COMP-421 Project Phase 3

Group 12

March 2015

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1)

-- **This table keeps records of patients who were treated successfully with the illness, the day**
-- **discharged, and the staff member treating the patient.**

```
CREATE TABLE OutPatientTreatment (
        patient_id INTEGER,
        ill_id char(8),
treated_by_staff_id INTEGER,
        ill_until DATE NOT NULL,
        FOREIGN KEY (patient_id)
                REFERENCES Patient(patient_id) ON DELETE CASCADE,
        FOREIGN KEY (ill_id)
                REFERENCES Illness(ill_id),
        FOREIGN KEY (treated_by_staff_id)
                REFERENCES Staff(staff_id) ON DELETE CASCADE,
        PRIMARY KEY (patient_id, ill_id, ill_until)
);
```

-- **Procedure to log outpatient services for cured patient**
-- **Find most recent staff member to treat patient; note that a patient who hasn't been treated and**
-- **has a null ill_until date may not be deleted or considered to be an outpatient.**

```
CREATE OR REPLACE FUNCTION log_out_patient() RETURNS TRIGGER AS $log_out_patient$
BEGIN
   IF old.ill_until IS NULL THEN
      RAISE EXCEPTION 'ill_until cannot be null';
   END IF;

   INSERT
   INTO OutPatientTreatment(patient_id, ill_id, treated_by_staff_id, ill_until)
   SELECT old.patient_id, old.ill_id, staff_id, old.ill_until
   FROM Treats
   WHERE Treats.patient_id = old.patient_id
   ORDER BY Treats.since DESC
   LIMIT 1;

   RETURN old;
END;
$log_out_patient$ LANGUAGE 'plpgsql';
```

-- **Response:**

```
CS421=> CREATE OR REPLACE FUNCTION log_out_patient() RETURNS TRIGGER AS $log_out_patient$
CS421$> BEGIN
CS421$>    IF old.ill_until IS NULL THEN
CS421$>        RAISE EXCEPTION 'ill_until cannot be null';
CS421$>    END IF;
```

```
CS421$>
CS421$>      INSERT
CS421$>      INTO OutPatientTreatment(patient_id, ill_id, treated_by_staff_id, ill_until)
CS421$>      SELECT old.patient_id, old.ill_id, staff_id, old.ill_until
CS421$>      FROM Treats
CS421$>      WHERE Treats.patient_id = old.patient_id
CS421$>      ORDER BY Treats.since DESC
CS421$>      LIMIT 1;
CS421$>
CS421$>      RETURN old;
CS421$> END;
CS421$> $log_out_patient$ LANGUAGE 'plpgsql';
CREATE TRICREATE FUNCTION
```

-- Trigger the procedure if we delete a patient

CREATE TRIGGER logOutPatient AFTER DELETE ON SufferingFrom
FOR EACH ROW EXECUTE PROCEDURE log_out_patient();

-- Response

```
CS421=> CREATE TRIGGER logOutPatient AFTER DELETE ON SufferingFrom
CS421-> FOR EACH ROW EXECUTE PROCEDURE log_out_patient();
CREATE TRIGGER
```

-- Examples; insert these if they are missing in the database

INSERT INTO SufferingFrom VALUES (691123, 'i0023325', '2014-05-15', '2014-06-01', 2000.00, 200.00, null);
INSERT INTO SufferingFrom VALUES (690000, 'i0023358', '2013-02-03', null, 60.00, 120.00, null);

-- Will not trigger because of null value

```
CS421=> DELETE FROM SufferingFrom WHERE patient_id = 690000 AND ill_id = 'i0023358';
ERROR:  ill_until cannot be null
```

-- Will trigger

```
CS421=> DELETE FROM SufferingFrom WHERE patient_id = 691123 AND ill_id = 'i0023325';
DELETE 1
CS421=> SELECT * FROM OutPatientTreatment;
 patient_id |  ill_id  | treated_by_staff_id | ill_until
------------+----------+---------------------+-----------
     690001 | i0023358 |               34002 | 2013-02-04
     691123 | i0023325 |               34001 | 2014-06-01
```

2)

-- **This procedure logs high priority cases and recommends doctors to be assigned to each patient**
-- **It first creates table HighPriorityPatient if it's not already been created**
-- **It takes an argument type::VARCHAR(9) that may either be some version of 'urgency' or 'infectious'**
-- **If urgency is chosen, patients of a high urgency will be considered to be high priority**
-- **If infectious is chosen, patients with infectious diseases will be considered to be high priority**
-- **It then polls a cursor created depending on the switches, and inserts the correct patients**
-- **Both require that the patient has not been treated yet (i.e. ill_until date is NULL)**
-- **It returns an integer of the number of inserted high priority cases**

```
CREATE OR REPLACE FUNCTION log_high_priority_patients(type VARCHAR(9)) RETURNS INTEGER AS
$log_high_priority_patients$
DECLARE
-- These are all the variables we need, with patient_id, ill_id, ill_since, urgency renamed
    cur refcursor;
    pat_id INTEGER;
    il_id CHAR(8);
    il_since DATE;
    urge VARCHAR(32);
    count INTEGER := 0;
BEGIN
-- Try to create the new relation, if it exists then move on.
    BEGIN
        CREATE TABLE HighPriorityPatient(
            patient_id INTEGER,
            ill_id char(8),
            ill_since DATE,
            recommended_staff_id INTEGER,
            urgency VARCHAR(32),
            contagious BOOLEAN,
            FOREIGN KEY (patient_id)
                REFERENCES Patient(patient_id) ON DELETE CASCADE,
            FOREIGN KEY (ill_id)
                REFERENCES Illness(ill_id),
            FOREIGN KEY (recommended_staff_id)
                REFERENCES Staff(staff_id),
            PRIMARY KEY (patient_id, ill_id, ill_since)
        );
    EXCEPTION WHEN duplicate_table THEN
    END;

    -- Case switches for the choice of high prioritisation based on urgency or infectiousness
    CASE
        WHEN type like '%urgency%' OR type like '%Urgency%' THEN
            OPEN cur FOR SELECT SufferingFrom.patient_id, SufferingFrom.ill_id, SufferingFrom.ill_since,
SufferingFrom.urgency FROM SufferingFrom WHERE (urgency LIKE '%Urgent%' OR urgency like
'%urgent%' AND ill_until IS NULL);
```

```
        WHEN type like '%infectious%' OR type like '%Infectious%' OR type like '%contagious%' OR type like
'%Contagious%' THEN
            OPEN cur FOR SELECT patient_id, Illness.ill_id, ill_since, urgency FROM Illness INNER JOIN
SufferingFrom ON Illness.ill_id = SufferingFrom.ill_id WHERE contagious = TRUE AND ill_until IS NULL;
        ELSE
            RAISE EXCEPTION 'Inapplicable high priority type.';
    END CASE;

    -- Look through the cursor
    LOOP
        FETCH cur INTO pat_id, il_id, il_since, urge;

        IF NOT FOUND THEN
            EXIT;
        END IF;

        -- Insert the new tuple, but ignore it if it already exists w.r.t. its primary key
        BEGIN
            INSERT INTO HighPriorityPatient
            SELECT pat_id, il_id, il_since, NULL, urge, Illness.contagious
            FROM Illness
            WHERE Illness.ill_id = il_id;

            -- attempt to find a suitable doctor
            UPDATE HighPriorityPatient
            SET recommended_staff_id = SpecializesIn.staff_id
            FROM SpecializesIn
            WHERE SpecializesIn.ill_id = il_id
            AND HighPriorityPatient.patient_id = pat_id
            AND HighPriorityPatient.ill_id = il_id
            AND HighPriorityPatient.ill_since = il_since;

            count = count + 1;

        EXCEPTION WHEN unique_violation THEN
        END;

    END LOOP;

    RETURN count;
END;
$log_high_priority_patients$ LANGUAGE 'plpgsql';


-- Applicable patients:
CS421=> SELECT * FROM SUFFERINGFROM where urgency like '%urgent%' or urgency like '%Urgent%' AND
ill_until is NULL;
 patient_id |  ill_id  | ill_since  | ill_until | insurance_coverage | treatment_cost |
urgency
```

```
------------+----------+------------+----------+-------------------+----------------+---------
--------------
     691126 | i0023313 | 2014-11-08 |          |           2500.00 |         200.00 | Urgent
     691128 | i0023313 | 2014-11-23 |          |          15000.00 |         200.00 | Urgent
     691129 | i0023366 | 2012-10-10 |          |           5000.00 |         400.00 | very
urgent
     691129 | i0023378 | 2012-01-01 |          |          10000.00 |         500.00 | very
urgent I will die
(4 rows)


CS421=> SELECT * FROM SUFFERINGFROM INNER JOIN ILLNESS ON SUFFERINGFROM.ILL_ID = ILLNESS.ILL_ID
WHERE contagious = true AND ill_until is NULL;
 patient_id |  ill_id  | ill_since  | ill_until | insurance_coverage | treatment_cost | urgency |
ill_id  |                     ill_name                      | contagious | average_treatment_cost
------------+----------+------------+----------+-------------------+----------------+---------
+----------+---------------------------------------------------+------------+----------------------
--
     690001 | i0023358 | 2013-02-03 |          |             60.00 |          60.00 |         |
i0023358 | unclassified disorders of the trigeminal nerves | t          |                 635.90
     690000 | i0023358 | 2013-02-03 |          |             60.00 |         120.00 |         |
i0023358 | unclassified disorders of the trigeminal nerves | t          |                 635.90
     691128 | i0023313 | 2014-11-23 |          |          15000.00 |         200.00 | Urgent  |
i0023313 | Gastroenteritis                                 | t          |                  80.50
     691127 | i0023313 | 2014-12-10 |          |           2000.00 |         200.00 | Minor   |
i0023313 | Gastroenteritis                                 | t          |                  80.50
     691126 | i0023313 | 2014-11-08 |          |           2500.00 |         200.00 | Urgent  |
i0023313 | Gastroenteritis                                 | t          |                  80.50
     691125 | i0023313 | 2014-12-07 |          |           1000.00 |         200.00 |         |
i0023313 | Gastroenteritis                                 | t          |                  80.50
     691123 | i0023313 | 2015-03-07 |          |           2000.00 |         200.00 |         |
i0023313 | Gastroenteritis                                 | t          |                  80.50
(7 rows)
```

-- To show that HighPriorityPatient does not exist

```
CS421=> SELECT * FROM HighPriorityPatient;
ERROR:  relation "highprioritypatient" does not exist
LINE 1: SELECT * FROM HighPriorityPatient;
```

-- Responses after executing procedure

```
CS421=> SELECT log_high_priority_patients('infectious');
NOTICE:  CREATE TABLE / PRIMARY KEY will create implicit index "highprioritypatient_pkey" for
table "highprioritypatient"
CONTEXT:  SQL statement "CREATE TABLE HighPriorityPatient(
        patient_id INTEGER,
        ill_id char(8),
        ill_since DATE,
        recommended_staff_id INTEGER,
        urgency VARCHAR(32),
        contagious BOOLEAN,
        FOREIGN KEY (patient_id)
            REFERENCES Patient(patient_id) ON DELETE CASCADE,
        FOREIGN KEY (ill_id)
            REFERENCES Illness(ill_id),
        FOREIGN KEY (recommended_staff_id)
            REFERENCES Staff(staff_id),
        PRIMARY KEY (patient_id, ill_id, ill_since)
    )"
PL/pgSQL function "log_high_priority_patients" line 12 at SQL statement
 log_high_priority_patients
----------------------------
```

```
                        7
(1 row)

CS421=> SELECT log_high_priority_patients('urgency');
 log_high_priority_patients
----------------------------
                          2
(1 row)

CS421=> SELECT * FROM HighPriorityPatient;
 patient_id |  ill_id  | ill_since  | recommended_staff_id |       urgency        | contagious
------------+----------+------------+----------------------+----------------------+-----------
     690000 | i0023358 | 2013-02-03 |                      |                      | t
     691123 | i0023313 | 2015-03-07 |                34001 |                      | t
     691125 | i0023313 | 2014-12-07 |                34001 |                      | t
     691126 | i0023313 | 2014-11-08 |                34001 | Urgent               | t
     691127 | i0023313 | 2014-12-10 |                34001 | Minor                | t
     691128 | i0023313 | 2014-11-23 |                34001 | Urgent               | t
     690001 | i0023358 | 2013-02-03 |                      |                      | t
     691129 | i0023366 | 2012-10-10 |                34001 | very urgent          | f
     691129 | i0023378 | 2012-01-01 |                34091 | very urgent I will die | f
(9 rows)
```
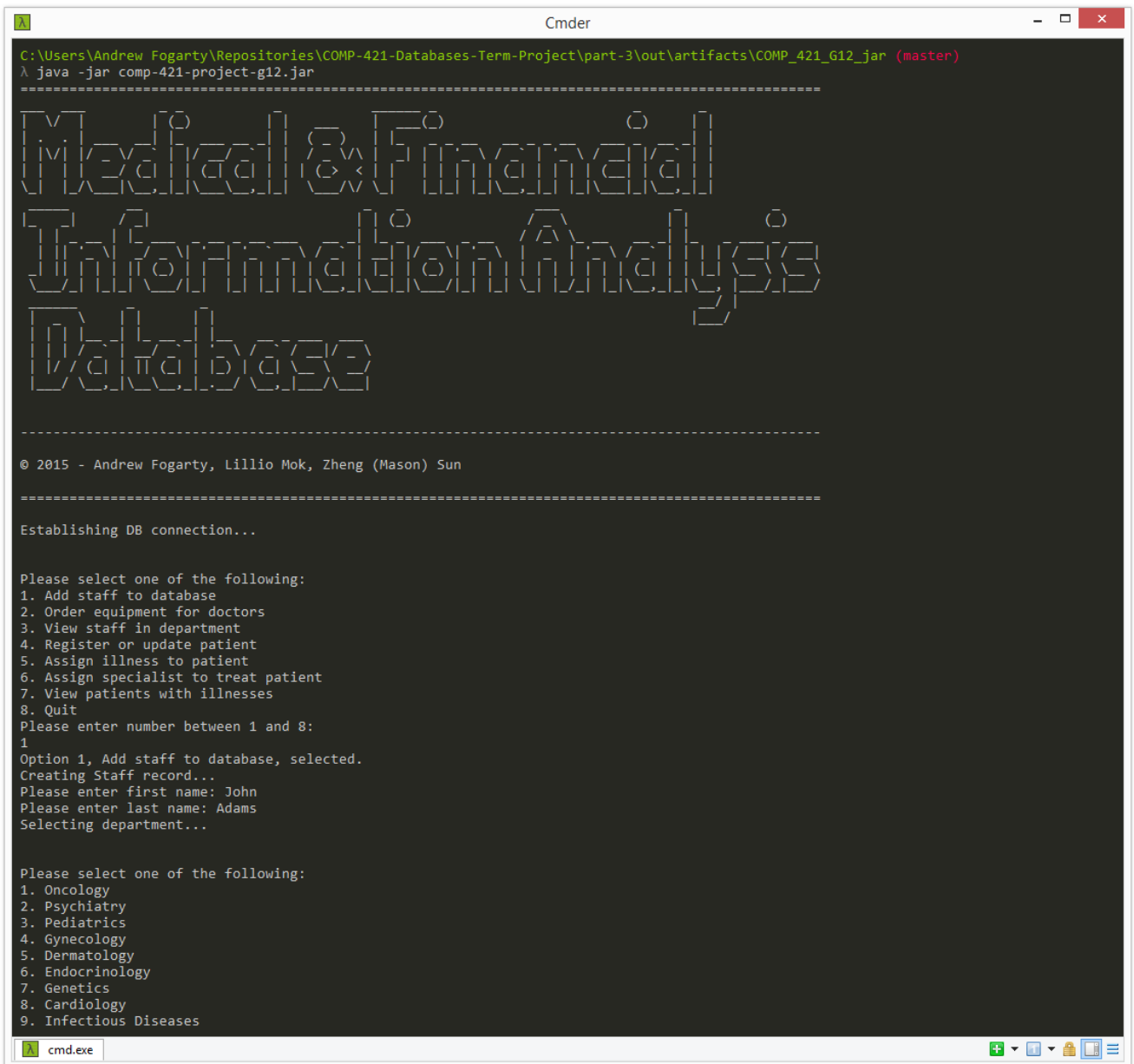
-- Note that repeated patients just imply that they have multiple untreated conditions requiring attention

3)

Please see attached for our application and executable. Due to ASCII art being produced on the command line, we cannot fit the output onto one pdf. This is also attached. Below are screenshots of the 7 procedures of our application.

Procedure 1: Insertion into Staff Relation

```
7. Genetics
8. Cardiology
9. Infectious Diseases
Please enter number between 1 and 9:
2
Option 2, Psychiatry, selected.
Please enter wages:
Please enter a currency value in form '00.00' with no dollar sign.
75.00
Please enter salary:
Please enter a currency value in form '00.00' with no dollar sign.
400000.00
Please enter shift to time:
Please enter a time in form '23:59:59'.
06:45:13
Please enter shift from time:
Please enter a time in form '23:59:59'.
19:00:00
Please enter number of overtime hours:
Please enter a number.
5.5
Please enter contract from:
Please enter a date in the form 'YYYY-MM-DD'.
1998-07-19
Please enter contract until:
Please enter a date in the form 'YYYY-MM-DD'.
2020-10-1
Please enter a date in the form 'YYYY-MM-DD'.
2020-10-01
Please enter contact information: johnadams@usa.gov
SUCCESS: Staff Adams, John created with id: 34117 created.


Does John Adams have a special job?



Please select one of the following:
1. Doctor
2. Nurse
3. Admin
4. No
Please enter number between 1 and 4:
1
Option 1, Doctor, selected.
Doctor selected.
Please enter rank: Director of Psychology
Please enter board certification: PhD
John Adams is now a doctor.

Staff insertion procedure complete.  Returning to main menu...
----------------------------------------------------------------------------------------

Please select one of the following:
1. Add staff to database
2. Order equipment for doctors
3. View staff in department
4. Register or update patient
5. Assign illness to patient
```
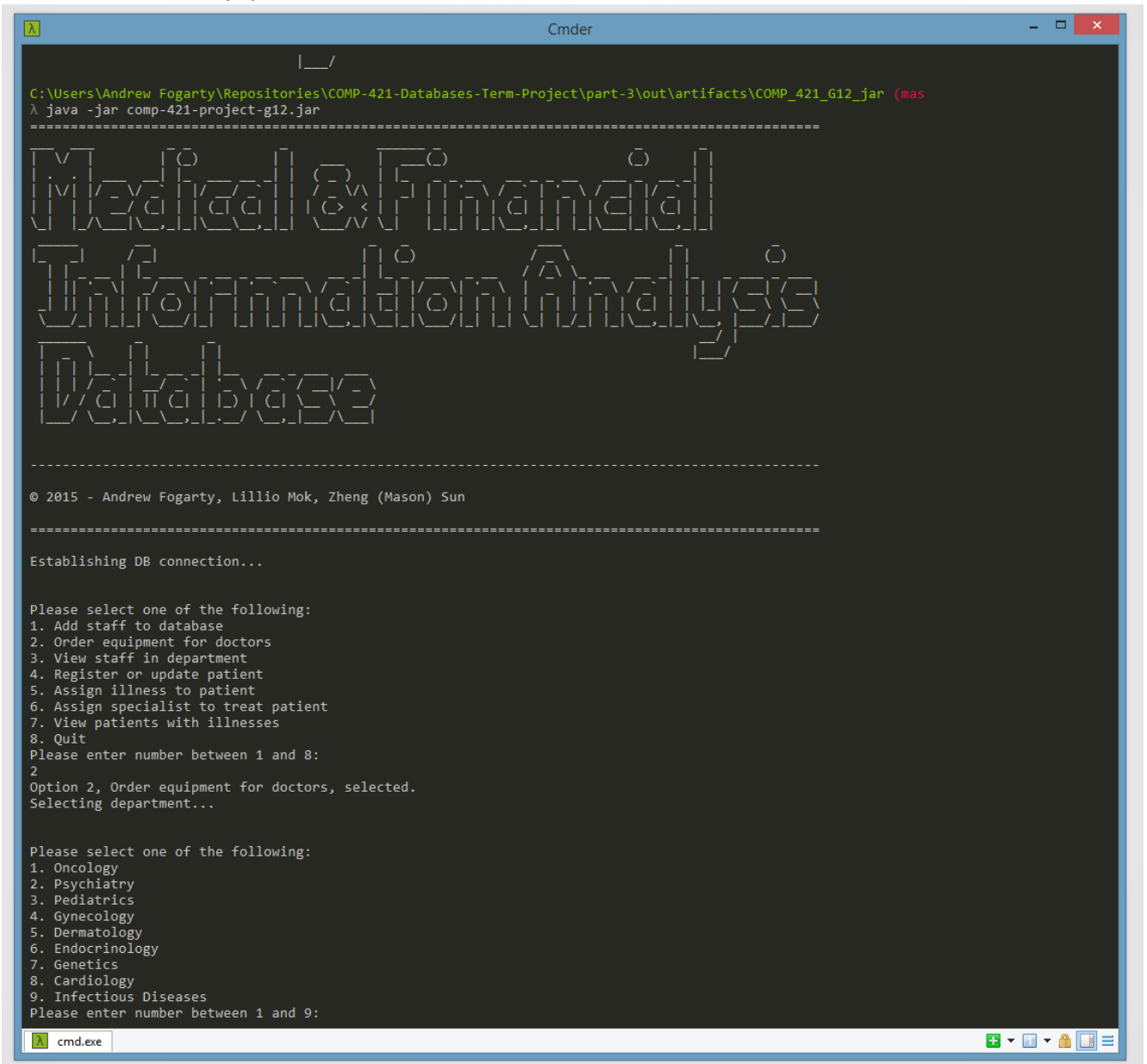
```
Please enter contract from:
Please enter a date in the form 'YYYY-MM-DD'.
1998-07-19
Please enter contract until:
Please enter a date in the form 'YYYY-MM-DD'.
2020-10-1
Please enter a date in the form 'YYYY-MM-DD'.
2020-10-01
Please enter contact information: johnadams@usa.gov
SUCCESS: Staff Adams, John created with id: 34117 created.


Does John Adams have a special job?


Please select one of the following:
1. Doctor
2. Nurse
3. Admin
4. No
Please enter number between 1 and 4:
1
Option 1, Doctor, selected.
Doctor selected.
Please enter rank: Director of Psychology
Please enter board certification: PhD
John Adams is now a doctor.

Staff insertion procedure complete.  Returning to main menu...
-------------------------------------------------------------------------------


Please select one of the following:
1. Add staff to database
2. Order equipment for doctors
3. View staff in department
4. Register or update patient
5. Assign illness to patient
6. Assign specialist to treat patient
7. View patients with illnesses
8. Quit
Please enter number between 1 and 8:
8
Option 8, Quit, selected.
Disconnected from Db.
Terminating program.
```

```
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|  _\     |   ||_|
| |_\  __  __| |  _  __   __
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|  _ | () | (_ | || | () | () |
|___| \__/ \__,|_.__/ \__/ |__()
                  |_/
```

Procedure 2: Order Equipment for Staff who are Doctors


```
                  |__/

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λ java -jar comp-421-project-g12.jar
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   ...

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=============================================================================================

Establishing DB connection...


Please select one of the following:
1. Add staff to database
2. Order equipment for doctors
3. View staff in department
4. Register or update patient
5. Assign illness to patient
6. Assign specialist to treat patient
7. View patients with illnesses
8. Quit
Please enter number between 1 and 8:
2
Option 2, Order equipment for doctors, selected.
Selecting department...


Please select one of the following:
1. Oncology
2. Psychiatry
3. Pediatrics
4. Gynecology
5. Dermatology
6. Endocrinology
7. Genetics
8. Cardiology
9. Infectious Diseases
Please enter number between 1 and 9:
```
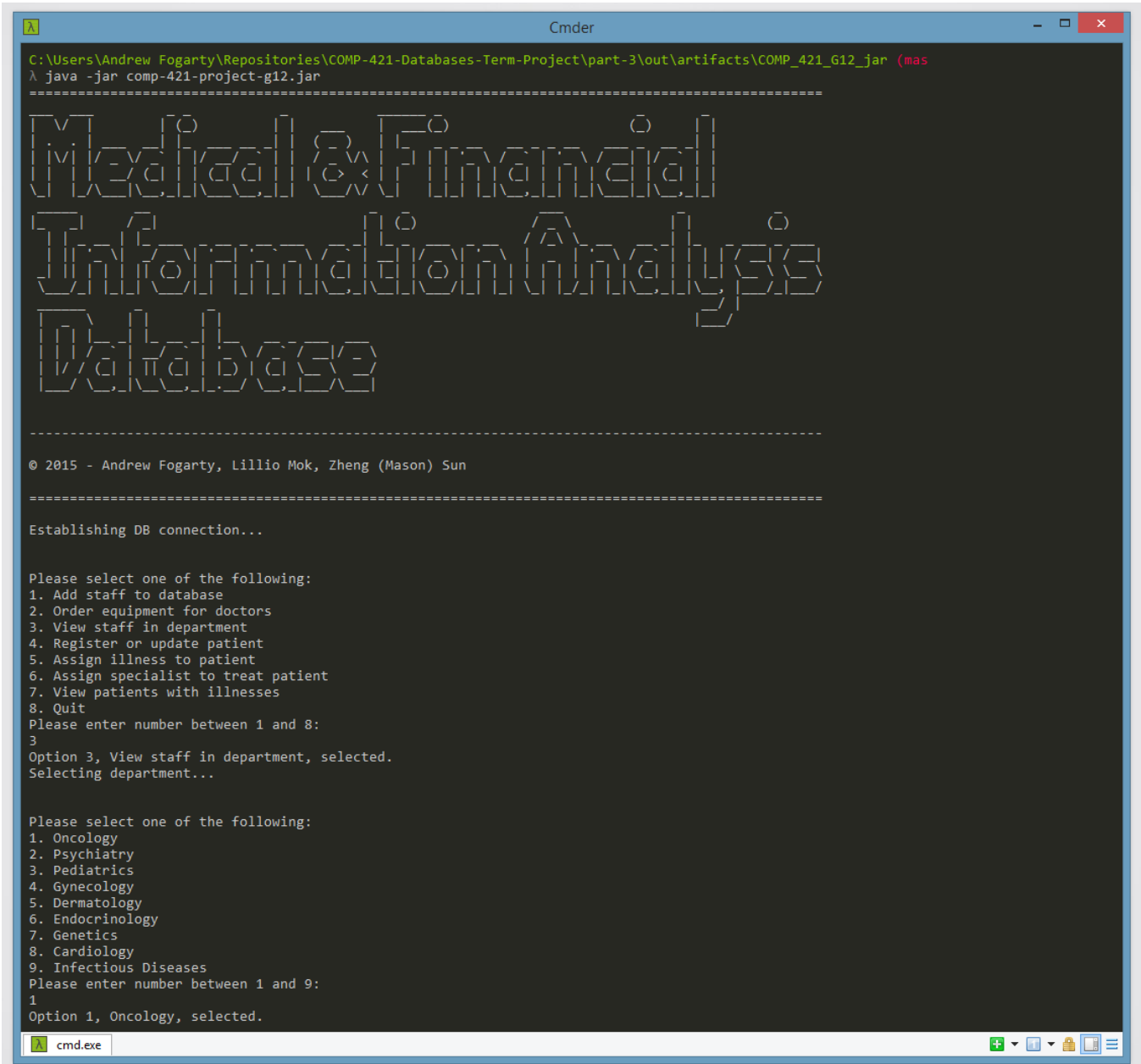
```
8. Cardiology
9. Infectious Diseases
Please enter number between 1 and 9:
9
Option 9, Infectious Diseases, selected.


Please select one of the following:
1. Scalpel
2. Buzzsaw
3. Calipers
4. Penicillin
5. Advil
6. Placebo
7. Stethoscope
8. Syringe
9. Defibrillator
10. test
Please enter number between 1 and 10:
8
Option 8, Syringe, selected.
Please enter number of equipment per doctor:
Please enter a natural number (integer >= 0).
10
4 doctors in Infectious Diseases.  Need 40 instances of Syringe.
Infectious Diseases already has 400 in stock, so we will only update number needed.

Equipment order procedure complete.  Returning to main menu...
--------------------------------------------------------------------------------------


Please select one of the following:
1. Add staff to database
2. Order equipment for doctors
3. View staff in department
4. Register or update patient
5. Assign illness to patient
6. Assign specialist to treat patient
7. View patients with illnesses
8. Quit
Please enter number between 1 and 8:
8
Option 8, Quit, selected.
Disconnected from Db.
Terminating program.


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λ λ java -jar comp-421-project-g12.jar
'λ' is not recognized as an internal or external command,
operable program or batch file.
```

Procedure 3: Search for Staff Members per Department

```
Please select one of the following:
1. Oncology
2. Psychiatry
3. Pediatrics
4. Gynecology
5. Dermatology
6. Endocrinology
7. Genetics
8. Cardiology
9. Infectious Diseases
Please enter number between 1 and 9:
1
Option 1, Oncology, selected.

Staff in Oncology department:
.......................................................
staff_id:        34090
first_name:      Immanuel
last_name:       Kant
wages:           99.00
salary:          400000.00
shift_from:      02:00:00
shift_to:        16:00:00
over_time:       null
contract_from:   2010-02-03
contract_until:  2017-07-18
contact:         514-001-1337 kant@hospital.com
.......................................................
staff_id:        34091
first_name:      Edmund
last_name:       Burke
wages:           94.00
salary:          380000.00
shift_from:      00:20:00
shift_to:        18:00:00
over_time:       null
contract_from:   2012-01-23
contract_until:  2015-08-29
contact:         514-001-1824 burke@hospital.com
.......................................................
staff_id:        34092
first_name:      David
last_name:       Hume
wages:           82.00
salary:          270000.00
shift_from:      11:30:00
shift_to:        20:00:00
over_time:       null
contract_from:   2010-09-12
contract_until:  2016-01-13
contact:         514-001-9812 hume@hospital.com

Staff view procedure complete.  Returning to main menu...
-----------------------------------------------------------------------------------


Please select one of the following:
1. Add staff to database
```
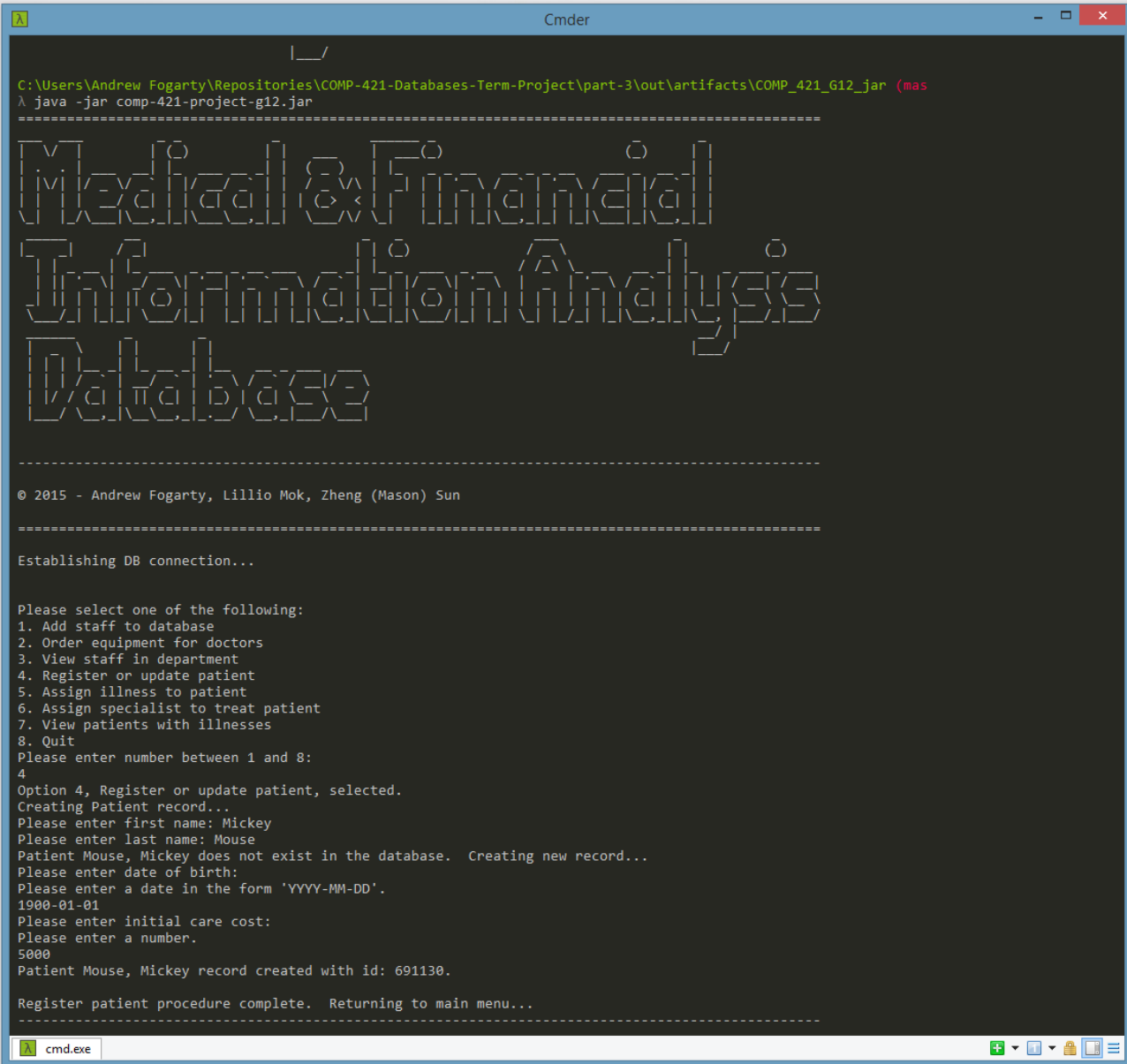
```
contract_until:   2017-07-18
contact:          514-001-1337 kant@hospital.com
.........................................................
staff_id:         34091
first_name:       Edmund
last_name:        Burke
wages:            94.00
salary:           380000.00
shift_from:       00:20:00
shift_to:         18:00:00
over_time:        null
contract_from:    2012-01-23
contract_until:   2015-08-29
contact:          514-001-1824 burke@hospital.com
.........................................................
staff_id:         34092
first_name:       David
last_name:        Hume
wages:            82.00
salary:           270000.00
shift_from:       11:30:00
shift_to:         20:00:00
over_time:        null
contract_from:    2010-09-12
contract_until:   2016-01-13
contact:          514-001-9812 hume@hospital.com

Staff view procedure complete.  Returning to main menu...
---------------------------------------------------------------------------------


Please select one of the following:
1. Add staff to database
2. Order equipment for doctors
3. View staff in department
4. Register or update patient
5. Assign illness to patient
6. Assign specialist to treat patient
7. View patients with illnesses
8. Quit
Please enter number between 1 and 8:
8
Option 8, Quit, selected.
Disconnected from Db.
Terminating program.


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  |___/     \__/ \__,_||_._/\_|\__()
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λ java -jar comp-421-project-g12.jar
==============================================================================================
```

Procedure 4: Register or Update a Patient

```
Please select one of the following:
1. Add staff to database
2. Order equipment for doctors
3. View staff in department
4. Register or update patient
5. Assign illness to patient
6. Assign specialist to treat patient
7. View patients with illnesses
8. Quit
Please enter number between 1 and 8:
4
Option 4, Register or update patient, selected.
Creating Patient record...
Please enter first name: Mickey
Please enter last name: Mouse
Patient Mouse, Mickey does not exist in the database.  Creating new record...
Please enter date of birth:
Please enter a date in the form 'YYYY-MM-DD'.
1900-01-01
Please enter initial care cost:
Please enter a number.
5000
Patient Mouse, Mickey record created with id: 691130.

Register patient procedure complete.  Returning to main menu...
----------------------------------------------------------------------------------


Please select one of the following:
1. Add staff to database
2. Order equipment for doctors
3. View staff in department
4. Register or update patient
5. Assign illness to patient
6. Assign specialist to treat patient
7. View patients with illnesses
8. Quit
Please enter number between 1 and 8:
8
Option 8, Quit, selected.
Disconnected from Db.
Terminating program.
```
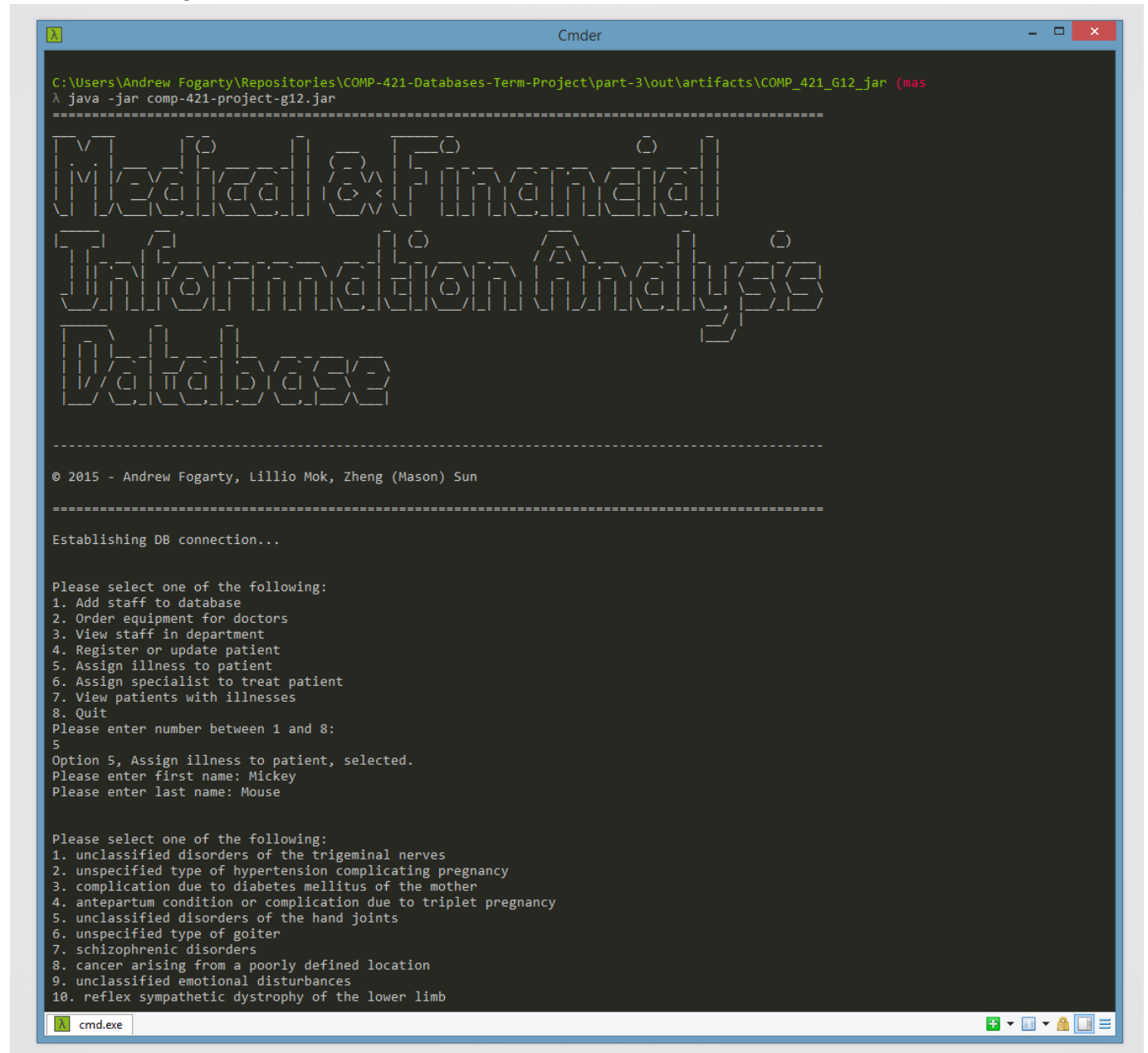
```
C:\Users\Andrew Fogarty\Repositories\COMP-421-Databases-Term-Project\part-3\out\artifacts\COMP_421_G12_jar (mas
λ java -jar comp-421-project-g12.jar
================================================================================
```

Procedure 5: Assign a Patient to an instance of a Disease


```
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λ java -jar comp-421-project-g12.jar
==============================================================================

  Medical & Financial
  Information Analysis
  Database

------------------------------------------------------------------------------

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==============================================================================

Establishing DB connection...

Please select one of the following:
1. Add staff to database
2. Order equipment for doctors
3. View staff in department
4. Register or update patient
5. Assign illness to patient
6. Assign specialist to treat patient
7. View patients with illnesses
8. Quit
Please enter number between 1 and 8:
5
Option 5, Assign illness to patient, selected.
Please enter first name: Mickey
Please enter last name: Mouse


Please select one of the following:
1. unclassified disorders of the trigeminal nerves
2. unspecified type of hypertension complicating pregnancy
3. complication due to diabetes mellitus of the mother
4. antepartum condition or complication due to triplet pregnancy
5. unclassified disorders of the hand joints
6. unspecified type of goiter
7. schizophrenic disorders
8. cancer arising from a poorly defined location
9. unclassified emotional disturbances
10. reflex sympathetic dystrophy of the lower limb
```

```
2. unspecified type of hypertension complicating pregnancy
3. complication due to diabetes mellitus of the mother
4. antepartum condition or complication due to triplet pregnancy
5. unclassified disorders of the hand joints
6. unspecified type of goiter
7. schizophrenic disorders
8. cancer arising from a poorly defined location
9. unclassified emotional disturbances
10. reflex sympathetic dystrophy of the lower limb
11. Gastroenteritis
12. Norovirus
Please enter number between 1 and 12:
7
Option 7, schizophrenic disorders, selected.
Please enter the date when the illness began:
Please enter a date in the form 'YYYY-MM-DD'.
1980-02-02
Please enter urgency: Really quite urgent!
Please enter insurance coverage:
Please enter a currency value in form '00.00' with no dollar sign.
1000.00
Please enter treatment cost (average $295.00 for schizophrenic disorders):
Please enter a currency value in form '00.00' with no dollar sign.
295.00
Record created that Mouse, Mickey suffers from schizophrenic disorders.

Assign illness procedure complete.  Returning to main menu...
--------------------------------------------------------------------------------


Please select one of the following:
1. Add staff to database
2. Order equipment for doctors
3. View staff in department
4. Register or update patient
5. Assign illness to patient
6. Assign specialist to treat patient
7. View patients with illnesses
8. Quit
Please enter number between 1 and 8:
8
Option 8, Quit, selected.
Disconnected from Db.
Terminating program.
```
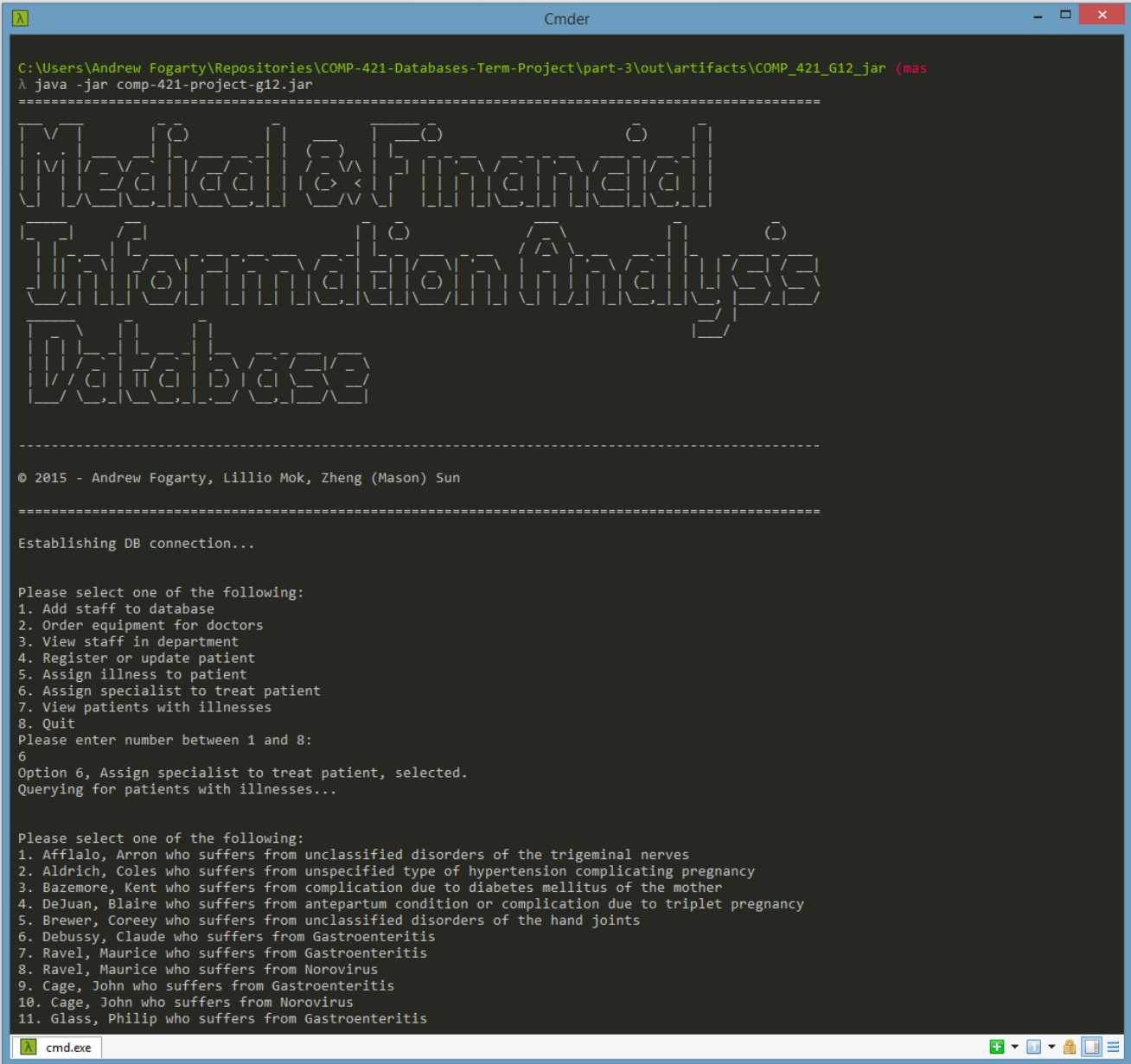


```
C:\Users\Andrew Fogarty\Repositories\COMP-421-Databases-Term-Project\part-3\out\artifacts\COMP_421_G12_jar (mas
λ java -jar comp-421-project-g12.jar
=================================================================================
```

Procedure 6: Assign a Specialist to a Patient for his/her Illness

```
C:\Users\Andrew Fogarty\Repositories\COMP-421-Databases-Term-Project\part-3\out\artifacts\COMP_421_G12_jar (mas
λ java -jar comp-421-project-g12.jar
==================================================================================



     Medical & Financial
     Information Analysis
     Database



----------------------------------------------------------------------

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==================================================================================

Establishing DB connection...


Please select one of the following:
1. Add staff to database
2. Order equipment for doctors
3. View staff in department
4. Register or update patient
5. Assign illness to patient
6. Assign specialist to treat patient
7. View patients with illnesses
8. Quit
Please enter number between 1 and 8:
6
Option 6, Assign specialist to treat patient, selected.
Querying for patients with illnesses...


Please select one of the following:
1. Afflalo, Arron who suffers from unclassified disorders of the trigeminal nerves
2. Aldrich, Coles who suffers from unspecified type of hypertension complicating pregnancy
3. Bazemore, Kent who suffers from complication due to diabetes mellitus of the mother
4. DeJuan, Blaire who suffers from antepartum condition or complication due to triplet pregnancy
5. Brewer, Coreey who suffers from unclassified disorders of the hand joints
6. Debussy, Claude who suffers from Gastroenteritis
7. Ravel, Maurice who suffers from Gastroenteritis
8. Ravel, Maurice who suffers from Norovirus
9. Cage, John who suffers from Gastroenteritis
10. Cage, John who suffers from Norovirus
11. Glass, Philip who suffers from Gastroenteritis
```

```
Please select one of the following:
1. Afflalo, Arron who suffers from unclassified disorders of the trigeminal nerves
2. Aldrich, Coles who suffers from unspecified type of hypertension complicating pregnancy
3. Bazemore, Kent who suffers from complication due to diabetes mellitus of the mother
4. DeJuan, Blaire who suffers from antepartum condition or complication due to triplet pregnancy
5. Brewer, Coreey who suffers from unclassified disorders of the hand joints
6. Debussy, Claude who suffers from Gastroenteritis
7. Ravel, Maurice who suffers from Gastroenteritis
8. Ravel, Maurice who suffers from Norovirus
9. Cage, John who suffers from Gastroenteritis
10. Cage, John who suffers from Norovirus
11. Glass, Philip who suffers from Gastroenteritis
12. Glass, Philip who suffers from Norovirus
13. Stockhausen, Karlheinz who suffers from Gastroenteritis
14. Stockhausen, Karlheinz who suffers from Norovirus
15. Webern, Anton who suffers from Gastroenteritis
16. Webern, Anton who suffers from Norovirus
17. Aldrich, Coles who suffers from unclassified disorders of the trigeminal nerves
18. Debussy, Claude who suffers from Norovirus
19. Fogarty, Andrew who suffers from schizophrenic disorders
20. Fogarty, Andrew who suffers from cancer arising from a poorly defined location
21. Mouse, Mickey who suffers from schizophrenic disorders
Please enter number between 1 and 21:
21
Option 21, Mouse, Mickey who suffers from schizophrenic disorders, selected.


Patient selected.  Now, select a doctor who specializes in the chosen illness.

Doctors who already treat the patient are excluded.




Please select one of the following:
1. Dr. Thomas Kuhn
Please enter number between 1 and 1:
1
Option 1, Dr. Thomas Kuhn, selected.


Dr. Kuhn now treats patient Mouse, Mickey for schizophrenic disorders.



Assign specialist procedure complete.  Returning to main menu...
-------------------------------------------------------------------------------------------


Please select one of the following:
1. Add staff to database
2. Order equipment for doctors
3. View staff in department
4. Register or update patient
5. Assign illness to patient
6. Assign specialist to treat patient
7. View patients with illnesses
8. Quit
Please enter number between 1 and 8:
8
```

```
18. Debussy, Claude who suffers from Norovirus
19. Fogarty, Andrew who suffers from schizophrenic disorders
20. Fogarty, Andrew who suffers from cancer arising from a poorly defined location
21. Mouse, Mickey who suffers from schizophrenic disorders
Please enter number between 1 and 21:
21
Option 21, Mouse, Mickey who suffers from schizophrenic disorders, selected.


Patient selected.  Now, select a doctor who specializes in the chosen illness.

Doctors who already treat the patient are excluded.




Please select one of the following:
1. Dr. Thomas Kuhn
Please enter number between 1 and 1:
1
Option 1, Dr. Thomas Kuhn, selected.


Dr. Kuhn now treats patient Mouse, Mickey for schizophrenic disorders.



Assign specialist procedure complete.  Returning to main menu...
-----------------------------------------------------------------------------------------


Please select one of the following:
1. Add staff to database
2. Order equipment for doctors
3. View staff in department
4. Register or update patient
5. Assign illness to patient
6. Assign specialist to treat patient
7. View patients with illnesses
8. Quit
Please enter number between 1 and 8:
8
Option 8, Quit, selected.
Disconnected from Db.
Terminating program.


  |__\        | | |
  |  _\  ___  | | |__   _  _  ___
  | \ \ / _ \ / _ \ / _` || '_ \ / _ \
  |\_\ \ (_) | (_) | (_| || |_) |  __/
  \___/\___/ \___/ \__,_||_.__/ \___()
                        |_./

C:\Users\Andrew Fogarty\Repositories\COMP-421-Databases-Term-Project\part-3\out\artifacts\COMP_421_G12_jar (mas
λ java -jar comp-421-project-g12.jar
===============================================================================================
```
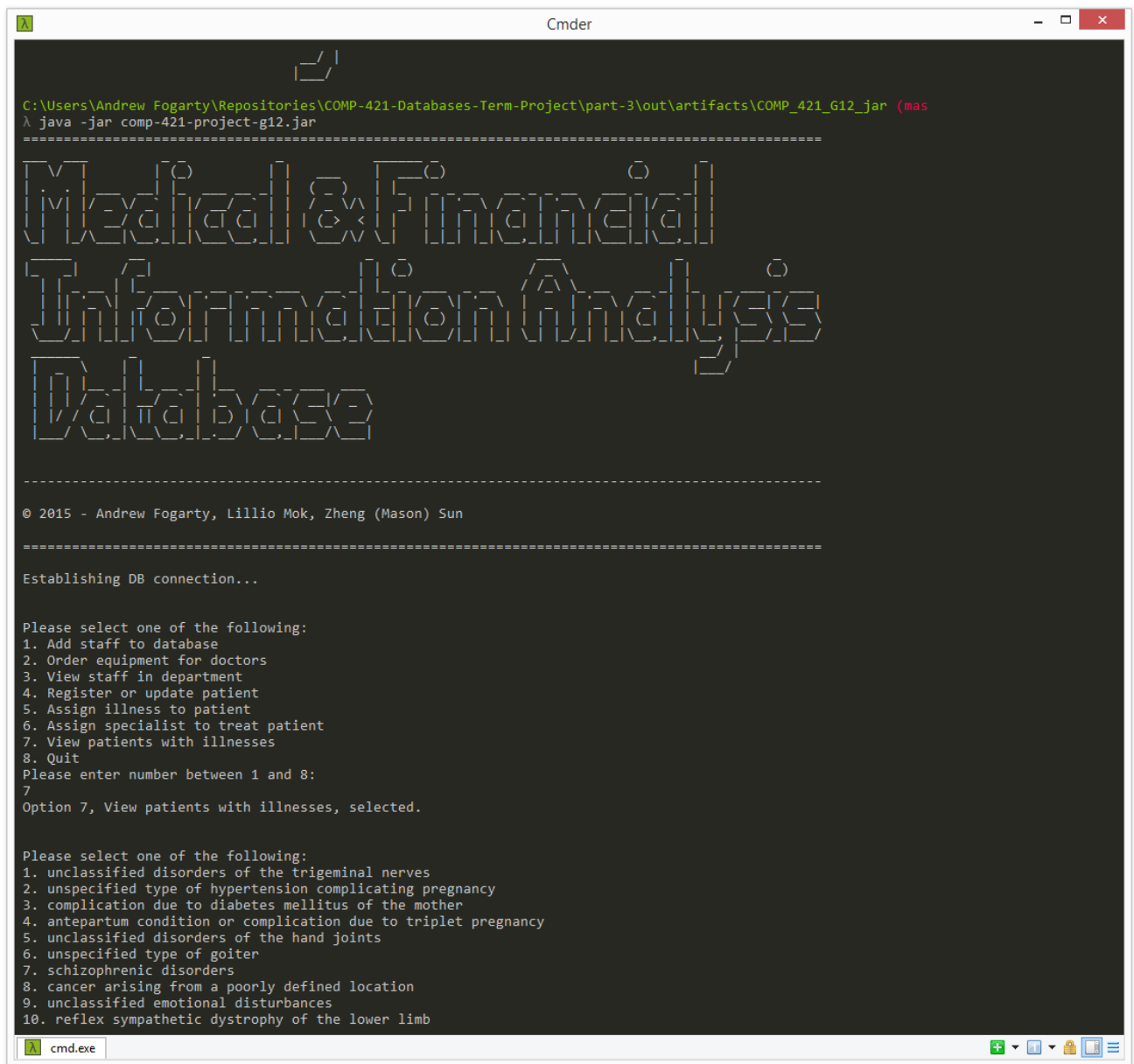
Procedure 7: View Patients with a specific Illness


```
C:\Users\Andrew Fogarty\Repositories\COMP-421-Databases-Term-Project\part-3\out\artifacts\COMP_421_G12_jar (mas
λ java -jar comp-421-project-g12.jar
===============================================================================
```

(Medical & Financial Information Analysis Database ASCII art banner)

```
-------------------------------------------------------------------------------

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===============================================================================

Establishing DB connection...

Please select one of the following:
1. Add staff to database
2. Order equipment for doctors
3. View staff in department
4. Register or update patient
5. Assign illness to patient
6. Assign specialist to treat patient
7. View patients with illnesses
8. Quit
Please enter number between 1 and 8:
7
Option 7, View patients with illnesses, selected.


Please select one of the following:
1. unclassified disorders of the trigeminal nerves
2. unspecified type of hypertension complicating pregnancy
3. complication due to diabetes mellitus of the mother
4. antepartum condition or complication due to triplet pregnancy
5. unclassified disorders of the hand joints
6. unspecified type of goiter
7. schizophrenic disorders
8. cancer arising from a poorly defined location
9. unclassified emotional disturbances
10. reflex sympathetic dystrophy of the lower limb
```

```
8. cancer arising from a poorly defined location
9. unclassified emotional disturbances
10. reflex sympathetic dystrophy of the lower limb
11. Gastroenteritis
12. Norovirus
Please enter number between 1 and 12:
11
Option 11, Gastroenteritis, selected.

Patients suffering from Gastroenteritis:
..................................................
patient_id:    691123
first_name:    Claude
last_name:     Debussy
date_of_birth: 1951-12-23
care_cost:     200.00
..................................................
patient_id:    691124
first_name:    Maurice
last_name:     Ravel
date_of_birth: 1951-12-27
care_cost:     100.00
..................................................
patient_id:    691125
first_name:    John
last_name:     Cage
date_of_birth: 1952-12-27
care_cost:     200.00
..................................................
patient_id:    691126
first_name:    Philip
last_name:     Glass
date_of_birth: 1952-04-03
care_cost:     200.00
..................................................
patient_id:    691127
first_name:    Karlheinz
last_name:     Stockhausen
date_of_birth: 1949-04-13
care_cost:     200.00
..................................................
patient_id:    691128
first_name:    Anton
last_name:     Webern
date_of_birth: 1945-04-23
care_cost:     200.00

View patient procedure complete.  Returning to main menu...
------------------------------------------------------------------------


Please select one of the following:
1. Add staff to database
2. Order equipment for doctors
3. View staff in department
4. Register or update patient
5. Assign illness to patient
6. Assign specialist to treat patient
7. View patients with illnesses
8. Quit
```

The complete scripts of these outputs are found under directory console-print-outs.

Please read README before running our executable.

Source code is under directory source.

4)

SELECT S.staff_id, first_name, last_name
FROM Staff S INNER JOIN Doctor D
ON S.staff_id = D.staff_id
   FULL OUTER JOIN Nurse N
   ON S.staff_id = N.staff_id
WHERE (
     shift_from <= '03:00:00' -- Shift ends between midnight and 3am
     OR shift_to <='03:00:00' -- Shift begins between midnight and 3am
     OR (shift_to > '03:00:00' AND shift_from > shift_to) -- Shift begins before midnight and ends after 3am
  );

CREATE INDEX fromInd ON Staff(shift_from);

CREATE INDEX toInd ON Staff(shift_to);

```
CS421=> CREATE INDEX fromInd ON Staff(shift_from);
CREATE INDEX
CS421=> CREATE INDEX toInd ON Staff(shift_to);
CREATE INDEX
```
-- These indices are useful as cost and amount_needed as they require range searches,

-- and should shorten the time required for the queries. We don't think that it would make

-- a large amount of difference, however, because of limited records in the relation.

DROP INDEX fromInd;

DROP INDEX toInd;

-- As we guessed, our results with the indexes were around 160ms, while the results without the

-- indexes took around 130ms. This is, again, probably because we don't have the number of entries

-- to justify the overhead for using indexes, and so there was little difference between the speeds.