Software Quality Engineering

Assignment # 1,2 & 3

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Github link: https://github.com/minahilx/SQE

Section # 1

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CASE STUDY
Hospital Management System

Taking care of our Health is the most prior thing in our lives and there is always in times of needs when our health is at risk and due to some reason we could not reach to clinics immediately and sometimes due to our hectic schedule we could not just go the clinic and waiting long queue just to take an appointment for the check up so we need some automated system which should be reliable, fast and accurate which should be there for us in times of needs
Hospital Management System is aimed to maintain the day-to-day state of admission/discharge of patients, a list of doctor's reports generation, etc.
This system will be designed to improve clinical workflow, and perform advanced appointment scheduling. This application will connect clinics and patient online through web based application. Now days no one has time to visit clinic and wait for appointment. This application will help for getting online appointment. Patient can get appointment through SMS or Internet.

Patient will request to make an appointment; receptionist will manage the appointment details. Doctors can make their schedule according to patient's appointments, which should be at least 3 and at most 10 in a day**.** Once patient's appointment gets confirmed then patient can see online how many people are waiting in queue for appointment and Receptionist saves appointment details. Doctor will upload all the patient medical history on portal. This information will be visible to the patient and the visiting Doctors only to maintain the privacy with help of their own personal login system which they have to provide their name which should be less than or equal to 20 alphabet character and should be greater than or equal to 6 character, password which should contain 6 characters at least and at most 10 character's and contact number which contains less than or equal to 15 digit and greater than or equal to 7 digit. As patient and clinic will be connected online, if a patient gets transferred from one clinic to another clinic, visited clinics

doctor can see medical history of that patient and personal information of patient using the portal. It will be a waiting room solution. Patient can pay the doctor's bill through online payment system, which will be starting, from PRs.300 to PRs. 3000 according to patient treatment. Once the payment has been made, a medical receipt is provided to the patient, which includes what services provided and their respective costs that have been paid for.

Importance of web-based application is increasing day by day, it is important to manage all the healthcare data online. Now everyone has Internet connection and it is easy to use web application. This application will reduce the work of patient as well as doctor. Doctor does not need to take patient's initial description such as weight, patient's blood group repeatedly, because all this information will be entered at the time of registration of patient on website. Doctor will automatically see patient's information. There is no more hardware required for patient and doctor. Efficient appointment schedules will reduce patient waiting time while keeping doctor's idle time as low as possible without adding extra resources. Efficient and effective management of healthcare is imperative due to the efficient appointment scheduling.

FUNCTIONS:

1. Manage_Appointment (int appointment)
2. PayBill(Double amount)
3. Sign-up(String name, String password, String contact_no)

BLACK BOX TESTING

1. Boundary Value Analysis Testing:

Function 1:*Manage_Appointment (int noOfappointment)*

- **Constarint:**

  Appointment should be at least 3 and at most 10

- **Boundary**:
  noOfappointment = 3 and 10

- **Test cases**: 4(n) + 1 => 4(1) +1 = 5

- **Input values :**

  min = 3
  min+1= 4
  normal = 7
  max-1 = 9
  max = 10

Case	noOfappointment	Expected output
1	3	✓
2	4	✓
3	7	✓
4	9	✓
5	10	✓

✓ => Valid input

Function 2:_PayBill(Double amount)

- **Constraint:**
  Bill should be in range of PRs.300 to PRs. 3000

- **Boundary**:
  amount = 300 and 3000

- **Test cases**: 4(n) + 1 => 4(1) +1 = 5

- **Input values :**

  min = 300
  min+1= 301
  normal = 1800

max-1 = 2999
max = 3000

Case	amount	Expected output
1	300	✓
2	301	✓
3	1800	✓
4	2999	✓
5	3000	✓

✓ => Valid input

Function 3: Sign-up (String name, String password, String contact_no)

- **Total Test cases**: 4n+1 => 4(3)+1 = 13
- **Constraint:**

  Name should be less than or equal to 20 alphabet character and should be greater than or equal to 6 character.
  Password should contain 6 characters at least and at most 10 characters.
  Contact_no should be less than or equal to 15 digit and greater than or equal to 7 digit.

- **Boundaries**:
  Name = 6 and 20
  Password = 6 and 10
  Contact_no = 7 and 15

- **Input values:**

  For name

  min = Newton
  min+1= Thommas
  normal = Mark Zukerburg
  max-1 = Mahenoor Haider Ali
  max = Aleaxander Hamillton

For Password

min = 123abc
min+1= 567mnop
normal = gho34566
max-1 = code22246
max = pinx123456

For Contact_no

min = 1234567
min+1= 12345678
normal = 12345678910
max-1 = 12345678911234
max = 123456789112345

Case	name	password	contact_no	Expected output
1	Mark Zukerburg	gho34566	1234567	✓
2	Mark Zukerburg	gho34566	12345678	✓
3	Mark Zukerburg	gho34566	12345678910	✓
4	Mark Zukerburg	gho34566	12345678911234	✓
5	Mark Zukerburg	gho34566	123456789112345	✓
6	Newton	gho34566	12345678910	✓
7	Thommas	gho34566	12345678910	✓
8	Mahenoor Haider Ali	gho34566	12345678910	✓
9	Aleaxander Hamillton	gho34566	12345678910	✓
10	Mark Zukerburg	123abc	12345678910	✓

11	Mark Zukerburg	567mnop	12345678910	✓
12	Mark Zukerburg	code22246	12345678910	✓
13	Mark Zukerburg	pinx123456	12345678910	✓

2. Robust Boundary Value Analysis Testing:

- **Function 1: Manage_Appointment (int noOfappointment)**

- **Constarint:**

  Appointment should be at least 3 and at most 10

- **Boundary**:

noOfappointment = 3 and 10

- **Test cases**: 6(n) + 1 => 6(1) +1 = 7
- **Input values :**

  Min-1= 2
  Min = 3
  Min+1= 4
  Normal = 7
  Max-1 = 9
  Max = 10
  Max+1= 11

Case	noOfappointment	Expected output
1	2	✗
2	3	✓
3	4	✓
4	7	✓
5	9	✓
6	10	✓
7	11	✗

✓ => Valid input
✗ => Invalid input

- **Function 2: PayBill(Double amount)**

- **Constraint:**

  Bill should be in range of PRs.300 to PRs. 3000

- **Boundary**:
  amount = 300 and 3000
- **Test cases**: 6(n) + 1 => 6(1) +1 = 7
- **Input values :**

Min-1= 299
Min = 300
Min+1= 301
Normal = 1800
Max-1 = 2999
Max = 3000
Max+1= 3001

Case	amount	Expected output
1	299	×
2	300	✓
3	301	✓
4	1800	✓
5	2999	✓
6	3000	✓
7	3001	×

✓ => Valid input
× => Invalid input

- **Function3 : Sign-up (String name, String password, String contact_no)**

- **Total Test cases**: 6n+1 => 6(3)+1 = 19

- **Constraint:**

  Name should be less than or equal to 20 alphabet character and should be greater than or equal to 6 character.
  Password should contain 6 characters at least and at most 10 characters.
  Contact_no should be less than or equal to 15 digit and greater than or equal to 7 digit.

- **Boundaries**:
  Name = 6 and 20
  Password = 6 and 10
  Contact_no = 7 and 15

- **Input values:**

For name

Min-1= Jonas
Min = Newton
Min+1= Thommas
Normal = Mark Zukerburg
Max-1 = Mahenoor Haider Ali
Max = Aleaxander Hamillton
Max+1= Hubert Blaine Grayson

For Password

min-1= 123ab
min = 123abc
min+1= 567mnop
normal = gho34566
max-1 = code22246
max = pinx123456
max+1= putx4445556

For Contact_no

min-1= 123456
min = 1234567
min+1= 12345678
normal = 12345678910
max-1 = 12345678911234
max = 123456789112345
max+1=224466889977551

Case	name	password	Contact_no	Expexted output
1	Mark Zukerburg	gho34566	123456	×
2	Mark Zukerburg	gho34566	1234567	✓
3	Mark Zukerburg	gho34566	12345678	✓
4	Mark Zukerburg	gho34566	12345678910	✓
5	Mark	gho34566	12345678911234	✓

	Zukerburg			
6	Mark Zukerburg	gho34566	123456789112345	✓
7	Mark Zukerburg	gho34566	224466889977551	×
8	Mark Zukerburg	123ab	12345678910	×
9	Mark Zukerburg	123abc	12345678910	✓
10	Mark Zukerburg	567mnop	12345678910	✓
11	Mark Zukerburg	code22246	12345678910	✓
12	Mark Zukerburg	pinx123456	12345678910	✓
13	Mark Zukerburg	putx4445556	12345678910	×
14	Jonas	gho34566	12345678910	×
15	Newton	gho34566	12345678910	✓
16	Thommas	gho34566	12345678910	✓
17	Mahenoor Haider Ali	gho34566	12345678910	✓
18	Aleaxander Hamillton	gho34566	12345678910	✓
19	Hubert Blaine Grayson	gho34566	12345678910	×

3. Worst Case Boundary value Analysis Testing:

- **Function 1:Manage_Appointment (int noOfappointment)**

- **Constarint:**

  Appointment should be at least 3 and at most 10

- **Boundary**:
  noOfappointment = 3 and 10

- **Test cases**: $5^{\wedge n}$ => $5^{\wedge 1}$ => 5

- **Input values :**

  min = 3
  min+1= 4
  normal = 7
  max-1 = 9
  max = 10

Case	noOfappointment	Expected output
1	3	✓
2	4	✓
3	7	✓
4	9	✓
5	10	✓

✓ => Valid input

➢ **Function 2**:**PayBill(Double amount)**

- **Constraint:**

  Bill should be in range of PRs.300 to PRs. 3000

- **Boundary**:
  Amount = 300 and 3000

- **Test cases**: $5^{\wedge n}$ => $5^{\wedge 1}$ => 5

- **Input values:**

  min = 300
  min+1= 301

normal = 1800
max-1 = 2999
max = 3000

Case	amount	Expected output
1	300	✓
2	301	✓
3	1800	✓
4	2999	✓
5	3000	✓

✓ => Valid input

- **Function3: Sign-up (String name, String password, String contact_no)**

- **Test cases**: $5^{\wedge n}$ => $5^{\wedge 3}$ => 125

- **Constraint:**

  Name should be less than or equal to 20 alphabet character and should be greater than or equal to 6 character.
  Password should contain 6 characters at least and at most 10 characters.
  Contact_no should be less than or equal to 15 digit and greater than or equal to 7 digit.

- **Boundaries**:
  Name = 6 and 20
  Password = 6 and 10
  Contact_no = 7 and 15

- **Input values =**

  For name

  min = Newton
  min+1= Thommas
  normal = Mark Zukerburg
  max-1 = Mahenoor Haider Ali
  max = Aleaxander Hamillton

  For Password

  min = 123abc
  min+1= 567mnop
  normal = gho34566
  max-1 = code22246
  max = pinx123456

  For Contact_no

  min = 1234567
  min+1= 12345678
  normal = 12345678910
  max-1 = 12345678911234
  max = 123456789112345

Case	name	password	contact_no	Expected output
1.	Newton	123abc	1234567	✓
2.	Newton	123abc	12345678	✓
3.	Newton	123abc	12345678910	✓
4.	Newton	123abc	12345678911234	✓
5.	Newton	123abc	123456789112345	✓
6.	Newton	567mnop	1234567	✓
7.	Newton	567mnop	12345678	✓
8.	Newton	567mnop	12345678910	✓
9.	Newton	567mnop	12345678911234	✓
10.	Newton	567mnop	123456789112345	✓

11.	Newton	gho34566	1234567	✓
12.	Newton	gho34566	12345678	✓
13.	Newton	gho34566	12345678910	✓
14.	Newton	gho34566	12345678911234	✓
15.	Newton	gho34566	123456789112345	✓
16.	Newton	code22246	1234567	✓
17.	Newton	code22246	12345678	✓
18.	Newton	code22246	12345678910	✓
19.	Newton	code22246	12345678911234	✓
20.	Newton	code22246	123456789112345	✓
21.	Newton	pinx123456	1234567	✓
22.	Newton	pinx123456	12345678	✓
23.	Newton	pinx123456	12345678910	✓
24.	Newton	pinx123456	12345678911234	✓
25.	Newton	pinx123456	123456789112345	✓
26.	Thommas	123abc	1234567	✓
27.	Thommas	123abc	12345678	✓
28.	Thommas	123abc	12345678910	✓
29.	Thommas	123abc	12345678911234	✓
30.	Thommas	123abc	123456789112345	✓
31.	Thommas	567mnop	1234567	✓
32.	Thommas	567mnop	12345678	✓
33.	Thommas	567mnop	12345678910	✓
34.	Thommas	567mnop	12345678911234	✓
35.	Thommas	567mnop	123456789112345	✓
36.	Thommas	gho34566	1234567	✓
37.	Thommas	gho34566	12345678	✓
38.	Thommas	gho34566	12345678910	✓
39.	Thommas	gho34566	12345678911234	✓
40.	Thommas	gho34566	123456789112345	✓
41.	Thommas	code22246	1234567	✓
42.	Thommas	code22246	12345678	✓
43.	Thommas	code22246	12345678910	✓
44.	Thommas	code22246	12345678911234	✓
45.	Thommas	code22246	123456789112345	✓
46.	Thommas	pinx123456	1234567	✓
47.	Thommas	pinx123456	12345678	✓
48.	Thommas	pinx123456	12345678910	✓
49.	Thommas	pinx123456	12345678911234	✓
50.	Thommas	pinx123456	123456789112345	✓
51.	Mark Zukerburg	123abc	1234567	✓
52.	Mark Zukerburg	123abc	12345678	✓

53.	Mark Zukerburg	123abc	12345678910	✓
54.	Mark Zukerburg	123abc	12345678911234	✓
55.	Mark Zukerburg	123abc	123456789112345	✓
56.	Mark Zukerburg	567mnop	1234567	✓
57.	Mark Zukerburg	567mnop	12345678	✓
58.	Mark Zukerburg	567mnop	12345678910	✓
59.	Mark Zukerburg	567mnop	12345678911234	✓
60.	Mark Zukerburg	567mnop	123456789112345	✓
61.	Mark Zukerburg	gho34566	1234567	✓
62.	Mark Zukerburg	gho34566	12345678	✓
63.	Mark Zukerburg	gho34566	12345678910	✓
64.	Mark Zukerburg	gho34566	12345678911234	✓
65.	Mark Zukerburg	gho34566	123456789112345	✓
66.	Mark Zukerburg	code22246	1234567	✓
67.	Mark Zukerburg	code22246	12345678	✓
68.	Mark Zukerburg	code22246	12345678910	✓
69.	Mark Zukerburg	code22246	12345678911234	✓
70.	Mark Zukerburg	code22246	123456789112345	✓
71.	Mark Zukerburg	pinx123456	1234567	✓
72.	Mark Zukerburg	pinx123456	12345678	✓
73.	Mark Zukerburg	pinx123456	12345678910	✓
74.	Mark Zukerburg	pinx123456	12345678911234	✓
75.	Mark Zukerburg	pinx123456	123456789112345	✓

76.	Mahenoor Haider Ali	123abc	1234567	✓
77.	Mahenoor Haider Ali	123abc	12345678	✓
78.	Mahenoor Haider Ali	123abc	12345678910	✓
79.	Mahenoor Haider Ali	123abc	12345678911234	✓
80.	Mahenoor Haider Ali	123abc	123456789112345	✓
81.	Mahenoor Haider Ali	567mnop	1234567	✓
82.	Mahenoor Haider Ali	567mnop	12345678	✓
83.	Mahenoor Haider Ali	567mnop	12345678910	✓
84.	Mahenoor Haider Ali	567mnop	12345678911234	✓
85.	Mahenoor Haider Ali	567mnop	123456789112345	✓
86.	Mahenoor Haider Ali	gho34566	1234567	✓
87.	Mahenoor Haider Ali	gho34566	12345678	✓
88.	Mahenoor Haider Ali	gho34566	12345678910	✓
89.	Mahenoor Haider Ali	gho34566	12345678911234	✓
90.	Mahenoor Haider Ali	gho34566	123456789112345	✓
91.	Mahenoor Haider Ali	code22246	1234567	✓
92.	Mahenoor Haider Ali	code22246	12345678	✓
93.	Mahenoor Haider Ali	code22246	12345678910	✓
94.	Mahenoor Haider Ali	code22246	12345678911234	✓
95.	Mahenoor Haider Ali	code22246	123456789112345	✓
96.	Mahenoor Haider Ali	pinx123456	1234567	✓
97.	Mahenoor Haider Ali	pinx123456	12345678	✓
98.	Mahenoor Haider Ali	pinx123456	12345678910	✓

99.	Mahenoor Haider Ali	pinx123456	12345678911234	✓
100.	Mahenoor Haider Ali	pinx123456	123456789112345	✓
101.	Aleaxander Hamillton	123abc	1234567	✓
102.	Aleaxander Hamillton	123abc	12345678	✓
103.	Aleaxander Hamillton	123abc	12345678910	✓
104.	Aleaxander Hamillton	123abc	12345678911234	✓
105.	Aleaxander Hamillton	123abc	123456789112345	✓
106.	Aleaxander Hamillton	567mnop	1234567	✓
107.	Aleaxander Hamillton	567mnop	12345678	✓
108.	Aleaxander Hamillton	567mnop	12345678910	✓
109.	Aleaxander Hamillton	567mnop	12345678911234	✓
110.	Aleaxander Hamillton	567mnop	123456789112345	✓
111.	Aleaxander Hamillton	gho34566	1234567	✓
	Aleaxander Hamillton	gho34566	12345678	✓
112.	Aleaxander Hamillton	gho34566	12345678910	✓
113.	Aleaxander Hamillton	gho34566	12345678911234	✓
114.	Aleaxander Hamillton	gho34566	123456789112345	✓
115.	Aleaxander Hamillton	code22246	1234567	✓
116.	Aleaxander Hamillton	code22246	12345678	✓
117.	Aleaxander Hamillton	code22246	12345678910	✓
118.	Aleaxander Hamillton	code22246	12345678911234	✓
119.	Aleaxander Hamillton	code22246	123456789112345	✓
120.	Aleaxander Hamillton	pinx123456	1234567	✓

	Aleaxander Hamillton	pinx123456	12345678	✓
121.	Aleaxander Hamillton	pinx123456	12345678910	✓
122.	Aleaxander Hamillton	pinx123456	12345678911234	✓
123.	Aleaxander Hamillton	pinx123456	123456789112345	✓
124.	Aleaxander Hamillton	123abc	1234567	✓
125.	Aleaxander Hamillton	123abc	12345678	✓

4. Robust Worst Case Testing

- **Function 1:Manage_Appointment (int noOfappointment)**

- **Constarint:**

  Appointment should be at least 3 and at most 10

- **Boundary**:
  noOfappointmen => *3* and 10

- **Test cases**: $7^{\wedge n}$ => $7^{\wedge 1}$ => 7

- **Input value:**

  Min-1= 2
  Min = 3
  Min+1= 4
  Normal = 7
  Max-1 = 9
  Max = 10
  Max+1= 11

Case	noOfappointment	Expected output
1	2	×
2	3	✓
3	4	✓
4	7	✓
5	9	✓
6	10	✓
7	11	×

✓ => Valid input
× => Invalid input

- **Function 2:PayBill(Double amount)**

- **Constraint:**

  Bill should be in range of PRs.300 to PRs. 3000

- **Boundary**:
  Amount => 300 and 3000

- **Test cases**: $7^{\wedge n}$ => $7^{\wedge 1}$ => 7

- **Input values:**

Min-1= 299
Min = 300
Min+1= 301
Normal = 1800
Max-1 = 2999
Max = 3000
Max+1= 3001

Case	amount	Expected output
1	299	×
2	300	✓
3	301	✓
4	1800	✓
5	2999	✓
6	3000	✓
7	3001	×

✓ => Valid input
× => Invalid input

- **Function 3:Sign-up (String name, String password, String contact_no)**

- **Test cases**: $7^{\wedge n}$ => $7^{\wedge 3}$ => 343

- **Constraint:**

  Name should be less than or equal to 20 alphabet character and should be greater than or equal to 6 character.
  Password should contain 6 characters at least and at most 10 characters.
  Contact_no should be less than or equal to 15 digit and greater than or equal to 7 digit.

Boundaries:
name = 6 and 20
password = 6 and 10
contact_no = 7 and 15

- **Input values:**

For name

Min-1= Jonas
Min = Newton
Min+1= Thommas
Normal = Mark Zukerburg
Max-1 = Mahenoor Haider Ali
Max = Aleaxander Hamillton
Max+1= Hubert Blaine Grayson

For Password

min-1= 123ab
min = 123abc
min+1= 567mnop
normal = gho34566
max-1 = code22246
max = pinx123456
max+1= putx4445556

For Contact_no

min-1= 123456
min = 1234567
min+1= 12345678
normal = 12345678910
max-1 = 12345678911234
max = 123456789112345
max+1=224466889977551

Case	Name	Password	Contact_no	Expected Output
1.	Jonas	123ab	123456	×
2.	Jonas	123ab	1234567	×
3.	Jonas	123ab	12345678	×

4.	Jonas	123ab	12345678910	×
5.	Jonas	123ab	12345678911234	×
6.	Jonas	123ab	123456789112345	×
7.	Jonas	123ab	224466889977551	×
8.	Jonas	123abc	123456	×
9.	Jonas	123abc	1234567	×
10.	Jonas	123abc	12345678	×
11.	Jonas	123abc	12345678910	×
12.	Jonas	123abc	12345678911234	×
13.	Jonas	123abc	123456789112345	×
14.	Jonas	123abc	224466889977551	×
15.	Jonas	567mnop	123456	×
16.	Jonas	567mnop	1234567	×
17.	Jonas	567mnop	12345678	×
18.	Jonas	567mnop	12345678910	×
19.	Jonas	567mnop	12345678911234	×
20.	Jonas	567mnop	123456789112345	×
21.	Jonas	567mnop	224466889977551	×
22.	Jonas	gho34566	123456	×
23.	Jonas	gho34566	1234567	×
24.	Jonas	gho34566	12345678	×
25.	Jonas	gho34566	12345678910	×
26.	Jonas	gho34566	12345678911234	×
27.	Jonas	gho34566	123456789112345	×
28.	Jonas	gho34566	224466889977551	×
29.	Jonas	code22246	123456	×
30.	Jonas	code22246	1234567	×
31.	Jonas	code22246	12345678	×
32.	Jonas	code22246	12345678910	×
33.	Jonas	code22246	12345678911234	×
34.	Jonas	code22246	123456789112345	×
35.	Jonas	code22246	224466889977551	×
36.	Jonas	pinx123456	123456	×
37.	Jonas	pinx123456	1234567	×
38.	Jonas	pinx123456	12345678	×
39.	Jonas	pinx123456	12345678910	×
40.	Jonas	pinx123456	12345678911234	×
41.	Jonas	pinx123456	123456789112345	×

42.	Jonas	pinx123456	224466889977551	×
43.	Jonas	putx4445556	123456	×
44.	Jonas	putx4445556	1234567	×
45.	Jonas	putx4445556	12345678	×
46.	Jonas	putx4445556	12345678910	×
47.	Jonas	putx4445556	12345678911234	×
48.	Jonas	putx4445556	123456789112345	×
49.	Jonas	putx4445556	224466889977551	×
50.	Newton	123ab	123456	×
51.	Newton	123ab	1234567	×
52.	Newton	123ab	12345678	×
53.	Newton	123ab	12345678910	×
54.	Newton	123ab	12345678911234	×
55.	Newton	123ab	123456789112345	×
56.	Newton	123ab	224466889977551	×
57.	Newton	123abc	123456	×
58.	Newton	123abc	1234567	✓
59.	Newton	123abc	12345678	✓
60.	Newton	123abc	12345678910	✓
61.	Newton	123abc	12345678911234	✓
62.	Newton	123abc	123456789112345	✓
63.	Newton	123abc	224466889977551	✓
64.	Newton	567mnop	123456	×
65.	Newton	567mnop	1234567	✓
66.	Newton	567mnop	12345678	✓
67.	Newton	567mnop	12345678910	✓
68.	Newton	567mnop	12345678911234	✓
69.	Newton	567mnop	123456789112345	✓
70.	Newton	567mnop	224466889977551	✓
71.	Newton	gho34566	123456	×
72.	Newton	gho34566	1234567	✓
73.	Newton	gho34566	12345678	✓
74.	Newton	gho34566	12345678910	✓
75.	Newton	gho34566	12345678911234	✓
76.	Newton	gho34566	123456789112345	✓
77.	Newton	gho34566	224466889977551	✓
78.	Newton	code22246	123456	×

79.	Newton	code22246	1234567	✓
80.	Newton	code22246	12345678	✓
81.	Newton	code22246	12345678910	✓
82.	Newton	code22246	12345678911234	✓
83.	Newton	code22246	123456789112345	✓
84.	Newton	code22246	224466889977551	✓
85.	Newton	pinx123456	123456	×
86.	Newton	pinx123456	1234567	✓
87.	Newton	pinx123456	12345678	✓
88.	Newton	pinx123456	12345678910	✓
89.	Newton	pinx123456	12345678911234	✓
90.	Newton	pinx123456	123456789112345	✓
91.	Newton	pinx123456	224466889977551	✓
92.	Newton	putx4445556	123456	×
93.	Newton	putx4445556	1234567	×
94.	Newton	putx4445556	12345678	×
95.	Newton	putx4445556	12345678910	×
96.	Newton	putx4445556	12345678911234	×
97.	Newton	putx4445556	123456789112345	×
98.	Newton	putx4445556	224466889977551	×
99.	Thommas	123ab	123456	×
100.	Thommas	123ab	1234567	×
101.	Thommas	123ab	12345678	×
102.	Thommas	123ab	12345678910	×
103.	Thommas	123ab	12345678911234	×
104.	Thommas	123ab	123456789112345	×
105.	Thommas	123ab	224466889977551	×
106.	Thommas	123abc	123456	×
107.	Thommas	123abc	1234567	✓
108.	Thommas	123abc	12345678	✓
109.	Thommas	123abc	12345678910	✓
110.	Thommas	123abc	12345678911234	✓
111.	Thommas	123abc	123456789112345	✓
112.	Thommas	123abc	224466889977551	✓
113.	Thommas	567mnop	123456	×
114.	Thommas	567mnop	1234567	✓
115.	Thommas	567mnop	12345678	✓

116.	Thommas	567mnop	12345678910	✓
117.	Thommas	567mnop	12345678911234	✓
118.	Thommas	567mnop	123456789112345	✓
119.	Thommas	567mnop	224466889977551	✓
120.	Thommas	gho34566	123456	×
121.	Thommas	gho34566	1234567	✓
122.	Thommas	gho34566	12345678	✓
123.	Thommas	gho34566	12345678910	✓
124.	Thommas	gho34566	12345678911234	✓
125.	Thommas	gho34566	123456789112345	✓
126.	Thommas	gho34566	224466889977551	✓
127.	Thommas	code22246	123456	×
128.	Thommas	code22246	1234567	✓
129.	Thommas	code22246	12345678	✓
130.	Thommas	code22246	12345678910	✓
131.	Thommas	code22246	12345678911234	✓
132.	Thommas	code22246	123456789112345	✓
133.	Thommas	code22246	224466889977551	✓
134.	Thommas	pinx123456	123456	×
135.	Thommas	pinx123456	1234567	✓
136.	Thommas	pinx123456	12345678	✓
137.	Thommas	pinx123456	12345678910	✓
138.	Thommas	pinx123456	12345678911234	✓
139.	Thommas	pinx123456	123456789112345	✓
140.	Thommas	pinx123456	224466889977551	✓
141.	Thommas	putx4445556	123456	×
142.	Thommas	putx4445556	1234567	×
143.	Thommas	putx4445556	12345678	×
144.	Thommas	putx4445556	12345678910	×
145.	Thommas	putx4445556	12345678911234	×
146.	Thommas	putx4445556	123456789112345	×
147.	Thommas	putx4445556	224466889977551	×
148.	Mark Zukerburg	123ab	123456	×
149.	Mark Zukerburg	123ab	1234567	×
150.	Mark Zukerburg	123ab	12345678	×
151.	Mark	123ab	12345678910	×

	Zukerburg			
152.	Mark Zukerburg	123ab	12345678911234	×
153.	Mark Zukerburg	123ab	123456789112345	×
154.	Mark Zukerburg	123ab	224466889977551	×
155.	Mark Zukerburg	123abc	123456	×
156.	Mark Zukerburg	123abc	1234567	✓
157.	Mark Zukerburg	123abc	12345678	✓
158.	Mark Zukerburg	123abc	12345678910	✓
159.	Mark Zukerburg	123abc	12345678911234	✓
160.	Mark Zukerburg	123abc	123456789112345	✓
161.	Mark Zukerburg	123abc	224466889977551	✓
162.	Mark Zukerburg	567mnop	123456	×
163.	Mark Zukerburg	567mnop	1234567	✓
164.	Mark Zukerburg	567mnop	12345678	✓
165.	Mark Zukerburg	567mnop	12345678910	✓
166.	Mark Zukerburg	567mnop	12345678911234	✓
167.	Mark Zukerburg	567mnop	123456789112345	✓
168.	Mark Zukerburg	567mnop	224466889977551	✓
169.	Mark Zukerburg	gho34566	123456	×
170.	Mark Zukerburg	gho34566	1234567	✓

171.	Mark Zukerburg	gho34566	12345678	✓
172.	Mark Zukerburg	gho34566	12345678910	✓
173.	Mark Zukerburg	gho34566	12345678911234	✓
174.	Mark Zukerburg	gho34566	123456789112345	✓
175.	Mark Zukerburg	gho34566	224466889977551	✓
176.	Mark Zukerburg	code22246	123456	✗
177.	Mark Zukerburg	code22246	1234567	✓
178.	Mark Zukerburg	code22246	12345678	✓
179.	Mark Zukerburg	code22246	12345678910	✓
180.	Mark Zukerburg	code22246	12345678911234	✓
181.	Mark Zukerburg	code22246	123456789112345	✓
182.	Mark Zukerburg	code22246	224466889977551	✓
183.	Mark Zukerburg	pinx123456	123456	✗
184.	Mark Zukerburg	pinx123456	1234567	✓
185.	Mark Zukerburg	pinx123456	12345678	✓
186.	Mark Zukerburg	pinx123456	12345678910	✓
187.	Mark Zukerburg	pinx123456	12345678911234	✓
188.	Mark Zukerburg	pinx123456	123456789112345	✓
189.	Mark Zukerburg	pinx123456	224466889977551	✓
190.	Mark	putx4445556	123456	✗

	Zukerburg			
191.	Mark Zukerburg	putx4445556	1234567	×
192.	Mark Zukerburg	putx4445556	12345678	×
193.	Mark Zukerburg	putx4445556	12345678910	×
194.	Mark Zukerburg	putx4445556	12345678911234	×
195.	Mark Zukerburg	putx4445556	123456789112345	×
196.	Mark Zukerburg	putx4445556	224466889977551	×
197.	Mahenoor Haider Ali	123ab	123456	×
198.	Mahenoor Haider Ali	123ab	1234567	×
199.	Mahenoor Haider Ali	123ab	12345678	×
200.	Mahenoor Haider Ali	123ab	12345678910	×
201.	Mahenoor Haider Ali	123ab	12345678911234	×
202.	Mahenoor Haider Ali	123ab	123456789112345	×
203.	Mahenoor Haider Ali	123ab	224466889977551	×
204.	Mahenoor Haider Ali	123abc	123456	×
205.	Mahenoor Haider Ali	123abc	1234567	✓
206.	Mahenoor Haider Ali	123abc	12345678	✓
207.	Mahenoor Haider Ali	123abc	12345678910	✓
208.	Mahenoor Haider Ali	123abc	12345678911234	✓
209.	Mahenoor Haider Ali	123abc	123456789112345	✓

210.	Mahenoor Haider Ali	123abc	224466889977551	✓
211.	Mahenoor Haider Ali	567mnop	123456	✗
212.	Mahenoor Haider Ali	567mnop	1234567	✓
213.	Mahenoor Haider Ali	567mnop	12345678	✓
214.	Mahenoor Haider Ali	567mnop	12345678910	✓
215.	Mahenoor Haider Ali	567mnop	12345678911234	✓
216.	Mahenoor Haider Ali	567mnop	123456789112345	✓
217.	Mahenoor Haider Ali	567mnop	224466889977551	✓
218.	Mahenoor Haider Ali	gho34566	123456	✗
219.	Mahenoor Haider Ali	gho34566	1234567	✓
220.	Mahenoor Haider Ali	gho34566	12345678	✓
221.	Mahenoor Haider Ali	gho34566	12345678910	✓
222.	Mahenoor Haider Ali	gho34566	12345678911234	✓
223.	Mahenoor Haider Ali	gho34566	123456789112345	✓
224.	Mahenoor Haider Ali	gho34566	224466889977551	✓
225.	Mahenoor Haider Ali	code22246	123456	✗
226.	Mahenoor Haider Ali	code22246	1234567	✓
227.	Mahenoor Haider Ali	code22246	12345678	✓
228.	Mahenoor Haider Ali	code22246	12345678910	✓
229.	Mahenoor	code22246	12345678911234	✓

	Haider Ali			
230.	Mahenoor Haider Ali	code22246	123456789112345	✓
231.	Mahenoor Haider Ali	code22246	224466889977551	✓
232.	Mahenoor Haider Ali	pinx123456	123456	×
233.	Mahenoor Haider Ali	pinx123456	1234567	✓
234.	Mahenoor Haider Ali	pinx123456	12345678	✓
235.	Mahenoor Haider Ali	pinx123456	12345678910	✓
236.	Mahenoor Haider Ali	pinx123456	12345678911234	✓
237.	Mahenoor Haider Ali	pinx123456	123456789112345	✓
238.	Mahenoor Haider Ali	pinx123456	224466889977551	✓
239.	Mahenoor Haider Ali	putx4445556	123456	×
240.	Mahenoor Haider Ali	putx4445556	1234567	×
241.	Mahenoor Haider Ali	putx4445556	12345678	×
242.	Mahenoor Haider Ali	putx4445556	12345678910	×
243.	Mahenoor Haider Ali	putx4445556	12345678911234	×
244.	Mahenoor Haider Ali	putx4445556	123456789112345	×
245.	Mahenoor Haider Ali	putx4445556	224466889977551	×
246.	Aleaxander Hamillton	123ab	123456	×
247.	Aleaxander Hamillton	123ab	1234567	×
248.	Aleaxander Hamillton	123ab	12345678	×

249.	Aleaxander Hamillton	123ab	12345678910	✖
250.	Aleaxander Hamillton	123ab	12345678911234	✖
251.	Aleaxander Hamillton	123ab	123456789112345	✖
252.	Aleaxander Hamillton	123ab	224466889977551	✖
253.	Aleaxander Hamillton	123abc	123456	✖
254.	Aleaxander Hamillton	123abc	1234567	✓
255.	Aleaxander Hamillton	123abc	12345678	✓
256.	Aleaxander Hamillton	123abc	12345678910	✓
257.	Aleaxander Hamillton	123abc	12345678911234	✓
258.	Aleaxander Hamillton	123abc	123456789112345	✓
259.	Aleaxander Hamillton	123abc	224466889977551	✓
260.	Aleaxander Hamillton	567mnop	123456	✖
261.	Aleaxander Hamillton	567mnop	1234567	✓
262.	Aleaxander Hamillton	567mnop	12345678	✓
263.	Aleaxander Hamillton	567mnop	12345678910	✓
264.	Aleaxander Hamillton	567mnop	12345678911234	✓
265.	Aleaxander Hamillton	567mnop	123456789112345	✓
266.	Aleaxander Hamillton	567mnop	224466889977551	✓
267.	Aleaxander Hamillton	gho34566	123456	✖
268.	Aleaxander	gho34566	1234567	✓

	Hamillton			
269.	Aleaxander Hamillton	gho34566	12345678	✓
270.	Aleaxander Hamillton	gho34566	12345678910	✓
271.	Aleaxander Hamillton	gho34566	12345678911234	✓
272.	Aleaxander Hamillton	gho34566	123456789112345	✓
273.	Aleaxander Hamillton	gho34566	224466889977551	✓
274.	Aleaxander Hamillton	code22246	123456	✖
275.	Aleaxander Hamillton	code22246	1234567	✓
276.	Aleaxander Hamillton	code22246	12345678	✓
277.	Aleaxander Hamillton	code22246	12345678910	✓
278.	Aleaxander Hamillton	code22246	12345678911234	✓
279.	Aleaxander Hamillton	code22246	123456789112345	✓
280.	Aleaxander Hamillton	code22246	224466889977551	✓
281.	Aleaxander Hamillton	pinx123456	123456	✖
282.	Aleaxander Hamillton	pinx123456	1234567	✓
283.	Aleaxander Hamillton	pinx123456	12345678	✓
284.	Aleaxander Hamillton	pinx123456	12345678910	✓
285.	Aleaxander Hamillton	pinx123456	12345678911234	✓
286.	Aleaxander Hamillton	pinx123456	123456789112345	✓
287.	Aleaxander Hamillton	pinx123456	224466889977551	✓

288.	Aleaxander Hamillton	putx4445556	123456	×
289.	Aleaxander Hamillton	putx4445556	1234567	×
290.	Aleaxander Hamillton	putx4445556	12345678	×
291.	Aleaxander Hamillton	putx4445556	12345678910	×
292.	Aleaxander Hamillton	putx4445556	12345678911234	×
293.	Aleaxander Hamillton	putx4445556	123456789112345	×
294.	Aleaxander Hamillton	putx4445556	224466889977551	×
295.	Hubert Blaine Grayson	123ab	123456	×
296.	Hubert Blaine Grayson	123ab	1234567	×
297.	Hubert Blaine Grayson	123ab	12345678	×
298.	Hubert Blaine Grayson	123ab	12345678910	×
299.	Hubert Blaine Grayson	123ab	12345678911234	×
300.	Hubert Blaine Grayson	123ab	123456789112345	×
301.	Hubert Blaine Grayson	123ab	224466889977551	×
302.	Hubert Blaine Grayson	123abc	123456	×
303.	Hubert	123abc	1234567	✓

	Blaine Grayson			
304.	Hubert Blaine Grayson	123abc	12345678	✓
305.	Hubert Blaine Grayson	123abc	12345678910	✓
306.	Hubert Blaine Grayson	123abc	12345678911234	✓
307.	Hubert Blaine Grayson	123abc	123456789112345	✓
308.	Hubert Blaine Grayson	123abc	224466889977551	✓
309.	Hubert Blaine Grayson	567mnop	123456	✗
310.	Hubert Blaine Grayson	567mnop	1234567	✓
311.	Hubert Blaine Grayson	567mnop	12345678	✓
312.	Hubert Blaine Grayson	567mnop	12345678910	✓
313.	Hubert Blaine Grayson	567mnop	12345678911234	✓
314.	Hubert Blaine Grayson	567mnop	123456789112345	✓
315.	Hubert Blaine Grayson	567mnop	224466889977551	✓
316.	Hubert	gho34566	123456	✗

	Blaine Grayson			
317.	Hubert Blaine Grayson	gho34566	1234567	✓
318.	Hubert Blaine Grayson	gho34566	12345678	✓
319.	Hubert Blaine Grayson	gho34566	12345678910	✓
320.	Hubert Blaine Grayson	gho34566	12345678911234	✓
321.	Hubert Blaine Grayson	gho34566	123456789112345	✓
322.	Hubert Blaine Grayson	gho34566	224466889977551	✓
323.	Hubert Blaine Grayson	code22246	123456	✗
324.	Hubert Blaine Grayson	code22246	1234567	✓
325.	Hubert Blaine Grayson	code22246	12345678	✓
326.	Hubert Blaine Grayson	code22246	12345678910	✓
327.	Hubert Blaine Grayson	code22246	12345678911234	✓
328.	Hubert Blaine Grayson	code22246	123456789112345	✓
329.	Hubert	code22246	224466889977551	✓

	Blaine Grayson			
330.	Hubert Blaine Grayson	pinx123456	123456	✗
331.	Hubert Blaine Grayson	pinx123456	1234567	✓
332.	Hubert Blaine Grayson	pinx123456	12345678	✓
333.	Hubert Blaine Grayson	pinx123456	12345678910	✓
334.	Hubert Blaine Grayson	pinx123456	12345678911234	✓
335.	Hubert Blaine Grayson	pinx123456	123456789112345	✓
336.	Hubert Blaine Grayson	pinx123456	224466889977551	✓
337.	Hubert Blaine Grayson	putx4445556	123456	✗
338.	Hubert Blaine Grayson	putx4445556	1234567	✗
339.	Hubert Blaine Grayson	putx4445556	12345678	✗
340.	Hubert Blaine Grayson	putx4445556	12345678910	✗
341.	Hubert Blaine Grayson	putx4445556	12345678911234	✗
342.	Hubert	putx4445556	123456789112345	✗

	Blaine Grayson			
343.	Hubert Blaine Grayson	putx4445556	224466889977551	✗

✓ => Valid input
✗ => Invalid input

5. Strong Robust Equivalence Class Partitioning:

- **Function 1:Manage_Appointment (int noOfappointment)**

- **Constraint:**

  Appointments has be at least 3 and at most 10

- **Test cases:**

Normal value: 6
Upper robust value: 11
Lower robust value: 2

Case	noOfappointment	Expected output
1	6	✓
2	11	×
3	2	×

✓ => Valid input
× => Invalid input

- **Function 2: *PayBill(Double amount)***

- **Constraint:**

  Bill should be greater than or equal to PRs.300 and less than or equal to PRs. 3000

- **Test cases:**

  Normal value: 2000
  Upper robust value: 3001
  Lower robust value: 299

Case	amount	Expected output
1	2000	✓
2	3001	×
3	299	×

✓ => Valid input

× => Invalid input

- **Function 3: Sign-up (String name, String password, String contact_no)**

- **Constraint:**

  Name should be less than or equal to 20 alphabet character and should be greater than or equal to 6 character.
  Password should contain 6 characters at least and at most 10 characters.
  Contact_no should be less than or equal to 15 digit and greater than or equal to 7 digit.

- **Test cases:**

  For Name:

  Normal value: Thommas
  Upper robust value: Hubert Blaine Grayson (spaces are also considered)
  Lower robust value: Jonas

  For Password:

  Normal value: gho34566
  Upper robust value: putx4445556
  Lower robust value: 123ab

  For Contact_no:

  Normal value: 12345678911
  Upper robust value: 2244668899775512
  Lower robust value: 123456

Case	Name	Password	Contact_no	Expected output
1	Hubert Blaine Grayson	putx4445556	2244668899775512	✗
2	Hubert Blaine Grayson	putx4445556	12345678911	✗
3	Hubert Blaine Grayson	gho34566	2244668899775512	✗
4	Thommas	putx4445556	2244668899775512	✗
5	Hubert Blaine Grayson	gho34566	12345678911	✗
6	Thommas	putx4445556	12345678911	✗
7	Thommas	gho34566	2244668899775512	✗
8	Jonas	123ab	123456	✗
9	Jonas	123ab	12345678911	✗
10	Jonas	gho34566	123456	✗
11	Thommas	123ab	123456	✗
12	Thommas	gho34566	123456	✗
13	Jonas	gho34566	12345678911	✗
14	Thommas	123ab	12345678911	✗
15	Thommas	gho34566	12345678911	✓

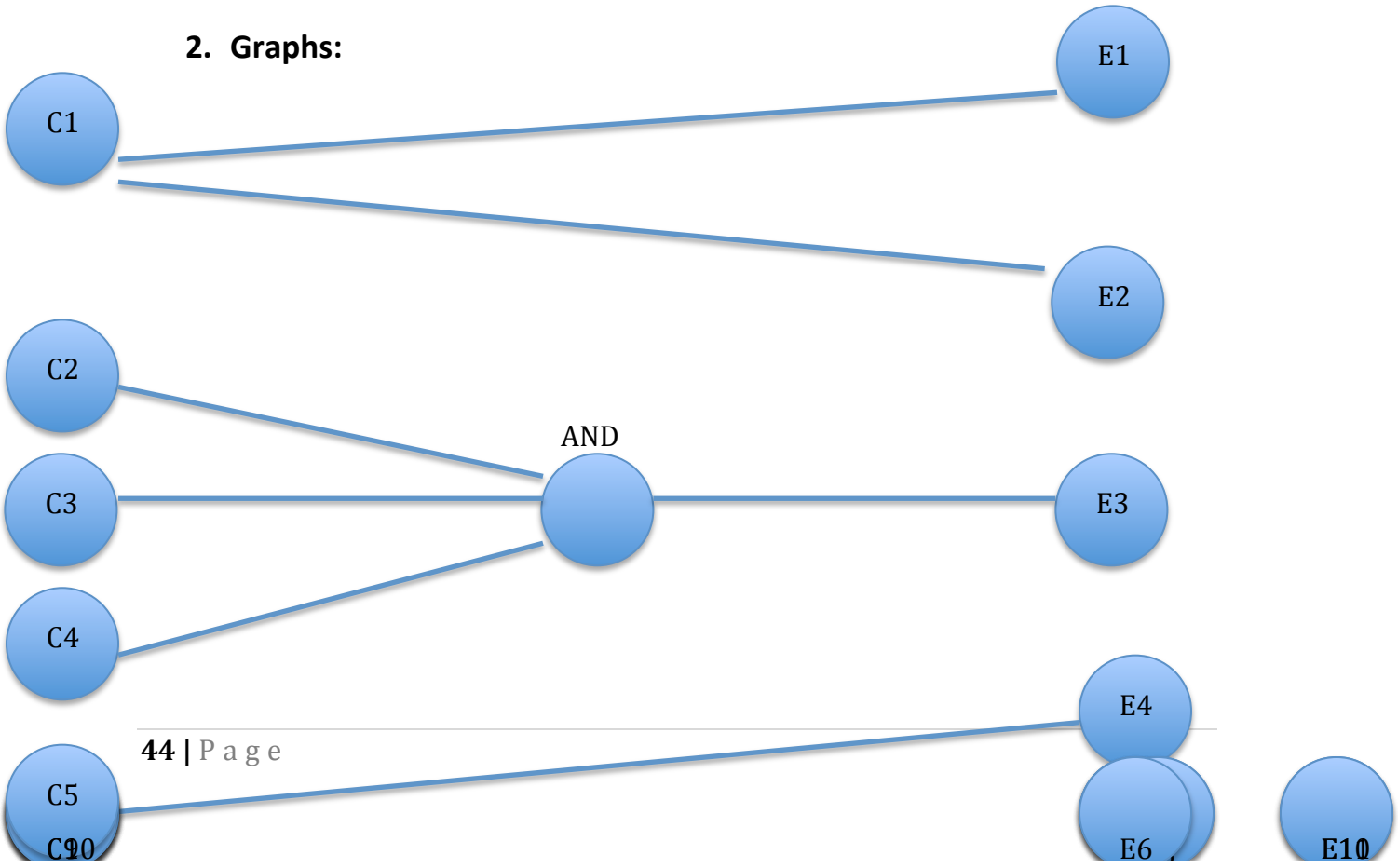
6. Cause Effect Graphing

1. Identify Causes and effects

Causes	Effects
C1: Doctors uploads patient medical history on portal	**E1:** Patient medical history will be visible to the patient **E2:** Patient medical history will be visible to the doctor

C2: User enters name in string, which is less than or equal to 20 alphabet characters and greater than or equal to 6 characters. **C3:** User enters password in string, which is at least 6 characters and at most 10 characters. **C4:** User enters contact no in digits, which is at least 7 digits and at most 15 digits.	**E3:** Registered
C5: User enters password in string, which is at least 6 characters and at most 10 characters.	**E4:** Logins
C6: Patient gets transferred from one clinic to another	**E5:** Visited clinic doctor can view medical history of that patient **E6:** Visited clinic doctor can view personal information of that patient
C7: Patient pays bill within range of PR. 300 to PR. 3000 according to patient's treatment	**E7:** Provide a medical receipt to patient
C8: Patient requests for making an appointment	**E8:** Receptionist manages appointment details.
C9: If Appointments made are at least 3 and at most 10 in a day.	**E9:** Doctors can make their schedule according to patients appointments
C10: Once patients appointment gets confirmed	**E10:** Patient can see online how many people are waiting in queue for appointment. **E11:** Receptionist saves appointment details.

2. Graphs:



3. Decision Table:

		T1	T2	T3	T4	T5	T6	T7	T8
cause	C1	1	0	0	0	0	0	0	0
cause	C2	0	1	0	0	0	0	0	0
cause	C3	0	1	0	0	0	0	0	0
cause	C4	0	1	0	0	0	0	0	0
cause	C5	0	0	1	0	0	0	0	0
cause	C6	0	0	0	1	0	0	0	0
cause	C7	0	0	0	0	1	0	0	0
cause	C8	0	0	0	0	0	1	0	0
cause	C9	0	0	0	0	0	0	1	0
cause	C10	0	0	0	0	0	0	0	1
Effect	E1	1	-	-	-	-	-	-	-

Effect	E2	1	-	-	-	-	-	-	-
Effect	E3	-	1	-	-	-	-	-	-
Effect	E4	-	-	1	-	-	-	-	-
Effect	E5	-	-	-	1	-	-	-	-
Effect	E6	-	-	-	1	-	-	-	-

Test cases	**Input (Cause)**	**Expected Output (Effect)**

Effect	E7	-	-	-	-	1	-	-	-
Effect	E8	-	-	-	-	-	1	-	-
Effect	E9	-	-	-	-	-	-	1	-
Effect	E10	-	-	-	-	-	-	-	1
Effect	E11	-	-	-	-	-	-	-	1

4. Identifying Test cases:

1	• name >=6 **&&** name <=20 • password>=6**&&**password<=10 • contact_no>=7**&&**contact_no<=15	Registered
2	• password>=6**&&**password<=10	Login
3	• bill>=300 **&&** bill<=3000	Generate medical receipt
4	• appointments>=3**&&**appointments<=10	Make schedule

5. Test cases:

Applying Weak Robust Equivalence Class.

Test case #	**Inputs (causes)**	**Expected Output (effects)**

<table>
<tr>
<td>T1</td>
<td>
<table>
<tr><th>Name</th><th>Password</th><th>Contact_no</th></tr>
<tr><td>Jonas</td><td>123ab</td><td>123456</td></tr>
<tr><td>Thommas</td><td>gho34566</td><td>12345678911</td></tr>
<tr><td>Keannaemilyelizebeth</td><td>putx4445556</td><td>2244668899775512</td></tr>
</table>
</td>
<td>
<table>
<tr><td>Invalid</td></tr>
<tr><td>Valid (registered)</td></tr>
<tr><td>Invalid</td></tr>
</table>
</td>
</tr>
<tr>
<td>T2</td>
<td>
<table>
<tr><th>Password</th></tr>
<tr><td>123ab</td></tr>
<tr><td>gho34566</td></tr>
<tr><td>putx4445556</td></tr>
</table>
</td>
<td>
<table>
<tr><td>Invalid</td></tr>
<tr><td>Valid (login)</td></tr>
<tr><td>Invalid</td></tr>
</table>
</td>
</tr>
<tr>
<td>T3</td>
<td>
<table>
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<tr><td>Invalid</td></tr>
<tr><td>Valid (generate medical receipt)</td></tr>
<tr><td>Invalid</td></tr>
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<td>T4</td>
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<tr><th>Appointment</th></tr>
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<tr><td>11</td></tr>
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<td>
<table>
<tr><td>Invalid</td></tr>
<tr><td>Valid (makes schedule)</td></tr>
<tr><td>Invalid</td></tr>
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Reasoning to choose the Equivalence Class:

The Reason to choose the Equivalence Class is that it reduces the number of test cases so; the effort and the time are also reduced without the compromise on the overall testing.