NAME: FATEMA TABASSUM LIZA

1.

Query:

SELECT length FROM movies WHERE Rating='G';

Result:

```
mysql> SELECT  length FROM movies WHERE Rating='G';
+--------+
| length |
+--------+
|     85 |
+--------+
1 row in set (0.01 sec)
```


3.

Query:

SELECT theaters.Phone, districts.Name FROM theaters, theaters2districts, districts WHERE theaters2districts.DistrictCode = districts.DistrictCode AND theaters2districts.TheaterCode = theaters.TheaterCode AND theaters.Name = 'Boeing Imax Theater';

Result:

```
+-------------------+-------------------+
| Phone             | Name              |
+-------------------+-------------------+
| (206) 443-4629    | CAPITOL HILL      |
| (206) 443-4629    | THE U DISTRICT    |
| (206) 443-4629    | DOWNTOWN          |
+-------------------+-------------------+
3 rows in set (0.00 sec)
```

5.
Query:

SELECT movies.Title, movies.Length, movies2theaters.MovieTime FROM ((theaters INNER JOIN movies2theaters ON theaters.TheaterCode = movies2theaters.TheaterCode) INNER JOIN movies ON movies.MovieCode = movies2theaters.MovieCode) WHERE theaters.Name = 'Cineplex Odeon Uptown';

Result:

```
+---------------------+--------+---------------------+
| Title               | Length | MovieTime           |
+---------------------+--------+---------------------+
| Barenaked in America |     89 | 10/20/2000 14:30:00 |
| Barenaked in America |     89 | 10/20/2000 19:20:00 |
| Barenaked in America |     89 | 10/20/2000 21:30:00 |
| Chicken Run         |     85 | 10/20/2000 17:30:00 |
| Human Resources     |    100 | 10/20/2000 14:15:00 |
| Human Resources     |    100 | 10/20/2000 16:30:00 |
| Human Resources     |    100 | 10/20/2000 19:00:00 |
| Human Resources     |    100 | 10/20/2000 21:15:00 |
| One                 |    102 | 10/20/2000 14:00:00 |
| One                 |    102 | 10/20/2000 16:15:00 |
| One                 |    102 | 10/20/2000 18:30:00 |
| One                 |    102 | 10/20/2000 20:45:00 |
+---------------------+--------+---------------------+
12 rows in set (0.00 sec)
```

8.
Query:

SELECT districts.Name, COUNT(*) FROM districts, theaters2districts WHERE districts.DistrictCode = theaters2districts.DistrictCode AND theaters2districts.TheaterCode IN
(SELECT DISTINCT movies2theaters.TheaterCode FROM movies2theaters WHERE movies2theaters.MovieCode IN

```
(SELECT DISTINCT movies.MovieCode FROM movies WHERE movies.Title =
'Chicken Run' OR movies.Rating = 'PG' ) )
GROUP BY (districts.Name)
HAVING COUNT(*) > 2;
```

Result:

```
+----------------------+----------+
| Name                 | COUNT(*) |
+----------------------+----------+
| CAPITOL HILL         |        4 |
| DOWNTOWN             |        4 |
| THE U DISTRICT       |        5 |
+----------------------+----------+
3 rows in set (0.00 sec)
```

9.
Query:

```
SELECT Title, AVG(Length) FROM movies JOIN movies2theaters ON
movies.MovieCode = movies2theaters.MovieCode WHERE
movies2theaters.TheaterCode IN (
SELECT TheaterCode from theaters WHERE Name  = 'Landmark Neptune Theatre' );
```

Result:

```
+------------------+----------------+
| Title            | AVG(Length)    |
+------------------+----------------+
| Best in Show     |        90.0000 |
+------------------+----------------+
1 row in set (0.00 sec)
```

10. Query:

SELECT theaters.Name, COUNT(*) FROM theaters JOIN movies2theaters ON
theaters.TheaterCode = movies2theaters.TheaterCode WHERE theaters.Name =
'Landmark Metro Cinemas' AND movies2theaters.MovieCode IN (SELECT MovieCode
FROM movies WHERE Length < 120);

Result:

```
+------------------------------+------------+
| Name                         | COUNT(*)   |
+------------------------------+------------+
| Landmark Metro Cinemas       |         17 |
+------------------------------+------------+
1 row in set (0.00 sec)
```

11. Query:

SELECT DISTINCT theaters.Name, theaters.Address from theaters JOIN
theaters2districts ON theaters.TheaterCode = theaters2districts.TheaterCode WHERE
theaters2districts.TheaterCode IN (SELECT TheaterCode FROM movies2theaters
GROUP BY TheaterCode HAVING COUNT(DISTINCT MovieCode) < 5);

Result:

```
+-------------------------------+----------------------------------------------------------------+
| Name                          | Address                                                        |
+-------------------------------+----------------------------------------------------------------+
| Cineplex Odeon City Centre    | 1420 Fifth Avenue, Suite 375 | Seattle, WA 98101 |
| Cineplex Odeon Uptown         | 511 Queen Anne Avenue North | Seattle, WA 98109  |
| Landmark Varsity Theatre      | 4329 University Way, NE | Seattle, WA 98105       |
| Landmark Seven Gables Theatre | 911 NE 50th | Seattle, WA 98105                   |
| Landmark Neptune Theatre      | 1303 NE 45th | Seattle, WA 98105                 |
| Landmark Harvard Exit Theatre | 807 E.Roy | Seattle, WA 98102                    |
| Landmark Guild 45th           | 2115 N. 45th | Seattle, WA 98103                 |
| Landmark Broadway Market Cinemas | 425 Broadway East | Seattle, WA 98102          |
| General Cinema Cinerama       | 2100 4th Avenue | Seattle, WA 98121              |
| Cineplex Odeon Northgate      | 10 Northgate Plaza | Seattle, WA 98125           |
+-------------------------------+----------------------------------------------------------------+
10 rows in set (0.00 sec)
```

12. Query:

SELECT DISTINCT theaters.Name, theaters.Phone, COUNT(DISTINCT
movies2theaters.MovieCode) AS MovieCount from ((theaters
JOIN theaters2districts ON theaters.TheaterCode = theaters2districts.TheaterCode)
JOIN movies2theaters ON movies2theaters.TheaterCode =
theaters2districts.TheaterCode)
GROUP BY theaters.Name HAVING COUNT(DISTINCT movies2theaters.MovieCode)
< 5
ORDER BY MovieCount DESC;

Result:
```
+---------------------------------+----------------+------------+
| Name                            | Phone          | MovieCount |
+---------------------------------+----------------+------------+
| Cineplex Odeon Uptown           | (206) 285-1022 |          4 |
| Landmark Harvard Exit Theatre   | (206) 323-8986 |          2 |
| Landmark Guild 45th             | (206) 633-3353 |          2 |
| Cineplex Odeon City Centre      | (206) 622-6465 |          2 |
| Landmark Broadway Market Cinemas| (206) 323-0231 |          2 |
| Landmark Varsity Theatre        | (206) 632-3131 |          2 |
| Cineplex Odeon Northgate        | (206) 363-5800 |          1 |
| Landmark Seven Gables Theatre   | (206) 632-8820 |          1 |
| General Cinema Cinerama         | (206) 441-3080 |          1 |
| Landmark Neptune Theatre        | (206) 633-5545 |          1 |
+---------------------------------+----------------+------------+
10 rows in set (0.01 sec)
```

13. Query:

SELECT theaters.Name, theaters.Phone FROM ((theaters JOIN theaters2districts ON
theaters.TheaterCode = theaters2districts.TheaterCode)
JOIN districts ON districts.DistrictCode = theaters2districts.DistrictCode)
WHERE districts.Name = 'CAPITOL HILL' AND theaters2districts.TheaterCode IN
(
SELECT DISTINCT M.TheaterCode FROM movies2theaters AS M WHERE
M.MovieCode IN (SELECT MovieCode FROM movies WHERE Rating = 'R' AND
Length = (SELECT MAX(Length) FROM movies WHERE Rating = 'R'))

) ORDER BY theaters.Name;

Result:

```
+--------------------------+-----------------+
| Name                     | Phone           |
+--------------------------+-----------------+
| Cineplex Odeon Meridian  | (206) 223-9600  |
| Landmark Metro Cinemas   | (206) 633-0055  |
+--------------------------+-----------------+
2 rows in set (0.00 sec)
```

BONUS

16. Query:

CREATE TABLE query16 (Title VARCHAR (20), Length INT, MovieTime DATETIME);

INSERT INTO query16 VALUES('Barenaked in America', 89, '2000-10-20 14:30:00');
INSERT INTO query16 VALUES('Barenaked in America', 89, '2000-10-20 19:20:00');
INSERT INTO query16 VALUES('Barenaked in America', 89, '2000-10-20 21:30:00');
INSERT INTO query16 VALUES('Chicken Run', 85, '2000-10-20 17:30:00');
INSERT INTO query16 VALUES('Human Resources', 100, '2000-10-20 14:15:00');
INSERT INTO query16 VALUES('Human Resources', 100, '2000-10-20 16:30:00');

```
INSERT INTO query16 VALUES('Human Resources', 100, '2000-10-20 19:00:00');
INSERT INTO query16 VALUES('Human Resources', 100, '2000-10-20 21:15:00');
INSERT INTO query16 VALUES('ONE', 102, '2000-10-20 14:00:00');
INSERT INTO query16 VALUES('ONE', 102, '2000-10-20 16:15:00');
INSERT INTO query16 VALUES('ONE', 102, '2000-10-20 18:30:00');
INSERT INTO query16 VALUES('ONE', 102, '2000-10-20 20:45:00');

ALTER TABLE query16  ADD `want to see` BOOLEAN;
```

17. Query

```
CREATE TABLE query17 AS SELECT * FROM query16;

UPDATE query17 SET `want to see` = TRUE  WHERE Title LIKE '%The%';

UPDATE query17 SET `want to see` = FALSE  WHERE Title NOT LIKE '%The%';
```

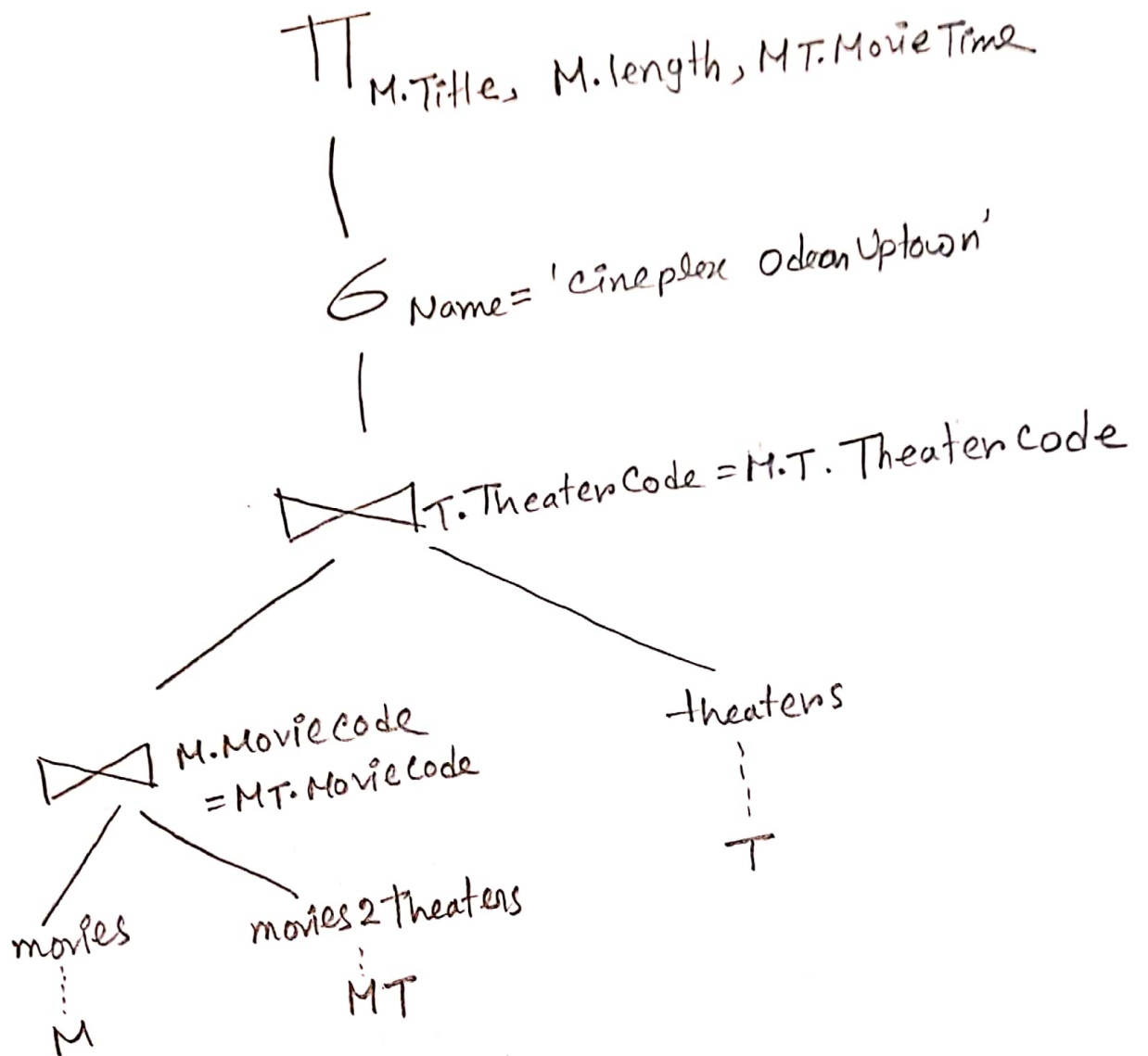**2) Ans:** $\prod_{length} (\sigma_{rating = 'G'} (movies))$

3) Ans:

$\prod_{theaters.phone, \ districts.phone} (\sigma_{theater.Name = 'Boeing \ Imax \ Theater'} (Theaters \bowtie theaters2district \bowtie districts))$

6) Ans:

$\prod_{\substack{M.title, \\ M.length, \\ MT.MovieTime}} (\sigma_{Name = 'Cineplex \ Odeon \ Uptown'} (\rho_M^{(movies)} (movies) \bowtie \rho_{MT}^{(movies2theaters)} (movies2theaters) \bowtie \rho_T^{(theaters)} (theaters)))$

7.

$$\Pi_{M.Title,\ M.length,\ MT.MovieTime}$$

|

$$\sigma_{Name='cineplex\ Odeon\ Uptown'}$$

|

$$\bowtie_{T.TheaterCode = M.T.TheaterCode}$$

$$\bowtie_{M.MovieCode = MT.MovieCode}$$ theaters
                                                    ¦
                                                    T

movies   movies2theaters
¦   MT
M

14/

$$\pi_{T.address,\ T.phone} \left(\sigma_{M.title='Frozen'} \left(\rho_M(movies) \bowtie \rho_{MT}(movies2theaters) \bowtie \rho_T(theaters) \right) \right)$$

15/

$$\pi_{T.address,\ T.phone}$$
$$|$$
$$\sigma_{M.title='Frozen'}$$
$$|$$
$$\bowtie_{M.Moviecode = MT.Moviecode}$$

$\bowtie_{MT.theatercode = T.theatercode}$

movies
⋮
M

movies2theaters
⋮
MT

theaters
⋮
T