DATA WAREHOUSE
Stefan Majiros, Aqib Hameed
Project: Dashboarding

Part a). Proposed SQL queries to retrieve data for the created the queries

1. **Give me FH and FC per month, filtered by the aircraft model (e.g., "777"**

```
SELECT T.MONTHID, SUM(AU.FLIGHTHOURS) AS FH,
SUM(AU.FLIGHTCYCLES) AS FC FROM TEMPORALDIMENSION T,
AIRCRAFTDIMENSION AD, AIRCRAFTUTILIZATION AU
WHERE AU.AIRCRAFTID = AD.ID AND AU.TIMEID = T.ID AND AD.MODEL = '777'
GROUP BY T.MONTHID;
```

2. **Give me ADOSS, ADOSU per year, filtered by the aircraft from the fleet (e.g., "XY-WTR").**

```
SELECT SUM(AU.SCHEDULEDOUTOFSERVICE) AS ADOSS,
SUM(AU.UNSCHEDULEDOUTOFSERVICE) AS ADOSU FROM AIRCRAFTUTILIZATION
AU, MONTHS M, TEMPORALDIMENSION T WHERE AU.AIRCRAFTID = 'XY-WTR' AND
M.ID = T.MONTHID AND AU.TIMEID = T.ID GROUP BY M.Y;
```

3. **Give me the RRh, RRc, PRRh, PRRc, MRRh and MRRc per month, filtered by the aircraft model (e.g., "777").**

```
SELECT LR.MONTHID,
 1000*(MAREP+PIREP)/FH AS RRh,
 100*(MAREP+PIREP)/FC AS RRc,
 1000*PIREP/FH AS PRRh,
 100*PIREP/FC AS PRRc,
 1000*MAREP/FH AS MRRh,
 100*MAREP/FC AS MRRc
FROM (SELECT T.MONTHID, SUM(AU.FLIGHTHOURS) AS FH,
SUM(AU.FLIGHTCYCLES) AS FC FROM TEMPORALDIMENSION T,
AIRCRAFTDIMENSION AD, AIRCRAFTUTILIZATION AU
WHERE AU.AIRCRAFTID = AD.ID AND AU.TIMEID = T.ID AND AD.MODEL = '777'
 GROUP BY T.MONTHID) AU,
    (SELECT LBR.MONTHID,
        SUM(CASE WHEN P.ROLE ='M' THEN LBR.COUNTER ELSE 0 END) AS
MAREP,
        SUM(CASE WHEN P.ROLE ='P' THEN LBR.COUNTER ELSE 0 END) AS PIREP
     FROM LOGBOOKREPORTING LBR, AIRCRAFTDIMENSION AD,
PEOPLEDIMENSION P WHERE LBR.AIRCRAFTID = AD.ID AND P.ID = LBR.PERSONID
AND AD.MODEL = '777' GROUP BY LBR.MONTHID) LR
WHERE AU.MONTHID = LR.MONTHID;
```

4. **Give me the MRRh and MRRc per aircraft model, filtered by the airport of the reporting person (e.g., "KRS").**

```
SELECT LR.MODEL,1000*MAREP/FH AS MRRh, 100*MAREP/FC AS MRRc
FROM (SELECT AD.MODEL,SUM(AU.FLIGHTHOURS) AS FH, SUM(AU.FLIGHTCYCLES)
```

```
AS FC FROM AIRCRAFTDIMENSION AD, AIRCRAFTUTILIZATION AU
WHERE AU.AIRCRAFTID = AD.ID GROUP BY AD.MODEL) AU,
(SELECT AD.MODEL,SUM(CASE WHEN P.ROLE ='M' THEN LBR.COUNTER ELSE 0
END) AS MAREP,
        SUM(CASE WHEN P.ROLE ='P' THEN LBR.COUNTER ELSE 0 END) AS PIREP
FROM LOGBOOKREPORTING LBR, AIRCRAFTDIMENSION AD, PEOPLEDIMENSION P
    WHERE LBR.AIRCRAFTID = AD.ID AND P.AIRPORT = 'KRS' AND
P.ID = LBR.PERSONID GROUP BY AD.MODEL ) LR  WHERE AU.MODEL = LR.MODEL;
```

Part b). Indexes Created in Oracle DB

```
CREATE BITMAP INDEX aid_au
ON AIRCRAFTUTILIZATION(AIRCRAFTID) PCTFREE 0;

CREATE BITMAP INDEX aid_log_reporting
ON LOGBOOKREPORTING(AIRCRAFTID) PCTFREE 0;

CREATE BITMAP INDEX pid_log_reporting
ON LOGBOOKREPORTING(PERSONID) PCTFREE 0;
```

Part c).Assumptions

We have created three bitmaps on the fact table because the fact tables take more space than dimension tables (4.1M and 9.8M). One index is created on the AIRCRAFTID in the AIRCRAFTUTILIZATION fact table and the other two indexes are created on the AIRCRAFTID and PERSONID in the LOGBOOKREPORTING fact table because it is used frequently in the KPI queries.
In the Execution Plan, we observe that the cost of the KPI queries decrease after adding the indexes.
We also observe that,after adding the indexes the number of blocks also reduced, before the indexes total number of blocks 4880.After adding the indexes its reduced to 1872 and its not exceed the limit of 1900.
Overall we observe that with the help of indexes queries become more efficient and spaces also improve.