```sql
/* CREATING NEW TABLE em_flights */
create table em_flights (
YEAR int,
MONTH int,
DAY int,
DAY_OF_WEEK int,
AIRLINE varchar(5),
FLIGHT_NUMBER int,
TAIL_NUMBER varchar (10),
ORIGIN_AIRPORT varchar (7),
DESTINATION_AIRPORT varchar (7),
SCHEDULED_DEPARTURE int,
DEPARTURE_TIME float,
DEPARTURE_DELAY float,
TAXI_OUT float,
WHEELS_OFF float,
SCHEDULED_TIME float,
ELAPSED_TIME float,
AIR_TIME float,
DISTANCE  int,
WHEELS_ON  float,
TAXI_IN float,
SCHEDULED_ARRIVAL float,
ARRIVAL_TIME float,
ARRIVAL_DELAY float,
DIVERTED   float,
CANCELLED  float,
CANCELLATION_REASON  varchar(5),
AIR_SYSTEM_DELAY float,
SECURITY_DELAY float,
AIRLINE_DELAY float,
LATE_AIRCRAFT_DELAY float,
WEATHER_DELAY float
);

/* UPLOADING DATA IN TO em_flights TABLE */

COPY em_flights
FROM 'D:/Data Analytics/Intership/Labmentix/Emirates_Flight
Analysis/Final_project_data_archive/flights.csv'
WITH (
    FORMAT csv,
    HEADER,
    DELIMITER ',',
    QUOTE '"'
);


alter table em_flights add column SCHEDULED_DATE date;

UPDATE em_flights SET SCHEDULED_DATE = TO_DATE(
    LPAD(YEAR:: TEXT, 4, '0') || '-' ||
    LPAD(MONTH:: TEXT, 2, '0') || '-' ||
    LPAD(DAY:: TEXT, 2, '0'), 'YYYY-MM-DD')
WHERE SCHEDULED_DATE IS NULL;

-- -------

-- WORKING ON SCHEDULED_ARRIVAL COLUMN

ALTER TABLE EM_FLIGHTS ADD COLUMN FORMATED_SCHEDULED_ARRIVAL TIME;

    UPDATE EM_FLIGHTS
        SET FORMATED_SCHEDULED_ARRIVAL =
            TO_TIMESTAMP(
                CASE
                    WHEN SCHEDULED_ARRIVAL = 2400 THEN '0000'
                    ELSE LPAD(SCHEDULED_ARRIVAL:: TEXT, 4, '0') END,
                'HH24MI'):: TIME;
```

```
69
70
71      ALTER TABLE EM_FLIGHTS
72      DROP COLUMN SCHEDULED_ARRIVAL;
73
74      ALTER TABLE EM_FLIGHTS
75      RENAME COLUMN FORMATED_SCHEDULED_ARRIVAL TO SCHEDULED_ARRIVAL;
76
77  -- WORKING ON ARRIVAL_TIME COLUMN
78
79  ALTER TABLE EM_FLIGHTS ADD COLUMN FORMATED_ARRIVAL_TIME TIME;
80
81      UPDATE EM_FLIGHTS SET
82      FORMATED_ARRIVAL_TIME= TO_TIMESTAMP(
83          CASE
84              WHEN ARRIVAL_TIME = 2400 THEN '0000'
85              ELSE LPAD(ARRIVAL_TIME:: TEXT, 4, '0') END,
86              'HH24MI')::TIME;
87
88  -- SELECT *
89  -- FROM EM_FLIGHTS WHERE ARRIVAL_TIME IS NULL;
90
91
92      ALTER TABLE EM_FLIGHTS
93      DROP COLUMN ARRIVAL_TIME;
94
95      ALTER TABLE EM_FLIGHTS
96      RENAME COLUMN FORMATED_ARRIVAL_TIME TO ARRIVAL_TIME;
97
98
99  -- WORKING ON SCHEDULE_DEPARTURE COLUMN
100
101 ALTER TABLE EM_FLIGHTS ADD COLUMN FORMATED_SCHEDULED_DEPARTURE TIME;
102
103     UPDATE EM_FLIGHTS SET
104     FORMATED_SCHEDULED_DEPARTURE= TO_TIMESTAMP(
105         CASE
106             WHEN SCHEDULED_DEPARTURE = 2400 THEN '0000'
107             ELSE LPAD(SCHEDULED_DEPARTURE:: TEXT, 4, '0') END,
108             'HH24MI')::TIME;
109
110     ALTER TABLE EM_FLIGHTS
111     DROP COLUMN SCHEDULED_DEPARTURE;
112
113     ALTER TABLE EM_FLIGHTS
114     RENAME COLUMN FORMATED_SCHEDULED_DEPARTURE TO SCHEDULED_DEPARTURE;
115
116
117 -- WORKING ON DEPARTURE_TIME COLUMN:
118
119 ALTER TABLE EM_FLIGHTS ADD COLUMN FORMATED_DEPARTURE_TIME TIME;
120
121     UPDATE EM_FLIGHTS SET
122     FORMATED_DEPARTURE_TIME= TO_TIMESTAMP(
123         CASE
124             WHEN DEPARTURE_TIME = 2400 THEN '0000'
125             ELSE LPAD(DEPARTURE_TIME:: TEXT, 4, '0') END,
126             'HH24MI')::TIME;
127
128     ALTER TABLE EM_FLIGHTS
129     DROP COLUMN DEPARTURE_TIME;
130
131     ALTER TABLE EM_FLIGHTS
132     RENAME COLUMN FORMATED_DEPARTURE_TIME TO DEPARTURE_TIME;
133
134
135 -- WORKING ON DEPARTURE_TIME / ARRIVAL_TIME COLUMN
136 -- -- FOR CREATING TIME BUCKED:
137 -- ALTER TABLE EM_FLIGHTS DROP COLUMN ARRIVAL_TIME_BUCKET;
```

```sql

ALTER TABLE EM_FLIGHTS ADD COLUMN DEPARTURE_TIME_BUCKET INT; -- CREATING TIME BUCKED FOR DEPARTURE_TIME

ALTER TABLE EM_FLIGHTS ADD COLUMN ARRIVAL_TIME_BUCKET INT;  -- CREATING TIME BUCKED FOR ARRIVAL_TIME


/* EXTARCTING HOURS FROM DEPARTURE_TIME / ARRIVAL_TIME FOR
DEPARTURE_TIME_BUCKET AND ARRIVAL_TIME_BUCKET COLUMN
*/

UPDATE EM_FLIGHTS
SET DEPARTURE_TIME_BUCKET = EXTRACT(HOUR FROM DEPARTURE_TIME),
ARRIVAL_TIME_BUCKET = EXTRACT(HOUR FROM ARRIVAL_TIME);




SELECT DISTINCT(EXTRACT(HOUR FROM DEPARTURE_TIME))
FROM EM_FLIGHTS;

SELECT *
FROM EM_FLIGHTS LIMIT 1000;

-- SELECT MAX(SCHEDULED_ARRIVAL) FROM EM_FLIGHTS;


-- DROP TABLE em_flights;
-- SELECT * FROM EM_FLIGHTS LIMIT 100000;
-- SELECT COUNT(*) FROM EM_FLIGHTS;
/* ------------------------------------------------------------------  */

/* CREATING NEW TABLE Airports */

Create table Airports (
IATA_CODE varchar(4),
AIRPORT varchar(78),
CITY varchar(32),
STATE varchar(4),
COUNTRY varchar(4),
LATITUDE float,
LONGITUDE float);

/* UPLOADING DATA IN TO airports TABLE*/

COPY airports
FROM 'D:/Data Analytics/Intership/Labmentix/Emirates_Flight Analysis/Final_project_data_archive/airports_changed_encode.csv'
WITH (
     FORMAT csv,
     HEADER,
     DELIMITER ',',
     QUOTE '"'
     );

/* ------------------------------------------------------------------  */

/* CREATING NEW TABLE Airlines */
Create table Airlines(
    IATA_CODE varchar(4),
    AIRLINE varchar(28)
    );

-- DROP TABLE Airlines;

/* UPLOADING DATA IN TO Airlines TABLE*/

```

```
COPY Airlines
FROM 'D:/Data Analytics/Intership/Labmentix/Emirates_Flight Analysis/Final_project_data_archive/airlines.csv'
WITH(
    FORMAT csv,
    HEADER,
    DELIMITER ',',
    QUOTE '"'
    );

/* ---------------------------------------------------------------------  */

/* DATA OPERATIONS  */


SELECT * FROM EM_FLIGHTS;

/* THE 10th MONTH DATA HAS PROBLEM:
        ORIGIN_AIRPORTS and ORIGIN_AIRPORTS DATA ARE IN NUMBER FORMAT
*/
SELECT * FROM EM_FLIGHTS WHERE month =10;




/* Problem Statement:
---------------------
1 Analyzing the primary causes and patterns of flight delays
For strategic operational adjustments:
Means for what reason in each month how many flights delayed in each month
*/


-- Solution: Finding in each month how many and what types of flights delayed happend.
-- COUNT OF ALL DELAYED FLIGHTS


/*
THIS CODE WILL NOT GIVE RESULTS, AND/OR LOGIC WILL EITHER
DECRESES/ INCREASES THE COUNTS
*/
    -- WITH FT_DEPT_CTE AS
    --  (SELECT MONTH,
    --  COUNT(DEPARTURE_DELAY) AS DEPARTURE_DELAYED_FLIGHTS,
    --  COUNT(ARRIVAL_DELAY) AS ARRIVAL_DELAYED_FLIGHTS,
    --  COUNT(AIR_SYSTEM_DELAY) AS AIR_SYSTEM_DELAYED_FLIGHTS,
    --  COUNT(WEATHER_DELAY) AS WEATHER_DELAYED_FLIGHTS,
    --  COUNT(LATE_AIRCRAFT_DELAY) AS LATE_AIRCRAFT_DELAYED_FLIGHTS,
    --  COUNT(AIRLINE_DELAY) AS AIRLINE_DELAYED_FLIGHTS,
    --  COUNT(SECURITY_DELAY) AS SECURITY_DELAYED_FLIGHTS
    --  FROM EM_FLIGHTS
    --  WHERE DEPARTURE_DELAY > 0 OR ARRIVAL_DELAY  > 0 OR AIR_SYSTEM_DELAY > 0  OR WEATHER_DELAY > 0
    --  OR LATE_AIRCRAFT_DELAY > 0  OR AIRLINE_DELAY > 0  OR SECURITY_DELAY > 0
    --  GROUP BY MONTH
    --  )
    -- SELECT * FROM FT_DEPT_CTE;
/*

ACTUAL CODE

*/

WITH FT_DEPT_CTE AS
    (SELECT MONTH,
    COUNT(DEPARTURE_DELAY) AS DEPARTURE_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
```

```
    WHERE DEPARTURE_DELAY > 0
    GROUP BY MONTH
    ),
FT_ARRIV_CTE AS
    (SELECT MONTH,
    COUNT(ARRIVAL_DELAY) AS ARRIVAL_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE ARRIVAL_DELAY > 0
    GROUP BY MONTH
    ),

FT_AIRSYS_CTE AS
    (SELECT MONTH,
    COUNT(AIR_SYSTEM_DELAY) AS AIR_SYSTEM_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE AIR_SYSTEM_DELAY > 0
    GROUP BY MONTH
    ),
FT_WEATH_CTE AS
    (SELECT MONTH,
    COUNT(WEATHER_DELAY) AS WEATHER_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE WEATHER_DELAY > 0
    GROUP BY MONTH
    ),

FT_LT_AIRCFT_CTE AS
    (SELECT MONTH,
    COUNT(LATE_AIRCRAFT_DELAY) AS LATE_AIRCRAFT_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE LATE_AIRCRAFT_DELAY > 0
    GROUP BY MONTH
    ),

FT_AIRL_CTE AS
    (SELECT MONTH,
    COUNT(AIRLINE_DELAY) AS AIRLINE_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE AIRLINE_DELAY > 0
    GROUP BY MONTH
    ),

FT_SECU_CTE AS
    (SELECT MONTH,
    COUNT(SECURITY_DELAY) AS SECURITY_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE DEPARTURE_DELAY > 0
    GROUP BY MONTH
    ),

CUSTOM_JOIN_1 AS
    (SELECT F1.MONTH, F1.DEPARTURE_DELAYED_FLIGHTS,
     F2.ARRIVAL_DELAYED_FLIGHTS,
     F3.AIR_SYSTEM_DELAYED_FLIGHTS,
     F4.WEATHER_DELAYED_FLIGHTS,
     F5.LATE_AIRCRAFT_DELAYED_FLIGHTS,
     F6.SECURITY_DELAYED_FLIGHTS
     FROM FT_DEPT_CTE AS F1
     JOIN FT_ARRIV_CTE  AS F2
     ON F1.MONTH = F2.MONTH
     JOIN FT_AIRSYS_CTE AS F3
     ON F1.MONTH = F3.MONTH
     JOIN FT_WEATH_CTE AS F4
     ON F1.MONTH = F4.MONTH
     JOIN FT_LT_AIRCFT_CTE AS F5
     ON F1.MONTH = F5.MONTH
     JOIN FT_SECU_CTE AS F6
     ON F1.MONTH = F6.MONTH
    )
```

```sql
SELECT * FROM CUSTOM_JOIN_1;

-- EXPORRTING COUNT OF ALL DELAYED FLIGHTS INTO CSV:

COPY
    (
    WITH FT_DEPT_CTE AS
        (SELECT MONTH,
        COUNT(DEPARTURE_DELAY) AS DEPARTURE_DELAYED_FLIGHTS
        FROM EM_FLIGHTS
        WHERE DEPARTURE_DELAY > 0
        GROUP BY MONTH
        ),
    FT_ARRIV_CTE AS
        (SELECT MONTH,
        COUNT(ARRIVAL_DELAY) AS ARRIVAL_DELAYED_FLIGHTS
        FROM EM_FLIGHTS
        WHERE ARRIVAL_DELAY > 0
        GROUP BY MONTH
        ),

    FT_AIRSYS_CTE AS
        (SELECT MONTH,
        COUNT(AIR_SYSTEM_DELAY) AS AIR_SYSTEM_DELAYED_FLIGHTS
        FROM EM_FLIGHTS
        WHERE AIR_SYSTEM_DELAY > 0
        GROUP BY MONTH
        ),
    FT_WEATH_CTE AS
        (SELECT MONTH,
        COUNT(WEATHER_DELAY) AS WEATHER_DELAYED_FLIGHTS
        FROM EM_FLIGHTS
        WHERE WEATHER_DELAY > 0
        GROUP BY MONTH
        ),

    FT_LT_AIRCFT_CTE AS
        (SELECT MONTH,
        COUNT(LATE_AIRCRAFT_DELAY) AS LATE_AIRCRAFT_DELAYED_FLIGHTS
        FROM EM_FLIGHTS
        WHERE LATE_AIRCRAFT_DELAY > 0
        GROUP BY MONTH
        ),

    FT_AIRL_CTE AS
        (SELECT MONTH,
        COUNT(AIRLINE_DELAY) AS AIRLINE_DELAYED_FLIGHTS
        FROM EM_FLIGHTS
        WHERE AIRLINE_DELAY > 0
        GROUP BY MONTH
        ),

    FT_SECU_CTE AS
        (SELECT MONTH,
        COUNT(SECURITY_DELAY) AS SECURITY_DELAYED_FLIGHTS
        FROM EM_FLIGHTS
        WHERE DEPARTURE_DELAY > 0
        GROUP BY MONTH
        ),

    CUSTOM_JOIN_1 AS
        (SELECT F1.MONTH,
         COALESCE(F1.DEPARTURE_DELAYED_FLIGHTS,0) AS  DEPARTURE_DELAYED_FLIGHTS,
         COALESCE(F2.ARRIVAL_DELAYED_FLIGHTS,0) AS  ARRIVAL_DELAYED_FLIGHTS,
         COALESCE(F3.AIR_SYSTEM_DELAYED_FLIGHTS,0) AS  AIR_SYSTEM_DELAYED_FLIGHTS,
         COALESCE(F4.WEATHER_DELAYED_FLIGHTS,0) AS  WEATHER_DELAYED_FLIGHTS,
         COALESCE(F5.LATE_AIRCRAFT_DELAYED_FLIGHTS,0) AS  LATE_AIRCRAFT_DELAYED_FLIGHTS,
         COALESCE(F6.SECURITY_DELAYED_FLIGHTS,0) AS  SECURITY_DELAYED_FLIGHTS
         FROM FT_DEPT_CTE AS F1
```

```
409             JOIN FT_ARRIV_CTE  AS F2
410             ON F1.MONTH = F2.MONTH
411             JOIN FT_AIRSYS_CTE AS F3
412             ON F1.MONTH = F3.MONTH
413             JOIN FT_WEATH_CTE AS F4
414             ON F1.MONTH = F4.MONTH
415             JOIN FT_LT_AIRCFT_CTE AS F5
416             ON F1.MONTH = F5.MONTH
417             JOIN FT_SECU_CTE AS F6
418             ON F1.MONTH = F6.MONTH
419            )
420            SELECT * FROM CUSTOM_JOIN_1
421        )TO 'D:/Data Analytics/Intership/Labmentix/Emirates_Flight
           Analysis/SUBMISSION/CUSTOM CSV/DELAYED_FLIGHTS_COUNTS.csv'
422            WITH CSV HEADER;
423
424
425    /* ---------------------------------------- */
426
427    /* COUNT OF IN WHICH MOTH EACH TYPES OF FLIGHTS DELAYED HAPPEND MOST*/
428
429    -- COUNT OF DEPARTURE DELAYED FLIGHTS
430
431        SELECT MONTH,
432        COUNT(DEPARTURE_DELAY) AS DEPARTURE_DELAYED_FLIGHTS
433        FROM EM_FLIGHTS
434        WHERE DEPARTURE_DELAY > 0
435        GROUP BY MONTH
436        ORDER BY DEPARTURE_DELAYED_FLIGHTS DESC;
437
438    -- AIRPORT WISE DEPARTURE DELAYED FLIGHTS
439
440        SELECT EMF.ORIGIN_AIRPORT AS ORIGIN_AIRPORT_IATA, ARP1.AIRPORT AS ORIGIN_AIRPORT_NAME
           ,
441        EMF.DESTINATION_AIRPORT AS DESTINATION_AIRPORT_IATA, ARP2.AIRPORT AS
           DESTINATION_AIRPORT_NAME,
442        COUNT(EMF.DEPARTURE_DELAY) AS DEPARTURE_DELAYED_FLIGHTS
443        FROM EM_FLIGHTS AS EMF
444        JOIN AIRPORTS AS ARP1
445        ON EMF.ORIGIN_AIRPORT = ARP1.IATA_CODE
446
447        JOIN AIRPORTS AS ARP2
448        ON EMF.DESTINATION_AIRPORT = ARP2.IATA_CODE
449
450        WHERE DEPARTURE_DELAY > 0
451        GROUP BY EMF.ORIGIN_AIRPORT, EMF.DESTINATION_AIRPORT, ARP1.AIRPORT, ARP2.AIRPORT
452        ORDER BY DEPARTURE_DELAYED_FLIGHTS DESC;
453
454
455    /*
456        Peak in June & July (over 200K delays), lowest in September & October.
457    */
458
459    -- COUNT OF ARRIVAL DELAYED FLIGHTS
460
461        SELECT MONTH,
462        COUNT(ARRIVAL_DELAY) AS ARRIVAL_DELAYED_FLIGHTS
463        FROM EM_FLIGHTS
464        WHERE ARRIVAL_DELAY > 0  -- "ARRIVAL_DELAY <= 15 OR ARRIVAL_DELAY >= 15" BASEDD ON
           THE INSTRUCTIONS,
465                                 -- BUT I HAVE COSIDER ALL THOSE FLIGHTS THOSE EVEN 1 MINUTE
                                    LATE.
466        GROUP BY MONTH
467        ORDER BY ARRIVAL_DELAYED_FLIGHTS DESC;
468
469
470    -- AIRPORT WISE ARRIVAL DELAYED FLIGHTS:
471
472        SELECT EMF.ORIGIN_AIRPORT AS ORIGIN_AIRPORT_IATA, ARP1.AIRPORT AS ORIGIN_AIRPORT_NAME
```

```
    ,
473     EMF.DESTINATION_AIRPORT AS DESTINATION_AIRPORT_IATA, ARP2.AIRPORT AS
        DESTINATION_AIRPORT_NAME,
474     COUNT(EMF.ARRIVAL_DELAY) AS ARRIVAL_DELAYED_FLIGHTS
475     FROM EM_FLIGHTS AS EMF
476     JOIN AIRPORTS AS ARP1
477     ON EMF.ORIGIN_AIRPORT = ARP1.IATA_CODE
478
479     JOIN AIRPORTS AS ARP2
480     ON EMF.DESTINATION_AIRPORT = ARP2.IATA_CODE
481
482     WHERE ARRIVAL_DELAY > 0
483     GROUP BY EMF.ORIGIN_AIRPORT, EMF.DESTINATION_AIRPORT, ARP1.AIRPORT, ARP2.AIRPORT
484     ORDER BY ARRIVAL_DELAYED_FLIGHTS DESC;
485
486 /*
487     Peak in June & July (over 200K delays), lowest in September & October.
488 */
489
490 -- COUNT OF AIR SYSTEM DELAYED FLIGHTS
491
492     SELECT MONTH,
493     COUNT(AIR_SYSTEM_DELAY) AS AIR_SYSTEM_DELAYED_FLIGHTS
494     FROM EM_FLIGHTS
495     WHERE AIR_SYSTEM_DELAY > 0
496     GROUP BY MONTH
497     ORDER BY AIR_SYSTEM_DELAYED_FLIGHTS DESC;
498
499
500 -- AIRPORT WISE AIR SYSTEM DELAYED FLIGHTS
501
502     SELECT EMF.ORIGIN_AIRPORT AS ORIGIN_AIRPORT_IATA, ARP1.AIRPORT AS ORIGIN_AIRPORT_NAME
        ,
503     EMF.DESTINATION_AIRPORT AS DESTINATION_AIRPORT_IATA, ARP2.AIRPORT AS
        DESTINATION_AIRPORT_NAME,
504     COUNT(EMF.AIR_SYSTEM_DELAY) AS AIR_SYSTEM_DELAYED_FLIGHTS
505     FROM EM_FLIGHTS AS EMF
506     JOIN AIRPORTS AS ARP1
507     ON EMF.ORIGIN_AIRPORT = ARP1.IATA_CODE
508
509     JOIN AIRPORTS AS ARP2
510     ON EMF.DESTINATION_AIRPORT = ARP2.IATA_CODE
511
512     WHERE AIR_SYSTEM_DELAY > 0
513     GROUP BY EMF.ORIGIN_AIRPORT, EMF.DESTINATION_AIRPORT, ARP1.AIRPORT, ARP2.AIRPORT
514     ORDER BY AIR_SYSTEM_DELAYED_FLIGHTS DESC;
515
516 /*
517 Gradual rise till June, peaking at ~58K, with dip in fall (Sep-Nov)
518 */
519
520 -- COUNT OF SECURITY DELAYED FLIGHTS
521
522     SELECT MONTH,
523     COUNT(SECURITY_DELAY) AS SECURITY_DELAYED_FLIGHTS
524     FROM EM_FLIGHTS
525     WHERE SECURITY_DELAY > 0
526     GROUP BY MONTH
527     ORDER BY SECURITY_DELAYED_FLIGHTS DESC;
528
529 -- AIRPORT WISE SECURITY DELAYED FLIGHTS
530
531     SELECT EMF.ORIGIN_AIRPORT AS ORIGIN_AIRPORT_IATA, ARP1.AIRPORT AS ORIGIN_AIRPORT_NAME
        ,
532     EMF.DESTINATION_AIRPORT AS DESTINATION_AIRPORT_IATA, ARP2.AIRPORT AS
        DESTINATION_AIRPORT_NAME,
533     COUNT(EMF.SECURITY_DELAY) AS SECURITY_DELAYED_FLIGHTS
534     FROM EM_FLIGHTS AS EMF
535     JOIN AIRPORTS AS ARP1
```

```
536       ON EMF.ORIGIN_AIRPORT = ARP1.IATA_CODE
537
538       JOIN AIRPORTS AS ARP2
539       ON EMF.DESTINATION_AIRPORT = ARP2.IATA_CODE
540
541       WHERE SECURITY_DELAY > 0
542       GROUP BY EMF.ORIGIN_AIRPORT, EMF.DESTINATION_AIRPORT, ARP1.AIRPORT, ARP2.AIRPORT
543       ORDER BY SECURITY_DELAYED_FLIGHTS DESC;
544
545
546   /*
547       Most severe in June (105K), with a consistent pattern around ~85K for most months.
548   */
549
550   -- COUNT OF AIRLINE DELAYED FLIGHTS
551
552       SELECT MONTH,
553       COUNT(AIRLINE_DELAY) AS AIRLINE_DELAYED_FLIGHTS
554       FROM EM_FLIGHTS
555       WHERE AIRLINE_DELAY > 0
556       GROUP BY MONTH
557       ORDER BY AIRLINE_DELAYED_FLIGHTS DESC;
558
559   -- AIRPORT WISE AIRLINE DELAYED FLIGHTS
560
561       SELECT EMF.ORIGIN_AIRPORT AS ORIGIN_AIRPORT_IATA, ARP1.AIRPORT AS ORIGIN_AIRPORT_NAME
          ,
562       EMF.DESTINATION_AIRPORT AS DESTINATION_AIRPORT_IATA, ARP2.AIRPORT AS
          DESTINATION_AIRPORT_NAME,
563       COUNT(EMF.AIRLINE_DELAY) AS AIRLINE_DELAYED_FLIGHTS
564       FROM EM_FLIGHTS AS EMF
565       JOIN AIRPORTS AS ARP1
566       ON EMF.ORIGIN_AIRPORT = ARP1.IATA_CODE
567
568       JOIN AIRPORTS AS ARP2
569       ON EMF.DESTINATION_AIRPORT = ARP2.IATA_CODE
570
571       WHERE AIRLINE_DELAY > 0
572       GROUP BY EMF.ORIGIN_AIRPORT, EMF.DESTINATION_AIRPORT, ARP1.AIRPORT, ARP2.AIRPORT
573       ORDER BY AIRLINE_DELAYED_FLIGHTS DESC;
574
575   /*
576   Airline delayed mostly happened in June & July month, may be due rainy season and
      maintenance required extra care
577   */
578
579   -- COUNT OF LATE AIRCRAFT DELAYED FLIGHTS
580
581       SELECT MONTH,
582       COUNT(LATE_AIRCRAFT_DELAY) AS LATE_AIRCRAFT_DELAYED_FLIGHTS
583       FROM EM_FLIGHTS
584       WHERE LATE_AIRCRAFT_DELAY > 0
585       GROUP BY MONTH
586       ORDER BY LATE_AIRCRAFT_DELAYED_FLIGHTS DESC;
587
588   -- AIRPORT WISE LATE AIRCRAFT DELAYED FLIGHTS
589
590       SELECT EMF.ORIGIN_AIRPORT AS ORIGIN_AIRPORT_IATA, ARP1.AIRPORT AS ORIGIN_AIRPORT_NAME
          ,
591       EMF.DESTINATION_AIRPORT AS DESTINATION_AIRPORT_IATA, ARP2.AIRPORT AS
          DESTINATION_AIRPORT_NAME,
592       COUNT(EMF.LATE_AIRCRAFT_DELAY) AS LATE_AIRCRAFT_DELAYED_FLIGHTS
593       FROM EM_FLIGHTS AS EMF
594       JOIN AIRPORTS AS ARP1
595       ON EMF.ORIGIN_AIRPORT = ARP1.IATA_CODE
596
597       JOIN AIRPORTS AS ARP2
598       ON EMF.DESTINATION_AIRPORT = ARP2.IATA_CODE
599
```

```sql
    WHERE LATE_AIRCRAFT_DELAY > 0
    GROUP BY EMF.ORIGIN_AIRPORT, EMF.DESTINATION_AIRPORT, ARP1.AIRPORT, ARP2.AIRPORT
    ORDER BY LATE_AIRCRAFT_DELAYED_FLIGHTS DESC;

/*
Highest in June (64K), lowest in September & October
*/

-- COUNT OF WEATHER DELAYED FLIGHTS

    SELECT MONTH,
    COUNT(WEATHER_DELAY) AS WEATHER_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE WEATHER_DELAY > 0
    GROUP BY MONTH
    ORDER BY WEATHER_DELAYED_FLIGHTS DESC;


-- AIRPORT WISE LATE WEATHER DELAYED FLIGHTS
    SELECT EMF.ORIGIN_AIRPORT AS ORIGIN_AIRPORT_IATA, ARP1.AIRPORT AS ORIGIN_AIRPORT_NAME
    ,
    EMF.DESTINATION_AIRPORT AS DESTINATION_AIRPORT_IATA, ARP2.AIRPORT AS
    DESTINATION_AIRPORT_NAME,
    COUNT(EMF.WEATHER_DELAY) AS WEATHER_DELAYED_FLIGHTS
    FROM EM_FLIGHTS AS EMF
    JOIN AIRPORTS AS ARP1
    ON EMF.ORIGIN_AIRPORT = ARP1.IATA_CODE

    JOIN AIRPORTS AS ARP2
    ON EMF.DESTINATION_AIRPORT = ARP2.IATA_CODE

    WHERE WEATHER_DELAY > 0
    GROUP BY EMF.ORIGIN_AIRPORT, EMF.DESTINATION_AIRPORT, ARP1.AIRPORT, ARP2.AIRPORT
    ORDER BY WEATHER_DELAYED_FLIGHTS DESC;

    SELECT * FROM AIRPORTS;

/*
    February may see unpredictable winter storms or fog (common in many connecting hubs).
    June could involve summer storms or heat waves.

*/

-- COUNT OF DELAYED FLIGHTS BASED ON THE INSTRUCTION

SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
        COUNT(ARRIVAL_DELAY) AS DELAYED_FLIGHTS
        FROM EM_FLIGHTS
        WHERE ARRIVAL_DELAY >= -15 AND ARRIVAL_DELAY <= 15
        GROUP BY MONTH,ORIGIN_AIRPORT, DESTINATION_AIRPORT
        ORDER BY DELAYED_FLIGHTS DESC;


-- EXPORTING IN CSV:

COPY
    (
    SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
        COUNT(ARRIVAL_DELAY) AS DELAYED_FLIGHTS
        FROM EM_FLIGHTS
        WHERE ARRIVAL_DELAY >= -15 AND ARRIVAL_DELAY <= 15
        GROUP BY MONTH,ORIGIN_AIRPORT, DESTINATION_AIRPORT
        ORDER BY DELAYED_FLIGHTS DESC

    )TO 'D:/Data Analytics/Intership/Labmentix/Emirates_Flight
    Analysis/SUBMISSION/INSTRUCTION_DELAYED_FLIGHTS.csv'
    WITH CSV HEADER;


```

```sql
/* ---------------------------------------- */

/* FINDING DEPARTURE DELAY IN EACH MONTHS:
        BASED ON HOW MANY FLIGHTS, HOW MANY MINUTES  */

SELECT MONTH, DEPARTURE_DELAY AS DEPARTURE_DELAY_MINUTE,
COUNT(DEPARTURE_DELAY) AS  NO_OF_DELAYED_FLIGHTS
FROM EM_FLIGHTS
WHERE DEPARTURE_DELAY > 0
GROUP BY MONTH, DEPARTURE_DELAY
ORDER BY NO_OF_DELAYED_FLIGHTS DESC;

/* FINDING EARLY DEPARTURE IN EACH MONTHS:
        BASED ON HOW MANY FLIGHTS, HOW MANY MINUTES */


SELECT MONTH, ABS(DEPARTURE_DELAY) AS EARLY_DEPARTURE_MINUTE,
COUNT(DEPARTURE_DELAY) AS  NO_OF_EARLY_DEPARTURE_FLIGHTS
FROM EM_FLIGHTS
WHERE DEPARTURE_DELAY < 0  -- WHEN DEPARTURE_DELAY IS IN NEGETIVE
GROUP BY MONTH, DEPARTURE_DELAY
ORDER BY NO_OF_EARLY_DEPARTURE_FLIGHTS DESC;

/*
-------------------------------------------------------------------------------------------
*/



/* Problem Statement 2:
Benchmarking the on-time performance, delay severity,
and cancellation rates of different airlines for competitive analysis and improvement
initiatives.
*/


/* FINDING ON TIME PERFORMANCE (PERCENTAGE) OF EACH AIRLINE IN EACH MONTHS: */

WITH AIR_L_CTE AS
    (
        SELECT MONTH, AIRLINE,
        COUNT(SCHEDULED_ARRIVAL) AS  ON_TIME_FLIGHTS
        FROM EM_FLIGHTS
        WHERE
            ARRIVAL_TIME <= SCHEDULED_ARRIVAL
            AND ARRIVAL_TIME IS NOT NULL
            AND CANCELLED = 0

        GROUP BY MONTH,AIRLINE
    ),

    AIR_L_CTE2 AS
        (

        SELECT ALC.MONTH, ALC.AIRLINE,
        ALN.AIRLINE AS AIRLINE_NAME,
        ALC.ON_TIME_FLIGHTS

        FROM AIR_L_CTE AS ALC
        LEFT JOIN AIRLINES AS ALN
        ON ALC.AIRLINE= ALN.IATA_CODE
        ORDER BY ALC.MONTH
        ),

    AIR_L_CTE3 AS
        (

        SELECT
            ALC2.MONTH,
```

```
732             ALC2.AIRLINE,
733             ALC2.AIRLINE_NAME,
734             ALC2.ON_TIME_FLIGHTS,
735         COUNT(EMF.ARRIVAL_TIME) AS NUMBER_OF_FLIGHTS_FLY
736         FROM AIR_L_CTE2 AS ALC2
737         JOIN EM_FLIGHTS AS EMF
738         ON ALC2.AIRLINE = EMF.AIRLINE
739         WHERE EMF.CANCELLED = 0
740         GROUP BY
741             ALC2.MONTH,
742             ALC2.AIRLINE,
743             ALC2.AIRLINE_NAME,
744             ALC2.ON_TIME_FLIGHTS
745         ORDER BY ALC2.MONTH
746         )
747 SELECT *, ROUND((ON_TIME_FLIGHTS::NUMERIC /NUMBER_OF_FLIGHTS_FLY)*100, 2) AS
    ON_TIME_PERCENTAGE
748 FROM AIR_L_CTE3;
749
750
751 -- FINDING ON TIME PERFORMANCE ON AIRLINES:
752     SELECT
753     EMF.AIRLINE AS AIRLINE_IATA,
754     ARL.AIRLINE AS AIRLINE_NAME,
755     COUNT(EMF.SCHEDULED_ARRIVAL) AS  ON_TIME_FLIGHTS
756
757     FROM EM_FLIGHTS AS EMF
758     JOIN AIRLINES AS ARL
759     ON EMF.AIRLINE = ARL.IATA_CODE
760
761     WHERE EMF.ARRIVAL_TIME <= EMF.SCHEDULED_ARRIVAL AND EMF.ARRIVAL_TIME IS NOT NULL
762     GROUP BY EMF.AIRLINE, ARL.AIRLINE
763     ORDER BY ON_TIME_FLIGHTS DESC;
764
765 SELECT * FROM AIRLINES;
766
767 SELECT * FROM EM_FLIGHTS LIMIT 10;
768
769 /*
770
771 THE SOUTHWEST AIRLINE DELIVER BEST ON TIME PERFORMANCE
772
773 */
774
775
776 -- -- BY AIRLINE
777 --  SELECT MONTH, AIRLINE,
778 --  COUNT(SCHEDULED_ARRIVAL) AS  ON_TIME_FLIGHTS
779 --  FROM EM_FLIGHTS
780 --  WHERE ARRIVAL_TIME <= SCHEDULED_ARRIVAL AND ARRIVAL_TIME IS NOT NULL
781 --  GROUP BY MONTH,AIRLINE;
782
783 -- WORKING ON AIRLINES SCHEDULED_ARRIVAL AND ACTUAL ARRIVAL_TIME
784
785 -- FINDING ON TIME PERFORMANCE ON MONTH:
786
787     SELECT MONTH,
788     COUNT(SCHEDULED_ARRIVAL) AS  ON_TIME_FLIGHTS
789     FROM EM_FLIGHTS
790     WHERE ARRIVAL_TIME <= SCHEDULED_ARRIVAL
791     GROUP BY MONTH
792     ORDER BY ON_TIME_FLIGHTS DESC;
793 /*
794 POOREST ON TIME PERFORMANCE HAPPENED IN JANUARY AND FEBRUARY MAY BE DUE TO THUNDER
    STROME, UN EXPECTED MACHINARY PROBLEMS
795 */
796
797     SELECT EMF.MONTH, EMF.AIRLINE AS AIRLINE_IATA,
798     ARL.AIRLINE AS AIRLINE_NAME,
```

```sql
    COUNT(EMF.SCHEDULED_ARRIVAL) AS  ON_TIME_FLIGHTS

    FROM EM_FLIGHTS AS EMF
    JOIN AIRLINES AS ARL
    ON EMF.AIRLINE = ARL.IATA_CODE

    WHERE ARRIVAL_TIME <= SCHEDULED_ARRIVAL
    GROUP BY EMF.MONTH, EMF.AIRLINE, ARL.AIRLINE
    ORDER BY ON_TIME_FLIGHTS DESC;

/*-----------------------------------------------------------*/

/* PROBLEM 2 PART 2:
FINDING ON DELAY SEVERITY OF EACH AIRLINE IN EACH MONTHS
*/


WITH FT_DEPT_CTE AS
    (SELECT MONTH, AIRLINE,
    COUNT(DEPARTURE_DELAY) AS DEPARTURE_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE DEPARTURE_DELAY > 0
    GROUP BY MONTH, AIRLINE
    ),
FT_ARRIV_CTE AS
    (SELECT MONTH, AIRLINE,
    COUNT(ARRIVAL_DELAY) AS ARRIVAL_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE ARRIVAL_DELAY > 0
    GROUP BY MONTH, AIRLINE
    ),

FT_AIRSYS_CTE AS
    (SELECT MONTH, AIRLINE,
    COUNT(AIR_SYSTEM_DELAY) AS AIR_SYSTEM_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE AIR_SYSTEM_DELAY > 0
    GROUP BY MONTH, AIRLINE
    ),
FT_WEATH_CTE AS
    (SELECT MONTH, AIRLINE,
    COUNT(WEATHER_DELAY) AS WEATHER_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE WEATHER_DELAY > 0
    GROUP BY MONTH, AIRLINE
    ),

FT_LT_AIRCFT_CTE AS
    (SELECT MONTH, AIRLINE,
    COUNT(LATE_AIRCRAFT_DELAY) AS LATE_AIRCRAFT_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE LATE_AIRCRAFT_DELAY > 0
    GROUP BY MONTH, AIRLINE
    ),

FT_AIRL_CTE AS
    (SELECT MONTH, AIRLINE,
    COUNT(AIRLINE_DELAY) AS AIRLINE_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE AIRLINE_DELAY > 0
    GROUP BY MONTH, AIRLINE
    ),

FT_SECU_CTE AS
    (SELECT MONTH, AIRLINE,
    COUNT(SECURITY_DELAY) AS SECURITY_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE DEPARTURE_DELAY > 0
    GROUP BY MONTH, AIRLINE
```

```
    ),

CUSTOM_JOIN_1 AS
    (SELECT F1.MONTH, F1.AIRLINE, F1.DEPARTURE_DELAYED_FLIGHTS,
     F2.ARRIVAL_DELAYED_FLIGHTS,
     F3.AIR_SYSTEM_DELAYED_FLIGHTS,
     F4.WEATHER_DELAYED_FLIGHTS,
     F5.LATE_AIRCRAFT_DELAYED_FLIGHTS,
     F6.SECURITY_DELAYED_FLIGHTS
     FROM FT_DEPT_CTE AS F1
     LEFT JOIN FT_ARRIV_CTE  AS F2
     ON F1.MONTH = F2.MONTH AND F1.AIRLINE = F2.AIRLINE
     LEFT JOIN FT_AIRSYS_CTE AS F3
     ON F1.MONTH = F3.MONTH AND F1.AIRLINE = F3.AIRLINE
     LEFT JOIN FT_WEATH_CTE AS F4
     ON F1.MONTH = F4.MONTH AND F1.AIRLINE = F4.AIRLINE
     LEFT JOIN FT_LT_AIRCFT_CTE AS F5
     ON F1.MONTH = F5.MONTH AND F1.AIRLINE = F5.AIRLINE
     LEFT JOIN FT_SECU_CTE AS F6
     ON F1.MONTH = F6.MONTH AND F1.AIRLINE = F6.AIRLINE
    ),
CUSTOM_JOIN_2 AS
    (
    SELECT MONTH, AIRLINE,
    COUNT (DEPARTURE_TIME) AS TOTAL_FLIGHTS_DEPARTED FROM EM_FLIGHTS
    WHERE DEPARTURE_TIME IS NOT NULL
    GROUP BY MONTH, AIRLINE
    ),
CUSTOM_JOIN_3 AS
    (
    SELECT CJ1.*,
    CJ2.TOTAL_FLIGHTS_DEPARTED
    FROM CUSTOM_JOIN_1 AS CJ1
    JOIN CUSTOM_JOIN_2 AS CJ2
    ON CJ1.MONTH = CJ2.MONTH AND CJ1.AIRLINE = CJ2.AIRLINE
    ),
CUSTOM_JOIN_4 AS
    (
    SELECT MONTH, AIRLINE,
    (DEPARTURE_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100 AS
    DEPARTURE_DELAYED_PERCENTAGE,
    (ARRIVAL_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100 AS
    ARRIVAL_DELAYED_PERCENTAGE,
    (AIR_SYSTEM_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100 AS
    AIR_SYSTEM_DELAYED_PERCENTAGE,
    (WEATHER_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100 AS
    WEATHER_DELAYED_PERCENTAGE,
    (LATE_AIRCRAFT_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100 AS
    LATE_AIRCRAFT_DELAYED_PERCENTAGE,
    (SECURITY_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100 AS
    SECURITY_DELAYED_PERCENTAGE
    FROM CUSTOM_JOIN_3
    )


SELECT CJ3.*,
CJ4.DEPARTURE_DELAYED_PERCENTAGE,
CJ4.ARRIVAL_DELAYED_PERCENTAGE ,
CJ4.AIR_SYSTEM_DELAYED_PERCENTAGE ,
CJ4.WEATHER_DELAYED_PERCENTAGE ,
CJ4.LATE_AIRCRAFT_DELAYED_PERCENTAGE ,
CJ4.SECURITY_DELAYED_PERCENTAGE
FROM CUSTOM_JOIN_4 AS CJ4
JOIN CUSTOM_JOIN_3 AS CJ3
ON CJ3.MONTH = CJ4.MONTH AND CJ3.AIRLINE = CJ4.AIRLINE;



/* ---------------------------------- */
```

```
931
932  -- EXPORTING DELAY SEVERITY OF EACH AIRLINE IN EACH MONTHS:
933
934  COPY
935      (
936      WITH FT_DEPT_CTE AS
937      (SELECT MONTH, AIRLINE,
938      COUNT(DEPARTURE_DELAY) AS DEPARTURE_DELAYED_FLIGHTS
939      FROM EM_FLIGHTS
940      WHERE DEPARTURE_DELAY > 0
941      GROUP BY MONTH, AIRLINE
942      ),
943  FT_ARRIV_CTE AS
944      (SELECT MONTH, AIRLINE,
945      COUNT(ARRIVAL_DELAY) AS ARRIVAL_DELAYED_FLIGHTS
946      FROM EM_FLIGHTS
947      WHERE ARRIVAL_DELAY > 0
948      GROUP BY MONTH, AIRLINE
949      ),
950
951  FT_AIRSYS_CTE AS
952      (SELECT MONTH, AIRLINE,
953      COUNT(AIR_SYSTEM_DELAY) AS AIR_SYSTEM_DELAYED_FLIGHTS
954      FROM EM_FLIGHTS
955      WHERE AIR_SYSTEM_DELAY > 0
956      GROUP BY MONTH, AIRLINE
957      ),
958  FT_WEATH_CTE AS
959      (SELECT MONTH, AIRLINE,
960      COUNT(WEATHER_DELAY) AS WEATHER_DELAYED_FLIGHTS
961      FROM EM_FLIGHTS
962      WHERE WEATHER_DELAY > 0
963      GROUP BY MONTH, AIRLINE
964      ),
965
966  FT_LT_AIRCFT_CTE AS
967      (SELECT MONTH, AIRLINE,
968      COUNT(LATE_AIRCRAFT_DELAY) AS LATE_AIRCRAFT_DELAYED_FLIGHTS
969      FROM EM_FLIGHTS
970      WHERE LATE_AIRCRAFT_DELAY > 0
971      GROUP BY MONTH, AIRLINE
972      ),
973
974  FT_AIRL_CTE AS
975      (SELECT MONTH, AIRLINE,
976      COUNT(AIRLINE_DELAY) AS AIRLINE_DELAYED_FLIGHTS
977      FROM EM_FLIGHTS
978      WHERE AIRLINE_DELAY > 0
979      GROUP BY MONTH, AIRLINE
980      ),
981
982  FT_SECU_CTE AS
983      (SELECT MONTH, AIRLINE,
984      COUNT(SECURITY_DELAY) AS SECURITY_DELAYED_FLIGHTS
985      FROM EM_FLIGHTS
986      WHERE DEPARTURE_DELAY > 0
987      GROUP BY MONTH, AIRLINE
988      ),
989
990  CUSTOM_JOIN_1 AS
991      (SELECT F1.MONTH, F1.AIRLINE,
992       COALESCE(F1.DEPARTURE_DELAYED_FLIGHTS, 0) AS DEPARTURE_DELAYED_FLIGHTS,
993       COALESCE(F2.ARRIVAL_DELAYED_FLIGHTS, 0) AS ARRIVAL_DELAYED_FLIGHTS,
994       COALESCE(F3.AIR_SYSTEM_DELAYED_FLIGHTS, 0) AS AIR_SYSTEM_DELAYED_FLIGHTS,
995       COALESCE(F4.WEATHER_DELAYED_FLIGHTS, 0) AS WEATHER_DELAYED_FLIGHTS,
996       COALESCE(F5.LATE_AIRCRAFT_DELAYED_FLIGHTS, 0) AS LATE_AIRCRAFT_DELAYED_FLIGHTS,
997       COALESCE(F6.SECURITY_DELAYED_FLIGHTS, 0) AS SECURITY_DELAYED_FLIGHTS
998       FROM FT_DEPT_CTE AS F1
999       LEFT JOIN FT_ARRIV_CTE  AS F2
```

```
     ON F1.MONTH = F2.MONTH AND F1.AIRLINE = F2.AIRLINE
     LEFT JOIN FT_AIRSYS_CTE AS F3
     ON F1.MONTH = F3.MONTH AND F1.AIRLINE = F3.AIRLINE
     LEFT JOIN FT_WEATH_CTE AS F4
     ON F1.MONTH = F4.MONTH AND F1.AIRLINE = F4.AIRLINE
     LEFT JOIN FT_LT_AIRCFT_CTE AS F5
     ON F1.MONTH = F5.MONTH AND F1.AIRLINE = F5.AIRLINE
     LEFT JOIN FT_SECU_CTE AS F6
     ON F1.MONTH = F6.MONTH AND F1.AIRLINE = F6.AIRLINE
    ),
CUSTOM_JOIN_2 AS
    (
    SELECT MONTH, AIRLINE,
    COUNT (DEPARTURE_TIME) AS TOTAL_FLIGHTS_DEPARTED FROM EM_FLIGHTS
    WHERE DEPARTURE_TIME IS NOT NULL
    GROUP BY MONTH, AIRLINE
    ),
CUSTOM_JOIN_3 AS
    (
    SELECT CJ1.*,
    CJ2.TOTAL_FLIGHTS_DEPARTED
    FROM CUSTOM_JOIN_1 AS CJ1
    JOIN CUSTOM_JOIN_2 AS CJ2
    ON CJ1.MONTH = CJ2.MONTH AND CJ1.AIRLINE = CJ2.AIRLINE
    ),
CUSTOM_JOIN_4 AS
    (
    SELECT MONTH, AIRLINE,
    ROUND((DEPARTURE_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100,2) AS
    DEPARTURE_DELAYED_PERCENTAGE,
    ROUND((ARRIVAL_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100,2) AS
    ARRIVAL_DELAYED_PERCENTAGE,
    ROUND((AIR_SYSTEM_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100,2) AS
    AIR_SYSTEM_DELAYED_PERCENTAGE,
    ROUND((WEATHER_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100,2) AS
    WEATHER_DELAYED_PERCENTAGE,
    ROUND((LATE_AIRCRAFT_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100,2) AS
    LATE_AIRCRAFT_DELAYED_PERCENTAGE,
    ROUND((SECURITY_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100,2) AS
    SECURITY_DELAYED_PERCENTAGE
    FROM CUSTOM_JOIN_3
    )
SELECT CJ3.*,
    COALESCE(CJ4.DEPARTURE_DELAYED_PERCENTAGE, 0) AS DEPARTURE_DELAYED_PERCENTAGE,
    COALESCE(CJ4.ARRIVAL_DELAYED_PERCENTAGE, 0) AS  ARRIVAL_DELAYED_PERCENTAGE,
    COALESCE(CJ4.AIR_SYSTEM_DELAYED_PERCENTAGE, 0) AS  AIR_SYSTEM_DELAYED_PERCENTAGE,
    COALESCE(CJ4.WEATHER_DELAYED_PERCENTAGE, 0) AS  WEATHER_DELAYED_PERCENTAGE,
    COALESCE(CJ4.LATE_AIRCRAFT_DELAYED_PERCENTAGE, 0)  AS
    LATE_AIRCRAFT_DELAYED_PERCENTAGE,
    COALESCE(CJ4.SECURITY_DELAYED_PERCENTAGE, 0) AS SECURITY_DELAYED_PERCENTAGE
FROM CUSTOM_JOIN_4 AS CJ4
JOIN CUSTOM_JOIN_3 AS CJ3
ON CJ3.MONTH = CJ4.MONTH AND CJ3.AIRLINE = CJ4.AIRLINE
    ) TO 'D:/Data Analytics/Intership/Labmentix/Emirates_Flight
    Analysis/SUBMISSION/CUSTOM CSV/AIRLINES_DELAY_SEVERITY_MONTHS.csv'
    WITH CSV HEADER;



/* PROBLEM 2 PART 2.2:
FINDING ON DELAY SEVERITY OF "EACH AIRLINE FROM DEPARTURE AIRPORT" IN EACH MONTHS
*/


WITH FT_DEPT_CTE AS
    (SELECT MONTH, AIRLINE, ORIGIN_AIRPORT,
    COUNT(DEPARTURE_DELAY) AS DEPARTURE_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE DEPARTURE_DELAY > 0
```

```
1061        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
1062        ),
1063    FT_ARRIV_CTE AS
1064        (SELECT MONTH, AIRLINE, ORIGIN_AIRPORT,
1065        COUNT(ARRIVAL_DELAY) AS ARRIVAL_DELAYED_FLIGHTS
1066        FROM EM_FLIGHTS
1067        WHERE ARRIVAL_DELAY > 0
1068        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
1069        ),
1070
1071    FT_AIRSYS_CTE AS
1072        (SELECT MONTH, AIRLINE , ORIGIN_AIRPORT,
1073        COUNT(AIR_SYSTEM_DELAY) AS AIR_SYSTEM_DELAYED_FLIGHTS
1074        FROM EM_FLIGHTS
1075        WHERE AIR_SYSTEM_DELAY > 0
1076        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
1077        ),
1078    FT_WEATH_CTE AS
1079        (SELECT MONTH, AIRLINE , ORIGIN_AIRPORT,
1080        COUNT(WEATHER_DELAY) AS WEATHER_DELAYED_FLIGHTS
1081        FROM EM_FLIGHTS
1082        WHERE WEATHER_DELAY > 0
1083        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
1084        ),
1085
1086    FT_LT_AIRCFT_CTE AS
1087        (SELECT MONTH, AIRLINE , ORIGIN_AIRPORT,
1088        COUNT(LATE_AIRCRAFT_DELAY) AS LATE_AIRCRAFT_DELAYED_FLIGHTS
1089        FROM EM_FLIGHTS
1090        WHERE LATE_AIRCRAFT_DELAY > 0
1091        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
1092        ),
1093
1094    FT_AIRL_CTE AS
1095        (SELECT MONTH, AIRLINE , ORIGIN_AIRPORT,
1096        COUNT(AIRLINE_DELAY) AS AIRLINE_DELAYED_FLIGHTS
1097        FROM EM_FLIGHTS
1098        WHERE AIRLINE_DELAY > 0
1099        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
1100        ),
1101
1102    FT_SECU_CTE AS
1103        (SELECT MONTH, AIRLINE , ORIGIN_AIRPORT,
1104        COUNT(SECURITY_DELAY) AS SECURITY_DELAYED_FLIGHTS
1105        FROM EM_FLIGHTS
1106        WHERE DEPARTURE_DELAY > 0
1107        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
1108        ),
1109
1110    CUSTOM_JOIN_1 AS
1111        (SELECT F1.MONTH, F1.AIRLINE,F1.ORIGIN_AIRPORT, F1.DEPARTURE_DELAYED_FLIGHTS,
1112         F2.ARRIVAL_DELAYED_FLIGHTS,
1113         F3.AIR_SYSTEM_DELAYED_FLIGHTS,
1114         F4.WEATHER_DELAYED_FLIGHTS,
1115         F5.LATE_AIRCRAFT_DELAYED_FLIGHTS,
1116         F6.SECURITY_DELAYED_FLIGHTS
1117         FROM FT_DEPT_CTE AS F1
1118         LEFT JOIN FT_ARRIV_CTE  AS F2
1119         ON F1.MONTH = F2.MONTH AND F1.AIRLINE = F2.AIRLINE AND F1.ORIGIN_AIRPORT = F2.
         ORIGIN_AIRPORT
1120         LEFT JOIN FT_AIRSYS_CTE AS F3
1121         ON F1.MONTH = F3.MONTH AND F1.AIRLINE = F3.AIRLINE AND F1.ORIGIN_AIRPORT = F3.
         ORIGIN_AIRPORT
1122         LEFT JOIN FT_WEATH_CTE AS F4
1123         ON F1.MONTH = F4.MONTH AND F1.AIRLINE = F4.AIRLINE AND F1.ORIGIN_AIRPORT = F4.
         ORIGIN_AIRPORT
1124         LEFT JOIN FT_LT_AIRCFT_CTE AS F5
1125         ON F1.MONTH = F5.MONTH AND F1.AIRLINE = F5.AIRLINE AND F1.ORIGIN_AIRPORT = F5.
         ORIGIN_AIRPORT
```

```
1126        LEFT JOIN FT_SECU_CTE AS F6
1127        ON F1.MONTH = F6.MONTH AND F1.AIRLINE = F6.AIRLINE AND F1.ORIGIN_AIRPORT = F6.
            ORIGIN_AIRPORT
1128        ),
1129    CUSTOM_JOIN_2 AS
1130        (
1131        SELECT MONTH, AIRLINE, ORIGIN_AIRPORT,
1132        COUNT (DEPARTURE_TIME) AS TOTAL_FLIGHTS_DEPARTED FROM EM_FLIGHTS
1133        WHERE DEPARTURE_TIME IS NOT NULL
1134        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
1135        ),
1136    CUSTOM_JOIN_3 AS
1137        (
1138        SELECT CJ1.*,
1139        CJ2.TOTAL_FLIGHTS_DEPARTED
1140        FROM CUSTOM_JOIN_1 AS CJ1
1141        JOIN CUSTOM_JOIN_2 AS CJ2
1142        ON CJ1.MONTH = CJ2.MONTH AND CJ1.AIRLINE = CJ2.AIRLINE AND CJ1.ORIGIN_AIRPORT = CJ2.
            ORIGIN_AIRPORT
1143        ),
1144    CUSTOM_JOIN_4 AS
1145        (
1146        SELECT MONTH, AIRLINE, ORIGIN_AIRPORT,
1147            (DEPARTURE_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100 AS
                DEPARTURE_DELAYED_PERCENTAGE,
1148            (ARRIVAL_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100 AS
                ARRIVAL_DELAYED_PERCENTAGE,
1149            (AIR_SYSTEM_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100 AS
                AIR_SYSTEM_DELAYED_PERCENTAGE,
1150            (WEATHER_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100 AS
                WEATHER_DELAYED_PERCENTAGE,
1151            (LATE_AIRCRAFT_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100 AS
                LATE_AIRCRAFT_DELAYED_PERCENTAGE,
1152            (SECURITY_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100 AS
                SECURITY_DELAYED_PERCENTAGE
1153        FROM CUSTOM_JOIN_3
1154        )
1155
1156        SELECT CJ3.*,
1157            CJ4.DEPARTURE_DELAYED_PERCENTAGE,
1158            CJ4.ARRIVAL_DELAYED_PERCENTAGE ,
1159            CJ4.AIR_SYSTEM_DELAYED_PERCENTAGE ,
1160            CJ4.WEATHER_DELAYED_PERCENTAGE ,
1161            CJ4.LATE_AIRCRAFT_DELAYED_PERCENTAGE ,
1162            CJ4.SECURITY_DELAYED_PERCENTAGE
1163        FROM CUSTOM_JOIN_4 AS CJ4
1164        JOIN CUSTOM_JOIN_3 AS CJ3
1165            ON CJ3.MONTH = CJ4.MONTH
1166            AND CJ3.AIRLINE = CJ4.AIRLINE
1167            AND CJ3.ORIGIN_AIRPORT = CJ4.ORIGIN_AIRPORT
1168            ;
1169
1170
1171    -- EXPORTING DELAY SEVERITY OF EACH AIRLINE FROM ORIGIN_AIRPORT IN EACH MONTHS:
1172
1173    COPY
1174        (
1175        WITH FT_DEPT_CTE AS
1176        (SELECT MONTH, AIRLINE, ORIGIN_AIRPORT,
1177        COUNT(DEPARTURE_DELAY) AS DEPARTURE_DELAYED_FLIGHTS
1178        FROM EM_FLIGHTS
1179        WHERE DEPARTURE_DELAY > 0
1180        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
1181        ),
1182    FT_ARRIV_CTE AS
1183        (SELECT MONTH, AIRLINE, ORIGIN_AIRPORT,
1184        COUNT(ARRIVAL_DELAY) AS ARRIVAL_DELAYED_FLIGHTS
1185        FROM EM_FLIGHTS
1186        WHERE ARRIVAL_DELAY > 0
```

```
1187        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
1188        ),
1189
1190    FT_AIRSYS_CTE AS
1191        (SELECT MONTH, AIRLINE , ORIGIN_AIRPORT,
1192        COUNT(AIR_SYSTEM_DELAY) AS AIR_SYSTEM_DELAYED_FLIGHTS
1193        FROM EM_FLIGHTS
1194        WHERE AIR_SYSTEM_DELAY > 0
1195        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
1196        ),
1197    FT_WEATH_CTE AS
1198        (SELECT MONTH, AIRLINE , ORIGIN_AIRPORT,
1199        COUNT(WEATHER_DELAY) AS WEATHER_DELAYED_FLIGHTS
1200        FROM EM_FLIGHTS
1201        WHERE WEATHER_DELAY > 0
1202        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
1203        ),
1204
1205    FT_LT_AIRCFT_CTE AS
1206        (SELECT MONTH, AIRLINE , ORIGIN_AIRPORT,
1207        COUNT(LATE_AIRCRAFT_DELAY) AS LATE_AIRCRAFT_DELAYED_FLIGHTS
1208        FROM EM_FLIGHTS
1209        WHERE LATE_AIRCRAFT_DELAY > 0
1210        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
1211        ),
1212
1213    FT_AIRL_CTE AS
1214        (SELECT MONTH, AIRLINE , ORIGIN_AIRPORT,
1215        COUNT(AIRLINE_DELAY) AS AIRLINE_DELAYED_FLIGHTS
1216        FROM EM_FLIGHTS
1217        WHERE AIRLINE_DELAY > 0
1218        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
1219        ),
1220
1221    FT_SECU_CTE AS
1222        (SELECT MONTH, AIRLINE , ORIGIN_AIRPORT,
1223        COUNT(SECURITY_DELAY) AS SECURITY_DELAYED_FLIGHTS
1224        FROM EM_FLIGHTS
1225        WHERE DEPARTURE_DELAY > 0
1226        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
1227        ),
1228
1229    CUSTOM_JOIN_1 AS
1230        (SELECT F1.MONTH, F1.AIRLINE,F1.ORIGIN_AIRPORT,
1231         COALESCE(F1.DEPARTURE_DELAYED_FLIGHTS, 0) AS DEPARTURE_DELAYED_FLIGHTS,
1232         COALESCE(F2.ARRIVAL_DELAYED_FLIGHTS, 0) AS ARRIVAL_DELAYED_FLIGHTS,
1233         COALESCE(F3.AIR_SYSTEM_DELAYED_FLIGHTS, 0) AS AIR_SYSTEM_DELAYED_FLIGHTS,
1234         COALESCE(F4.WEATHER_DELAYED_FLIGHTS, 0) AS WEATHER_DELAYED_FLIGHTS,
1235         COALESCE(F5.LATE_AIRCRAFT_DELAYED_FLIGHTS, 0) AS LATE_AIRCRAFT_DELAYED_FLIGHTS,
1236         COALESCE(F6.SECURITY_DELAYED_FLIGHTS, 0) AS SECURITY_DELAYED_FLIGHTS
1237         FROM FT_DEPT_CTE AS F1
1238         LEFT JOIN FT_ARRIV_CTE  AS F2
1239         ON F1.MONTH = F2.MONTH AND F1.AIRLINE = F2.AIRLINE AND F1.ORIGIN_AIRPORT = F2.
             ORIGIN_AIRPORT
1240         LEFT JOIN FT_AIRSYS_CTE AS F3
1241         ON F1.MONTH = F3.MONTH AND F1.AIRLINE = F3.AIRLINE AND F1.ORIGIN_AIRPORT = F3.
             ORIGIN_AIRPORT
1242         LEFT JOIN FT_WEATH_CTE AS F4
1243         ON F1.MONTH = F4.MONTH AND F1.AIRLINE = F4.AIRLINE AND F1.ORIGIN_AIRPORT = F4.
             ORIGIN_AIRPORT
1244         LEFT JOIN FT_LT_AIRCFT_CTE AS F5
1245         ON F1.MONTH = F5.MONTH AND F1.AIRLINE = F5.AIRLINE AND F1.ORIGIN_AIRPORT = F5.
             ORIGIN_AIRPORT
1246         LEFT JOIN FT_SECU_CTE AS F6
1247         ON F1.MONTH = F6.MONTH AND F1.AIRLINE = F6.AIRLINE AND F1.ORIGIN_AIRPORT = F6.
             ORIGIN_AIRPORT
1248        ),
1249    CUSTOM_JOIN_2 AS
1250        (
```

```
1251        SELECT MONTH, AIRLINE, ORIGIN_AIRPORT,
1252        COUNT (DEPARTURE_TIME) AS TOTAL_FLIGHTS_DEPARTED FROM EM_FLIGHTS
1253        WHERE DEPARTURE_TIME IS NOT NULL
1254        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
1255        ),
1256    CUSTOM_JOIN_3 AS
1257        (
1258        SELECT CJ1.*,
1259        CJ2.TOTAL_FLIGHTS_DEPARTED
1260        FROM CUSTOM_JOIN_1 AS CJ1
1261        JOIN CUSTOM_JOIN_2 AS CJ2
1262        ON CJ1.MONTH = CJ2.MONTH AND CJ1.AIRLINE = CJ2.AIRLINE AND CJ1.ORIGIN_AIRPORT = CJ2.
            ORIGIN_AIRPORT
1263        ),
1264    CUSTOM_JOIN_4 AS
1265        (
1266        SELECT MONTH, AIRLINE, ORIGIN_AIRPORT,
1267        ROUND((DEPARTURE_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100,2) AS
            DEPARTURE_DELAYED_PERCENTAGE,
1268        ROUND((ARRIVAL_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100,2) AS
            ARRIVAL_DELAYED_PERCENTAGE,
1269        ROUND((AIR_SYSTEM_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100,2) AS
            AIR_SYSTEM_DELAYED_PERCENTAGE,
1270        ROUND((WEATHER_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100,2) AS
            WEATHER_DELAYED_PERCENTAGE,
1271        ROUND((LATE_AIRCRAFT_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100,2) AS
            LATE_AIRCRAFT_DELAYED_PERCENTAGE,
1272        ROUND((SECURITY_DELAYED_FLIGHTS::NUMERIC / TOTAL_FLIGHTS_DEPARTED) * 100,2) AS
            SECURITY_DELAYED_PERCENTAGE
1273        FROM CUSTOM_JOIN_3
1274        )
1275
1276        SELECT CJ3.*,
1277            COALESCE(CJ4.DEPARTURE_DELAYED_PERCENTAGE, 0) AS DEPARTURE_DELAYED_PERCENTAGE,
1278            COALESCE(CJ4.ARRIVAL_DELAYED_PERCENTAGE, 0) AS ARRIVAL_DELAYED_PERCENTAGE,
1279            COALESCE(CJ4.AIR_SYSTEM_DELAYED_PERCENTAGE, 0) AS AIR_SYSTEM_DELAYED_PERCENTAGE,
1280            COALESCE(CJ4.WEATHER_DELAYED_PERCENTAGE, 0) AS WEATHER_DELAYED_PERCENTAGE,
1281            COALESCE(CJ4.LATE_AIRCRAFT_DELAYED_PERCENTAGE, 0) AS
                LATE_AIRCRAFT_DELAYED_PERCENTAGE,
1282            COALESCE(CJ4.SECURITY_DELAYED_PERCENTAGE, 0) AS SECURITY_DELAYED_PERCENTAGE
1283        FROM CUSTOM_JOIN_4 AS CJ4
1284        JOIN CUSTOM_JOIN_3 AS CJ3
1285            ON CJ3.MONTH = CJ4.MONTH
1286            AND CJ3.AIRLINE = CJ4.AIRLINE
1287            AND CJ3.ORIGIN_AIRPORT = CJ4.ORIGIN_AIRPORT
1288
1289        ) TO 'D:/Data Analytics/Intership/Labmentix/Emirates_Flight
            Analysis/SUBMISSION/CUSTOM CSV/AIRLINES_AIRPORT_MONTHLY_DELAYED.csv'
1290        WITH CSV HEADER;
1291
1292
1293    /* PROBLEM 2 PART 3:
1294    FINDING ON CANCELLATION SEVERITY RATES OF EACH AIRLINE FROM ORIGIN AIRPORT IN EACH
        MONTHS
1295    */
1296
1297    -- AIRLINE>AIROPRT MONTHLY CANCELLATION GROUP BY CANCELLATION_REASON:
1298
1299    WITH FT_CANCELLED_CTE AS
1300        (SELECT MONTH, AIRLINE, ORIGIN_AIRPORT, CANCELLATION_REASON,
1301        COUNT(CANCELLED) AS CANCELLED_FLIGHTS
1302        FROM EM_FLIGHTS
1303        WHERE CANCELLED = 1
1304        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT, CANCELLATION_REASON
1305        )
1306    SELECT * FROM FT_CANCELLED_CTE;
1307
1308    -- AIRLINE>AIROPRT MONTHLY CANCELLATION PERCENTAGE:
1309
```

```sql
WITH FT_CANCEL2_CTE AS
        (
        SELECT
            MONTH,
            AIRLINE,
            ORIGIN_AIRPORT,
            COUNT(SCHEDULED_DEPARTURE) AS SCHEDULED_FLIGHTS_COUNT,
            COUNT(CASE WHEN CANCELLED = 1 THEN 1 END) AS CANCELLED_FLIGHTS
        FROM EM_FLIGHTS
        GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
        ),
FT_CANCEL2_PERCENT AS
        (
        SELECT *,
        ROUND ((CANCELLED_FLIGHTS::NUMERIC/ SCHEDULED_FLIGHTS_COUNT)*100, 2) AS
        CANCELLED_FT_PERCENT
        FROM FT_CANCEL2_CTE
        )
SELECT * FROM FT_CANCEL2_PERCENT;

-- AIRPORT WISE CANCELLED_FLIGHTS
    SELECT EMF.ORIGIN_AIRPORT AS ORIGIN_AIRPORT_IATA, ARP1.AIRPORT AS ORIGIN_AIRPORT_NAME
    ,
    EMF.DESTINATION_AIRPORT AS DESTINATION_AIRPORT_IATA, ARP2.AIRPORT AS
    DESTINATION_AIRPORT_NAME,
    COUNT(EMF.CANCELLED) AS CANCELLED_FLIGHTS
    FROM EM_FLIGHTS AS EMF
    JOIN AIRPORTS AS ARP1
    ON EMF.ORIGIN_AIRPORT = ARP1.IATA_CODE

    JOIN AIRPORTS AS ARP2
    ON EMF.DESTINATION_AIRPORT = ARP2.IATA_CODE

    WHERE CANCELLED > 0
    GROUP BY EMF.ORIGIN_AIRPORT, EMF.DESTINATION_AIRPORT, ARP1.AIRPORT, ARP2.AIRPORT
    ORDER BY CANCELLED_FLIGHTS ASC
    -- ORDER BY CANCELLED_FLIGHTS ASC
    ;

-- MONTH WISE CANCELLED_FLIGHTS

SELECT
    MONTH,
    COUNT(CANCELLED) AS CANCELLED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE CANCELLED> 0 OR  CANCELLED=1
    GROUP BY MONTH
ORDER BY CANCELLED_FLIGHTS DESC;


    -- SELECT * FROM AIRPORTS;

-- EXPORTING CANCELLATION SEVERITY RATES OF EACH AIRLINE FROM ORIGIN AIRPORT IN EACH
MONTHS:

    COPY
        (
        WITH FT_CANCEL2_CTE AS
            (
            SELECT
                MONTH,
                AIRLINE,
                ORIGIN_AIRPORT,
                COUNT(SCHEDULED_DEPARTURE) AS SCHEDULED_FLIGHTS_COUNT,
                COUNT(CASE WHEN CANCELLED = 1 THEN 1 END) AS CANCELLED_FLIGHTS
            FROM EM_FLIGHTS
            GROUP BY MONTH, AIRLINE, ORIGIN_AIRPORT
            ),
        FT_CANCEL2_PERCENT AS
```

```
                    (
                    SELECT *,
                    ROUND ((CANCELLED_FLIGHTS::NUMERIC/ SCHEDULED_FLIGHTS_COUNT)*100, 2)
                    AS CANCELLED_FT_PERCENT
                    FROM FT_CANCEL2_CTE
                    )
        SELECT * FROM FT_CANCEL2_PERCENT
        )
        TO 'D:/Data Analytics/Intership/Labmentix/Emirates_Flight
        Analysis/SUBMISSION/CUSTOM CSV/AIRLINES_AIRPORT_MONTHLY_CANCELLED.csv'
        WITH CSV HEADER;


-- AIRLINE MONTHLY CANCELLATION PERCENTAGE:

WITH FT_CANCEL2_CTE AS
        (
        SELECT
            MONTH,
            AIRLINE,
            COUNT(SCHEDULED_DEPARTURE) AS SCHEDULED_FLIGHTS_COUNT,
            COUNT(CASE WHEN CANCELLED = 1 THEN 1 END) AS CANCELLED_FLIGHTS
        FROM EM_FLIGHTS
        GROUP BY MONTH, AIRLINE
        ),
FT_CANCEL2_PERCENT AS
        (
        SELECT *,
        ROUND ((CANCELLED_FLIGHTS::NUMERIC/ SCHEDULED_FLIGHTS_COUNT)*100, 2) AS
        CANCELLED_FT_PERCENT
        FROM FT_CANCEL2_CTE
        )
SELECT * FROM FT_CANCEL2_PERCENT
ORDER BY CANCELLED_FT_PERCENT DESC;


-- FROM ORIGIN AIRPORTS MONTHLY CANCELLATION PERCENTAGE:

WITH FT_CANCEL2_CTE AS
        (
        SELECT
            MONTH,
            ORIGIN_AIRPORT,
            COUNT(SCHEDULED_DEPARTURE) AS SCHEDULED_FLIGHTS_COUNT,
            COUNT(CASE WHEN CANCELLED = 1 THEN 1 END) AS CANCELLED_FLIGHTS
        FROM EM_FLIGHTS
        GROUP BY MONTH, ORIGIN_AIRPORT
        ),
FT_CANCEL2_PERCENT AS
        (
        SELECT *,
        ROUND ((CANCELLED_FLIGHTS::NUMERIC/ SCHEDULED_FLIGHTS_COUNT)*100, 2) AS
        CANCELLED_FT_PERCENT
        FROM FT_CANCEL2_CTE
        )
SELECT * FROM FT_CANCEL2_PERCENT
ORDER BY CANCELLED_FT_PERCENT DESC;


-- CANCELLATION PATTERN/REASONS BASED ON THE TRAVELLING ROUTS:

WITH CR_CTE AS
    (
    SELECT ORIGIN_AIRPORT AS ORIGIN_AIRPORT_IATA,
    DESTINATION_AIRPORT AS DESTINATION_AIRPORT_IATA,
    CANCELLATION_REASON,
    COUNT(CANCELLED) AS CANCELLATION_COUNT
    FROM EM_FLIGHTS
```

```
    WHERE CANCELLED = 1
    GROUP BY ORIGIN_AIRPORT, DESTINATION_AIRPORT, CANCELLATION_REASON
    ORDER BY CANCELLATION_COUNT DESC
    ),
ARP_CTE AS
    (
    SELECT ARP.IATA_CODE, ARP.AIRPORT AS ORIGIN_AIRPORT,
    ARP.CITY AS ORIGIN_CITY,
    ARP2.IATA_CODE AS DESTINATION_IATA_CODE,
    ARP2.AIRPORT AS DESTINATION_AIRPORT,
    ARP2.CITY AS DESTINATION_CITY
    FROM AIRPORTS AS ARP
    JOIN AIRPORTS AS ARP2
    ON ARP.IATA_CODE =ARP2.IATA_CODE
    ),

FINAL_OUTPUT AS
    (
    select CRC.ORIGIN_AIRPORT_IATA,
    ARPC.ORIGIN_AIRPORT,
    ARPC.ORIGIN_CITY,

    CRC.DESTINATION_AIRPORT_IATA,
    ARPC2.DESTINATION_AIRPORT,
    ARPC2.DESTINATION_CITY,

    CRC.CANCELLATION_REASON,
    CRC.CANCELLATION_COUNT
    FROM CR_CTE AS CRC
    JOIN ARP_CTE AS ARPC
    ON CRC.ORIGIN_AIRPORT_IATA =ARPC.IATA_CODE

    JOIN ARP_CTE AS ARPC2
    ON CRC.DESTINATION_AIRPORT_IATA =ARPC2.DESTINATION_IATA_CODE
    )
SELECT * FROM FINAL_OUTPUT;


-- EXPORTING CANCELLATION PATTERN/REASONS BASED ON THE TRAVELLING ROUTS

COPY
    (
    WITH CR_CTE AS
    (
    SELECT ORIGIN_AIRPORT AS ORIGIN_AIRPORT_IATA,
    DESTINATION_AIRPORT AS DESTINATION_AIRPORT_IATA,
    CANCELLATION_REASON,
    COUNT(CANCELLED) AS CANCELLATION_COUNT
    FROM EM_FLIGHTS
    WHERE CANCELLED = 1
    GROUP BY ORIGIN_AIRPORT, DESTINATION_AIRPORT, CANCELLATION_REASON
    ORDER BY CANCELLATION_COUNT DESC
    ),
ARP_CTE AS
    (
    SELECT ARP.IATA_CODE, ARP.AIRPORT AS ORIGIN_AIRPORT,
    ARP.CITY AS ORIGIN_CITY,
    ARP2.IATA_CODE AS DESTINATION_IATA_CODE,
    ARP2.AIRPORT AS DESTINATION_AIRPORT,
    ARP2.CITY AS DESTINATION_CITY
    FROM AIRPORTS AS ARP
    JOIN AIRPORTS AS ARP2
    ON ARP.IATA_CODE =ARP2.IATA_CODE
    ),

FINAL_OUTPUT AS
    (
    select CRC.ORIGIN_AIRPORT_IATA,
    ARPC.ORIGIN_AIRPORT,
```

```
1509        ARPC.ORIGIN_CITY,
1510
1511        CRC.DESTINATION_AIRPORT_IATA,
1512        ARPC2.DESTINATION_AIRPORT,
1513        ARPC2.DESTINATION_CITY,
1514
1515        CRC.CANCELLATION_REASON,
1516        CRC.CANCELLATION_COUNT
1517        FROM CR_CTE AS CRC
1518        JOIN ARP_CTE AS ARPC
1519        ON CRC.ORIGIN_AIRPORT_IATA =ARPC.IATA_CODE
1520
1521        JOIN ARP_CTE AS ARPC2
1522        ON CRC.DESTINATION_AIRPORT_IATA =ARPC2.DESTINATION_IATA_CODE
1523        )
1524    SELECT * FROM FINAL_OUTPUT
1525
1526        )
1527        TO 'D:\Data Analytics\Intership\Labmentix\Emirates_Flight Analysis\SUBMISSION\CUSTOM
        CSV\CANCEL_REASONS_ON_ROUTS.csv'
1528    WITH CSV HEADER;
1529
1530    -- ------------------------------------------------
1531
1532    /*
    ---------------------------------------------------------------------------------------------
    */
1533
1534    /* Problem Statement 3:
1535    Evaluating the operational performance of various U.S. airports
1536    to identify bottlenecks and areas for infrastructure or process improvement.
1537    */
1538
1539
1540    SELECT MONTH, ORIGIN_AIRPORT,
1541    COUNT(ARRIVAL_TIME) AS ON_TIME_FLIGHTS
1542        FROM EM_FLIGHTS
1543        WHERE ARRIVAL_TIME<= SCHEDULED_ARRIVAL AND  ARRIVAL_TIME IS NOT NULL
1544        GROUP BY MONTH, ORIGIN_AIRPORT
1545        ORDER BY ON_TIME_FLIGHTS DESC;
1546
1547    -- ----
1548    SELECT * FROM EM_FLIGHTS LIMIT 1000;
1549
1550    -- ORIGIN AND DESTINATION AIRPORTS GROUP BY OPERATIONS:
1551
1552    WITH FT_ON_TIME_CTE AS (
1553        SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
1554        COUNT(ARRIVAL_TIME) AS ON_TIME_FLIGHTS
1555            FROM EM_FLIGHTS
1556            WHERE ARRIVAL_TIME<= SCHEDULED_ARRIVAL AND  ARRIVAL_TIME IS NOT NULL
1557            GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
1558        ),
1559
1560    FT_CANCELLED_CTE AS
1561        (
1562        SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
1563        COUNT(CANCELLED) AS CANCELLED_FLIGHTS
1564        FROM EM_FLIGHTS
1565        WHERE CANCELLED = 1
1566        GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
1567        ),
1568
1569    FT_DEPT_CTE AS
1570        (SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
1571        COUNT(DEPARTURE_DELAY) AS DEPARTURE_DELAYED_FLIGHTS
1572        FROM EM_FLIGHTS
1573        WHERE DEPARTURE_DELAY > 0
1574        GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
```

```
    ),

FT_ARRIV_CTE AS
    (SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
    COUNT(ARRIVAL_DELAY) AS ARRIVAL_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE ARRIVAL_DELAY > 0
    GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
    ),

FT_AIRSYS_CTE AS
    (SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
    COUNT(AIR_SYSTEM_DELAY) AS AIR_SYSTEM_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE AIR_SYSTEM_DELAY > 0
    GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
    ),
FT_WEATH_CTE AS
    (SELECT MONTH,ORIGIN_AIRPORT, DESTINATION_AIRPORT,
    COUNT(WEATHER_DELAY) AS WEATHER_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE WEATHER_DELAY > 0
    GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
    ),

FT_LT_AIRCFT_CTE AS
    (SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
    COUNT(LATE_AIRCRAFT_DELAY) AS LATE_AIRCRAFT_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE LATE_AIRCRAFT_DELAY > 0
    GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
    ),

FT_AIRL_CTE AS
    (SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
    COUNT(AIRLINE_DELAY) AS AIRLINE_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE AIRLINE_DELAY > 0
    GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
    ),

FT_SECU_CTE AS
    (SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
    COUNT(SECURITY_DELAY) AS SECURITY_DELAYED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE DEPARTURE_DELAY > 0
    GROUP BY MONTH,  ORIGIN_AIRPORT, DESTINATION_AIRPORT
    ),

CUSTOM_JOIN_1 AS
    (SELECT F1.MONTH, F1.ORIGIN_AIRPORT, F1.DESTINATION_AIRPORT, F1.
    DEPARTURE_DELAYED_FLIGHTS,
     F2.ARRIVAL_DELAYED_FLIGHTS,
     F3.AIR_SYSTEM_DELAYED_FLIGHTS,
     F4.WEATHER_DELAYED_FLIGHTS,
     F5.LATE_AIRCRAFT_DELAYED_FLIGHTS,
     F6.SECURITY_DELAYED_FLIGHTS
     FROM FT_DEPT_CTE AS F1
     LEFT JOIN FT_ARRIV_CTE  AS F2
     ON F1.MONTH = F2.MONTH AND F1.ORIGIN_AIRPORT = F2.ORIGIN_AIRPORT AND F1.
     DESTINATION_AIRPORT = F2.DESTINATION_AIRPORT

     LEFT JOIN FT_AIRSYS_CTE AS F3
     ON F1.MONTH = F3.MONTH AND F1.ORIGIN_AIRPORT = F3.ORIGIN_AIRPORT AND F1.
     DESTINATION_AIRPORT = F3.DESTINATION_AIRPORT

     LEFT JOIN FT_WEATH_CTE AS F4
     ON F1.MONTH = F4.MONTH AND F1.ORIGIN_AIRPORT = F4.ORIGIN_AIRPORT AND F1.
     DESTINATION_AIRPORT = F4.DESTINATION_AIRPORT
```

```
1640
1641        LEFT JOIN FT_LT_AIRCFT_CTE AS F5
1642        ON F1.MONTH = F5.MONTH AND F1.ORIGIN_AIRPORT = F5.ORIGIN_AIRPORT AND F1.
            DESTINATION_AIRPORT = F5.DESTINATION_AIRPORT
1643
1644        LEFT JOIN FT_SECU_CTE AS F6
1645        ON F1.MONTH = F6.MONTH AND F1.ORIGIN_AIRPORT = F6.ORIGIN_AIRPORT AND F1.
            DESTINATION_AIRPORT = F6.DESTINATION_AIRPORT
1646      ),
1647    CUSTOM_JOIN_2 AS
1648      (
1649      SELECT MONTH, ORIGIN_AIRPORT,DESTINATION_AIRPORT,
1650      COUNT (DEPARTURE_TIME) AS TOTAL_FLIGHTS_DEPARTED FROM EM_FLIGHTS
1651      WHERE DEPARTURE_TIME IS NOT NULL
1652      GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
1653      ),
1654    CUSTOM_JOIN_3 AS
1655      (
1656      SELECT CJ1.*,
1657      CJ2.TOTAL_FLIGHTS_DEPARTED
1658      FROM CUSTOM_JOIN_1 AS CJ1
1659      JOIN CUSTOM_JOIN_2 AS CJ2
1660      ON CJ1.MONTH = CJ2.MONTH AND CJ1.ORIGIN_AIRPORT = CJ2.ORIGIN_AIRPORT AND CJ1.
          DESTINATION_AIRPORT = CJ2.DESTINATION_AIRPORT
1661      ),
1662    CUSTOM_JOIN_4 AS
1663      (
1664      SELECT FTON.*,
1665      COALESCE(FTCN.CANCELLED_FLIGHTS, 0) AS CANCELLED_FLIGHTS, -- COALESCE( FILL THE NULL
          VALUES WITH 0)
1666      COALESCE(CJ3.DEPARTURE_DELAYED_FLIGHTS, 0) AS DEPARTURE_DELAYED_FLIGHTS,
1667      COALESCE(CJ3.ARRIVAL_DELAYED_FLIGHTS, 0) AS ARRIVAL_DELAYED_FLIGHTS,
1668      COALESCE(CJ3.AIR_SYSTEM_DELAYED_FLIGHTS, 0) AS AIR_SYSTEM_DELAYED_FLIGHTS,
1669      COALESCE(CJ3.WEATHER_DELAYED_FLIGHTS, 0) AS WEATHER_DELAYED_FLIGHTS,
1670      COALESCE(CJ3.LATE_AIRCRAFT_DELAYED_FLIGHTS, 0) AS LATE_AIRCRAFT_DELAYED_FLIGHTS,
1671      COALESCE(CJ3.SECURITY_DELAYED_FLIGHTS, 0) AS SECURITY_DELAYED_FLIGHTS
1672      FROM FT_ON_TIME_CTE AS FTON
1673      LEFT JOIN CUSTOM_JOIN_3 AS CJ3
1674      ON FTON.MONTH = CJ3.MONTH AND FTON.ORIGIN_AIRPORT = CJ3.ORIGIN_AIRPORT AND FTON.
          DESTINATION_AIRPORT = CJ3.DESTINATION_AIRPORT
1675      LEFT JOIN FT_CANCELLED_CTE AS FTCN
1676      ON FTON.MONTH = FTCN.MONTH AND FTON.ORIGIN_AIRPORT = FTCN.ORIGIN_AIRPORT AND FTON.
          DESTINATION_AIRPORT = FTCN.DESTINATION_AIRPORT
1677      )
1678    SELECT * FROM CUSTOM_JOIN_4;
1679
1680
1681
1682
1683    -- EXPORTING EACH ORIGIN AND DESTINATION AIRPORTS FLIGHTS STATS IN EACH MONTHS:
1684    -- REPLACED THE NULL VALUE COUNTS WITH "0"
1685      /* COALESCE() returns the "first non-NULL value" from the list of arguments.
1686              So "if column_name is NULL", it will "return 0".*/
1687
1688    COPY
1689      (
1690      WITH FT_ON_TIME_CTE AS (
1691      SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
1692      COUNT(ARRIVAL_TIME) AS ON_TIME_FLIGHTS
1693          FROM EM_FLIGHTS
1694          WHERE ARRIVAL_TIME<= SCHEDULED_ARRIVAL AND  ARRIVAL_TIME IS NOT NULL
1695          GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
1696      ),
1697
1698    FT_CANCELLED_CTE AS
1699      (
1700      SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
1701      COUNT(CANCELLED) AS CANCELLED_FLIGHTS
1702      FROM EM_FLIGHTS
```

```
1703        WHERE CANCELLED = 1
1704        GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
1705        ),
1706
1707    FT_DEPT_CTE AS
1708        (SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
1709        COUNT(DEPARTURE_DELAY) AS DEPARTURE_DELAYED_FLIGHTS
1710        FROM EM_FLIGHTS
1711        WHERE DEPARTURE_DELAY > 0
1712        GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
1713        ),
1714
1715    FT_ARRIV_CTE AS
1716        (SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
1717        COUNT(ARRIVAL_DELAY) AS ARRIVAL_DELAYED_FLIGHTS
1718        FROM EM_FLIGHTS
1719        WHERE ARRIVAL_DELAY > 0
1720        GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
1721        ),
1722
1723    FT_AIRSYS_CTE AS
1724        (SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
1725        COUNT(AIR_SYSTEM_DELAY) AS AIR_SYSTEM_DELAYED_FLIGHTS
1726        FROM EM_FLIGHTS
1727        WHERE AIR_SYSTEM_DELAY > 0
1728        GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
1729        ),
1730    FT_WEATH_CTE AS
1731        (SELECT MONTH,ORIGIN_AIRPORT, DESTINATION_AIRPORT,
1732        COUNT(WEATHER_DELAY) AS WEATHER_DELAYED_FLIGHTS
1733        FROM EM_FLIGHTS
1734        WHERE WEATHER_DELAY > 0
1735        GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
1736        ),
1737
1738    FT_LT_AIRCFT_CTE AS
1739        (SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
1740        COUNT(LATE_AIRCRAFT_DELAY) AS LATE_AIRCRAFT_DELAYED_FLIGHTS
1741        FROM EM_FLIGHTS
1742        WHERE LATE_AIRCRAFT_DELAY > 0
1743        GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
1744        ),
1745
1746    FT_AIRL_CTE AS
1747        (SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
1748        COUNT(AIRLINE_DELAY) AS AIRLINE_DELAYED_FLIGHTS
1749        FROM EM_FLIGHTS
1750        WHERE AIRLINE_DELAY > 0
1751        GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
1752        ),
1753
1754    FT_SECU_CTE AS
1755        (SELECT MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
1756        COUNT(SECURITY_DELAY) AS SECURITY_DELAYED_FLIGHTS
1757        FROM EM_FLIGHTS
1758        WHERE DEPARTURE_DELAY > 0
1759        GROUP BY MONTH,  ORIGIN_AIRPORT, DESTINATION_AIRPORT
1760        ),
1761
1762    CUSTOM_JOIN_1 AS
1763        (SELECT F1.MONTH, F1.ORIGIN_AIRPORT, F1.DESTINATION_AIRPORT, F1.
        DEPARTURE_DELAYED_FLIGHTS,
1764         COALESCE(F2.ARRIVAL_DELAYED_FLIGHTS, 0) AS ARRIVAL_DELAYED_FLIGHTS,
1765         COALESCE(F3.AIR_SYSTEM_DELAYED_FLIGHTS, 0) AS AIR_SYSTEM_DELAYED_FLIGHTS,
1766         COALESCE(F4.WEATHER_DELAYED_FLIGHTS, 0) AS WEATHER_DELAYED_FLIGHTS,
1767         COALESCE(F5.LATE_AIRCRAFT_DELAYED_FLIGHTS, 0) AS LATE_AIRCRAFT_DELAYED_FLIGHTS,
1768         COALESCE(F6.SECURITY_DELAYED_FLIGHTS, 0) AS SECURITY_DELAYED_FLIGHTS
1769         FROM FT_DEPT_CTE AS F1
1770         LEFT JOIN FT_ARRIV_CTE  AS F2
```

```
1771        ON F1.MONTH = F2.MONTH AND F1.ORIGIN_AIRPORT = F2.ORIGIN_AIRPORT AND F1.
            DESTINATION_AIRPORT = F2.DESTINATION_AIRPORT
1772
1773        LEFT JOIN FT_AIRSYS_CTE AS F3
1774        ON F1.MONTH = F3.MONTH AND F1.ORIGIN_AIRPORT = F3.ORIGIN_AIRPORT AND F1.
            DESTINATION_AIRPORT = F3.DESTINATION_AIRPORT
1775
1776        LEFT JOIN FT_WEATH_CTE AS F4
1777        ON F1.MONTH = F4.MONTH AND F1.ORIGIN_AIRPORT = F4.ORIGIN_AIRPORT AND F1.
            DESTINATION_AIRPORT = F4.DESTINATION_AIRPORT
1778
1779        LEFT JOIN FT_LT_AIRCFT_CTE AS F5
1780        ON F1.MONTH = F5.MONTH AND F1.ORIGIN_AIRPORT = F5.ORIGIN_AIRPORT AND F1.
            DESTINATION_AIRPORT = F5.DESTINATION_AIRPORT
1781
1782        LEFT JOIN FT_SECU_CTE AS F6
1783        ON F1.MONTH = F6.MONTH AND F1.ORIGIN_AIRPORT = F6.ORIGIN_AIRPORT AND F1.
            DESTINATION_AIRPORT = F6.DESTINATION_AIRPORT
1784      ),
1785    CUSTOM_JOIN_2 AS
1786      (
1787      SELECT MONTH, ORIGIN_AIRPORT,DESTINATION_AIRPORT,
1788      COUNT (DEPARTURE_TIME) AS TOTAL_FLIGHTS_DEPARTED FROM EM_FLIGHTS
1789      WHERE DEPARTURE_TIME IS NOT NULL
1790      GROUP BY MONTH, ORIGIN_AIRPORT, DESTINATION_AIRPORT
1791      ),
1792    CUSTOM_JOIN_3 AS
1793      (
1794      SELECT CJ1.*,
1795      CJ2.TOTAL_FLIGHTS_DEPARTED
1796      FROM CUSTOM_JOIN_1 AS CJ1
1797      JOIN CUSTOM_JOIN_2 AS CJ2
1798      ON CJ1.MONTH = CJ2.MONTH AND CJ1.ORIGIN_AIRPORT = CJ2.ORIGIN_AIRPORT AND CJ1.
          DESTINATION_AIRPORT = CJ2.DESTINATION_AIRPORT
1799      ),
1800    CUSTOM_JOIN_4 AS
1801      (
1802      SELECT FTON.*,
1803      COALESCE(FTCN.CANCELLED_FLIGHTS, 0) AS CANCELLED_FLIGHTS,
1804      COALESCE(CJ3.DEPARTURE_DELAYED_FLIGHTS, 0) AS DEPARTURE_DELAYED_FLIGHTS,
1805      COALESCE(CJ3.ARRIVAL_DELAYED_FLIGHTS, 0) AS ARRIVAL_DELAYED_FLIGHTS,
1806      COALESCE(CJ3.AIR_SYSTEM_DELAYED_FLIGHTS, 0) AS AIR_SYSTEM_DELAYED_FLIGHTS,
1807      COALESCE(CJ3.WEATHER_DELAYED_FLIGHTS, 0) AS WEATHER_DELAYED_FLIGHTS,
1808      COALESCE(CJ3.LATE_AIRCRAFT_DELAYED_FLIGHTS, 0) AS LATE_AIRCRAFT_DELAYED_FLIGHTS,
1809      COALESCE(CJ3.SECURITY_DELAYED_FLIGHTS, 0) AS SECURITY_DELAYED_FLIGHTS
1810      FROM FT_ON_TIME_CTE AS FTON
1811      LEFT JOIN CUSTOM_JOIN_3 AS CJ3
1812      ON FTON.MONTH = CJ3.MONTH AND FTON.ORIGIN_AIRPORT = CJ3.ORIGIN_AIRPORT AND FTON.
          DESTINATION_AIRPORT = CJ3.DESTINATION_AIRPORT
1813      LEFT JOIN FT_CANCELLED_CTE AS FTCN
1814      ON FTON.MONTH = FTCN.MONTH AND FTON.ORIGIN_AIRPORT = FTCN.ORIGIN_AIRPORT AND FTON.
          DESTINATION_AIRPORT = FTCN.DESTINATION_AIRPORT
1815      )
1816    SELECT *
1817
1818    FROM CUSTOM_JOIN_4
1819
1820      ) TO 'D:/Data Analytics/Intership/Labmentix/Emirates_Flight
          Analysis/SUBMISSION/CUSTOM CSV/AIRPORTS_MONTHLY_DEPT_ARIVE_STATS.csv'
1821      WITH CSV HEADER;
1822
1823
1824
1825    /*
        ------------------------------------------------------------------------------------
        */
1826
1827
1828    /* Problem Statement 4:
```

```
Investigating how factors like time of day, day of week, month,
and specific routes affect flight operations to optimize scheduling and resource
allocation.
*/

-- DAY WISE OPERATION
-- -- DELAY OPERATION
-- 1)
SELECT DAY, COUNT(DEPARTURE_TIME) AS DELAY_FLIGHTS_PER_DAY
    FROM EM_FLIGHTS
    WHERE DEPARTURE_TIME> SCHEDULED_DEPARTURE
    GROUP BY DAY
    ORDER BY DELAY_FLIGHTS_PER_DAY DESC;

-- -- MONTH & DAY OPERATION
--1)
SELECT MONTH, DAY, COUNT(DEPARTURE_TIME) AS DELAY_FLIGHTS_PER_DAY
    FROM EM_FLIGHTS
    WHERE DEPARTURE_TIME> SCHEDULED_DEPARTURE
    GROUP BY MONTH, DAY
    ORDER BY DELAY_FLIGHTS_PER_DAY DESC;

-- 2)
SELECT MONTH, DAY, COUNT(DEPARTURE_TIME) AS ON_TIME_FLIGHTS_DAY
    FROM EM_FLIGHTS
    WHERE DEPARTURE_TIME<= SCHEDULED_DEPARTURE AND CANCELLED = 0
    GROUP BY MONTH, DAY
    ORDER BY ON_TIME_FLIGHTS_DAY DESC;

-- FINAL STATS: MONTH - DAY_OF_WEEK - DEPARTURE_TIME_BUCKET

-- PART 1:
WITH MONTHDAY_ONTIME_FTE AS
    (
    SELECT MONTH, DAY,DEPARTURE_TIME_BUCKET,
    COUNT(DEPARTURE_TIME) AS ON_TIME_FLIGHTS_DAY
        FROM EM_FLIGHTS
        WHERE DEPARTURE_TIME<= SCHEDULED_DEPARTURE AND CANCELLED = 0
        GROUP BY MONTH, DAY,DEPARTURE_TIME_BUCKET
        ORDER BY ON_TIME_FLIGHTS_DAY DESC
        ),
DELAYED_FT_CTE AS
    (
    SELECT MONTH, DAY,DEPARTURE_TIME_BUCKET,
    COUNT(DEPARTURE_TIME) AS DELAY_FLIGHTS_PER_DAY
        FROM EM_FLIGHTS
        WHERE DEPARTURE_TIME> SCHEDULED_DEPARTURE
        GROUP BY MONTH, DAY, DEPARTURE_TIME_BUCKET
    ),
CANCELLED_FT_CTE AS
    (
    SELECT MONTH, DAY, DEPARTURE_TIME_BUCKET,
    COUNT(CANCELLED) AS CANCELLED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE CANCELLED = 1
    GROUP BY MONTH, DAY, DEPARTURE_TIME_BUCKET
    ),
DATE_STATS AS
    (
    SELECT MDOF.*,
    COALESCE(DFC.DELAY_FLIGHTS_PER_DAY, 0) AS DELAY_FLIGHTS_PER_DAY,
    COALESCE(CFC.CANCELLED_FLIGHTS, 0) AS CANCELLED_FLIGHTS
    FROM MONTHDAY_ONTIME_FTE AS MDOF

    LEFT JOIN DELAYED_FT_CTE AS DFC
    ON MDOF.MONTH = DFC.MONTH AND MDOF.DAY = DFC.DAY AND MDOF.DEPARTURE_TIME_BUCKET = DFC
    .DEPARTURE_TIME_BUCKET

    LEFT JOIN CANCELLED_FT_CTE AS CFC
```

```
    ON MDOF.MONTH = CFC.MONTH AND MDOF.DAY = CFC.DAY AND MDOF.DEPARTURE_TIME_BUCKET = CFC
    .DEPARTURE_TIME_BUCKET
    )
SELECT * FROM DATE_STATS;

-- PART 2:



WITH MONTHDAY_ONTIME_FTE AS
    (
    SELECT MONTH, DAY,ORIGIN_AIRPORT, DESTINATION_AIRPORT,
    COUNT(DEPARTURE_TIME) AS ON_TIME_FLIGHTS_DAY
        FROM EM_FLIGHTS
        WHERE DEPARTURE_TIME<= SCHEDULED_DEPARTURE AND CANCELLED = 0
        GROUP BY MONTH, DAY,ORIGIN_AIRPORT, DESTINATION_AIRPORT
        ORDER BY MONTH
        ),
DELAYED_FT_CTE AS
    (
    SELECT MONTH, DAY,ORIGIN_AIRPORT, DESTINATION_AIRPORT,
    COUNT(DEPARTURE_TIME) AS DELAY_FLIGHTS_PER_DAY
        FROM EM_FLIGHTS
        WHERE DEPARTURE_TIME> SCHEDULED_DEPARTURE
        GROUP BY MONTH, DAY, ORIGIN_AIRPORT, DESTINATION_AIRPORT
    ),
CANCELLED_FT_CTE AS
    (
    SELECT MONTH, DAY, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
    COUNT(CANCELLED) AS CANCELLED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE CANCELLED = 1
    GROUP BY MONTH, DAY, ORIGIN_AIRPORT, DESTINATION_AIRPORT
    ),
DATE_STATS AS
    (
    SELECT MDOF.*,
    COALESCE(DFC.DELAY_FLIGHTS_PER_DAY, 0) AS DELAY_FLIGHTS_PER_DAY,
    COALESCE(CFC.CANCELLED_FLIGHTS, 0) AS CANCELLED_FLIGHTS
    FROM MONTHDAY_ONTIME_FTE AS MDOF

    LEFT JOIN DELAYED_FT_CTE AS DFC
    ON MDOF.MONTH = DFC.MONTH AND MDOF.DAY = DFC.DAY AND MDOF.ORIGIN_AIRPORT = DFC.
    ORIGIN_AIRPORT AND MDOF.DESTINATION_AIRPORT = DFC.DESTINATION_AIRPORT

    LEFT JOIN CANCELLED_FT_CTE AS CFC
    ON MDOF.MONTH = CFC.MONTH AND MDOF.DAY = CFC.DAY AND MDOF.ORIGIN_AIRPORT = CFC.
    ORIGIN_AIRPORT AND MDOF.DESTINATION_AIRPORT = CFC.DESTINATION_AIRPORT
    )
SELECT * FROM DATE_STATS;

-- EXPORTING THE DATA
-- -- PART 1

COPY
    (
    WITH MONTHDAY_ONTIME_FTE AS
    (
    SELECT MONTH, DAY,DEPARTURE_TIME_BUCKET,
    COUNT(DEPARTURE_TIME) AS ON_TIME_FLIGHTS_DAY
        FROM EM_FLIGHTS
        WHERE DEPARTURE_TIME<= SCHEDULED_DEPARTURE AND CANCELLED = 0
        GROUP BY MONTH, DAY,DEPARTURE_TIME_BUCKET
        ORDER BY ON_TIME_FLIGHTS_DAY DESC
        ),
DELAYED_FT_CTE AS
    (
    SELECT MONTH, DAY,DEPARTURE_TIME_BUCKET,
    COUNT(DEPARTURE_TIME) AS DELAY_FLIGHTS_PER_DAY
```

```
        FROM EM_FLIGHTS
        WHERE DEPARTURE_TIME> SCHEDULED_DEPARTURE
        GROUP BY MONTH, DAY, DEPARTURE_TIME_BUCKET
    ),
CANCELLED_FT_CTE AS
    (
    SELECT MONTH, DAY, DEPARTURE_TIME_BUCKET,
    COUNT(CANCELLED) AS CANCELLED_FLIGHTS
    FROM EM_FLIGHTS
    WHERE CANCELLED = 1
    GROUP BY MONTH, DAY, DEPARTURE_TIME_BUCKET
    ),
DATE_STATS AS
    (
    SELECT MDOF.*,
    COALESCE(DFC.DELAY_FLIGHTS_PER_DAY, 0) AS DELAY_FLIGHTS_PER_DAY,
    COALESCE(CFC.CANCELLED_FLIGHTS, 0) AS CANCELLED_FLIGHTS
    FROM MONTHDAY_ONTIME_FTE AS MDOF

    LEFT JOIN DELAYED_FT_CTE AS DFC
    ON MDOF.MONTH = DFC.MONTH AND MDOF.DAY = DFC.DAY AND MDOF.DEPARTURE_TIME_BUCKET = DFC
    .DEPARTURE_TIME_BUCKET

    LEFT JOIN CANCELLED_FT_CTE AS CFC
    ON MDOF.MONTH = CFC.MONTH AND MDOF.DAY = CFC.DAY AND MDOF.DEPARTURE_TIME_BUCKET = CFC
    .DEPARTURE_TIME_BUCKET
    )
SELECT * FROM DATE_STATS

    ) TO 'D:/Data Analytics/Intership/Labmentix/Emirates_Flight
    Analysis/SUBMISSION/CUSTOM CSV/M.D.T_FLIGHTS_STATS.csv'
    WITH CSV HEADER;




-- -- PART 2

COPY
    (
     WITH MONTHDAY_ONTIME_FTE AS
    (
     SELECT MONTH, DAY,ORIGIN_AIRPORT, DESTINATION_AIRPORT,
     COUNT(DEPARTURE_TIME) AS ON_TIME_FLIGHTS_DAY
        FROM EM_FLIGHTS
        WHERE DEPARTURE_TIME<= SCHEDULED_DEPARTURE AND CANCELLED = 0
        GROUP BY MONTH, DAY,ORIGIN_AIRPORT, DESTINATION_AIRPORT
        ORDER BY MONTH
    ),
    DELAYED_FT_CTE AS
        (
        SELECT MONTH, DAY,ORIGIN_AIRPORT, DESTINATION_AIRPORT,
        COUNT(DEPARTURE_TIME) AS DELAY_FLIGHTS_PER_DAY
            FROM EM_FLIGHTS
            WHERE DEPARTURE_TIME> SCHEDULED_DEPARTURE
            GROUP BY MONTH, DAY, ORIGIN_AIRPORT, DESTINATION_AIRPORT
        ),
    CANCELLED_FT_CTE AS
        (
        SELECT MONTH, DAY, ORIGIN_AIRPORT, DESTINATION_AIRPORT,
        COUNT(CANCELLED) AS CANCELLED_FLIGHTS
        FROM EM_FLIGHTS
        WHERE CANCELLED = 1
        GROUP BY MONTH, DAY, ORIGIN_AIRPORT, DESTINATION_AIRPORT
        ),
    DATE_STATS AS
        (
        SELECT MDOF.*,
        COALESCE(DFC.DELAY_FLIGHTS_PER_DAY, 0) AS DELAY_FLIGHTS_PER_DAY,
```

```
2028            COALESCE(CFC.CANCELLED_FLIGHTS, 0) AS CANCELLED_FLIGHTS
2029            FROM MONTHDAY_ONTIME_FTE AS MDOF
2030
2031            LEFT JOIN DELAYED_FT_CTE AS DFC
2032            ON MDOF.MONTH = DFC.MONTH AND MDOF.DAY = DFC.DAY AND MDOF.ORIGIN_AIRPORT = DFC.
                ORIGIN_AIRPORT AND MDOF.DESTINATION_AIRPORT = DFC.DESTINATION_AIRPORT
2033
2034            LEFT JOIN CANCELLED_FT_CTE AS CFC
2035            ON MDOF.MONTH = CFC.MONTH AND MDOF.DAY = CFC.DAY AND MDOF.ORIGIN_AIRPORT = CFC.
                ORIGIN_AIRPORT AND MDOF.DESTINATION_AIRPORT = CFC.DESTINATION_AIRPORT
2036            )
2037        SELECT * FROM DATE_STATS
2038
2039        )TO 'D:/Data Analytics/Intership/Labmentix/Emirates_Flight
            Analysis/SUBMISSION/CUSTOM CSV/M.D_ORG.DEST_FT_STATS.csv'
2040        WITH CSV HEADER;
2041
2042
2043
2044
2045
2046
2047    -- -- PART 3 MONTH-DAY-AIRLINE-ORIGIN_AIRPORT-DESTINATION_AIRPORT WISE DATA
2048
2049    COPY
2050        (
2051         WITH MONTHDAY_ONTIME_FTE AS
2052        (
2053         SELECT MONTH,DAY,ORIGIN_AIRPORT, DESTINATION_AIRPORT,AIRLINE,
2054         COUNT(DEPARTURE_TIME) AS ON_TIME_FLIGHTS_DAY
2055            FROM EM_FLIGHTS
2056            WHERE DEPARTURE_TIME<= SCHEDULED_DEPARTURE AND CANCELLED = 0
2057            GROUP BY MONTH, DAY,ORIGIN_AIRPORT, DESTINATION_AIRPORT, AIRLINE
2058            ORDER BY MONTH
2059        ),
2060        DELAYED_FT_CTE AS
2061            (
2062            SELECT MONTH, DAY,ORIGIN_AIRPORT, DESTINATION_AIRPORT, AIRLINE,
2063            COUNT(DEPARTURE_TIME) AS DELAY_FLIGHTS_PER_DAY
2064                FROM EM_FLIGHTS
2065                WHERE DEPARTURE_TIME> SCHEDULED_DEPARTURE
2066                GROUP BY MONTH, DAY, ORIGIN_AIRPORT, DESTINATION_AIRPORT, AIRLINE
2067            ),
2068        CANCELLED_FT_CTE AS
2069            (
2070            SELECT MONTH, DAY, ORIGIN_AIRPORT, DESTINATION_AIRPORT, AIRLINE,
2071            COUNT(CANCELLED) AS CANCELLED_FLIGHTS
2072            FROM EM_FLIGHTS
2073            WHERE CANCELLED = 1
2074            GROUP BY MONTH, DAY, ORIGIN_AIRPORT, DESTINATION_AIRPORT, AIRLINE
2075            ),
2076        DATE_STATS AS
2077            (
2078            SELECT MDOF.*,
2079            COALESCE(DFC.DELAY_FLIGHTS_PER_DAY, 0) AS DELAY_FLIGHTS_PER_DAY,
2080            COALESCE(CFC.CANCELLED_FLIGHTS, 0) AS CANCELLED_FLIGHTS
2081            FROM MONTHDAY_ONTIME_FTE AS MDOF
2082
2083            LEFT JOIN DELAYED_FT_CTE AS DFC
2084            ON MDOF.MONTH = DFC.MONTH AND MDOF.DAY = DFC.DAY AND MDOF.ORIGIN_AIRPORT = DFC.
                ORIGIN_AIRPORT AND MDOF.DESTINATION_AIRPORT = DFC.DESTINATION_AIRPORT
2085
2086            LEFT JOIN CANCELLED_FT_CTE AS CFC
2087            ON MDOF.MONTH = CFC.MONTH AND MDOF.DAY = CFC.DAY AND MDOF.ORIGIN_AIRPORT = CFC.
                ORIGIN_AIRPORT AND MDOF.DESTINATION_AIRPORT = CFC.DESTINATION_AIRPORT
2088            )
2089        SELECT * FROM DATE_STATS
2090
2091        )TO 'D:/Data Analytics/Intership/Labmentix/Emirates_Flight
```

```
    Analysis/SUBMISSION/CUSTOM CSV/M.D_AIRL_OR_DES_STATS.csv'
    WITH CSV HEADER;
```

```
SELECT *
    FROM EM_FLIGHTS LIMIT 100;


-- DAY_OF_WEEK WISE OPERATION: WHICH DAYS IN A WEEK MOST DELAYED HAPPEN
-- -- DELAY OPERATION
-- 1)

SELECT DAY_OF_WEEK, COUNT(DEPARTURE_TIME) AS DELAY_FLIGHTS_DAY_WEEK
    FROM EM_FLIGHTS
    WHERE DEPARTURE_TIME> SCHEDULED_DEPARTURE
    GROUP BY DAY_OF_WEEK
    ORDER BY DELAY_FLIGHTS_DAY_WEEK DESC;

-- -- MONTH & DAY_OF_WEEK OPERATION

SELECT MONTH, DAY_OF_WEEK, COUNT(DEPARTURE_TIME) AS DELAY_FLIGHTS_DAY_WEEK
    FROM EM_FLIGHTS
    WHERE DEPARTURE_TIME> SCHEDULED_DEPARTURE
    GROUP BY MONTH, DAY_OF_WEEK
    ORDER BY DELAY_FLIGHTS_DAY_WEEK DESC;



/*
--------------------------------------------------------------------------------------------
*/


/* Problem Statement 5:
Providing data-driven recommendations to stakeholders (airlines, airports, regulatory
bodies)
to enhance passenger experience and operational efficiency.
*/


WITH CR_CTE AS
    (
    SELECT ORIGIN_AIRPORT AS ORIGIN_AIRPORT_IATA,
    DESTINATION_AIRPORT AS DESTINATION_AIRPORT_IATA,
    CANCELLATION_REASON,
    COUNT(CANCELLED) AS CANCELLATION_COUNT
    FROM EM_FLIGHTS
    WHERE CANCELLED = 1
    GROUP BY ORIGIN_AIRPORT, DESTINATION_AIRPORT, CANCELLATION_REASON
    ORDER BY CANCELLATION_COUNT DESC
    ),
ARP_CTE AS
    (
    SELECT ARP.IATA_CODE, ARP.AIRPORT AS ORIGIN_AIRPORT,
    ARP.CITY AS ORIGIN_CITY,
    ARP2.IATA_CODE AS DESTINATION_IATA_CODE,
    ARP2.AIRPORT AS DESTINATION_AIRPORT,
    ARP2.CITY AS DESTINATION_CITY
    FROM AIRPORTS AS ARP
    JOIN AIRPORTS AS ARP2
```

```
2157        ON ARP.IATA_CODE =ARP2.IATA_CODE
2158        ),
2159
2160    FINAL_OUTPUT AS
2161        (
2162        select CRC.ORIGIN_AIRPORT_IATA,
2163        ARPC.ORIGIN_AIRPORT,
2164        ARPC.ORIGIN_CITY,
2165
2166        CRC.DESTINATION_AIRPORT_IATA,
2167        ARPC2.DESTINATION_AIRPORT,
2168        ARPC2.DESTINATION_CITY,
2169
2170        CRC.CANCELLATION_REASON,
2171        CRC.CANCELLATION_COUNT
2172        FROM CR_CTE AS CRC
2173        JOIN ARP_CTE AS ARPC
2174        ON CRC.ORIGIN_AIRPORT_IATA =ARPC.IATA_CODE
2175
2176        JOIN ARP_CTE AS ARPC2
2177        ON CRC.DESTINATION_AIRPORT_IATA =ARPC2.DESTINATION_IATA_CODE
2178        )
2179    SELECT * FROM FINAL_OUTPUT;
2180
2181
2182
2183    SELECT ORIGIN_AIRPORT, DESTINATION_AIRPORT, CANCELLATION_REASON,
2184        COUNT(CANCELLED) AS CANCELLATION_COUNT
2185        FROM EM_FLIGHTS
2186        WHERE CANCELLED = 1
2187        GROUP BY ORIGIN_AIRPORT, DESTINATION_AIRPORT, CANCELLATION_REASON
2188        ORDER BY CANCELLATION_COUNT DESC;
2189
2190
2191    SELECT *
2192        FROM AIRPORTS LIMIT 100;
2193
2194    SELECT DISTINCT(MONTH)
2195        FROM EM_FLIGHTS;
2196
2197
2198    /*
        ------------------------------------------------------------------------------------------
        */
2199
2200
2201    SELECT * FROM EM_FLIGHTS limit 10000;
2202    SELECT DISTINCT ORIGIN_AIRPORT FROM EM_FLIGHTS;
2203
2204    /*
2205
2206    ARRIVAL_DELAY float,
2207    DIVERTED   float,
2208    CANCELLED  float,
2209    CANCELLATION_REASON  object,
2210    AIR_SYSTEM_DELAY float,
2211    SECURITY_DELAY float,
2212    AIRLINE_DELAY float,
2213    LATE_AIRCRAFT_DELAY   float,
2214    WEATHER_DELAY        float
2215
2216    */
2217
2218
```