(isValidUser):
            password = input("Enter the password: ")
            hashedPassword = hashlib.md5(password.encode('utf8')).hexdigest()
            file = open("UserDetails.csv", "r", encoding="utf8")
            reader = csv.DictReader(file)
            for row in reader:
                if row['UserName'] == username:
                    if row['Password'] == hashedPassword:
                        userType = row['UserType']
                        priviledgeLevel = int(row['PriviledgeLevel'])
                        isLogged = True
                        #break
                    else:
                        loginAttempt+=1
                        if(loginAttempt < 3):
                            print("\n!--Incorrect Password--Please Retry--You have",3-
loginAttempt,"attempts left--!!\n")
                            exitInput = input("If you want to exit, please enter 'E': ").strip()
                            if(exitInput in ['E','e']):
                                isExit = True
                                #break
                            #break
                        break
                    if(isExit):
                        break
                else:
                    loginAttempt+=1
                    print("\n!--User does not exist--Try Again--You have",3-loginAttempt,"attempts left--!!")
            if (isLogged):
                print("\n!--Login Success--!!\n")
                if(priviledgeLevel == 1):
                    doctorInterface(username)
                elif (priviledgeLevel == 2):
                    nurseInterface(username)
                elif (priviledgeLevel == 3):
                    labAssistantInterface(username)
                elif (priviledgeLevel == 4):

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        patientInterface(username)
        break

    if(loginAttempt>=3):
        print("\n!--You have made 3 invalid login attempts--System terminating--!!")
        return -1
    else:
        print("\n!--Redirecting to welcome page--!!")

#user interfaces
def padUsername(username,prefix):
    totLen = 47
    padLen = totLen - len(username)-len(prefix)
    paddedUsername = prefix+username
    paddedUsername = paddedUsername.rjust(totLen-padLen//2,"=")
    paddedUsername = paddedUsername.ljust(totLen,"=")

    return paddedUsername

#DOCTOR
def doctorInterface(username):
    priviledgeLevel = 1

    print ("-----Welcome-----\n"+padUsername(username,"Dr.")+"\n-----
-----Dashboard-----")
    while (True):
        mainOption = input("-----Options-----\n1: View Details\n2: Edit
Details\n3: Log Out\n\nSelect an option: ").strip()
        #view details
        if (mainOption == "1"):
            subOption = input("1: View Patient's Personal Details\n2: View All Appointment Details\n3:
View a Single Appointment Details\n\nSelect an option: ").strip()

            if (subOption == "1"):
                patientUserName = input("Please Enter Patient's Username: ")
                if(getPersonalDetails(patientUserName)):
                    name,age,gender = getPersonalDetails(patientUserName)
                    print("Name: ",name,"|Age: ",age,"|Gender: ",gender)
                else:
                    print("No such patient exist!\n")
            elif (subOption == "2"):
                appointmentDetails = getAllAppointmentDetails(username,priviledgeLevel)
                if (len(appointmentDetails)>0):
                    for appointment in appointmentDetails:
                        print("AppointmentId: ",appointment[0],"|UserName:
",appointment[1],"|SicknessDetails: ",appointment[2],"|Drug Prescriptions: ",appointment[3],"|Lab
Prescriptions: ",appointment[4])
                else:
                    print("No Records found")
            elif (subOption == "3"):
                appointmentId = input("Please Enter the appointment Id: ")
                appointment = getOneAppointmentDetails(appointmentId,priviledgeLevel)
                if (len(appointment)>0):
                    print("AppointmentId: ",appointment[0],"|UserName:
",appointment[1],"|SicknessDetails: ",appointment[2],"|Drug Prescriptions: ",appointment[3],"|Lab
Prescriptions: ",appointment[4])
                else:
                    print("No Records found")
            else:
                print("\n!--INVALID ENTRY--!!")

        #edit details
        elif(mainOption == "2"):
            subOption = input("1: Add new appointment\n2: Edit Appointment Details\n\nSelect an
option: ").strip()

            if (subOption == "1"):
                addNewAppointment()
            elif (subOption == "2"):
                appointmentId = input("Please Enter the appointment Id: ").strip()
                editAppointmentDetails(appointmentId,priviledgeLevel)
            else:
                print("\n!--INVALID ENTRY--!!")

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        elif(mainOption == "3"):
            print("Logging out!")
            break
        else:
            print("Please select a valid option..")

#PATIENT
def patientInterface(username):
    priviledgeLevel = 4

    print ("-----Welcome-----\n"+padUsername(username,"Patient:")+"\n---
-----Dashboard-----")
    while (True):
        mainOption = input("\n-----Options-----\n1: View Details\n2:
Edit Personal Details\n3: Log Out\n\nSelect an option: ").strip()
        #view details
        if (mainOption == "1"):
            subOption = input("\n-----View Options-----\n1: View Personal
Details\n2: View All Appointment Details\n\nSelect an option: ").strip()

            if (subOption == "1"):
                if(getPersonalDetails(username)):
                    name,age,gender = getPersonalDetails(username)
                    print("Name: ",name,"|Age: ",age,"|Gender: ",gender)
                else:
                    print("!!-No such patient exist--!!\n")
            elif (subOption == "2"):
                appointmentDetails = getAllAppointmentDetails(username,priviledgeLevel)
                if (len(appointmentDetails)>0):
                    print()
                    for appointment in appointmentDetails:
                        print("AppointmentId: ",appointment[0],"|SicknessDetails:
",appointment[1],"|Drug Prescriptions: ",appointment[2],"|Lab Prescriptions: ",appointment[3])
                else:
                    print("!!-No Records found--!!")
            else:
                print("\n!--INVALID ENTRY--!!")

        #edit details
        elif(mainOption == "2"):
            editPersonalDetails(username)
        elif(mainOption == "3"):
            print("Logging out..")
            break
        else:
            print("Please select a valid option..")

#NURSE
def nurseInterface(username):
    priviledgeLevel = 2

    print ("-----Welcome-----\n"+padUsername(username,"Nurse:")+"\n-----
-----Dashboard-----")
    while (True):
        mainOption = input("\n-----Options-----\n1: View Details\n2: Log
Out\n\nSelect an option: ").strip()
        #view details
        if (mainOption == "1"):
            subOption = input("1: View Patient's Personal Details\n2: View All Appointment Details\n3:
View a Single Appointment Details\n\nSelect an option: ").strip()

            if (subOption == "1"):
                patientUserName = input("Please Enter Patient's Username: ")
                if(getPersonalDetails(patientUserName)):
                    name,age,gender = getPersonalDetails(patientUserName)
                    print("Name: ",name,"|Age: ",age,"|Gender: ",gender)
                else:
                    print("No such patient exist!\n")
            elif (subOption == "2"):
                appointmentDetails = getAllAppointmentDetails(username,priviledgeLevel)
                if (len(appointmentDetails)>0):
                    for appointment in appointmentDetails:
                        print("AppointmentId: ",appointment[0],"|UserName:

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",appointment[1],"|SicknessDetails: ",appointment[2],"|Drug Prescriptions: ",appointment[3])
    else:
        print("No Records found")
    elif (subOption == "3"):
        appointmentId = input("Please Enter the appointment Id: ").strip()
        appointment = getOneAppointmentDetails(appointmentId,priviledgeLevel)
        if (len(appointment)>0):
            print("AppointmentId: ",appointment[0],"|UserName: ",appointment[1],"|Lab
Prescriptions: ",appointment[2])
        else:
            print("\n!--No Records found--!!")
    else:
        print("\n!--INVALID ENTRY--!!")

elif (mainOption == "2"):
    print("Logging out..")
    break
else:
    print("Please select a valid option")

#LAB ASSISTANT
def labAssistantInterface(username):
    priviledgeLevel = 3

    print ("-----Welcome-----\n"+padUsername(username,"Lab
Assistant:")+"\n-----Dashboard-----")
    while (True):
        mainOption = input("-----Options-----\n1: View Details\n2: Edit
Appointment Details\n3: Log Out\n\nSelect an option: ").strip()
        #view details
        if (mainOption == "1"):
            subOption = input("1: View All Appointment Details\n2: View a Single Appointment
Details\n\nSelect an option: ").strip()

            if (subOption == "1"):
                appointmentDetails = getAllAppointmentDetails(username,priviledgeLevel)
                if (len(appointmentDetails)>0):
                    print()
                    for appointment in appointmentDetails:
                        print("AppointmentId: ",appointment[0],"|UserName: ",appointment[1],"|Lab
Prescriptions: ",appointment[2])
                else:
                    print("No Records found")

            elif (subOption == "2"):
                appointmentId = input("Please Enter the appointment Id: ").strip()
                appointment = getOneAppointmentDetails(appointmentId,priviledgeLevel)
                if (len(appointment)>0):
                    print("AppointmentId: ",appointment[0],"|UserName: ",appointment[1],"|Lab
Prescriptions: ",appointment[2])
                else:
                    print("No Records found")
            else:
                print("\n!--INVALID ENTRY--!!")

        #editDetails
        elif(mainOption == "2"):
            appointmentId = input("Please Enter the appointment Id: ")
            editAppointmentDetails(appointmentId,priviledgeLevel)
        elif(mainOption == "3"):
            print("Logging out..")
            break
        else:
            print("Please select a valid option..")

#-----Personal Details-----#
def getPersonalDetails(username):
    file = open("PersonalDetails.csv", "r", encoding="utf8")
    reader = csv.DictReader(file)
    for row in reader:
        if row['UserName'] == username:
            name = row['Name']
            gender = row['Gender']
            age = row['Age']

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        return name,age,gender
    else:
        return False

def editPersonalDetails(username):
    isAUser = False

    file = open("PersonalDetails.csv", "r", encoding="utf8")
    reader = csv.DictReader(file)
    for row in reader:
        if row['UserName'] == username:
            isAUser = True
            print("\nCurrent Details are as follows:
\nName:",row['Name'],"\nGender:",row['Gender'],"\nAge:",row['Age'],"\n")
            break
    if (isAUser):
        newName = input("\nEnter new name: ").strip()
        while (True):
            newGender = input("Enter new gender(F/M): ").strip()
            if (newGender in ["F","f"]):
                newGender = "Female"
                break
            elif(newGender in ["M","m"]):
                newGender = "Male"
                break
            else:
                print("\n!--Please select a valid gender--!!\n")
        while(True):
            try:
                newAge = int(input("Enter new age: ").strip())
                if newAge >0:
                    break
            else:
                print("\n!--Age should be a positive integer--!!")
        except:
            print("\n!--Please enter a valid age--!!")

        personalDetails = []
        file = open("PersonalDetails.csv", "r", encoding="utf8")
        reader = csv.DictReader(file)
        for row in reader:
            if row['UserName'] == username:
                row['Name'] = newName
                row['Gender'] = newGender
                row['Age'] = newAge
                personalDetails.append(row)

        with open('PersonalDetails.csv', 'w', newline='') as file:
            writer = csv.writer(file)
            writer.writerow(['UserName', 'Name', 'Gender', 'Age'])

            for user in personalDetails:
                writer.writerow([user['UserName'], user['Name'], user['Gender'], user['Age']])

        print("\n!--Personal details modified--!!\n")

#-----Appointment Details-----#
def getAllAppointmentDetails(username,priviledgeLevel):
    file = open("AppointmentDetails.csv", "r", encoding="utf8")
    reader = csv.DictReader(file)
    appointmentDetails = []

    if(priviledgeLevel == 4):
        for row in reader:
            if row['UserName'] == username:
                rowDetails = [
row['AppointmentId'],row['SicknessDetails'],row['DrugPrescriptions'],row['LabPrescriptions']]
                appointmentDetails.append(rowDetails)
    else:
        for row in reader:
            rowDetails = []
            rowDetails.extend([row['AppointmentId'],row['UserName']])

```



```

        if (priviledgeLevel == 1):
rowDetails.extend([row['SicknessDetails'],row['DrugPrescriptions'],row['LabPrescriptions']])
        elif (priviledgeLevel == 2):
            rowDetails.extend([row['SicknessDetails'],row['DrugPrescriptions']])
        elif (priviledgeLevel == 3):
            rowDetails.append(row['LabPrescriptions'])
        #else:
            #if (row['UserName'] == username):
                #rowDetails =
[ row['AppointmentId'],row['SicknessDetails'],row['DrugPrescriptions'],row['LabPrescriptions']]

            appointmentDetails.append(rowDetails)
        return appointmentDetails

def getOneAppointmentDetails(appointmentId,priviledgeLevel):
    isAnAppointment = False
    file = open("AppointmentDetails.csv", "r", encoding="utf8")
    reader = csv.DictReader(file)
    appointmentDetails = []

    for row in reader:
        if row['AppointmentId'] == appointmentId:
            isAnAppointment = True
            UserName = row['UserName']
            SicknessDetails = row['SicknessDetails']
            DrugPrescriptions = row['DrugPrescriptions']
            LabPrescriptions = row['LabPrescriptions']

            if (priviledgeLevel == 1):

appointmentDetails=[appointmentId,UserName,SicknessDetails,DrugPrescriptions,LabPrescriptions]
                elif (priviledgeLevel == 2):
                    appointmentDetails=[appointmentId,UserName,SicknessDetails,DrugPrescriptions]
                elif (priviledgeLevel == 3):
                    appointmentDetails=[appointmentId,UserName,LabPrescriptions]
                else:
                    pass
                break
            return appointmentDetails

def addNewAppointment():
    isAUser = False
    file = open("AppointmentDetails.csv", "r", encoding="utf8")
    reader = csv.DictReader(file)
    rows = list(reader)
    appointmentId = len(rows)

    #validate patient's user name
    while(not isAUser):
        patientUserName = input("\nEnter Patient's user name: ").strip()
        file1 = open("PersonalDetails.csv", "r", encoding="utf8")
        myReader = csv.DictReader(file1)
        for row in myReader:
            if row['UserName'] == patientUserName:
                isAUser = True
                break
        else:
            print("Please enter a valid patient's user name")

        sicknessDetails = input("Enter sickness details: ")
        drugPrescriptions = input("Enter drug prescriptions: ")
        labPrescriptions = input("Enter Lab prescriptions: ")

        with open("AppointmentDetails.csv", "a", newline="\n") as file:
            fileWriter = csv.writer(file, delimiter=",")

        fileWriter.writerow([appointmentId,patientUserName,sicknessDetails,drugPrescriptions,labPrescriptions])
    )
    print("\n!--New appointment added successfully--!!")

def editAppointmentDetails(appointmentId,priviledgeLevel):
    isAnAppointment = False

```

```

file = open("AppointmentDetails.csv", "r", encoding="utf8")
reader = csv.DictReader(file)
for row in reader:
    if row['AppointmentId'] == appointmentId:
        isAnAppointment = True
        newUser = row['UserName']
        newSicknessDetails = row['SicknessDetails']
        newDrugPrescriptions = row['DrugPrescriptions']
        newLabPrescriptions = row['LabPrescriptions']

        print("\nCurrent Details are as follows:\nUserName:",newUser)
        break
if (isAnAppointment):
    if (privilegeLevel == 1 ):
        print("Sickness Details:",newSicknessDetails,"\nDrug
Prescriptions:",newDrugPrescriptions,"\nLab Prescriptions:",newLabPrescriptions)
        newSicknessDetails = input("\nEnter new Sickness Details: ").strip()
        newDrugPrescriptions= input("Enter new Drug Prescriptions: ").strip()
        newLabPrescriptions = input("Enter new Lab Prescriptions: ").strip()

    if (privilegeLevel == 3 ):
        print("Lab Prescriptions:",newLabPrescriptions)
        newLabPrescriptions = input("\nEnter new Lab Prescriptions: ")

appointmentDetails = []
file = open("AppointmentDetails.csv", "r", encoding="utf8")
reader = csv.DictReader(file)
for row in reader:
    if row['AppointmentId'] == appointmentId:
        row['UserName'] = newUser
        row['SicknessDetails'] = newSicknessDetails
        row['DrugPrescriptions'] = newDrugPrescriptions
        row['LabPrescriptions'] = newLabPrescriptions
        appointmentDetails.append(row)

with open('AppointmentDetails.csv', 'w', newline='') as file:
    writer = csv.writer(file)

writer.writerow(['AppointmentId', 'UserName', 'SicknessDetails', 'DrugPrescriptions', 'LabPrescriptions'])

    for appointment in appointmentDetails:
        writer.writerow([appointment['AppointmentId'], appointment['UserName'],
appointment['SicknessDetails'], appointment['DrugPrescriptions'], appointment['LabPrescriptions']])

    print("\n!--Appointment details modified!--!\n")

#-----Medical Data Processing System-----#

while (True):
    print("\n-----Welcome-----")
    print("\n1:Sign Up\n2:Log In\n3:Exit\n")

    try :
        loginOrsignup = int(input("Please select an option: "))
        if (loginOrsignup == 1):
            register()
        elif (loginOrsignup == 2):
            returnValue = login()
            if(returnValue == -1):
                break
        elif (loginOrsignup == 3):
            print("!--System Terminating...GoodBye--!")
            break
        else:
            print("!--Please Enter a Valid Input--!")
    except:
        print("!--Please Enter a Valid Input--!")

```

2. Description of Privilege Levels and Data Sensitivity

In this medical data processing system, there are 2 main types of users

- 1) Patients
- 2) Staff

Within the staff, there are 3 types of users.

- 1) Doctor
- 2) Nurse
- 3) Lab Assistant

Initially when the program is run, the user is presented with options to either sign up or log in. New users can sign up to the system whereas existing users can log in to the system. Usernames are unique. Therefore, new users won't be allowed to pick usernames that are already in the system.

When logging in, if a user enters invalid data for 3 times in a row, the system will terminate preventing him from further attempts.

When a patient signs up, personal details of the patient will be collected. These include the name, gender, and the age. Personal details won't be collected from the staff members apart from the username and the password.

When a patient visits the hospital, an appointment record will be created by the doctor. This includes the appointment Id, username of the patient, sickness details, drug prescriptions and the lab test prescriptions.

Users are given privilege levels based on their roll.

Privilege level	Personal Details of Patients		Sickness Details		Drug Prescriptions		Lab Test Prescriptions	
	Read	Write	Read	Write	Read	Write	Read	Write
1 (Doctor)	✓	✗	✓	✓	✓	✓	✓	✓
2 (Nurse)	✓	✗	✓	✗	✓	✗	✗	✗
3 (Lab Assistant)	✗	✗	✗	✗	✗	✗	✓	✓
4 (Patient)	✓	✓	✓	✗	✓	✗	✓	✗

Privilege Level – 1 (Doctor)

Doctors has the highest privilege in the system. They have both read and write access to Sickness details, Drug prescriptions and Lab Test prescriptions but for personal details of the patients, doctors have read access only.

Functions of a doctor:

- View Patient's personal details
- View all appointment details
- View one specific appointment detail
- Add a new appointment
- Edit existing appointment details (Sickness detail, Drug prescription, Lab test prescription)

Privilege Level – 2 (Nurse)

Nurses don't have write access to any type of data in the system. But they can read all types of data except Lab Test Prescriptions. Hence, they have the second highest privilege level.

Functions of a nurse:

- View Patient's personal details
- View all appointment details (without lab test prescription)
- View one specific appointment detail (without lab test prescription)

Privilege Level – 3 (Lab Assistant)

Lab assistants have access to Lab test prescriptions only. They have both read and write access regarding lab test prescriptions. Hence, they are considered have a 3rd level privilege inside the system.

Functions of a lab assistant:

- View all appointment details (only the lab test prescription)
- View one specific appointment detail (only the lab test prescription)
- Edit appointment detail (only the lab test prescription)

Privilege Level – 4 (Patient)

The patients have read access to their data only. This includes personal details and appointment details of that patient. But they can only edit the personal details of themselves.

Functions of a patient:

- View personal details (name, age, gender)
- View His/her appointments (Sickness details, Drug prescriptions, Lab test prescriptions)
- Edit personal details (Name, age, and gender)

3. Annexes

UserDetails.csv

	A	B	C	D	E
1	UserName	Password	UserType	PriviledgeLevel	
2	TestPatient1	5f4dcc3b5aa765d61d8327deb882cf99	Patient	4	
3	TestDoctor1	5f4dcc3b5aa765d61d8327deb882cf99	Doctor	1	
4	TestNurse1	5f4dcc3b5aa765d61d8327deb882cf99	Nurse	2	
5	TestLabAssistant1	5f4dcc3b5aa765d61d8327deb882cf99	LabAssistant	3	
6	TestPatient2	5f4dcc3b5aa765d61d8327deb882cf99	Patient	4	
7	TestDoctor2	5f4dcc3b5aa765d61d8327deb882cf99	Doctor	1	
8	TestNurse2	5f4dcc3b5aa765d61d8327deb882cf99	Nurse	2	
9	TestLabAssistant3	5f4dcc3b5aa765d61d8327deb882cf99	LabAssistant	3	
10	TestPatient4	5f4dcc3b5aa765d61d8327deb882cf99	Patient	4	
11	TestPatient3	5f4dcc3b5aa765d61d8327deb882cf99	Patient	4	
12					

PersonalDetails.csv

	A	B	C	D	E
1	UserName	Name	Gender	Age	
2	TestPatient1	John F Doe	Male	36	
3	TestPatient2	test patient 2	Female	34	
4	TestPatient4	Jane Karen Doe	Female	23	
5	TestPatient3	John Arnold	Female	46	
6					
7					

AppointmentDetails.csv

	A	B	C	D	E
1	AppointmentId	UserName	SicknessDetails	DrugPrescriptions	LabPrescriptions
2	0	TestPatient1	Cough and sore throat	Cough Syrap	No need
3	1	TestPatient2	Flu	Panadol	Immediate Dengue test
4	2	TestPatient2	Covid 19	paracitamol	Rapid antigen test
5	3	TestPatient1	Stomach pain	Painkillers	Dengue Test is done
6	4	TestPatient4	Stomach Pain	Painkillers and panadol	No need
7					
8					

Important Screen Captures

Sign Up of a patient

```
-----Welcome-----

1:Sign Up
2:Log In
3:Exit

Please select an option: 1

-----Sign Up-----

Enter a UserName: TestPatient3
Select a user type
1:PATIENT
2:STAFF

(1/2)?:1
Enter the name: John Arnold
Enter the gender(F/M): f
Enter the age: 46
Enter a password: password

!--Registration Successfull--!!
```

Registration of staff members are similar, but in those cases, personal details are not collected apart from the username and the password.

User Login

```
-----Welcome-----
1:Sign Up
2:Log In
3:Exit

Please select an option: 2

-----Login-----

Enter your UserName: TestPatient3
Enter the password: password

!!--Login Success--!!

-----Welcome-----
=====Patient:TestPatient3=====
-----Dashboard-----

-----Options-----
1: View Details
2: Edit Personal Details
3: Log Out
```

Doctor adding a new appointment

```
-----Options-----
1: View Details
2: Edit Details
3: Log Out

Select an option: 2
1: Add new appointment
2: Edit Appointment Details

Select an option: 1

Enter Patient's user name: TestPatient4
Enter sickness details: Stomach Pain
Enter drug prescriptions: Painkillers and panadol
Enter Lab prescriptions: No need

!!--New appointment added successfully--!!
```

Doctor editing appointment details

```
1: Add new appointment
2: Edit Appointment Details

Select an option: 2
Please Enter the appointment Id: 2

Current Details are as follows:
UserName: TestPatient2
Sickness Details: Covid 19 danger state
Drug Prescriptions: paracetamol
Lab Prescriptions: Antigen Test

Enter new Sickness Details: Covid 19
Enter new Drug Prescriptions: paracetamol
Enter new Lab Prescriptions: Rapid antigen test

!!--Appointment details modified--!!
```

Doctors can edit all details regarding an appointment except for the patient username associated with the appointment.

Doctor Viewing appointment details

```
Select an option: 1
1: View Patient's Personal Details
2: View All Appointment Details
3: View a Single Appointment Details

Select an option: 2
AppointmentId: 0 |UserName: TestPatient1 |SicknessDetails: Cough and sore throat |Drug Prescriptions: Cough Syrap |Lab Prescriptions: No n
AppointmentId: 1 |UserName: TestPatient2 |SicknessDetails: Flu |Drug Prescriptions: Panadol |Lab Prescriptions: Immediate Dengue test
AppointmentId: 2 |UserName: TestPatient2 |SicknessDetails: Covid 19 |Drug Prescriptions: paracetamol |Lab Prescriptions: Rapid antigen tes
AppointmentId: 3 |UserName: TestPatient1 |SicknessDetails: Stomach pain |Drug Prescriptions: Painkillers |Lab Prescriptions: Dengue Test
AppointmentId: 4 |UserName: TestPatient4 |SicknessDetails: Stomach Pain |Drug Prescriptions: Painkillers and panadol |Lab Prescriptions: N
```

Nurse Viewing appointment details

```
Select an option: 1
1: View Patient's Personal Details
2: View All Appointment Details
3: View a Single Appointment Details

Select an option: 2
AppointmentId: 0 |UserName: TestPatient1 |SicknessDetails: Cough and sore throat |Drug Prescriptions: Cough Syrap
AppointmentId: 1 |UserName: TestPatient2 |SicknessDetails: Flu |Drug Prescriptions: Panadol
AppointmentId: 2 |UserName: TestPatient2 |SicknessDetails: Covid 19 |Drug Prescriptions: paracetamol
AppointmentId: 3 |UserName: TestPatient1 |SicknessDetails: Stomach pain |Drug Prescriptions: Painkillers
AppointmentId: 4 |UserName: TestPatient4 |SicknessDetails: Stomach Pain |Drug Prescriptions: Painkillers and panadol
```

Lab Assistant Viewing appointment details

```
Select an option: 1
1: View All Appointment Details
2: View a Single Appointment Details

Select an option: 1
AppointmentId: 0 |UserName: TestPatient1 |Lab Prescriptions: No need
AppointmentId: 1 |UserName: TestPatient2 |Lab Prescriptions: Immediate Dengue test
AppointmentId: 2 |UserName: TestPatient2 |Lab Prescriptions: Rapid antigen test
AppointmentId: 3 |UserName: TestPatient1 |Lab Prescriptions: Dengue Test
AppointmentId: 4 |UserName: TestPatient4 |Lab Prescriptions: No need
```

Lab Assistant Editing appointment details

```
1: View Details
2: Edit Appointment Details
3: Log Out

Select an option: 2
Please Enter the appointment Id: 3

Current Details are as follows:
UserName: TestPatient1
Lab Prescriptions: Dengue Test

Enter new Lab Prescriptions: Dengue Test is done

!--Appointment details modified--!!
```