Output of Queries:

#1:

```
Please make your choice: 1
        Enter name (MAX: 128 CHAR): Gabriel Zamora
        Enter specialty (MAX: 24 CHAR): Physician
        Enter did: 4
```

```
    242 | Magen Weller        | Otolaryngologist  |  15
    243 | Tamica Spence       | Otolaryngologist  |  15
    244 | Bianca Rich         | Otolaryngologist  |  15
    245 | Susann Venegas      | Otolaryngologist  |  15
    246 | Alene Kenyon        | Otolaryngologist  |  15
    247 | Shamika Odom        | Otolaryngologist  |  15
    248 | Kasey Hurtado       | Otolaryngologist  |  15
    249 | Cody Ruby           | Otolaryngologist  |  15
    250 | Gabriel Zamora      | Physician         |   4
 (251 rows)
```

#2:

```
Please make your choice: 2
        Enter name (MAX: 128 CHAR): Billy Butler
        Enter gender (M/F): M
        Enter age: 46
        Enter address (MAX: 256 CHAR): 960 Kraken Avenue
        Enter number of appointments: 3
```

```
    243 | Breana Pasha      | M  | 15 | 64 Sunset Street Daphne             |    2
    244 | Tamar Bundy       | M  | 26 | 8770 W. Edgemont Street Greenwood   |    2
    245 | Matilda Linville  | M  | 11 | 779 NW. Penn Court Santa Monica     |    2
    246 | Sherril Eason     | M  | 50 | 66 Ridgewood Street Titusville      |    3
    247 | Charissa Moreton  | M  | 45 | 970 Fordham Street Wilson           |    3
    248 | Rolando Hoehn     | M  | 59 | 712 Glendale Court Valrico          |    3
    249 | Mimi Stelle       | M  | 27 | 897 Lyme St. Duarte                 |    2
    250 | Billy Butler      | M  | 46 | 960 Kraken Avenue                   |    3
 (251 rows)
```

#3:

```
Please make your choice: 3
        Enter date: 08/08/2021
        Enter timeslot: 6:00-7:00
        Enter status: AV
```

```
    543 | 2021-06-16 | 8:00-10:30 | AV
    544 | 2021-02-09 | 8:00-10:30 | PA
    545 | 2020-05-22 | 8:00-10:30 | AC
    546 | 2020-08-31 | 8:00-10:30 | PA
    547 | 2020-09-21 | 8:00-10:30 | PA
    548 | 2021-03-23 | 8:00-10:30 | PA
    549 | 2020-07-10 | 8:00-17:00 | AC
    550 | 2021-08-08 | 6:00-7:00  | AV
 (551 rows)
```

#4:

```
Please make your choice: 4
        Enter patient name: Alberto Scarlett
        Enter patient gender: M
        Enter patient age: 50
        Enter patient address: 8120 Bald Hill Street Baton Rouge
        Enter doctor: 109
        Enter appointment: 9
Appointment status: AV -> AC
```

```
Please make your choice: 4
        Enter patient name: Holly Bellinger
        Enter patient gender: F
        Enter patient age: 34
        Enter patient address: 458 Chase Drive
        Enter doctor: 210
        Enter appointment: 3
Appointment status: AC -> WL
```

In both of the images above, the status of the appointment input by the user is updated

```
 244 | Tamar Bundy         | M   |  26 | 8770 W. Edgemont Street Greenwood        |                2
 245 | Matilda Linville    | M   |  11 | 779 NW. Penn Court Santa Monica          |                2
 246 | Sherril Eason       | M   |  50 | 66 Ridgewood Street Titusville           |                3
 247 | Charissa Moreton    | M   |  45 | 970 Fordham Street Wilson                |                3
 248 | Rolando Hoehn       | M   |  59 | 712 Glendale Court Valrico               |                3
 249 | Mimi Stelle         | M   |  27 | 897 Lyme St. Duarte                      |                2
 250 | Billy Butler        | M   |  46 | 960 Kraken Avenue                        |                3
 251 | Holly Bellinger     | F   |  34 | 458 Chase Drive                          |                0
(252 rows)
```

In the screenshot above, since the patient entered does not exist in the DB, a new entry is created

```
  3 |  87 |  11
  4 | 240 |  68
  2 | 228 |  99
  2 | 187 |  58
  0 |   1 |   9
  0 | 251 |   3
(252 rows)
```

Above: schedules relation

```
 95 |        127
 96 |        128
 97 |         49
 98 |        150
 99 |        180
  9 |        109
  3 |        210
(102 rows)
```

Above: has_appointment relation

#5:

```
MAIN MENU
---------
1. Add Doctor
2. Add Patient
3. Add Appointment
4. Make an Appointment
5. List appointments of a given doctor
6. List all available appointments of a given department
7. List total number of different types of appointments per doctor in descending order
8. Find total number of patients per doctor with a given status
9. < EXIT
Please make your choice: 5
Enter doctor ID:
4
Enter starting date(MM/DD/YYYY):
01/01/2020
Enter ending date(MM/DD/YYYY):
01/01/2022
name      doctor_id       appnt_id        adate      time_slot       status
Rita Brock      4         43        2021-09-28      8:00-10:30      AC
```

#6:

```
MAIN MENU
---------
1. Add Doctor
2. Add Patient
3. Add Appointment
4. Make an Appointment
5. List appointments of a given doctor
6. List all available appointments of a given department
7. List total number of different types of appointments per doctor in descending order
8. Find total number of patients per doctor with a given status
9. < EXIT
Please make your choice: 6
Enter department name:
Cardiology
Enter date(MM/DD/YYYY):
09/21/2021
appnt_id        adate      time_slot       status
91      2021-09-21      8:00-10:00      AV
```

#7:

```
MAIN MENU
---------
1. Add Doctor
2. Add Patient
3. Add Appointment
4. Make an Appointment
5. List appointments of a given doctor
6. List all available appointments of a given department
7. List total number of different types of appointments per doctor in descending order
8. Find total number of patients per doctor with a given status
9. < EXIT
Please make your choice: 7
doctor_id      name         status   count
11        Yvette Lane       PA       2
7         Adrian Garrett    PA       2
134       Phillip Wilson    PA       2
26        Kent Cole         PA       2
4         Rita Brock        PA       2
125       Elizabeth Hernandez  PA      1
130       Gloria Cox        PA       1
230       Etta Rosen        AV       1
95        Lillie Rogers     PA       1
45        Gertrude Warren   WL       1
239       Palmer Peralta    PA       1
126       Mildred James     PA       1
150       Judy Morris       PA       1
44        Rosemary Pena     AC       1
70        Patricia Brady    AC       1
222       Adriana Wooden    PA       1
25        Dexter Johnson    AC       1
45        Gertrude Warren   PA       1
128       Douglas Gonzalez     WL      1
233       Joella Estrella   AC       1
40        Edgar Copeland    AC       1
47        Josefina Neal     PA       1
36        Clara Rowe        WL       1
240       Rossana Staton    AV       1
18        Dwayne Delgado    PA       1
34        Irvin Kennedy     PA       1
44        Rosemary Pena     PA       1
144       Ashley Ramirez    PA       1
36        Clara Rowe        PA       1
12        Kenny Hall        AV       1
16        Derek Andrews     WL       1
44        Rosemary Pena     WL       1
2         Calvin Morrison   PA       1
22        Bradley Holmes    PA       1
96        Benny Terry       PA       1
191       Jacqueline Simmons   PA      1
127       Brian Flores      PA       1
235       Asuncion Looney   PA       1
130       Gloria Cox        AC       1
32        Tiffany Mills     WL       1
6         Diane Davidson    PA       1
24        Beatrice Myers    WL       1
32        Tiffany Mills     PA       1
46        Antoinette Rodriguez  PA      1
87        Kristopher King   PA       1
114       Jonathan Lee      PA       1
```

```
114        Jonathan Lee      PA        1
140        Timothy Jones     PA        1
119        Stephanie Thompson          PA        1
14         Myron Gibson      PA        1
28         Kelly Bailey      PA        1
42         Kristy Keller     AC        1
234        Nilsa Cavanaugh PA          1
189        Ruby Hill         PA        1
29         Edwin Lynch       PA        1
237        Myrl Aguiar       AV        1
238        Dannette Whitley            PA        1
3          Theodore Stewart            PA        1
197        Kenneth Rodriguez           AV        1
192        Martin Bryant     AC        1
41         Lynn Rose         PA        1
23         Shaun Obrien      PA        1
79         Milton Fletcher PA          1
94         Jenny Jackson     PA        1
75         Colin Williams    PA        1
19         Noah Hansen       PA        1
9          Becky Horton      PA        1
124        Paul Harris       AC        1
17         Heather Perez     PA        1
121        Amy Diaz          AV        1
49         Billie Carpenter            PA        1
30         Kevin Roberson    PA        1
35         Kim West          WL        1
88         Sophia Fields     AV        1
55         Christina Wilson            AV        1
120        Steven Richardson           AV        1
180        Larry Russell     PA        1
232        Emiko Braun       PA        1
124        Paul Harris       PA        1
50         Kirk Ruiz         PA        1
15         Fredrick Smith    WL        1
80         Rufus Lloyd       PA        1
236        Kathi Wimberly    AC        1
48         Olga Guerrero     AC        1
118        Wayne Robinson    AV        1
209        Lona Burchett     PA        1
230        Etta Rosen        AC        1
4          Rita Brock        AC        1
113        Benjamin Nelson PA          1
115        Randy Bell        PA        1
43         Damon Baldwin     PA        1
190        Norma Smith       PA        1
8          Randy Schultz     AC        1
51         Gabriel Taylor    PA        1
0          Alvin Saunders    PA        1
26         Kent Cole         AV        1
```

#8:

```
MAIN MENU
---------
1. Add Doctor
2. Add Patient
3. Add Appointment
4. Make an Appointment
5. List appointments of a given doctor
6. List all available appointments of a given department
7. List total number of different types of appointments per doctor in descending order
8. Find total number of patients per doctor with a given status
9. < EXIT
Please make your choice: 8
Enter status(PA, AC, AV, WL):
AV
doctor_id        name      count
88       Sophia Fields   1
121      Amy Diaz        1
230      Etta Rosen      1
237      Myrl Aguiar     2
26       Kent Cole       3
240      Rossana Staton  2
120      Steven Richardson      2
197      Kenneth Rodriguez      2
12       Kenny Hall      2
```

Error Handling:

String entered when integer expected.

```
Please make your choice: 5
Enter doctor ID:
hi
ERROR: Invalid input for doctor ID. java.lang.NumberFormatException: For input string: "hi"
```

Negative integer inputted when positive integer expected.

```
Enter doctor ID:
-3423
ERROR: Invalid input for doctor ID. java.lang.RuntimeException: ERROR: Doctor ID can't be less than 0
```

String entered for date.

```
Enter starting date(MM/DD/YYYY):
Not a valid date
ERROR: Invalid input for starting date. java.text.ParseException: Unparseable date: "Not a valid date"
```

Invalid months/days/year inputted.

```
Enter starting date(MM/DD/YYYY):
00/00/0000
ERROR: Invalid input for starting date. java.time.format.DateTimeParseException: Text '00/00/0000' could not be parsed: Invalid value for YearOfEra (valid values 1 - 999999999/1000000000): 0
```

Invalid status inputted.

```
Enter status(PA, AC, AV, WL):
Testing
ERROR: Invalid input for status. java.lang.RuntimeException: Please type PA, AC, AV, or WL
```

Indexes (Created for frequently used columns)**:**

```
1    CREATE INDEX doctor_did_idx
2    ON Doctor (did);
3
4    CREATE INDEX department_hid_idx
5    ON Department (hid);
6
7    CREATE INDEX doctor_ID_idx
8    ON Doctor (doctor_ID);
9
10   CREATE INDEX appnt_ID_idx
11   ON Appointment (appnt_ID);
12
13   CREATE INDEX appt_id_idx
14   ON has_appointment (appt_id);
15
16   CREATE INDEX doctor_id_idx
17   ON has_appointment (doctor_id);
```

Assumptions:
- Can't make appointments for appointments with status = 'PA'.
- Appointments can be shared between multiple different patients.
- Active appointments have at least one corresponding patient.
- Waitlist does not have a maximum capacity
- For command 4: Make an Appointment, the user input does not already exist in relation searches or has_appointment.

Comments:
- Some of the directions were a little vague hence we made assumptions to fill in the gaps

Contributions:

Austin Lee:
- Implemented functionality and created error handling for queries 5, 6, 7, and 8

Otniel Thehumury:
- Implemented functionality and created error handling for queries 1,2,3, and 4
- Created indexes in an sql file