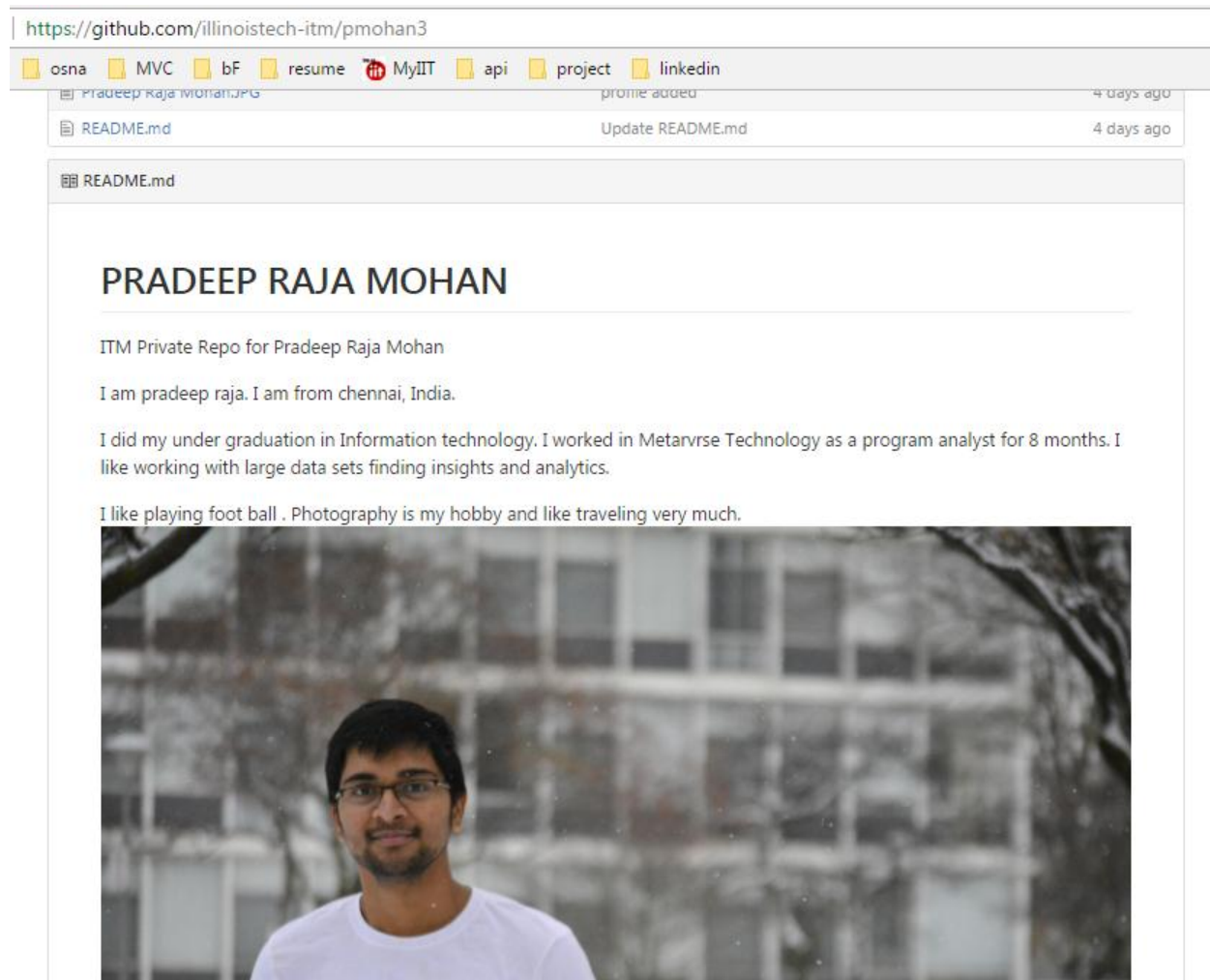# ITMD 521 – Week-02 – Chapter-02 Comparative Assignment

Part 0 – push image and introduction into read.me

- Add the image to the repository to insert the image in the read.me
- Add the introduction in the read.me file
- Use the inline function ![image](image URL) to insert the image.

Part 1: Finding max temperature using shell script.
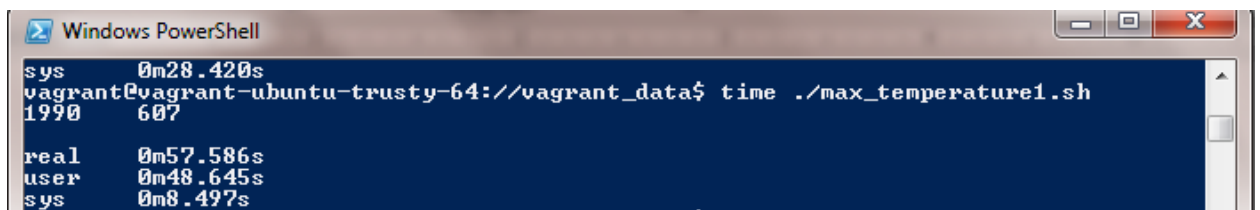
Steps involved:

- Download the temperature data files and add to the vagrant data
- Script to find the maximum temperature:

```
#!/usr/bin/env
bash
            for year in all/1990
            do
              echo -ne `basename $year .gz`"\t"
              gunzip -c $year | \
                awk '{ temp = substr($0, 88, 5) + 0;
                        q = substr($0, 93, 1);
                        if (temp !=9999 && q ~ /[01459]/ && temp > max) max = temp }
                     END { print max }'
            done
```
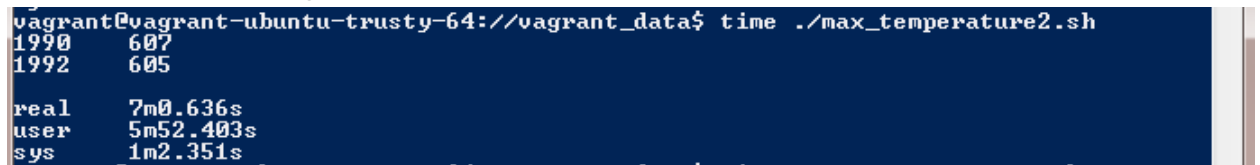
- First run - Run against the 1990 data set
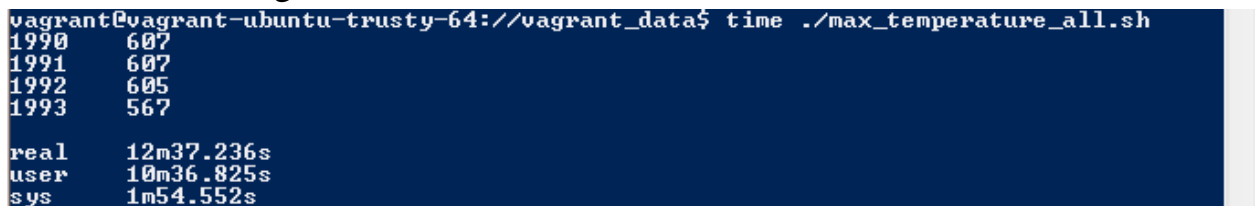
- Second run – Run against the 1990 and 1992

- Third run – Run against the 1990,1991,1992,1993

Graphical representation of time difference:
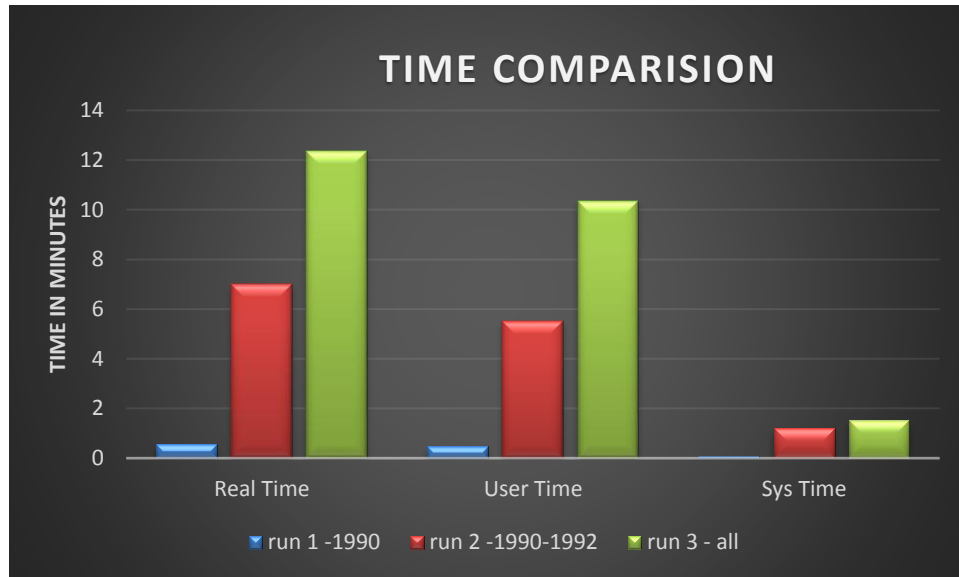
Explanation:
- From all three run, running all the 4 files takes the highest real time, user time and system time. (13minutest to run the task)
- Running only 1990 only takes the lowest time for all the three (1 minute to run)
- Running both 1990 and 1992 takes a real time of 7minutes to complete the task
- SYSTEM MEMORY: 2048MB
- SYSTEM SPEED: 2.53GHz

Part 2:

- Create database and table and run the create script.

```
vagrant@vagrant-ubuntu-trusty-64://vagrant_data$ ./create.sh
Enter password:
vagrant@vagrant-ubuntu-trusty-64://vagrant_data$
```

- Check the database the schema is created

```
mysql> use temperature_year
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> show tables;
+--------------------------+
| Tables_in_temperature_year |
+--------------------------+
| year1                    |
| year2                    |
| year3                    |
+--------------------------+
3 rows in set (0.00 sec)

mysql> desc year1;
+--------------+-------------+------+-----+---------+-------+
| Field        | Type        | Null | Key | Default | Extra |
+--------------+-------------+------+-----+---------+-------+
| station      | int(21)     | YES  |     | NULL    |       |
| weather_stn  | int(20)     | YES  |     | NULL    |       |
| obshr        | int(20)     | YES  |     | NULL    |       |
| lat          | varchar(20) | YES  |     | NULL    |       |
| longi        | varchar(20) | YES  |     | NULL    |       |
| elevation    | varchar(20) | YES  |     | NULL    |       |
| w_direct     | int(20)     | YES  |     | NULL    |       |
| q_code       | int(20)     | YES  |     | NULL    |       |
| v_dist       | int(20)     | YES  |     | NULL    |       |
| atm_pressure | int(20)     | YES  |     | NULL    |       |
| year         | int(25)     | YES  |     | NULL    |       |
| temp         | int(10)     | YES  |     | NULL    |       |
+--------------+-------------+------+-----+---------+-------+
12 rows in set (0.00 sec)
```

- Run Java files to insert the data into all three tables year1, year2, year3.
  Substring.java → insert 1990 into table year1
  Substring1.java → insert 1990 and 1992 into table year2
  Substring2.java → insert 1990,1991,1992,1993 into table year3

- Sample screen short while inserting data in the database:

Select Windows PowerShell

data inserted into year1 table
242377
00668384009999919990040208004-25517-049167FM-15+0908SBCT V0202201N00211002101CN0112001N1+01901+01901999999ADDAG10999GA108
1+002109059MA1101901091421MW1101EQDQ01+999990APOSP
data inserted into year1 table
242378
01148384009999919990040209004-25517-049167SY-MT+0908SBCT V0203501N00261001501CN0050001N1+01871+01861101491ADDAA106000091A
G10999AY121031AY221031GA1081+001509079GF1089910810610015019999999MA1102001091481MD1310021+9999MW1101
data inserted into year1 table
242379
00668384009999919990040210004-25517-049167FM-15+0908SBCT V0209991C00001001501CN0040001N1+01801+01801999999ADDAG10999GA108
1+001509079MA1102001091511MW1101EQDQ01+999990APOSP
data inserted into year1 table
242380
00668384009999919990040211004-25517-049167FM-15+0908SBCT V0203601N00151001801CN0030001N1+01901+01801999999ADDAG10999GA108
1+001809079MA1102101091601MW1101EQDQ01+999990APOSP
data inserted into year1 table
242381
01638384009999919990040212004-25517-049167SY-MT+0908SBCT V0203401N00151002701CN0080001N1+02051+01851101511ADDAA106000091A
G10999AY121061AY221061GA1051+002709059GA2071+030009039GF1079910510510025010310016IKA1240N+01781MA1102101091561MD1310051+99
99MW1101REMSYN011333 20178
data inserted into year1 table
242382
00828384009999919990040213004-25517-049167FM-15+0908SBCT V0203101N00211030001CN0080001N1+02201+01901999999ADDAG10999GA101
1+003009059GA2071+030009039MA1102101091601MW1101EQDQ01+999990APOSP
data inserted into year1 table
242383
00668384009999919990040214004-25517-049167FM-15+0908SBCT V0202801N00261027001CN0080001N1+02301+01901999999ADDAG10999GA107
1+027009039MA1102001091511MW1051EQDQ01+999990APOSP
data inserted into year1 table
242384
01308384009999919990040215004-25517-049167SY-MT+0908SBCT V0202801N00211030001CN0090001N1+02501+01951101441ADDAA106000091A
G19011AY121031AY221031GA1061+030009039GA2071+060009009GF1079910610010199999999031021MA1102001091471MD1810061+9999MW1051
data inserted into year1 table
242385
00988384009999919990040216004-25517-049167FM-15+0908SBCT V0203101N00361060001CN0112001N1+02701+02001999999ADDAG10999GA101
1+006009089GA2031+030009039GA3061+060009009MA1101801091321MW1051EQDQ01+999990APOSP
data inserted into year1 table
242386
00928384009999919990040217004-25517-049167FM-15+0908SBCT V0203101N00461060001CN0112001N1+02801+01901999999ADDAG10999GA102
1+007509089GA2061+060009009MA1101691091231EQDQ01+999990APOSP Q02+000000PRSWM2
data inserted into year1 table
242387
01338384009999919990040218004-25517-049167SY-MT+0908SBCT V0203001N00411060001CN0200001N1+02781+01801101071ADDAA106000091A
G10999GA1031+009009089GA2061+060009009GF1079910310210080010010211MA1101691091201MD1610291+9999MW1001EQDQ01+000000PRSWM2
data inserted into year1 table

- Year1 - Table in database and Its contents.

Windows PowerShell

mysql> select * from year1 LIMiT 50;

station	weather_stn	obshr	lat	longi	elevation	w_direct	q_code	v_dist	atm_pressure	year	temp
830950	99999	1200	-10983	-037067	+0009		150	1	20000	10196	1990	278
830950	99999	1300	-10983	-037067	+0009		160	1	11200	99999	1990	280
830950	99999	1400	-10983	-037067	+0009		170	1	11200	99999	1990	290
830950	99999	1500	-10983	-037067	+0009		180	1	11200	99999	1990	280
830950	99999	1700	-10983	-037067	+0009		190	1	11200	99999	1990	280
830950	99999	1800	-10983	-037067	+0009		200	1	20000	10172	1990	282
830950	99999	1900	-10983	-037067	+0009		170	1	11200	99999	1990	280
830950	99999	2000	-10983	-037067	+0009		160	1	11200	99999	1990	270
830950	99999	2100	-10983	-037067	+0009		160	1	20000	10176	1990	262
830950	99999	2200	-10983	-037067	+0009		180	1	11200	99999	1990	250
830950	99999	2300	-10983	-037067	+0009		150	1	11200	99999	1990	250
830950	99999	0	-10983	-037067	+0009		180	1	20000	10184	1990	252
830950	99999	100	-10983	-037067	+0009		160	1	11200	99999	1990	250
830950	99999	200	-10983	-037067	+0009		999	1	11200	99999	1990	250
830950	99999	300	-10983	-037067	+0009		999	1	20000	10182	1990	252
830950	99999	400	-10983	-037067	+0009		999	1	11200	99999	1990	250
830950	99999	500	-10983	-037067	+0009		999	1	11200	99999	1990	250
830950	99999	600	-10983	-037067	+0009		999	1	11200	99999	1990	250
830950	99999	700	-10983	-037067	+0009		999	1	11200	99999	1990	250
830950	99999	800	-10983	-037067	+0009		999	1	11200	99999	1990	250
830950	99999	900	-10983	-037067	+0009		999	1	20000	10174	1990	248
830950	99999	1000	-10983	-037067	+0009		999	1	11200	99999	1990	220
830950	99999	1100	-10983	-037067	+0009		280	1	11200	99999	1990	240
830950	99999	1200	-10983	-037067	+0009		130	1	20000	10190	1990	270
830950	99999	1400	-10983	-037067	+0009		130	1	11200	99999	1990	280

- Year2 - Table in database and Its contents.


```
mysql> select * from year2 LIMiT 50;
+---------+-------------+-------+--------+---------+-----------+----------+--------+--------+--------------+------+------+
| station | weather_stn | obshr | lat    | longi   | elevation | w_direct | q_code | v_dist | atm_pressure | year | temp |
+---------+-------------+-------+--------+---------+-----------+----------+--------+--------+--------------+------+------+
| 830950  |       99999 |  1200 | -10983 | -037067 | +0009     |      150 |      1 |  20000 |        10196 | 1990 |  278 |
| 830950  |       99999 |  1300 | -10983 | -037067 | +0009     |      160 |      1 |  11200 |        99999 | 1990 |  280 |
| 830950  |       99999 |  1400 | -10983 | -037067 | +0009     |      170 |      1 |  11200 |        99999 | 1990 |  290 |
| 830950  |       99999 |  1500 | -10983 | -037067 | +0009     |      180 |      1 |  11200 |        99999 | 1990 |  280 |
| 830950  |       99999 |  1700 | -10983 | -037067 | +0009     |      190 |      1 |  11200 |        99999 | 1990 |  280 |
| 830950  |       99999 |  1800 | -10983 | -037067 | +0009     |      200 |      1 |  20000 |        10172 | 1990 |  282 |
| 830950  |       99999 |  1900 | -10983 | -037067 | +0009     |      170 |      1 |  11200 |        99999 | 1990 |  280 |
| 830950  |       99999 |  2000 | -10983 | -037067 | +0009     |      160 |      1 |  11200 |        99999 | 1990 |  270 |
| 830950  |       99999 |  2100 | -10983 | -037067 | +0009     |      160 |      1 |  20000 |        10176 | 1990 |  262 |
| 830950  |       99999 |  2200 | -10983 | -037067 | +0009     |      180 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |  2300 | -10983 | -037067 | +0009     |      150 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |     0 | -10983 | -037067 | +0009     |      180 |      1 |  20000 |        10184 | 1990 |  252 |
| 830950  |       99999 |   100 | -10983 | -037067 | +0009     |      160 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |   200 | -10983 | -037067 | +0009     |      999 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |   300 | -10983 | -037067 | +0009     |      999 |      1 |  20000 |        10182 | 1990 |  252 |
| 830950  |       99999 |   400 | -10983 | -037067 | +0009     |      999 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |   500 | -10983 | -037067 | +0009     |      999 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |   600 | -10983 | -037067 | +0009     |      999 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |   700 | -10983 | -037067 | +0009     |      999 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |   800 | -10983 | -037067 | +0009     |      999 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |   900 | -10983 | -037067 | +0009     |      999 |      1 |  20000 |        10174 | 1990 |  248 |
| 830950  |       99999 |  1000 | -10983 | -037067 | +0009     |      999 |      1 |  11200 |        99999 | 1990 |  220 |
| 830950  |       99999 |  1100 | -10983 | -037067 | +0009     |      280 |      1 |  11200 |        99999 | 1990 |  240 |
| 830950  |       99999 |  1200 | -10983 | -037067 | +0009     |      130 |      1 |  20000 |        10190 | 1990 |  270 |
| 830950  |       99999 |  1400 | -10983 | -037067 | +0009     |      130 |      1 |  11200 |        99999 | 1990 |  280 |
```

- Year3:


```
mysql> select * from year3 LIMiT 50;
+---------+-------------+-------+--------+---------+-----------+----------+--------+--------+--------------+------+------+
| station | weather_stn | obshr | lat    | longi   | elevation | w_direct | q_code | v_dist | atm_pressure | year | temp |
+---------+-------------+-------+--------+---------+-----------+----------+--------+--------+--------------+------+------+
| 830950  |       99999 |  1200 | -10983 | -037067 | +0009     |      150 |      1 |  20000 |        10196 | 1990 |  278 |
| 830950  |       99999 |  1300 | -10983 | -037067 | +0009     |      160 |      1 |  11200 |        99999 | 1990 |  280 |
| 830950  |       99999 |  1400 | -10983 | -037067 | +0009     |      170 |      1 |  11200 |        99999 | 1990 |  290 |
| 830950  |       99999 |  1500 | -10983 | -037067 | +0009     |      180 |      1 |  11200 |        99999 | 1990 |  280 |
| 830950  |       99999 |  1700 | -10983 | -037067 | +0009     |      190 |      1 |  11200 |        99999 | 1990 |  280 |
| 830950  |       99999 |  1800 | -10983 | -037067 | +0009     |      200 |      1 |  20000 |        10172 | 1990 |  282 |
| 830950  |       99999 |  1900 | -10983 | -037067 | +0009     |      170 |      1 |  11200 |        99999 | 1990 |  280 |
| 830950  |       99999 |  2000 | -10983 | -037067 | +0009     |      160 |      1 |  11200 |        99999 | 1990 |  270 |
| 830950  |       99999 |  2100 | -10983 | -037067 | +0009     |      160 |      1 |  20000 |        10176 | 1990 |  262 |
| 830950  |       99999 |  2200 | -10983 | -037067 | +0009     |      180 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |  2300 | -10983 | -037067 | +0009     |      150 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |     0 | -10983 | -037067 | +0009     |      180 |      1 |  20000 |        10184 | 1990 |  252 |
| 830950  |       99999 |   100 | -10983 | -037067 | +0009     |      160 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |   200 | -10983 | -037067 | +0009     |      999 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |   300 | -10983 | -037067 | +0009     |      999 |      1 |  20000 |        10182 | 1990 |  252 |
| 830950  |       99999 |   400 | -10983 | -037067 | +0009     |      999 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |   500 | -10983 | -037067 | +0009     |      999 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |   600 | -10983 | -037067 | +0009     |      999 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |   700 | -10983 | -037067 | +0009     |      999 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |   800 | -10983 | -037067 | +0009     |      999 |      1 |  11200 |        99999 | 1990 |  250 |
| 830950  |       99999 |   900 | -10983 | -037067 | +0009     |      999 |      1 |  20000 |        10174 | 1990 |  248 |
| 830950  |       99999 |  1000 | -10983 | -037067 | +0009     |      999 |      1 |  11200 |        99999 | 1990 |  220 |
| 830950  |       99999 |  1100 | -10983 | -037067 | +0009     |      280 |      1 |  11200 |        99999 | 1990 |  240 |
| 830950  |       99999 |  1200 | -10983 | -037067 | +0009     |      130 |      1 |  20000 |        10190 | 1990 |  270 |
| 830950  |       99999 |  1400 | -10983 | -037067 | +0009     |      130 |      1 |  11200 |        99999 | 1990 |  280 |
```

- Run time for each table to find the maximum temperature

Run against table - year1 (1990) --

```
vagrant@vagrant-ubuntu-trusty-64://vagrant_data/all$ javac analysis.java
Picked up _JAVA_OPTIONS: -Xmx4096m
vagrant@vagrant-ubuntu-trusty-64://vagrant_data/all$ java analysis
Picked up _JAVA_OPTIONS: -Xmx4096m
Connected to the database temperature
Maximum temperature : 607


Time taken :     6800 ms
vagrant@vagrant-ubuntu-trusty-64://vagrant_data/all$
```

Run against table – year2 (1990,1992)

```
vagrant@vagrant-ubuntu-trusty-64://vagrant_data/all$ javac analysis.java
Picked up _JAVA_OPTIONS: -Xmx4096m
vagrant@vagrant-ubuntu-trusty-64://vagrant_data/all$ java analysis
Picked up _JAVA_OPTIONS: -Xmx4096m
Connected to the database temperature
Maximum temperature

1990 : 607
1992 : 605


Time taken :     18600 ms
vagrant@vagrant-ubuntu-trusty-64://vagrant_data/all$
```

Run against table – year3 (1990,1991,1993,1992)

```
vagrant@vagrant-ubuntu-trusty-64://vagrant_data/all$ javac analysis.java
Picked up _JAVA_OPTIONS: -Xmx4096m
vagrant@vagrant-ubuntu-trusty-64://vagrant_data/all$ java analysis
Picked up _JAVA_OPTIONS: -Xmx4096m
Connected to the database temperature
Maximum temperature

1990 : 607
1991 : 607
1992 : 605
1993 : 567


Time taken :     31200 ms
vagrant@vagrant-ubuntu-trusty-64://vagrant_data/all$
```

- Graph that represents the time taken for each data set is shown.
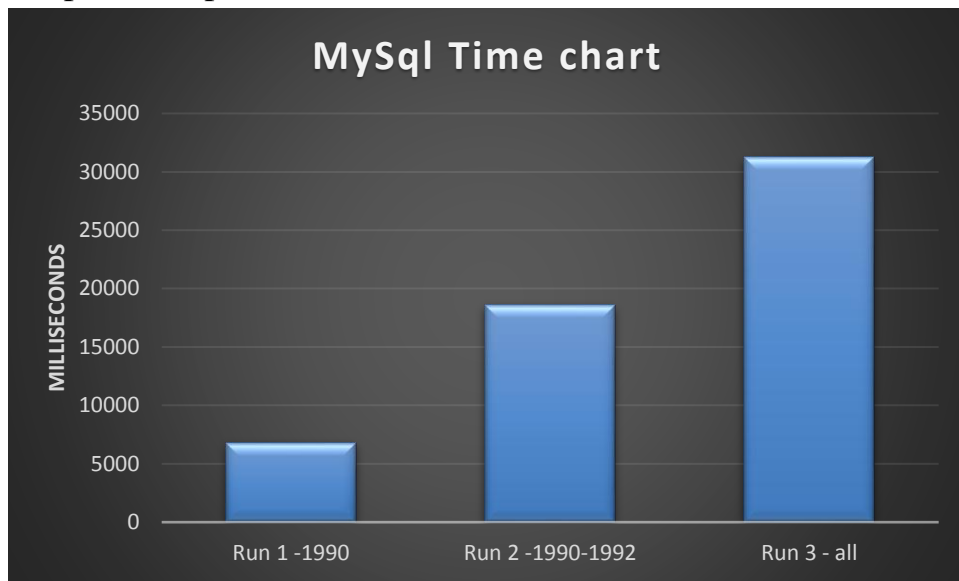
RAM: 4086MB (vagrant memory)

System speed: 2.53Ghz

Analytics:
- Running the same file using shell script takes much more time than running in Mysql
- MySql is much faster than normal unix file system