

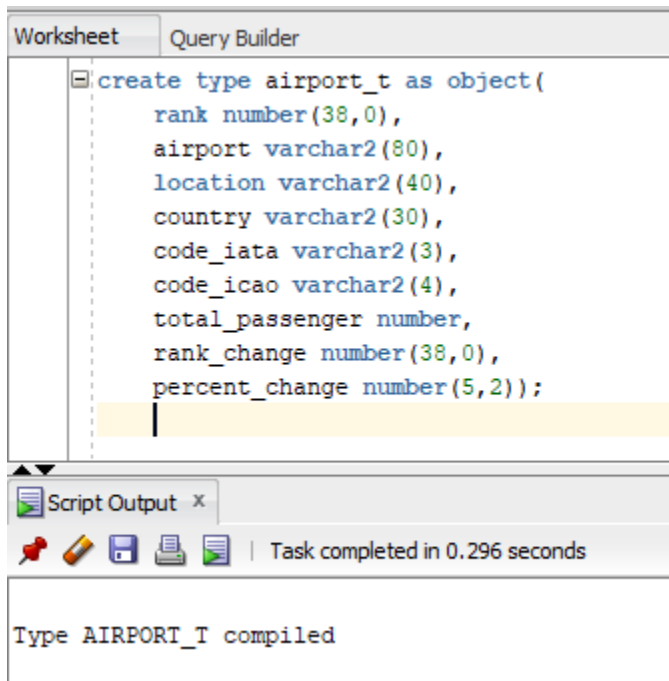
Homework 3

CS 632

Aashay Deepak Thakkar
11-20-2018
31447706

1.

a) Create an ORACLE class airport_t:

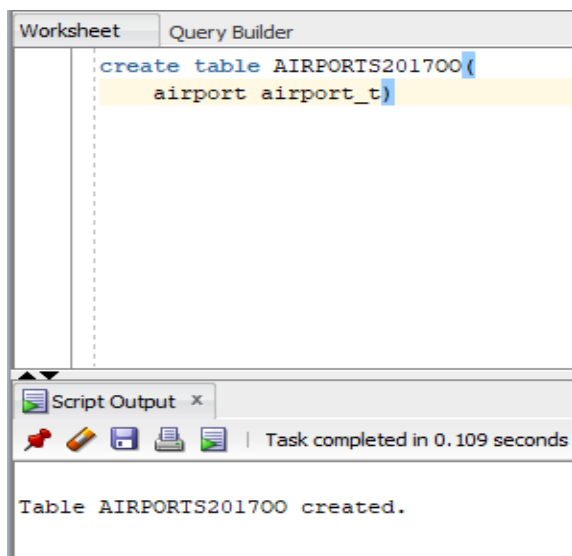


The screenshot shows the Oracle SQL Developer interface. The 'Query Builder' tab is active, displaying a SQL script to create an object type named 'airport_t'. The script defines several attributes: 'rank' (number(38,0)), 'airport' (varchar2(80)), 'location' (varchar2(40)), 'country' (varchar2(30)), 'code_iata' (varchar2(3)), 'code_icao' (varchar2(4)), 'total_passenger' (number), 'rank_change' (number(38,0)), and 'percent_change' (number(5,2)). The script ends with a semicolon. Below the script editor, the 'Script Output' window shows the message 'Type AIRPORT_T compiled' and a status bar indicating 'Task completed in 0.296 seconds'.

```
create type airport_t as object(  
    rank number(38,0),  
    airport varchar2(80),  
    location varchar2(40),  
    country varchar2(30),  
    code_iata varchar2(3),  
    code_icao varchar2(4),  
    total_passenger number,  
    rank_change number(38,0),  
    percent_change number(5,2));
```

Type AIRPORT_T compiled

b) Create a table AIRPORTS201700 that has one single column AIRPORT, which can store an object of type airport_t:



The screenshot shows the Oracle SQL Developer interface. The 'Query Builder' tab is active, displaying a SQL script to create a table named 'AIRPORTS201700' with a single column 'airport' of type 'airport_t'. The script is: 'create table AIRPORTS201700 (airport airport_t);'. Below the script editor, the 'Script Output' window shows the message 'Table AIRPORTS201700 created.' and a status bar indicating 'Task completed in 0.109 seconds'.

```
create table AIRPORTS201700(  
    airport airport_t)
```

Table AIRPORTS201700 created.

c) Write a PL/SQL main program that inserts 50 rows into AIRPORTS201700. The data should be taken from AIRPORTS2017 using a cursor:

```

Worksheet Query Builder
begin
for rtoob in (select * from airports2017)
loop
insert into airports201700 values
(airport_t(rtoob.rank, rtoob.airport, rtoob.location,
rtoob.country, rtoob.code_iata, rtoob.code_icao,
rtoob.total_passenger, rtoob.rank_change, rtoob.percent_change));
end loop;
end;

Worksheet Query Builder
select * from airports201700

```

AIRPORT(RANK, AIRPORT, LOCATION, COUNTRY, CODE_IATA, CODE_ICAO, TOTAL_PASSENGER, RANK_CHANGE, PERCENT_CHANGE)	
AIRPORT_I(1, ' Hartsfield-Jackson Atlanta International Airport', 'Atlanta, Georgia', 'United States', 'ATL', 'KATL', 103902992, 0, -0.3)	
AIRPORT_I(2, ' Beijing Capital International Airport', 'Chaoyang-Shunyi, Beijing', 'China', 'PEK', 'ZBAA', 95786442, 0, 1.5)	
AIRPORT_I(3, ' Dubai International Airport', 'Garhoud, Dubai', 'United Arab Emirates', 'DXB', 'OMDB', 88242099, 0, 5.5)	
AIRPORT_I(4, ' Tokyo Haneda Airport', 'Ota, Tokyo', 'Japan', 'HND', 'RJTT', 85408975, 1, 6.5)	
AIRPORT_I(5, ' Los Angeles International Airport', 'Los Angeles, California', 'United States', 'LAX', 'KLAX', 84557968, -1, 4.5)	
AIRPORT_I(6, ' O'Hare International Airport', 'Chicago, Illinois', 'United States', 'ORD', 'KORD', 79828183, 0, 2.4)	
AIRPORT_I(7, ' London Heathrow Airport', 'Hillingdon, London', 'United Kingdom', 'LHR', 'EGLL', 78014598, 0, 3)	
AIRPORT_I(8, ' Hong Kong International Airport', 'Chek Lap Kok, Hong Kong', 'Hong Kong', 'HKG', 'VHHH', 72665078, 0, 3.4)	
AIRPORT_I(9, ' Shanghai Pudong International Airport', 'Pudong, Shanghai', 'China', 'PVG', 'ZSPD', 70001237, 0, 6.1)	
AIRPORT_I(10, ' Paris-Charles de Gaulle Airport', 'Roissy-en-France, Ile-de-France', 'France', 'CDG', 'LFPG', 69471442, 0, 5.4)	
AIRPORT_I(11, ' Amsterdam Airport Schiphol', 'Haarlemmermeer, North Holland', 'Netherlands', 'AMS', 'EHAM', 68515425, 1, 7.7)	
AIRPORT(RANK, AIRPORT, LOCATION, COUNTRY, CODE_IATA, CODE_ICAO, TOTAL_PASSENGER, RANK_CHANGE, PERCENT_CHANGE)	
AIRPORT_I(12, ' Dallas/Fort Worth International Airport', 'Dallas-Fort Worth, Texas', 'United States', 'DFW', 'KDFW', 67092194, -1, 2.3)	
AIRPORT_I(13, ' Guangzhou Baiyun International Airport', 'Baiyun-Huadu, Guangzhou, Guangdong', 'China', 'CAN', 'ZGGG', 65887473, 2, 10.3)	
AIRPORT_I(14, ' Frankfurt Airport', 'Frankfurt, Hesse', 'Germany', 'FRA', 'EDDF', 64500386, -1, 6.1)	
AIRPORT_I(15, ' Istanbul Atatürk Airport', 'Yesilkoy, Istanbul', 'Turkey', 'IST', 'LTBA', 63859785, -1, 5.9)	
AIRPORT_I(16, ' Indira Gandhi International Airport', 'Delhi', 'India', 'DEL', 'VIDP', 63451503, 5, 14.1)	
AIRPORT_I(17, ' Soekarno-Hatta International Airport', 'Tangerang, Banten', 'Indonesia', 'CGK', 'WIII', 63015620, 5, 8.3)	
AIRPORT_I(18, ' Singapore Changi Airport', 'Changi', 'Singapore', 'SIN', 'WSSS', 62219573, -1, 6)	
AIRPORT_I(19, ' Seoul Incheon International Airport', 'Incheon', 'South Korea', 'ICN', 'RKSI', 62157834, 0, 7.5)	
AIRPORT_I(20, ' Denver International Airport', 'Denver, Colorado', 'United States', 'DEN', 'KDEN', 61379396, -2, 5.3)	
AIRPORT_I(21, ' Suvarnabhumi Airport', 'Bang Phli, Samut Prakan', 'Thailand', 'BKK', 'VTBS', 60860557, -1, 8.9)	
AIRPORT_I(22, ' John F. Kennedy International Airport', 'Queens, New York, New York', 'United States', 'JFK', 'KJFK', 59392500, -6, 0.5)	

AIRPORT(RANK, AIRPORT, LOCATION, COUNTRY, CODE_IATA, CODE_ICAO, TOTAL_PASSENGER, RANK_CHANGE, PERCENT_CHANGE)	
<hr/>	
AIRPORT_I(23, ' Kuala Lumpur International Airport', 'Sepang, Selangor', 'Malaysia', 'KUL', 'WMKK', 58558440, 1, 11.2)	
AIRPORT_I(24, ' San Francisco International Airport', 'San Mateo County, California', 'United States', 'SFO', 'KSFO', 55822129, -1, 5.1)	
AIRPORT_I(25, ' Madrid Barajas Airport', 'Barajas, Madrid', 'Spain', 'MAD', 'LEMD', 53386075, 0, 5.9)	
AIRPORT_I(26, ' Chengdu Shuangliu International Airport', 'Shuangliu-Wuhou, Chengdu, Sichuan', 'China', 'CTU', 'ZUUU', 49801693, 1, 8.2)	
AIRPORT_I(27, ' McCarran International Airport', 'Las Vegas, Nevada', 'United States', 'LAS', 'KLAS', 48566803, -1, 2.3)	
AIRPORT_I(28, ' Barcelona-El Prat Airport', 'Barcelona', 'Spain', 'BCN', 'LEBL', 47262826, 5, 7.1)	
AIRPORT_I(29, ' Chhatrapati Shivaji International Airport', 'Mumbai, Maharashtra', 'India', 'BOM', 'VABB', 47204259, 0, 5.7)	
AIRPORT_I(30, ' Toronto Pearson International Airport', 'Mississauga, Ontario', 'Canada', 'YYZ', 'CYYZ', 47054696, 2, 6.2)	
AIRPORT_I(31, ' Seattle-Tacoma International Airport', 'SeaTac, Washington', 'United States', 'SEA', 'KSEA', 46934194, -3, 2.6)	
AIRPORT_I(32, ' Charlotte Douglas International Airport', 'Charlotte, North Carolina', 'United States', 'CLT', 'KCLT', 45909899, -1, 3.4)	
AIRPORT_I(33, ' London Gatwick Airport', 'Crawley, West Sussex', 'United Kingdom', 'LGW', 'EGKK', 45561694, 2, 5.3)	
<hr/>	
AIRPORT(RANK, AIRPORT, LOCATION, COUNTRY, CODE_IATA, CODE_ICAO, TOTAL_PASSENGER, RANK_CHANGE, PERCENT_CHANGE)	
<hr/>	
AIRPORT_I(34, ' Shenzhen Bao'an International Airport', 'Bao'an, Shenzhen, Guangdong', 'China', 'SZX', 'ZGSZ', 45558409, 6, 8.5)	
AIRPORT_I(35, ' Taiwan Taoyuan International Airport', 'Dayuan, Taoyuan', 'Taiwan', 'TPE', 'RCTP', 44878703, 1, 6.1)	
AIRPORT_I(36, ' Benito Juarez International Airport', 'Venustiano Carranza, Mexico City', 'Mexico', 'MEX', 'MMMX', 44732418, 8, 8)	
AIRPORT_I(37, ' Kunming Changshui International Airport', 'Guandu, Kunming, Yunnan', 'China', 'KMG', 'ZPPP', 44729736, 2, 6.6)	
AIRPORT_I(38, ' Munich Airport', 'Freising, Bavaria', 'Germany', 'MUC', 'EDDM', 44577241, -1, 5.5)	
AIRPORT_I(39, ' Orlando International Airport', 'Orlando, Florida', 'United States', 'MCO', 'KMCO', 44511265, 2, 6.2)	
AIRPORT_I(40, ' Miami International Airport', 'Miami-Dade County, Florida', 'United States', 'MIA', 'KMIA', 44071313, -10, -1.2)	
AIRPORT_I(41, ' Phoenix Sky Harbor International Airport', 'Phoenix, Arizona', 'United States', 'PHX', 'KPHX', 43921670, -7, 1.2)	
AIRPORT_I(42, ' Sydney Kingsford-Smith Airport', 'Mascot, Sydney, New South Wales', 'Australia', 'SYD', 'YSSY', 43410355, -4, 3.4)	
AIRPORT_I(43, ' Newark Liberty International Airport', 'Newark, New Jersey', 'United States', 'EWR', 'KEWR', 43393499, 3, 7)	
AIRPORT_I(44, ' Ninoy Aquino International Airport', 'Pasay/Paranaque, Metro Manila', 'Philippines', 'MNL', 'RPLL', 42022484, 3, 6.2)	
<hr/>	
AIRPORT(RANK, AIRPORT, LOCATION, COUNTRY, CODE_IATA, CODE_ICAO, TOTAL_PASSENGER, RANK_CHANGE, PERCENT_CHANGE)	
<hr/>	
AIRPORT_I(45, ' Shanghai Hongqiao International Airport', 'Changning-Minhang, Shanghai', 'China', 'SHA', 'ZSSS', 41884059, 0, 3.5)	
AIRPORT_I(46, ' Xi'an Xianyang International Airport', 'Weicheng, Xianyang, Shaanxi', 'China', 'XIY', 'ZLXY', 41857406, 5, 13.2)	
AIRPORT_I(47, ' Leonardo da Vinci-Fiumicino Airport', 'Fiumicino, Lazio', 'Italy', 'FCO', 'LIRF', 40968756, -5, -1.8)	
AIRPORT_I(48, ' George Bush Intercontinental Airport', 'Houston, Texas', 'United States', 'IAH', 'KIAH', 40696189, -5, -2.2)	
AIRPORT_I(49, ' Narita International Airport', 'Narita, Chiba', 'Japan', 'NRT', 'RJAA', 40631193, -1, 4.2)	
AIRPORT_I(50, ' Sheremetyevo International Airport', 'Khimki, Moscow Oblast', 'Russia', 'SVO', 'UUEE', 40092806, 1, 17.8)	
<hr/>	
50 rows selected.	

d. Using **ONLY the table AIRPORTS201700** solve these problems from HWK 1 again:

A. Show AIRPORTS2017 in alphabetical order by Country.

Worksheet	Query Builder
	<pre>select * from airports201700 order by airport.country</pre>

AIRPORT(RANK, AIRPORT, LOCATION, COUNTRY, CODE_IATA, CODE_ICAO, TOTAL_PASSENGER, RANK_CHANGE, PERCENT_CHANGE)	

AIRPORT_I(42, ' Sydney Kingsford-Smith Airport', 'Mascot, Sydney, New South Wales', 'Australia', 'SYD', 'YSSY', 43410355, -4, 3.4)	
AIRPORT_I(30, ' Toronto Pearson International Airport', 'Mississauga, Ontario', 'Canada', 'YYZ', 'CYYZ', 47054696, 2, 6.2)	
AIRPORT_I(26, ' Chengdu Shuangliu International Airport', 'Shuangliu-Wuhou, Chengdu, Sichuan', 'China', 'CTU', 'ZUUU', 49801693, 1, 8.2)	
AIRPORT_I(9, ' Shanghai Pudong International Airport', 'Pudong, Shanghai', 'China', 'PVG', 'ZSPD', 70001237, 0, 6.1)	
AIRPORT_I(34, ' Shenzhen Bao'an International Airport', 'Bao'an, Shenzhen, Guangdong', 'China', 'SZX', 'ZGSZ', 45558409, 6, 8.5)	
AIRPORT_I(2, ' Beijing Capital International Airport', 'Chaoyang-Shunyi, Beijing', 'China', 'PEK', 'ZBAA', 95786442, 0, 1.5)	
AIRPORT_I(46, ' Xi'an Xianyang International Airport', 'Weicheng, Xianyang, Shaanxi', 'China', 'XIV', 'ZLXY', 41857406, 5, 13.2)	
AIRPORT_I(45, ' Shanghai Hongqiao International Airport', 'Changning-Minhang, Shanghai', 'China', 'SHA', 'ZSSS', 41884059, 0, 3.5)	
AIRPORT_I(13, ' Guangzhou Baiyun International Airport', 'Baiyun-Huadu, Guangzhou, Guangdong', 'China', 'CAN', 'ZGGG', 65887473, 2, 10.3)	
AIRPORT_I(37, ' Kunming Changshui International Airport', 'Guandu, Kunming, Yunnan', 'China', 'KMG', 'ZPPP', 44729736, 2, 6.6)	
AIRPORT_I(10, ' Paris-Charles de Gaulle Airport', 'Roissy-en-France, Ile-de-France', 'France', 'CDG', 'LFPG', 69471442, 0, 5.4)	

AIRPORT(RANK, AIRPORT, LOCATION, COUNTRY, CODE_IATA, CODE_ICAO, TOTAL_PASSENGER, RANK_CHANGE, PERCENT_CHANGE)	

AIRPORT_I(14, ' Frankfurt Airport', 'Frankfurt, Hesse', 'Germany', 'FRA', 'EDDF', 64500386, -1, 6.1)	
AIRPORT_I(38, ' Munich Airport', 'Freising, Bavaria', 'Germany', 'MUC', 'EDDM', 44577241, -1, 5.5)	
AIRPORT_I(8, ' Hong Kong International Airport', 'Chek Lap Kok, Hong Kong', 'Hong Kong', 'HKG', 'VHHH', 72665078, 0, 3.4)	
AIRPORT_I(29, ' Chhatrapati Shivaji International Airport', 'Mumbai, Maharashtra', 'India', 'BOM', 'VABB', 47204259, 0, 5.7)	
AIRPORT_I(16, ' Indira Gandhi International Airport', 'Delhi', 'India', 'DEL', 'VIDP', 63451503, 5, 14.1)	
AIRPORT_I(17, ' Soekarno-Hatta International Airport', 'Tangerang, Banten', 'Indonesia', 'CGK', 'WIII', 63015620, 5, 8.3)	
AIRPORT_I(47, ' Leonardo da Vinci-Fiumicino Airport', 'Fiumicino, Lazio', 'Italy', 'FCO', 'LIRF', 40968756, -5, -1.8)	
AIRPORT_I(4, ' Tokyo Haneda Airport', 'Ota, Tokyo', 'Japan', 'HND', 'RJTT', 85408975, 1, 6.5)	
AIRPORT_I(49, ' Narita International Airport', 'Narita, Chiba', 'Japan', 'NRT', 'RJAA', 40631193, -1, 4.2)	
AIRPORT_I(23, ' Kuala Lumpur International Airport', 'Sepang, Selangor', 'Malaysia', 'KUL', 'WMKK', 58558440, 1, 11.2)	
AIRPORT_I(36, ' Benito Juarez International Airport', 'Venustiano Carranza, Mexico City', 'Mexico', 'MEX', 'MMMX', 44732418, 8, 8)	

AIRPORT(RANK, AIRPORT, LOCATION, COUNTRY, CODE_IATA, CODE_ICAO, TOTAL_PASSENGER, RANK_CHANGE, PERCENT_CHANGE)	

AIRPORT_I(11, ' Amsterdam Airport Schiphol', 'Haarlemmermeer, North Holland', 'Netherlands', 'AMS', 'EHAM', 68515425, 1, 7.7)	
AIRPORT_I(44, ' Ninoy Aquino International Airport', 'Pasay/Paranaque, Metro Manila', 'Philippines', 'MNL', 'RPLL', 42022484, 3, 6.2)	
AIRPORT_I(50, ' Sheremetyevo International Airport', 'Khimki, Moscow Oblast', 'Russia', 'SVO', 'UUUE', 40092806, 2, 17.8)	
AIRPORT_I(18, ' Singapore Changi Airport', 'Changi', 'Singapore', 'SIN', 'WSSS', 62219573, -1, 6)	
AIRPORT_I(19, ' Seoul Incheon International Airport', 'Incheon', 'South Korea', 'ICN', 'RKSI', 62157834, 0, 7.5)	
AIRPORT_I(28, ' Barcelona-El Prat Airport', 'Barcelona', 'Spain', 'BCN', 'LEBL', 47262826, 5, 7.1)	
AIRPORT_I(25, ' Madrid Barajas Airport', 'Barajas, Madrid', 'Spain', 'MAD', 'LEMD', 53386075, 0, 5.9)	
AIRPORT_I(35, ' Taiwan Taoyuan International Airport', 'Dayuan, Taoyuan', 'Taiwan', 'TPE', 'RCTP', 44878703, 1, 6.1)	

AIRPORT_I(21, ' Suvarnabhumi Airport', 'Bang Phli, Samut Prakan', 'Thailand', 'BKK', 'VTBS', 60860557, -1, 8.9)	
AIRPORT_I(5, ' Istanbul Ataturk Airport', 'Yesilkoy, Istanbul', 'Turkey', 'IST', 'LTBA', 63859785, -1, 5.9)	
AIRPORT_I(3, ' Dubai International Airport', 'Garhoud, Dubai', 'United Arab Emirates', 'DXB', 'OMDB', 88242099, 0, 5.5)	

AIRPORT(RANK, AIRPORT, LOCATION, COUNTRY, CODE_IATA, CODE_ICAO, TOTAL_PASSENGER, RANK_CHANGE, PERCENT_CHANGE)	

AIRPORT_I(7, ' London Heathrow Airport', 'Hillingdon, London', 'United Kingdom', 'LHR', 'EGLL', 78014598, 0, 3)	
AIRPORT_I(33, ' London Gatwick Airport', 'Crawley, West Sussex', 'United Kingdom', 'LGW', 'EGKK', 45561694, 2, 5.3)	
AIRPORT_I(24, ' San Francisco International Airport', 'San Mateo County, California', 'United States', 'SFO', 'KSFO', 55822129, -1, 5.1)	
AIRPORT_I(22, ' John F. Kennedy International Airport', 'Queens, New York, New York', 'United States', 'JFK', 'KJFK', 59392500, -6, 0.5)	
AIRPORT_I(20, ' Denver International Airport', 'Denver, Colorado', 'United States', 'DEN', 'KDEN', 61379396, -2, 5.3)	
AIRPORT_I(12, ' Dallas/Fort Worth International Airport', 'Dallas-Fort Worth, Texas', 'United States', 'DFW', 'KDFW', 67092194, -1, 2.3)	
AIRPORT_I(6, ' O'Hare International Airport', 'Chicago, Illinois', 'United States', 'ORD', 'KORD', 79828183, 0, 2.4)	
AIRPORT_I(5, ' Los Angeles International Airport', 'Los Angeles, California', 'United States', 'LAX', 'KLAX', 84557968, -1, 4.5)	
AIRPORT_I(1, ' Hartsfield-Jackson Atlanta International Airport', 'Atlanta, Georgia', 'United States', 'ATL', 'KATL', 103902992, 0, -0.3)	
AIRPORT_I(48, ' George Bush Intercontinental Airport', 'Houston, Texas', 'United States', 'IAH', 'KIAH', 40696189, -5, -2.2)	
AIRPORT_I(43, ' Newark Liberty International Airport', 'Newark, New Jersey', 'United States', 'EWR', 'KEWR', 43393499, 3, 7)	

AIRPORT(RANK, AIRPORT, LOCATION, COUNTRY, CODE_IATA, CODE_ICAO, TOTAL_PASSENGER, RANK_CHANGE, PERCENT_CHANGE)	

AIRPORT_I(41, ' Phoenix Sky Harbor International Airport', 'Phoenix, Arizona', 'United States', 'PHX', 'KPHX', 43921670, -7, 1.2)	
AIRPORT_I(40, ' Miami International Airport', 'Miami-Dade County, Florida', 'United States', 'MIA', 'KMIA', 44071313, -10, -1.2)	
AIRPORT_I(39, ' Orlando International Airport', 'Orlando, Florida', 'United States', 'MCO', 'KMCO', 44511265, 2, 6.2)	
AIRPORT_I(32, ' Charlotte Douglas International Airport', 'Charlotte, North Carolina', 'United States', 'CLT', 'KCLT', 45909899, -1, 3.4)	
AIRPORT_I(31, ' Seattle-Tacoma International Airport', 'SeaTac, Washington', 'United States', 'SEA', 'KSEA', 46934194, -3, 2.6)	
AIRPORT_I(27, ' McCarran International Airport', 'Las Vegas, Nevada', 'United States', 'LAS', 'KLAS', 48566803, -1, 2.3)	

50 rows selected.	

- B. Using Group By, show each country once and how often it appears in the list.

Worksheet	Query Builder
	<pre>select c.airport.country, count(c.airport.country) from airports2017oo c group by c.airport.country</pre>

	AIRPORT.COUNTRY	COUNT(C.AIRPORT.COUNTRY)
1	China	8
2	United Kingdom	2
3	United Arab Emirates	1
4	Malaysia	1
5	United States	15
6	Spain	2
7	India	2
8	Germany	2
9	France	1
10	Taiwan	1
11	Australia	1
12	Philippines	1
13	Canada	1
14	Indonesia	1
15	Russia	1
16	Singapore	1
17	Mexico	1
18	Italy	1
19	Japan	2
20	Hong Kong	1
21	Netherlands	1
22	Turkey	1
23	South Korea	1
24	Thailand	1

- C. Show the total number of countries in the table. With a single SELECT statement.

Worksheet	Query Builder
	<pre>select count(distinct c.airport.country) from airports2017oo c</pre>

	COUNT(DISTINCT C.AIRPORT.COUNTRY)
1	24

D. Show all information about all airports that had more than 7 million flights in 2017.

Worksheet	Query Builder
	<pre>select * from airports2017oo c where c.airport.total_passenger>7000000</pre>

AIRPORT(RANK, AIRPORT, LOCATION, COUNTRY, CODE_IATA, CODE_ICAO, TOTAL_PASSENGER, RANK_CHANGE, PERCENT_CHANGE)	
AIRPORT_I(1, ' Hartsfield-Jackson Atlanta International Airport', 'Atlanta, Georgia', 'United States', 'ATL', 'KATL', 103902992, 0, -0.3)	
AIRPORT_I(2, ' Beijing Capital International Airport', 'Chaoyang-Shunyi, Beijing', 'China', 'PEK', 'ZBAA', 95786442, 0, 1.5)	
AIRPORT_I(3, ' Dubai International Airport', 'Garhoud, Dubai', 'United Arab Emirates', 'DXB', 'OMDB', 88242099, 0, 5.5)	
AIRPORT_I(4, ' Tokyo Haneda Airport', 'Ota, Tokyo', 'Japan', 'HND', 'RJTT', 85408975, 1, 6.5)	
AIRPORT_I(5, ' Los Angeles International Airport', 'Los Angeles, California', 'United States', 'LAX', 'KLAX', 84557968, -1, 4.5)	
AIRPORT_I(6, ' O'Hare International Airport', 'Chicago, Illinois', 'United States', 'ORD', 'KORD', 79828183, 0, 2.4)	
AIRPORT_I(7, ' London Heathrow Airport', 'Hillingdon, London', 'United Kingdom', 'LHR', 'EGLL', 78014598, 0, 3)	
AIRPORT_I(8, ' Hong Kong International Airport', 'Chek Lap Kok, Hong Kong', 'Hong Kong', 'HKG', 'VHHH', 72665078, 0, 3.4)	
AIRPORT_I(9, ' Shanghai Pudong International Airport', 'Pudong, Shanghai', 'China', 'PVG', 'ZSPD', 70001237, 0, 6.1)	
AIRPORT_I(10, ' Paris-Charles de Gaulle Airport', 'Roissy-en-France, Ile-de-France', 'France', 'CDG', 'LFPG', 69471442, 0, 5.4)	
AIRPORT_I(11, ' Amsterdam Airport Schiphol', 'Haarlemmermeer, North Holland', 'Netherlands', 'AMS', 'EHAM', 68515425, 1, 7.7)	
AIRPORT(RANK, AIRPORT, LOCATION, COUNTRY, CODE_IATA, CODE_ICAO, TOTAL_PASSENGER, RANK_CHANGE, PERCENT_CHANGE)	
AIRPORT_I(12, ' Dallas/Fort Worth International Airport', 'Dallas-Fort Worth, Texas', 'United States', 'DFW', 'KDFW', 67092194, -1, 2.3)	
AIRPORT_I(13, ' Guangzhou Baiyun International Airport', 'Baiyun-Huadu, Guangzhou, Guangdong', 'China', 'CAN', 'ZGGG', 65887473, 2, 10.3)	
AIRPORT_I(14, ' Frankfurt Airport', 'Frankfurt, Hesse', 'Germany', 'FRA', 'EDDF', 64500386, -1, 6.1)	
AIRPORT_I(15, ' Istanbul Atatürk Airport', 'Yesilkoy, Istanbul', 'Turkey', 'IST', 'LTBA', 63859785, -1, 5.9)	
AIRPORT_I(16, ' Indira Gandhi International Airport', 'Delhi', 'India', 'DEL', 'VIDP', 63451503, 5, 14.1)	
AIRPORT_I(17, ' Soekarno-Hatta International Airport', 'Tangerang, Banten', 'Indonesia', 'CGK', 'WIII', 63015620, 5, 8.3)	
AIRPORT_I(18, ' Singapore Changi Airport', 'Changi', 'Singapore', 'SIN', 'WSSS', 62219573, -1, 6)	
AIRPORT_I(19, ' Seoul Incheon International Airport', 'Incheon', 'South Korea', 'ICN', 'RKSI', 62157834, 0, 7.5)	
AIRPORT_I(20, ' Denver International Airport', 'Denver, Colorado', 'United States', 'DEN', 'KDEN', 61379396, -2, 5.3)	
AIRPORT_I(21, ' Suvarnabhumi Airport', 'Bang Phli, Samut Prakan', 'Thailand', 'BKK', 'VTBS', 60860557, -1, 8.9)	
AIRPORT_I(22, ' John F. Kennedy International Airport', 'Queens, New York, New York', 'United States', 'JFK', 'KJFK', 59392500, -6, 0.5)	

AIRPORT(RANK, AIRPORT, LOCATION, COUNTRY, CODE_IATA, CODE_ICAO, TOTAL_PASSENGER, RANK_CHANGE, PERCENT_CHANGE)	
AIRPORT_I(23, ' Kuala Lumpur International Airport', 'Sepang, Selangor', 'Malaysia', 'KUL', 'WMKK', 58558440, 1, 11.2)	
AIRPORT_I(24, ' San Francisco International Airport', 'San Mateo County, California', 'United States', 'SFO', 'KSFO', 55822129, -1, 5.1)	
AIRPORT_I(25, ' Madrid Barajas Airport', 'Barajas, Madrid', 'Spain', 'MAD', 'LEMD', 53386075, 0, 5.9)	
AIRPORT_I(26, ' Chengdu Shuangliu International Airport', 'Shuangliu-Wuhou, Chengdu, Sichuan', 'China', 'CTU', 'ZUUU', 49801693, 1, 8.2)	
AIRPORT_I(27, ' McCarran International Airport', 'Las Vegas, Nevada', 'United States', 'LAS', 'KLAS', 48566803, -1, 2.3)	
AIRPORT_I(28, ' Barcelona-El Prat Airport', 'Barcelona', 'Spain', 'BCN', 'LEBL', 47262826, 5, 7.1)	
AIRPORT_I(29, ' Chhatrapati Shivaji International Airport', 'Mumbai, Maharashtra', 'India', 'BOM', 'VABB', 47204259, 0, 5.7)	
AIRPORT_I(30, ' Toronto Pearson International Airport', 'Mississauga, Ontario', 'Canada', 'YYZ', 'CYYZ', 47054696, 2, 6.2)	
AIRPORT_I(31, ' Seattle-Tacoma International Airport', 'SeaTac, Washington', 'United States', 'SEA', 'KSEA', 46934194, -3, 2.6)	
AIRPORT_I(32, ' Charlotte Douglas International Airport', 'Charlotte, North Carolina', 'United States', 'CLT', 'KCLT', 45909899, -1, 3.4)	
AIRPORT_I(33, ' London Gatwick Airport', 'Crawley, West Sussex', 'United Kingdom', 'LGW', 'EGKK', 45561694, 2, 5.3)	
AIRPORT(RANK, AIRPORT, LOCATION, COUNTRY, CODE_IATA, CODE_ICAO, TOTAL_PASSENGER, RANK_CHANGE, PERCENT_CHANGE)	
AIRPORT_I(34, ' Shenzhen Bao'an International Airport', 'Bao'an, Shenzhen, Guangdong', 'China', 'SZX', 'ZGSZ', 45558409, 6, 8.5)	
AIRPORT_I(35, ' Taiwan Taoyuan International Airport', 'Dayuan, Taoyuan', 'Taiwan', 'TPE', 'RCTP', 44878703, 1, 6.1)	
AIRPORT_I(36, ' Benito Juarez International Airport', 'Venustiano Carranza, Mexico City', 'Mexico', 'MEX', 'MMMX', 44732418, 8, 8)	
AIRPORT_I(37, ' Kunming Changshui International Airport', 'Guandu, Kunming, Yunnan', 'China', 'KMG', 'ZPPP', 44729736, 2, 6.6)	
AIRPORT_I(38, ' Munich Airport', 'Freising, Bavaria', 'Germany', 'MUC', 'EDDM', 44577241, -1, 5.5)	
AIRPORT_I(39, ' Orlando International Airport', 'Orlando, Florida', 'United States', 'MCO', 'KMCO', 44511265, 2, 6.2)	
AIRPORT_I(40, ' Miami International Airport', 'Miami-Dade County, Florida', 'United States', 'MIA', 'KMIA', 44071313, -10, -1.2)	
AIRPORT_I(41, ' Phoenix Sky Harbor International Airport', 'Phoenix, Arizona', 'United States', 'PHX', 'KPHX', 43921670, -7, 1.2)	
AIRPORT_I(42, ' Sydney Kingsford-Smith Airport', 'Mascot, Sydney, New South Wales', 'Australia', 'SYD', 'YSSY', 43410355, -4, 3.4)	
AIRPORT_I(43, ' Newark Liberty International Airport', 'Newark, New Jersey', 'United States', 'EWR', 'KEWR', 43393499, 3, 7)	
AIRPORT_I(44, ' Ninoy Aquino International Airport', 'Pasay/Paranaque, Metro Manila', 'Philippines', 'MNL', 'RPLL', 42022484, 3, 6.2)	
AIRPORT(RANK, AIRPORT, LOCATION, COUNTRY, CODE_IATA, CODE_ICAO, TOTAL_PASSENGER, RANK_CHANGE, PERCENT_CHANGE)	
AIRPORT_I(45, ' Shanghai Hongqiao International Airport', 'Changning-Minhang, Shanghai', 'China', 'SHA', 'ZSSS', 41884059, 0, 3.5)	
AIRPORT_I(46, ' Xi'an Xianyang International Airport', 'Weicheng, Xianyang, Shaanxi', 'China', 'XIY', 'ZLXY', 41857406, 5, 13.2)	
AIRPORT_I(47, ' Leonardo da Vinci-Fiumicino Airport', 'Fiumicino, Lazio', 'Italy', 'FCO', 'LIRF', 40968756, -5, -1.8)	
AIRPORT_I(48, ' George Bush Intercontinental Airport', 'Houston, Texas', 'United States', 'IAH', 'KIAH', 40696189, -5, -2.2)	
AIRPORT_I(49, ' Narita International Airport', 'Narita, Chiba', 'Japan', 'NRT', 'RJAA', 40631193, -1, 4.2)	
AIRPORT_I(50, ' Sheremetyevo International Airport', 'Khimki, Moscow Oblast', 'Russia', 'SVO', 'UUEE', 40092806, 1, 17.8)	
50 rows selected.	

E. Show all information about all the airports that increased their passengers, yet decreased their ranking.

Worksheet	Query Builder
	<pre>select * from airports2017oo c where c.airport.percent_change>0 and c.airport.rank_change<0</pre>

AIRPORT(RANK, AIRPORT, LOCATION, COUNTRY, CODE_IATA, CODE_ICAO, TOTAL_PASSENGER, RANK_CHANGE, PERCENT_CHANGE)	

AIRPORT_I(27, ' McCarran International Airport', 'Las Vegas, Nevada', 'United States', 'LAS', 'KLAS', 48566803, -1, 2.3)	
AIRPORT_I(31, ' Seattle-Tacoma International Airport', 'SeaTac, Washington', 'United States', 'SEA', 'KSEA', 46934194, -3, 2.6)	
AIRPORT_I(32, ' Charlotte Douglas International Airport', 'Charlotte, North Carolina', 'United States', 'CLT', 'KCLI', 45909899, -1, 3.4)	
AIRPORT_I(38, ' Munich Airport', 'Freising, Bavaria', 'Germany', 'MUC', 'EDDM', 44577241, -1, 5.5)	
AIRPORT_I(41, ' Phoenix Sky Harbor International Airport', 'Phoenix, Arizona', 'United States', 'PHX', 'KPHX', 43921670, -7, 1.2)	
AIRPORT_I(42, ' Sydney Kingsford-Smith Airport', 'Mascot, Sydney, New South Wales', 'Australia', 'SYD', 'YSSY', 43410355, -4, 3.4)	
AIRPORT_I(49, ' Narita International Airport', 'Narita, Chiba', 'Japan', 'NRT', 'RJAA', 40631193, -1, 4.2)	
AIRPORT_I(5, ' Los Angeles International Airport', 'Los Angeles, California', 'United States', 'LAX', 'KLAX', 84557968, -1, 4.5)	
AIRPORT_I(12, ' Dallas/Fort Worth International Airport', 'Dallas-Fort Worth, Texas', 'United States', 'DFW', 'KDFW', 67092194, -1, 2.3)	
AIRPORT_I(14, ' Frankfurt Airport', 'Frankfurt, Hesse', 'Germany', 'FRA', 'EDDF', 64500386, -1, 6.1)	
AIRPORT_I(15, ' Istanbul Ataturk Airport', 'Yesilkoy, Istanbul', 'Turkey', 'IST', 'LTBA', 63859785, -1, 5.9)	

AIRPORT(RANK, AIRPORT, LOCATION, COUNTRY, CODE_IATA, CODE_ICAO, TOTAL_PASSENGER, RANK_CHANGE, PERCENT_CHANGE)	

AIRPORT_I(18, ' Singapore Changi Airport', 'Changi', 'Singapore', 'SIN', 'WSSS', 62219573, -1, 6)	
AIRPORT_I(20, ' Denver International Airport', 'Denver, Colorado', 'United States', 'DEN', 'KDEN', 61379396, -2, 5.3)	
AIRPORT_I(21, ' Suvarnabhumi Airport', 'Bang Phli, Samut Prakan', 'Thailand', 'BKK', 'VTBS', 60860557, -1, 8.9)	
AIRPORT_I(22, ' John F. Kennedy International Airport', 'Queens, New York, New York', 'United States', 'JFK', 'KJFK', 59392500, -6, 0.5)	
AIRPORT_I(24, ' San Francisco International Airport', 'San Mateo County, California', 'United States', 'SFO', 'KSFO', 55822129, -1, 5.1)	

16 rows selected.	

2.

A. Create a table AIRPORTS2017XML that has one single column AIRPORT which can store data of type XML:

Worksheet	Query Builder	
	<pre>create table AIRPORTS2017XML(airport sys.xmltype)</pre>	Table AIRPORTS2017XML created.

B. Write a PL/SQL main program that inserts 50 rows into AIRPORTS2017XML. The data should be taken from AIRPORTS2017 using a cursor

Worksheet	Query Builder	
	<pre>BEGIN FOR xmlcur IN (select * from airports2017) LOOP insert into airports2017xml values ('<OneAirport> <Rank>' xmlcur.Rank '</Rank> <Airport>' xmlcur.Airport '</Airport> <Location>' xmlcur.Location '</Location> <Country>' xmlcur.Country '</Country> <Code_IATA>' xmlcur.Code_IATA '</Code_IATA> <Code_ICAO>' xmlcur.Code_ICAO '</Code_ICAO> <Total_passenger>' xmlcur.Total_Passenger '</Total_passenger> <Rank_Change>' xmlcur.Rank_Change '</Rank_Change> <Percent_change>' xmlcur.Percent_Change '</Percent_change> </OneAirport>'); END LOOP; END;</pre>	
Worksheet	Query Builder	
	<pre>set long 35000; select * from airports2017xml;</pre>	

C. Using ONLY the table AIRPORTS2017XML solve these problems from HWK 1 again:

A. Show AIRPORTS2017 in alphabetical order by Country.

Worksheet	Query Builder
	<pre>set long 35000; select * from airports2017xml order by airport.extract('/OneAirport/Country').getStringVal();</pre>

- B. Using Group By, show each country once and how often it appears in the list.

Worksheet	Query Builder
	<pre>set long 35000; set pages 200; select c.airport.extract('/OneAirport/Country').getStringVal(), count(c.airport.extract('/OneAirport/Country').getStringVal()) from airports2017xml c group by c.airport.extract('/OneAirport/Country').getStringVal();</pre>

- C. Show the total number of countries in the table. With a single SELECT statement.

Worksheet	Query Builder
	<pre>set long 35000; set pages 200; select count(distinct c.airport.extract('/OneAirport/Country').getStringVal()) from airports2017xml c;</pre>

```
COUNT(DISTINCTC.AIRPORT.EXTRACT('/ONEAIRPORT/COUNTRY').GETSTRINGVAL())
```

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I

- D. Show all information about all airports that had more than 7 million flights in 2017.

Worksheet	Query Builder
	<pre>set long 35000; set pages 200; select * from airports2017xml c where c.airport.extract('/OneAirport/Total_passenger').getStringVal()>'7000000';</pre>

- E. Show all information about all the airports that increased their passengers, yet decreased their ranking.

Worksheet	Query Builder
	<pre>set long 35000; set pages 200; select * from airports2017xml c where c.airport.extract('/OneAirport/Percent_change/text()').getStringVal() > 0 and c.airport.extract('/OneAirport/Rank_Change/text()').getStringVal() < 0;</pre>

3. Solve problem 5) from the midterm exam. Do everything that is necessary. Create the two tables. Write the trigger. Show an insert statement. Show the inventory table and the tracking table before and after the insert. Show two more insert statements. Show the inventory table and the tracking table after each of them.

Worksheet	Query Builder
	<pre>create table INVENTORY(ITEM varchar2(10), HOWMANYAVAILABLE number, PRICE number);</pre>

Worksheet	Query Builder
	<pre>create table TRACK(KEEP number);</pre>

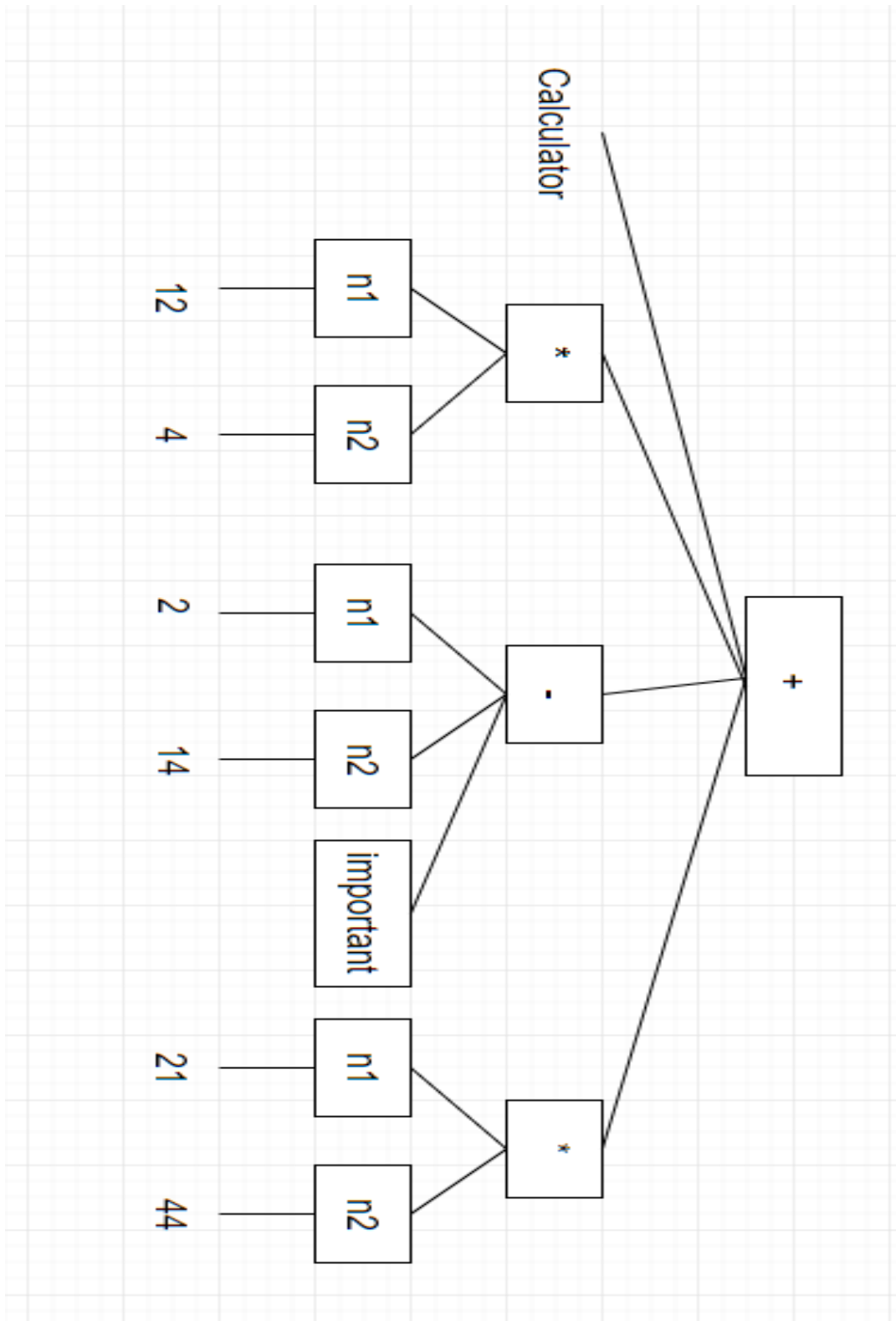
Worksheet	Query Builder
	<pre>insert into track values (0);</pre>

Worksheet	Query Builder
	<pre>create or replace trigger TTRIG after insert on inventory begin update track set keep = keep + 1; end;</pre>

Worksheet	Query Builder
	<pre>select * from track;</pre>

	KEEP
1	5

4. Using any computer drawing tool you like (but **not** hand-drawing) show the following XML tree as a tree diagram.



5.

A. Create a normal Oracle table MYMEASURES with one column TIMEMEASURE.

Worksheet	Query Builder
	<pre>create table MYMEASURES(TIMEMEASURE varchar2(30));</pre>

B. Insert into the table MYMEASURES:

Worksheet	Query Builder
	<pre>insert into MYMEASURES(TIMEMEASURE) values ('12 ms'); insert into MYMEASURES(TIMEMEASURE) values ('3 s'); insert into MYMEASURES(TIMEMEASURE) values ('x s'); insert into MYMEASURES(TIMEMEASURE) values ('18 ms'); insert into MYMEASURES(TIMEMEASURE) values ('45 ms'); insert into MYMEASURES(TIMEMEASURE) values ('y ms'); insert into MYMEASURES(TIMEMEASURE) values ('26 s'); insert into MYMEASURES(TIMEMEASURE) values ('zzz s'); insert into MYMEASURES(TIMEMEASURE) values ('18 s'); insert into MYMEASURES(TIMEMEASURE) values ('28 fs'); insert into MYMEASURES(TIMEMEASURE) values ('54ms');</pre>

	TIMEMEASURE
1	12 ms
2	3 s
3	x s
4	18 ms
5	45 ms
6	y ms
7	26 s
8	zzz s
9	18 s
10	28 fs
11	54ms


Worksheet	Query Builder
	<pre>select * from mymeasures;</pre>

C. Write a select statement that must use REGULAR EXPRESSIONS that displays only the correct TIME MEASURES

Worksheet

Query Builder

```
select * from mymeasures;
```

	 TIME MEASURE
1	12 ms
2	3 s
3	x s
4	18 ms
5	45 ms
6	y ms
7	26 s
8	zzz s
9	18 s
10	28 fs
11	54ms

Worksheet		Query Builder
		<pre>select * from mymeasures where REGEXP_LIKE(timemeasure, '[1-9][0-9]*[]+m?s') ;</pre>

TIME MEASURE

12 ms
3 s
18 ms
45 ms
26 s
18 s
6 rows selected.

D. Write a select statement that displays only the INCORRECT lines of MYMEASURE.

Worksheet

Query Builder

```
select * from mymeasures
where
NOT REGEXP_LIKE(timemeasure, '[1-9][0-9]*[ ]+m?s) ;
```

TIMEMEASURE

x s

y ms

zzz s

28 fs

54ms