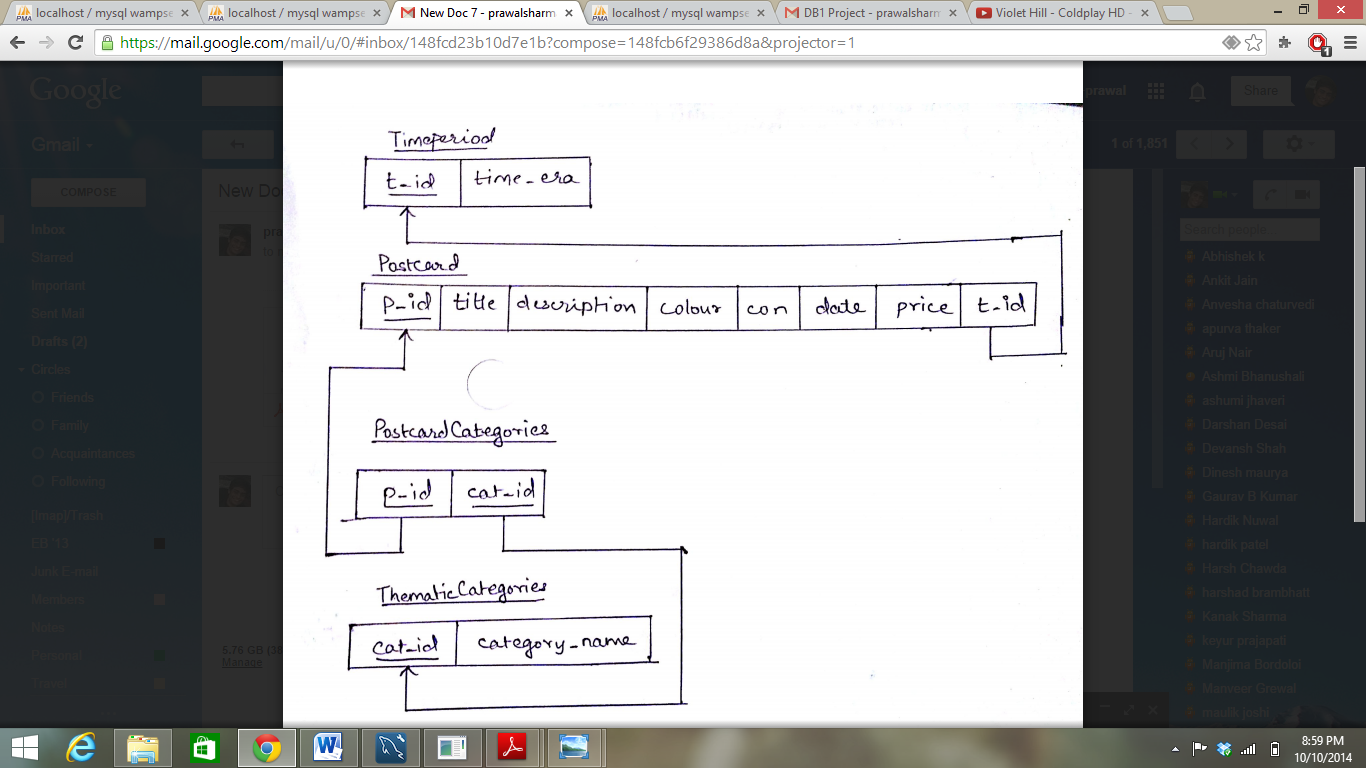
**Database Systems Project – 1 From: Prawal Sharma UTA ID: 1001104720**

**Task – 1**

1. **List of Entities:** 
   1. Postcard
   2. ThematicCategories
   3. TimePeriod
   4. PostcardCategories
2. **For each attribute:**

|  |  |
| --- | --- |
| **Postcard** | |
| p\_Id | Int(5) |
| t\_id | Int(5) |
| title | Varchar(30) |
| description | Varchar(255) |
| color | Varchar(15) |
| condition | Varchar(25) |
| date | Date |
| price | Int(10) |
|  | |
| **TimePeriod** |  |
| t\_id | Int(5) |
| time\_era | Varchar(25) |
|  | |
| **ThematicCategories** |  |
| cat\_Id | Int(5) |
| category | Varchar(50) |
|  | |
| **PostcardCategories** |  |
| p\_id | Int(5) |
| cat\_id | Int(5) |

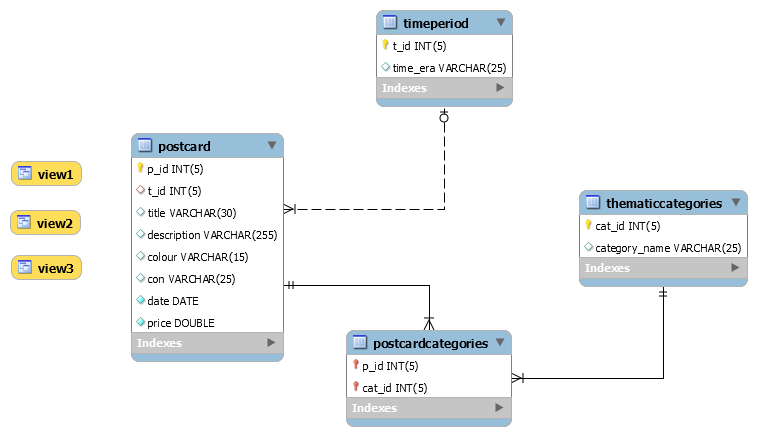
**Task – 2**

1. **Database Schema:**
   1. About relationships. There are a total of 3 relations
      1. The relation between **Postcard** and **PostcardCategories** defines which category does a postcard belongs to.
      2. The relationship between **PostcardCategories** and **ThematicCategories** defines each Thematic Category can be related to many tuples of the PostcardCategories. Explicitly, the relationship i. & ii. satisfies the condition of one postcard being associated with many categories, and one category to be associated with many postcards.
      3. The third relation between **Postcard** and **TimePeriod** states which time era does a single postcard belongs to.
   2. Cardinality of relationships:
      1. **Postcard** and **PostcardCategories** is a **many to one** relationship
      2. **PostcardCategories** and **ThematicCategories** has a **one to many** relationship
      3. **Postcard** and **TimePeriod** has a **one to one** relationship
2. **Constraints:** 
   1. **Primary Key** of Postcard, TimePeriod and ThematicCategories cannot be NULL. This is **Entity Constraints.**
   2. **Foreign Key**: Time\_Id in Postcard is a Primary Key: Time\_Id in TimePeriod. This is **Referential Integrity Constraints.**
   3. **Foreign Key**: Postcard\_Id, **Foreign Key:** Cat\_Id in PostcardCategories is a **Primary Key:** Postcard\_Id, **Primary Key:** Cat\_Id in Postcard and ThematicCategory respectively. This is a **Referential Integrity Constraint**.
   4. There is a Key that uniquely identifies the entity in the schema. This is a **Key Constraint**.

**Task – 3**

1. **SQL Code to implement Schema:**

* CREATE DATABASE postcard;
* USE postcard;
* CREATE TABLE TimePeriod(t\_id int(5) NOT NULL, time\_era varchar(25), PRIMARY KEY(t\_id));
* CREATE TABLE ThematicCategories(cat\_id int(5) NOT NULL, category\_name varchar(25), PRIMARY KEY (cat\_id));
* CREATE TABLE postcard(p\_id int(5) NOT NULL, t\_id int(5), title varchar(30), description varchar(255), colour varchar(15),con varchar(25), p\_date DATE, price double, PRIMARY KEY(p\_id), FOREIGN KEY (t\_id) REFERENCES timeperiod (t\_id) );
* CREATE TABLE postcardcategories(p\_id int(5), cat\_id int(5), PRIMARY KEY(p\_id,cat\_id), FOREIGN KEY (p\_id) REFERENCES postcard(p\_id), FOREIGN KEY (cat\_id) REFERENCES thematiccategories(cat\_id));



1. **Populate Table**

Time Period:

* INSERT INTO timeperiod(t\_id,time\_era) VALUES (2,'silverera'), (3,'modernera');

Thematic Categories:

* INSERT INTO thematiccategories(cat\_id,category\_name) VALUES (1,'nature'),(2,'buildings'),(3,'people');

Postcard:

* INSERT INTO postcard (`p\_id`, `t\_id`, `title`, `description`, `colour`, `con`,`date`, `price`) VALUES ('1', '1', 'Happy Birthday', 'For Celebrating Birthday', 'b/w', 'mint', '2014-10-05', '21.3'),('2', '3', 'Official Posts', 'Commercial uses of postcards', 'b/w', 'mint', '2011-04-5', '12.33'), ('3', '3', 'Official Posts', 'Commercial uses of postcards', 'b/w', 'acceptable', '2009-9-30', '3.44'), ('4', '2', 'Adventure Sports', 'Cards dedicated towards adventure sports.', 'color', 'very good', '2011-3-3', '14.33'), ('5', '1', 'Adventure Sports', 'Cards dedicated towards adventure sports.', 'color', 'poor', '2008-7-25', '34.5'), ('6', '1', 'Happy Birthday', 'For Celebrating birthday.', 'b/w', 'good', '2013-6-5', '10.25'), ('7', '2', 'Summer', 'Postcards that relate to summer season.', 'color', 'acceptable', '2012-3-9', '6.55'), ('8', '3', 'Get Well Soon', 'Cards to ease people in pain.', 'b/w', 'good', '2007-7-16', '7.66'), ('9', '1', 'European Mail', 'Used at the time of mail in Europe continent.', 'color', 'poor', '2011-9-13', '2.55'), ('10', '1', 'European Mail', 'Used at the time of mail in Europe continent.', 'color', 'acceptable', '2012-3-4', '12.55'), ('11', '1', 'Ancient Mails', 'Postcards used in ancient times as mails', 'b/w', 'poor', '2013-9-13', '133.66'), ('12', '3', 'Gift Postcards', 'Used to greet people with gift.', 'color', 'mint', '2012-2-3', '5.88'), ('13', '2', 'Telegram Postcard', 'Elegant Telegram styled postcard', 'color', 'good', '2014-7-3', '17.35'), ('14', '2', 'Religious Postcards', 'Describes the specific religion', 'b/w', 'good', '2014-10-05', '7.55'), ('15', '2', 'Mauritius', 'Holidays in Mauritius', 'color', 'acceptable', '2011-5-30', '30.22'), ('16', '3', 'Mountains', 'Description about the mountains of Central Asia', 'color', 'good', '2008-3-1', '100'), ('17', '1', 'Architecture', 'About the people and building', 'color', 'good', '2008-3-1', '100');

PostcardCategories:

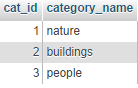
* INSERT INTO `postcard`.`postcardcategories` (`p\_id`, `cat\_id`)VALUES ('1', '3'), ('2', '3'), ('3', '3'), ('4', '1'), ('4', '3'), ('5', '1'), ('5', '3'), ('6', '3'), ('7', '1'), ('8', '3'), ('9', '2'), ('9', '3'), ('10', '2'), ('10', '3'), ('11', '2'), ('11', '3'), ('12', '2'), ('12', '3'), ('13', '2'), ('13', '3'), ('14', '1'), ('14', '2'), ('15', '1'), ('15', '3'), ('16', '1'), ('16', '2'), ('17', '1');

1. **Initial State of the Database**

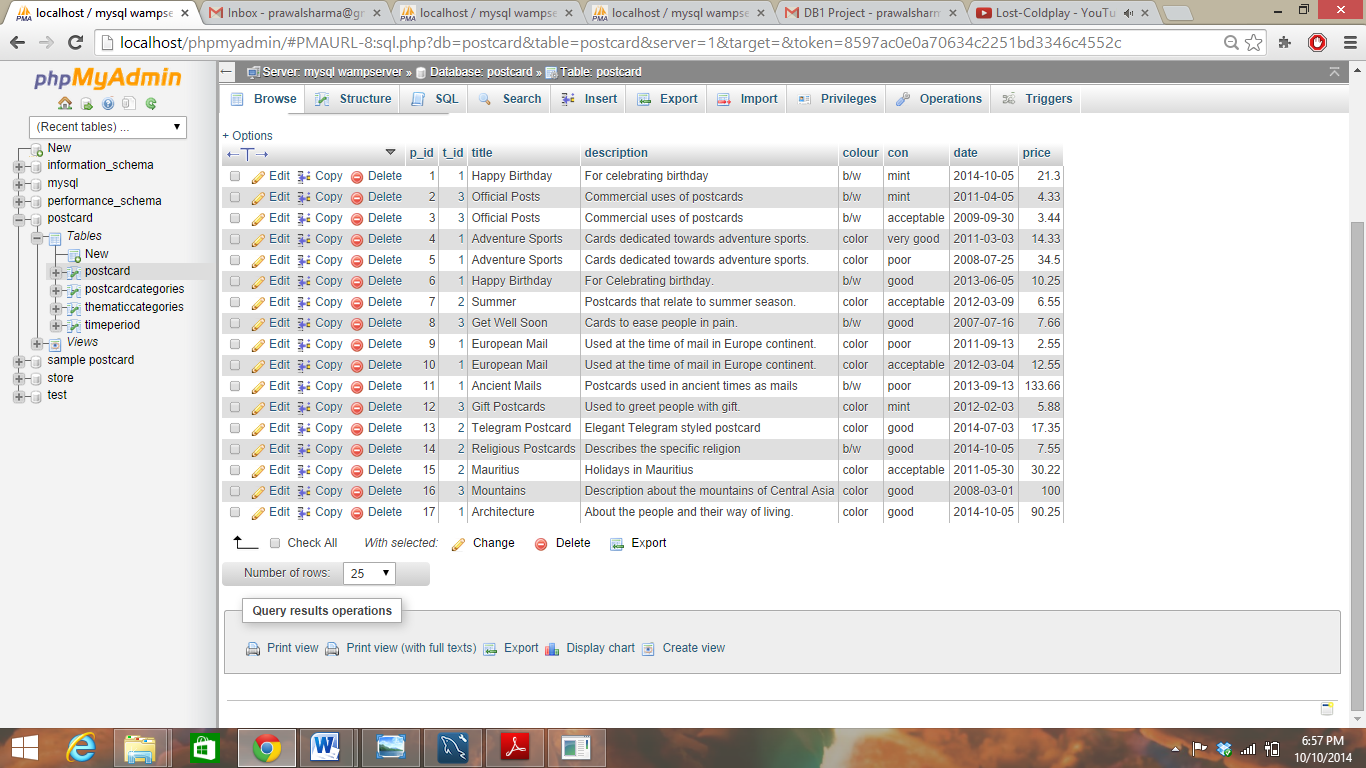
* TimePeriod:



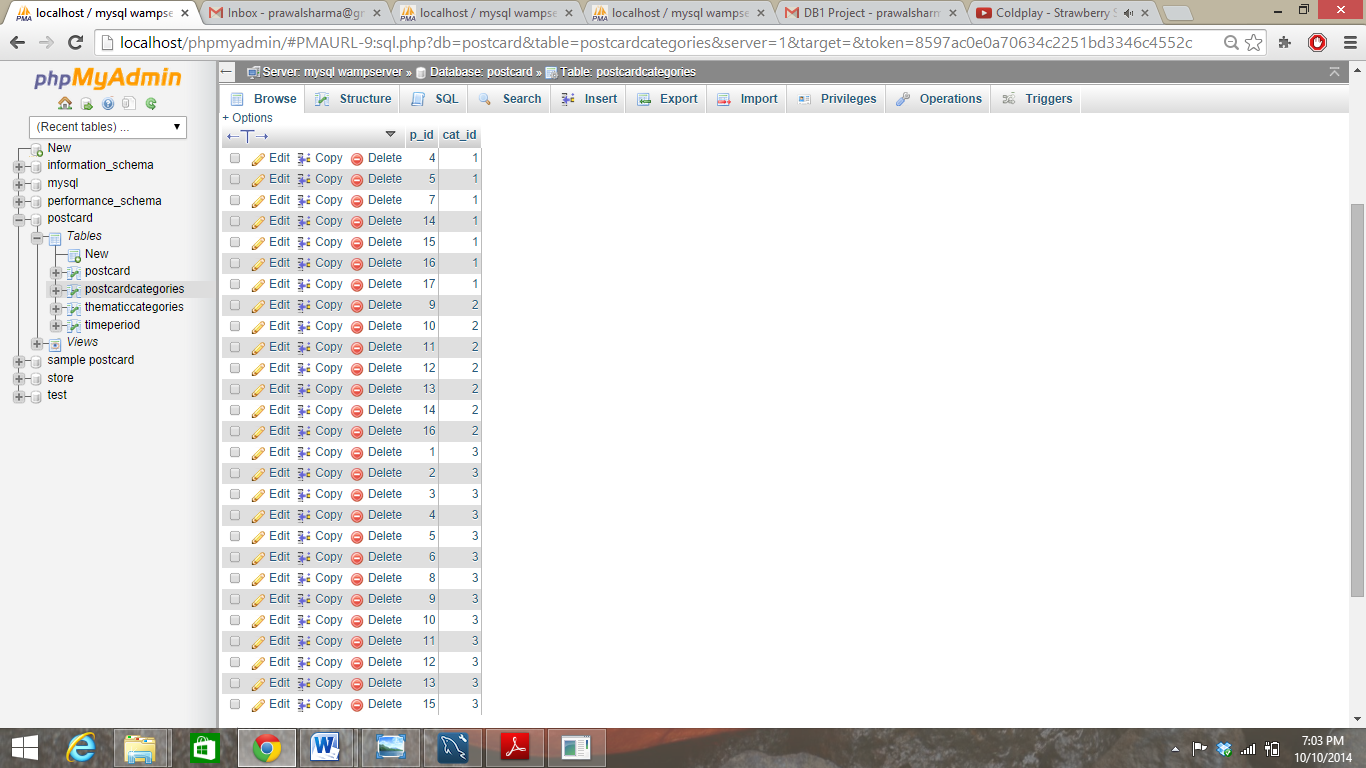
* ThematicCategories:



* Postcard:

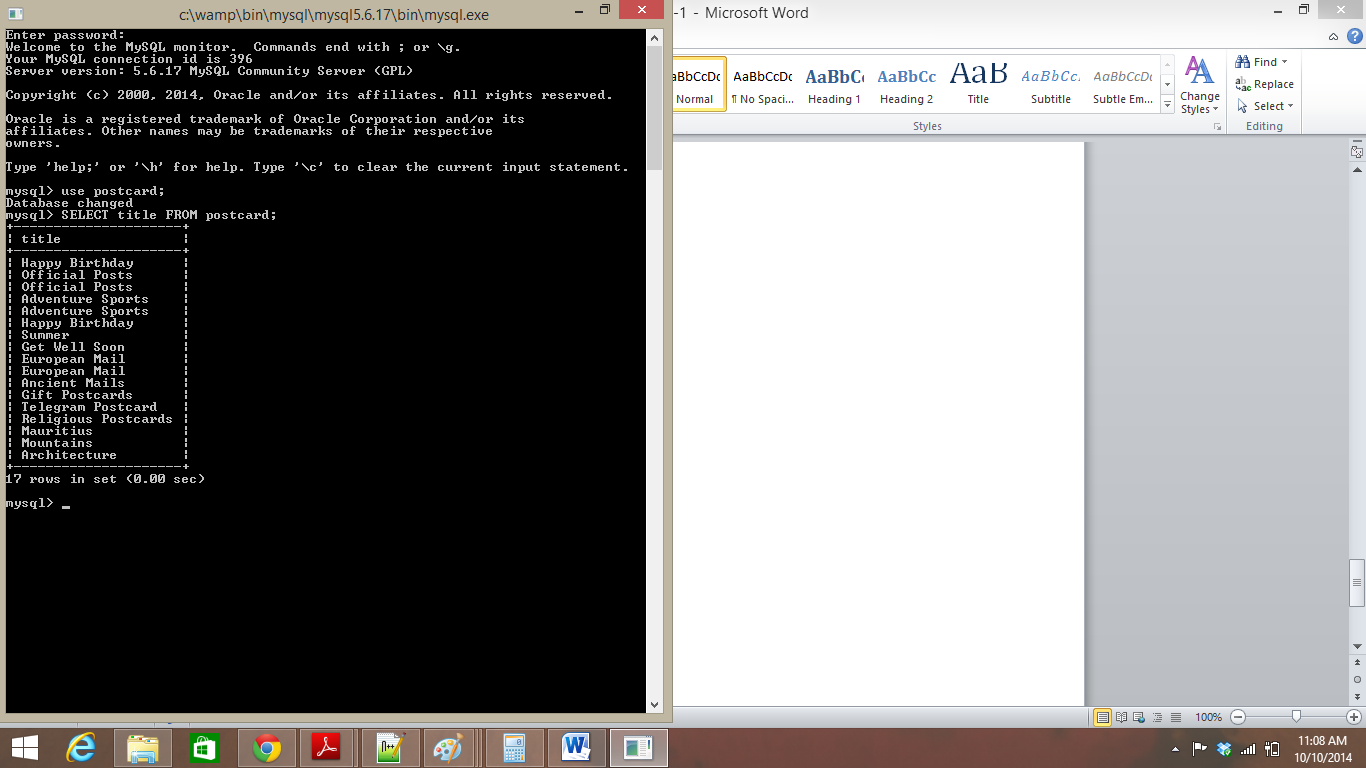


* Postcardcategories:

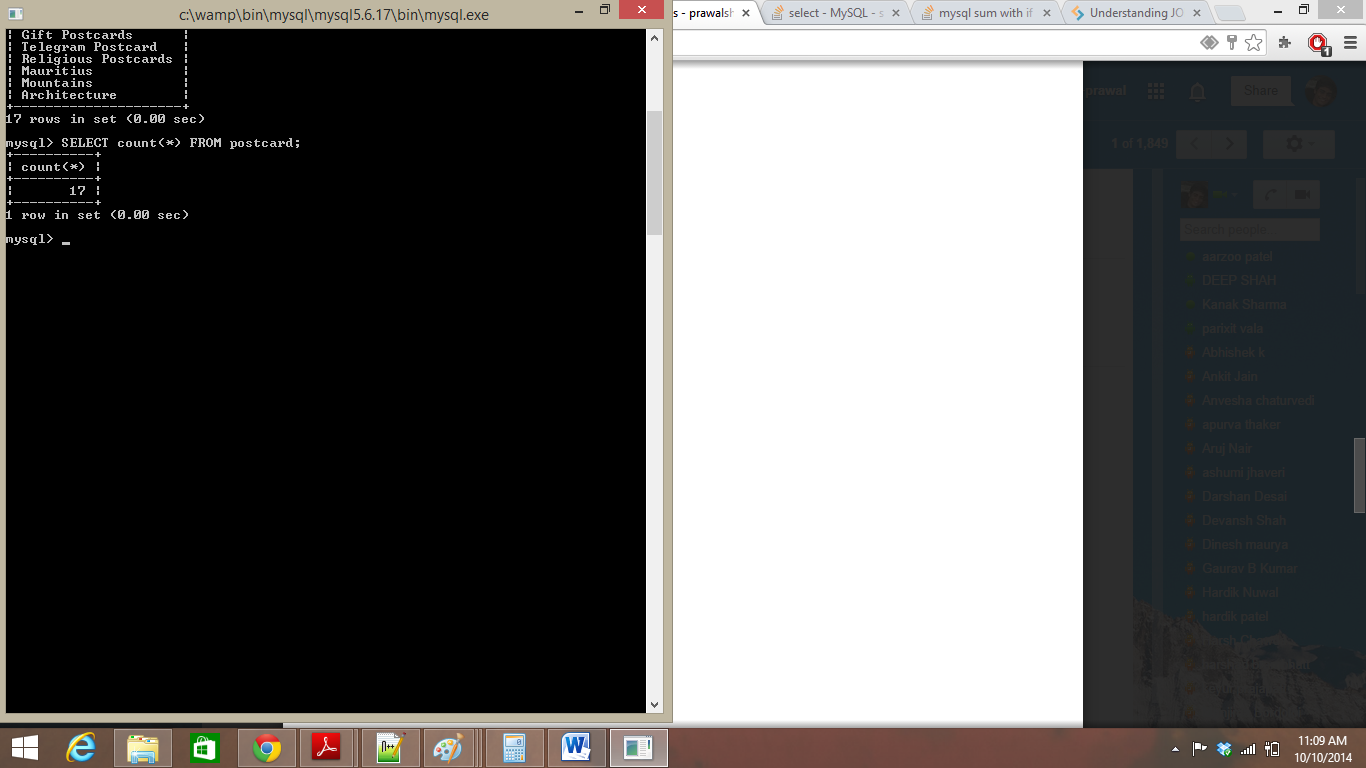


**Task – 4**

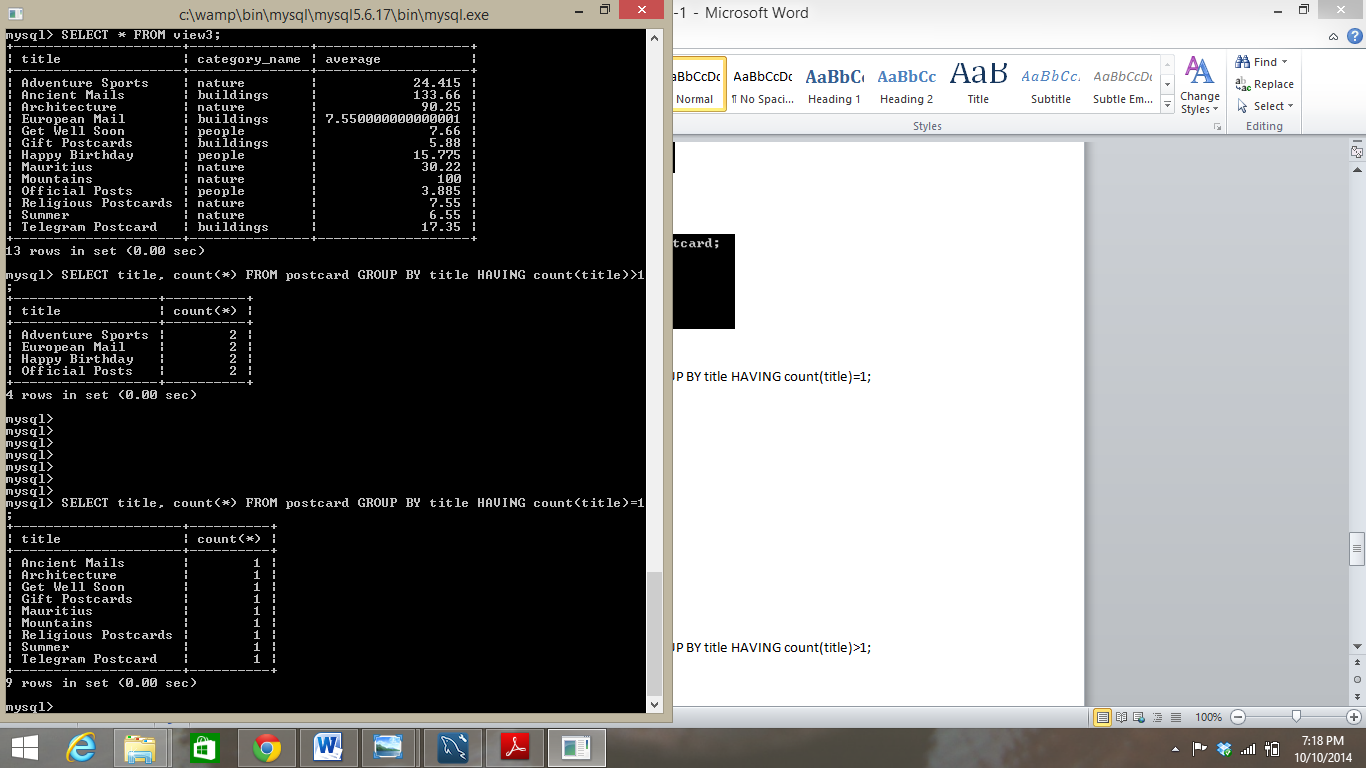
1. SELECT title FROM postcard;



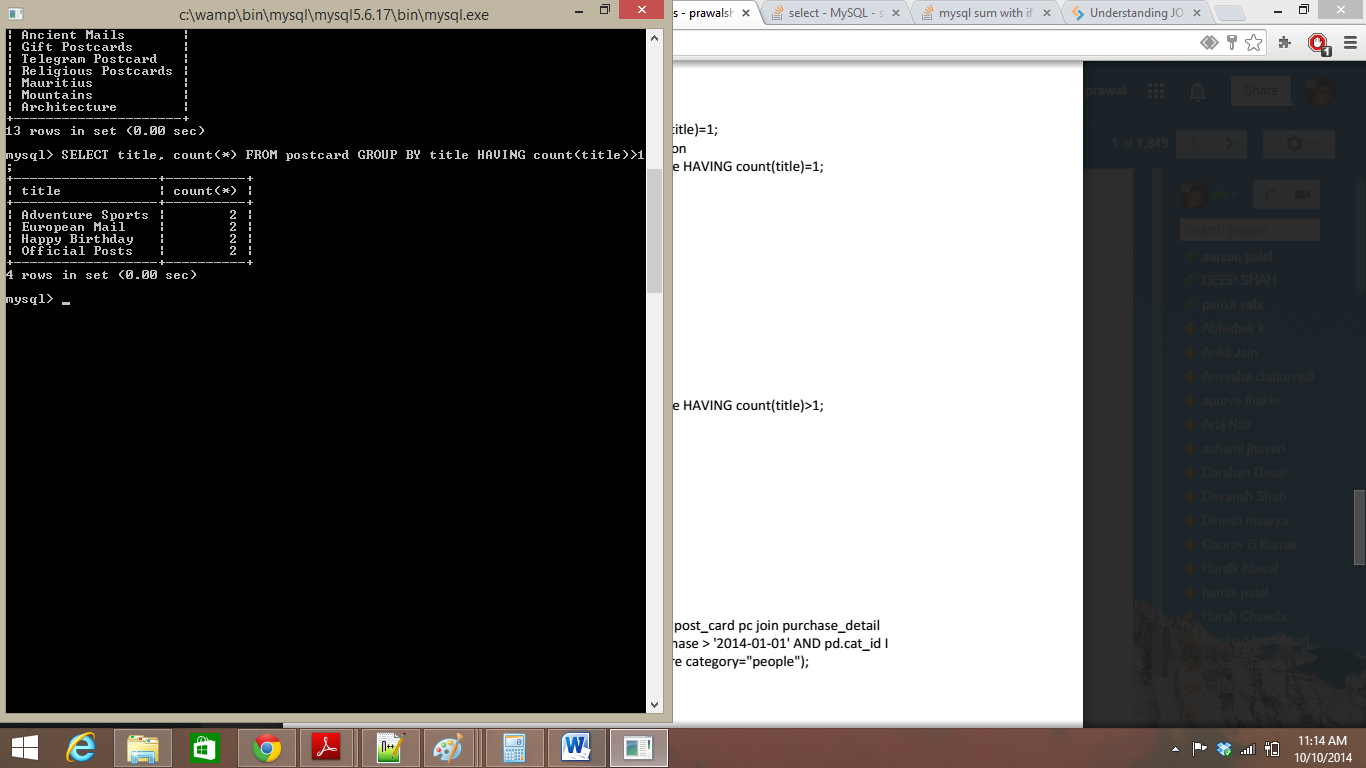
1. SELECT count(\*) FROM postcard;



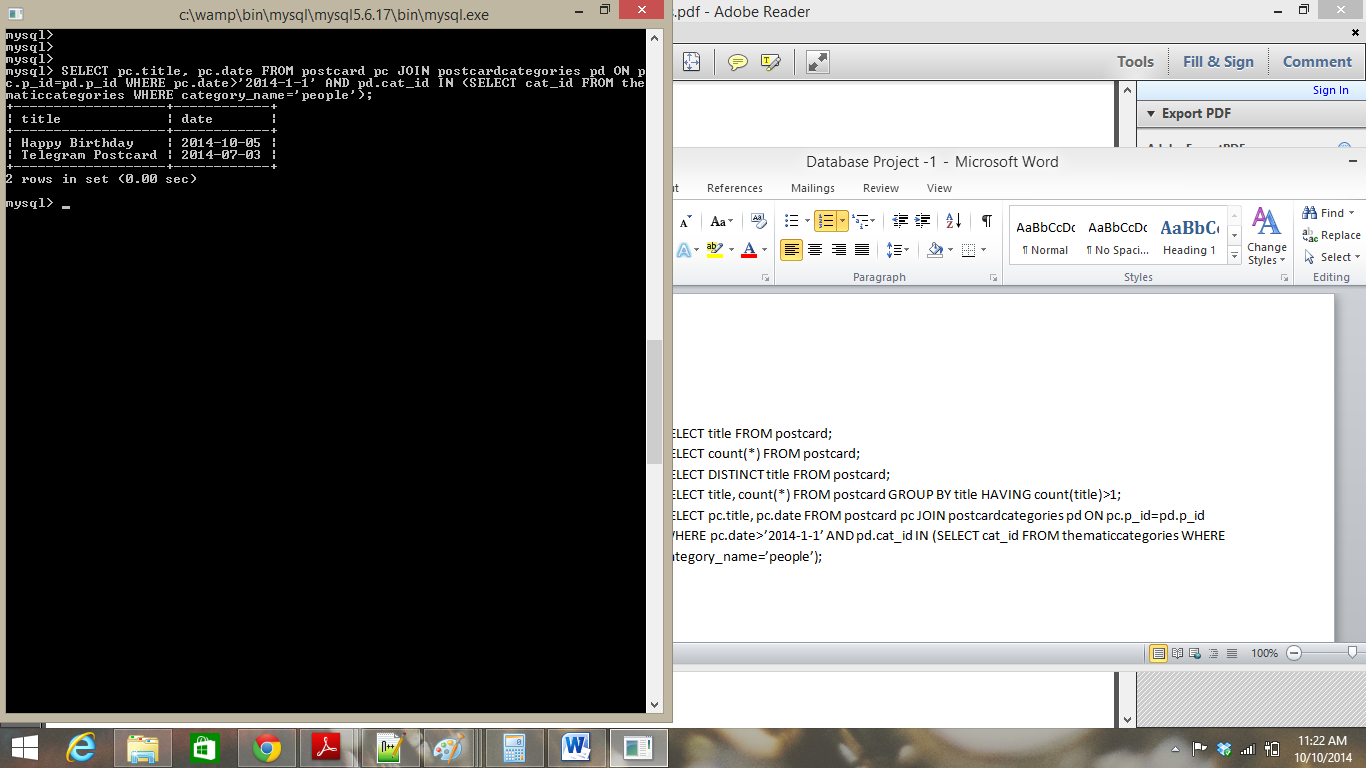
1. SELECT title, count(\*) FROM postcard GROUP BY title HAVING count(title)=1;



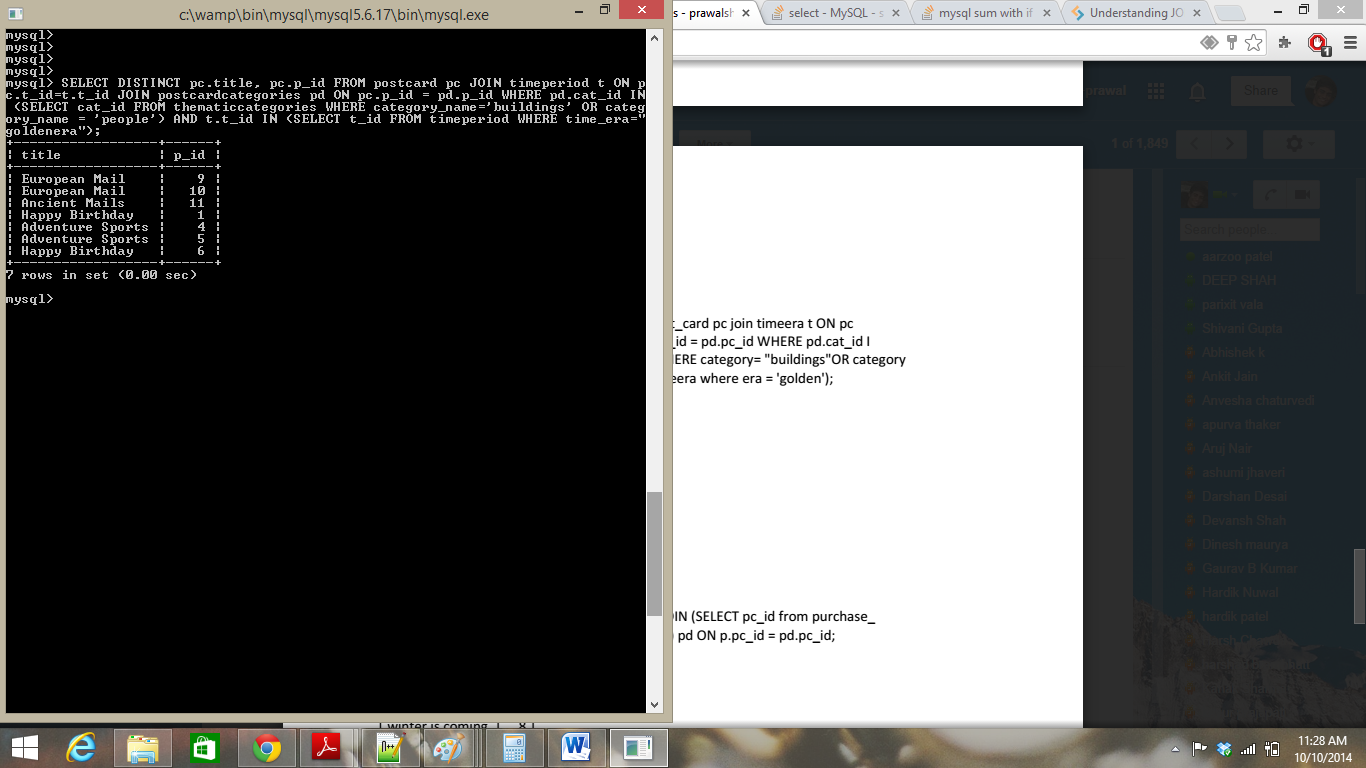
1. SELECT title, count(\*) FROM postcard GROUP BY title HAVING count(title)>1;



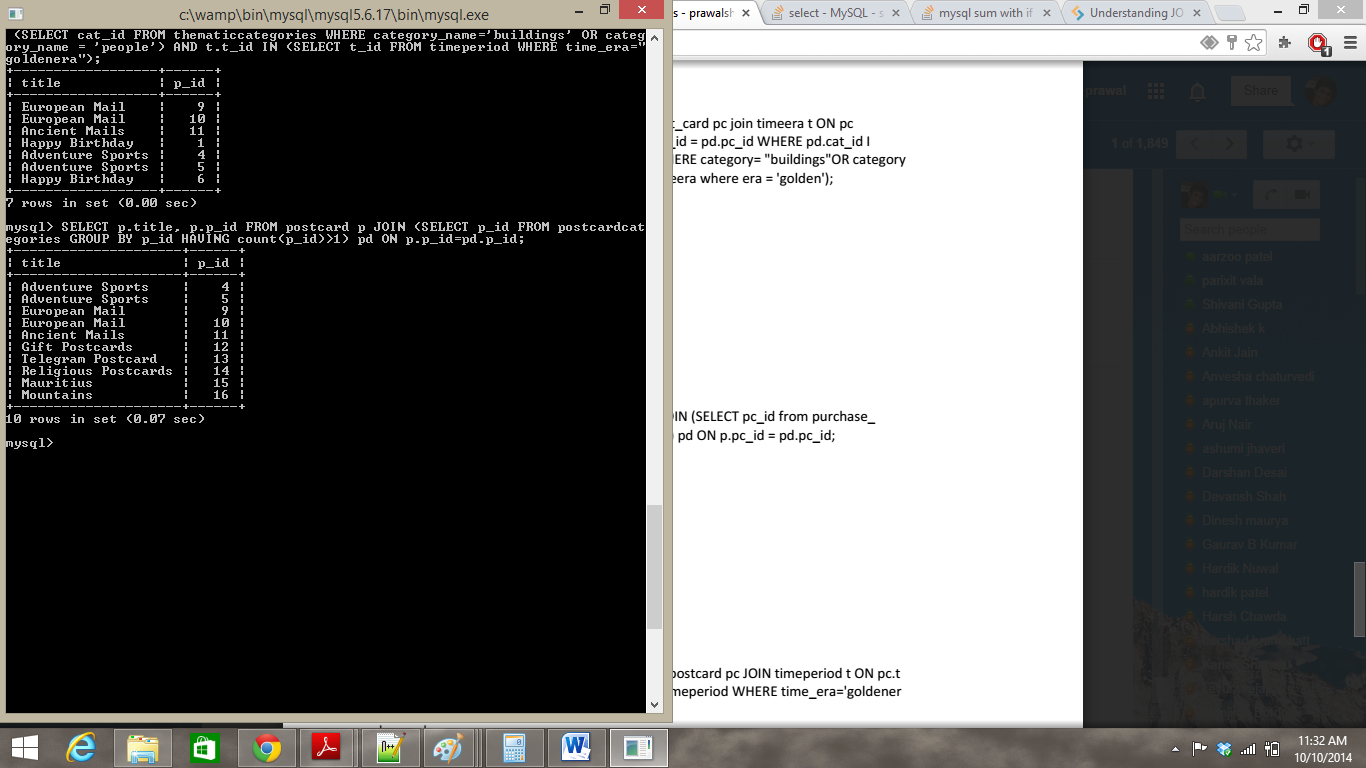
1. SELECT pc.title, pc.date FROM postcard pc JOIN postcardcategories pd ON pc.p\_id=pd.p\_id WHERE pc.date>’2014-1-1’ AND pd.cat\_id IN (SELECT cat\_id FROM thematiccategories WHERE category\_name=’people’);



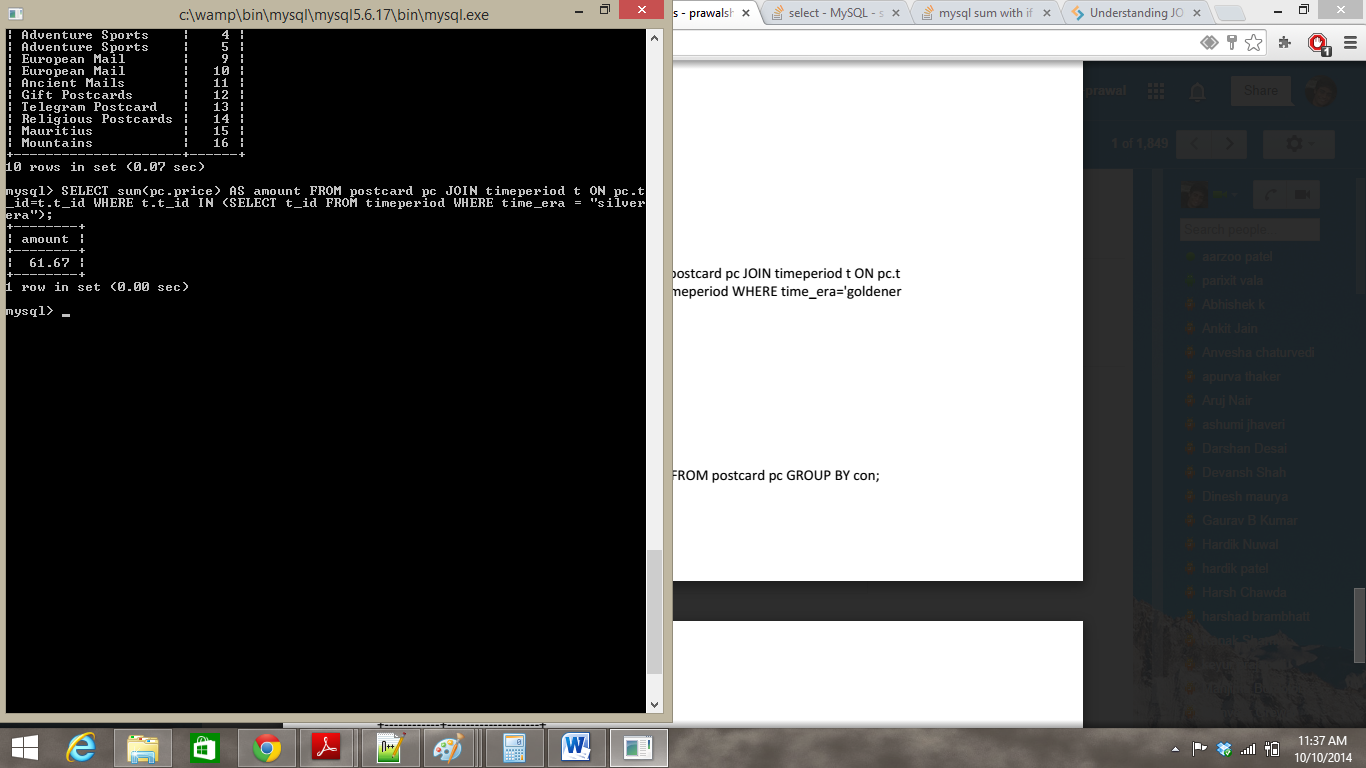
1. SELECT DISTINCT pc.title, pc.p\_id FROM postcard pc JOIN timeperiod t ON pc.t\_id=t.t\_id JOIN postcardcategories pd ON pc.p\_id = pd.p\_id WHERE pd.cat\_id IN (SELECT cat\_id FROM thematiccategories WHERE category\_name='buildings' OR category\_name = 'people') AND t.t\_id IN (SELECT t\_id FROM timeperiod WHERE time\_era="goldenera");



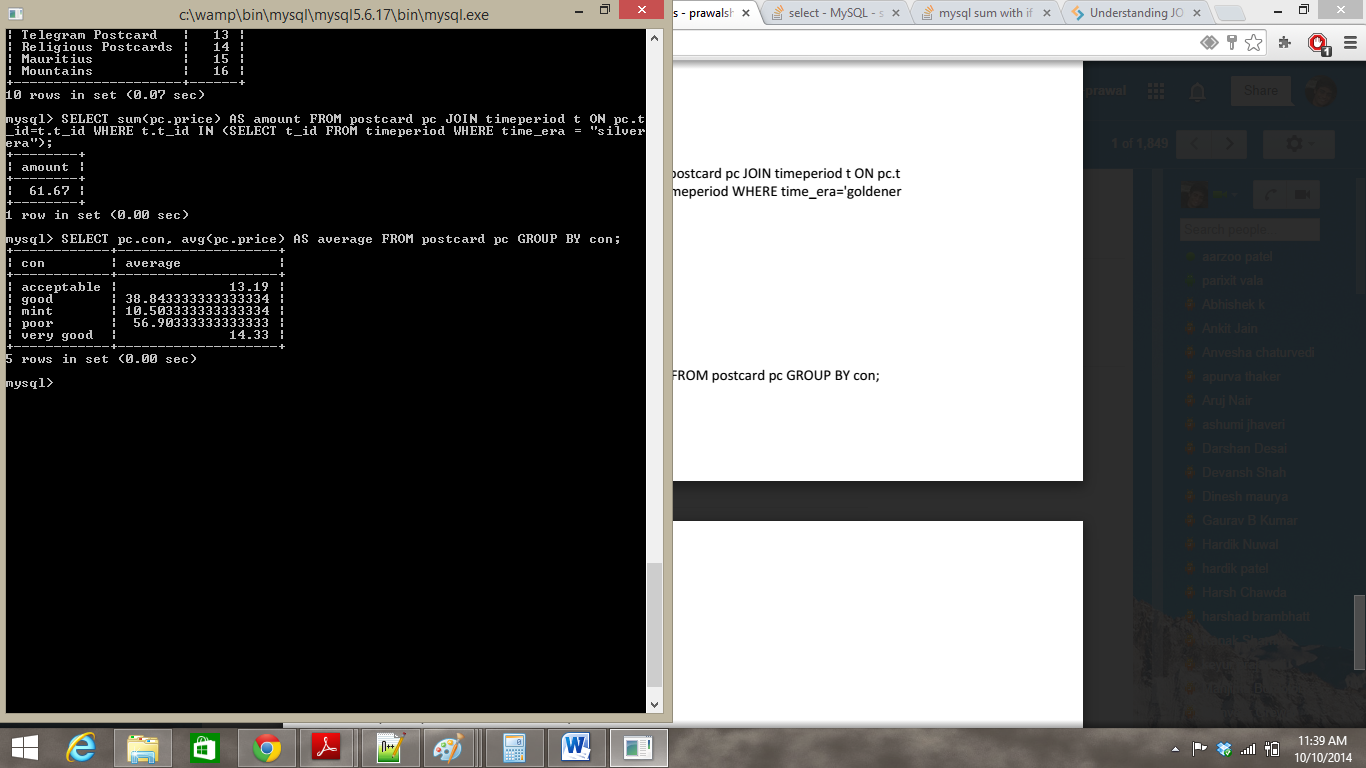
1. SELECT p.title, p.p\_id FROM postcard p JOIN (SELECT p\_id FROM postcardcategories GROUP BY p\_id HAVING count(p\_id)>1) pd ON p.p\_id=pd.p\_id;



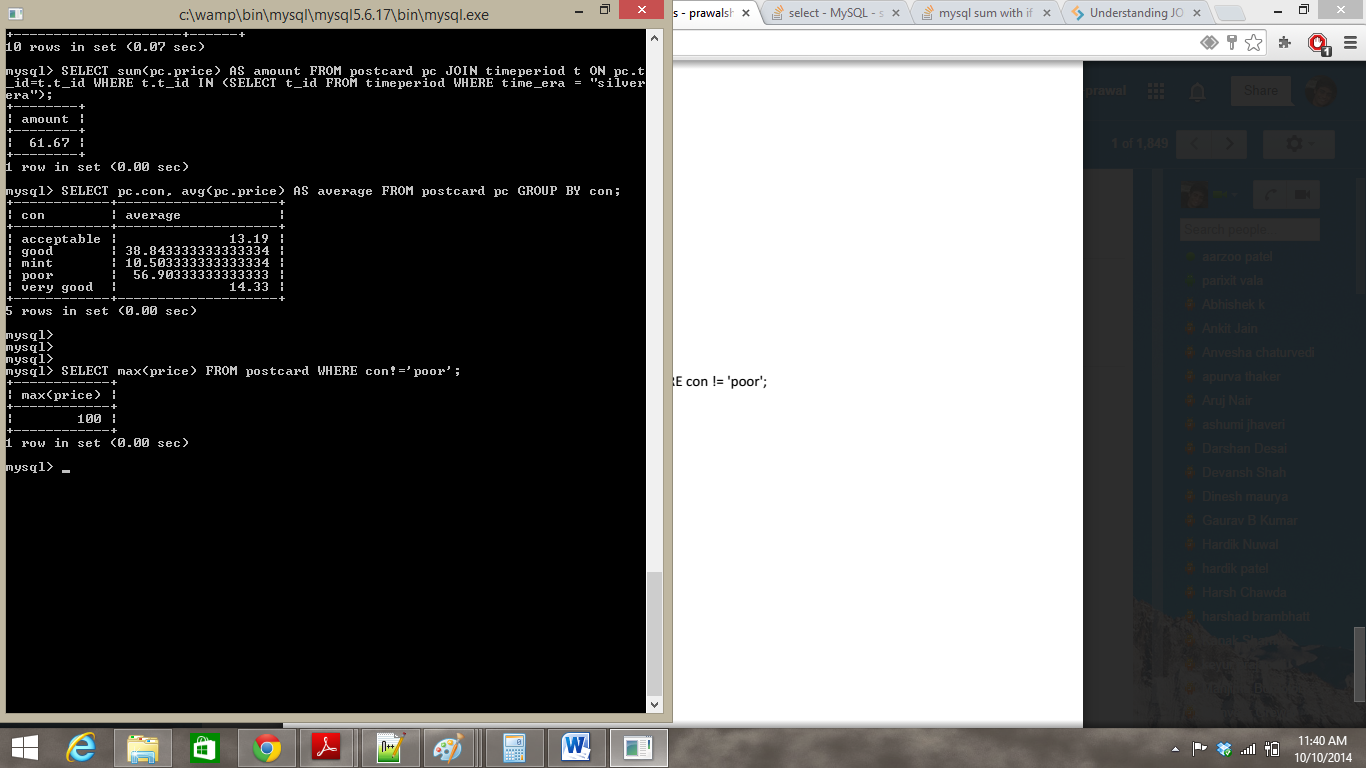
1. SELECT sum(pc.price) AS amount FROM postcard pc JOIN timeperiod t ON pc.t\_id=t.t\_id WHERE t.t\_id IN (SELECT t\_id FROM timeperiod WHERE time\_era = "silverera");



1. SELECT pc.con, avg(pc.price) AS average FROM postcard pc GROUP BY con;

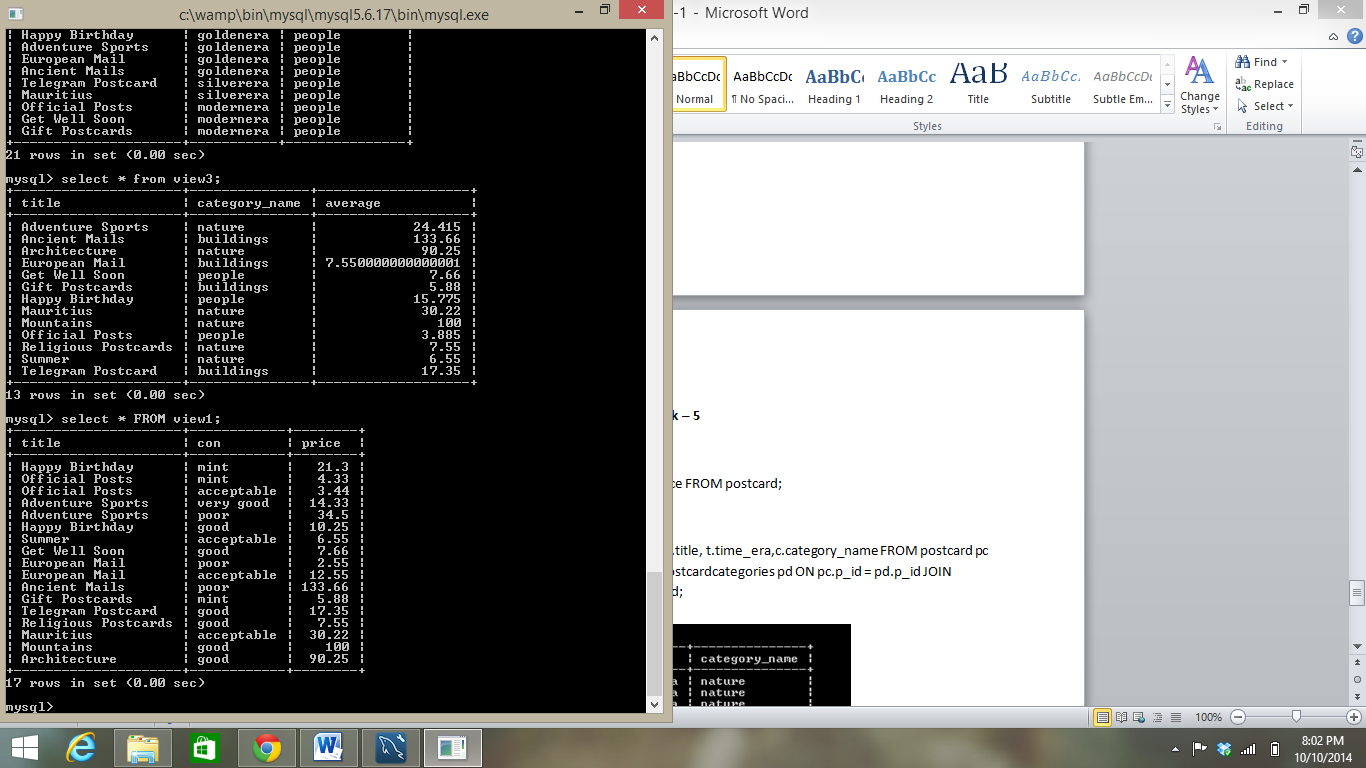


1. SELECT max(price) FROM postcard WHERE con!='poor';

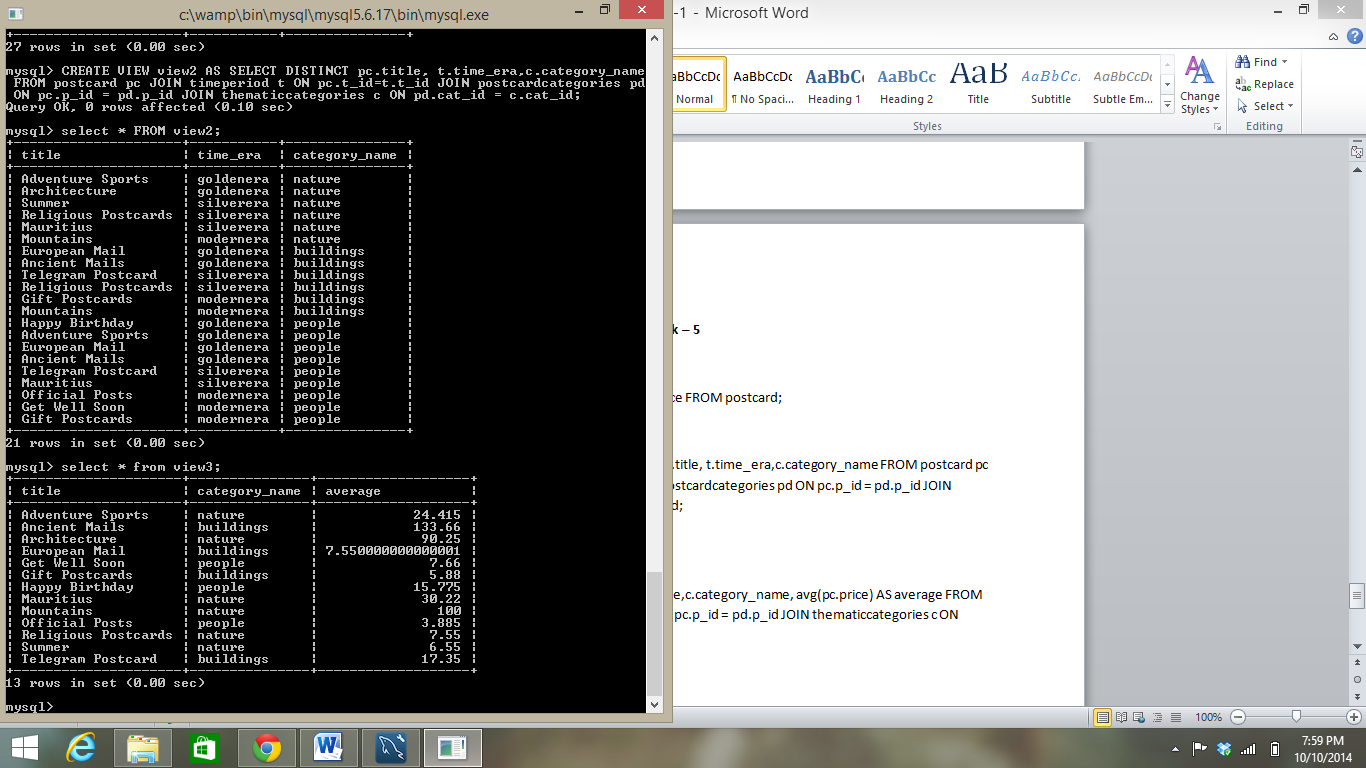


**Task – 5**

1. CREATE VIEW view1 AS SELECT title,con,price FROM postcard;



1. CREATE VIEW view2 AS SELECT DISTINCT pc.title, t.time\_era,c.category\_name FROM postcard pc JOIN timeperiod t ON pc.t\_id=t.t\_id JOIN postcardcategories pd ON pc.p\_id = pd.p\_id JOIN thematiccategories c ON pd.cat\_id = c.cat\_id;



1. CREATE VIEW view3 AS SELECT c.category\_name, avg(p.price) FROM postcard p JOIN postcardcategories pd ON pd.p\_id = p.p\_id JOIN thematiccategories c ON c.cat\_id = pd.cat\_id GROUP BY c.category\_name;

