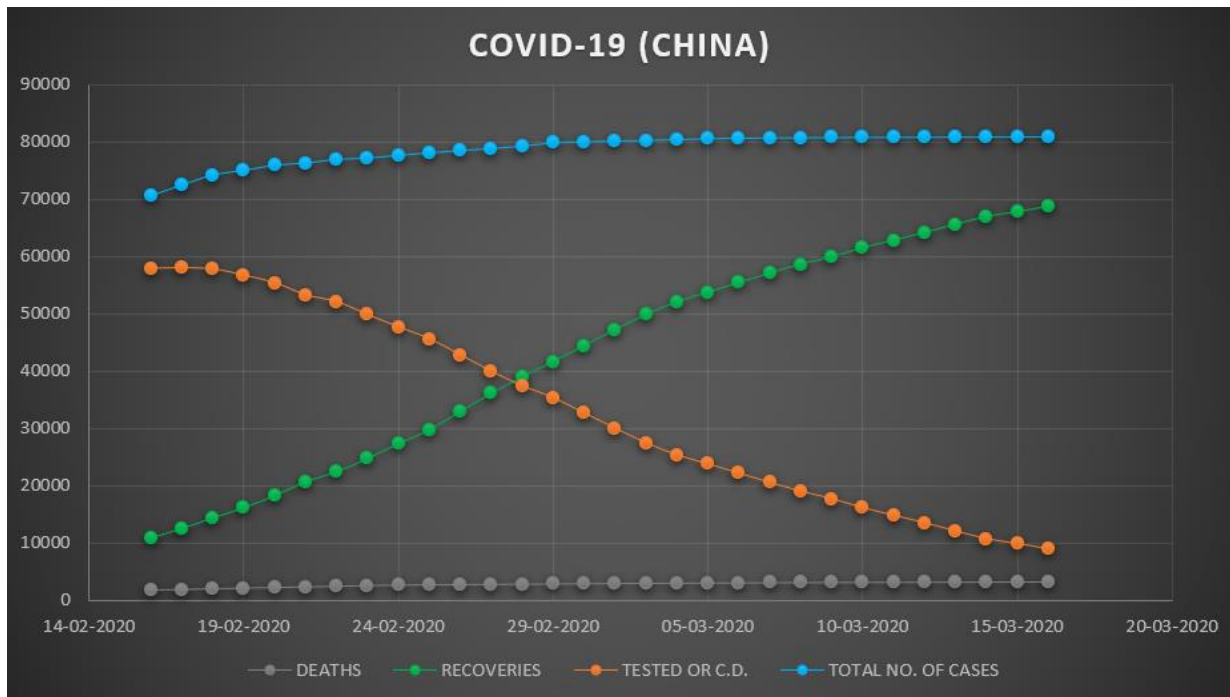


Division Two

After the execution of code we get the present day total cases and we draw certain outcomes in Excel like creating graph and counting:



We could get a graph in a quick way but, counting and calculation is a big task in excel file as it deals with large data set inefficiently and has a higher possibility of making accidental changes in data. So, we use SQL to implement further calculations as it gives us more accurate options to analyse the data.

Hence, we create SQL table count the number of dates, get averages, minimum and maximum (Basic Mathematics). Also, we introduce one more concept of **Discrete Mathematics : Set Theory** and get various outcomes shown below:

```
SELECT * from corona;
SELECT COUNT(Dates) from corona;
SELECT AVG(Total_cases) from corona;
SELECT AVG(recovered_cases) from corona;
SELECT AVG(deaths) from corona;
SELECT MIN(Total_cases) FROM corona;
```

Output:

```
Result
$sqlite3 database.sdb < main.sql
16-02-2020|70548|10844|1770|57934
17-02-2020|72436|12545|1868|58023
18-02-2020|74185|14376|2004|58023
19-02-2020|75002|16155|2118|56729
20-02-2020|75891|18264|2236|55391
21-02-2020|76288|20659|2345|53284
22-02-2020|76936|22410|2443|52092
23-02-2020|77150|24734|2592|49824
24-02-2020|78064|27323|2663|47672
25-02-2020|78497|29745|2715|45604
26-02-2020|78497|32945|2744|42808
27-02-2020|78824|36117|2788|39919
28-02-2020|79251|39002|2835|37414
29-02-2020|79824|41625|2870|35329
01-03-2020|80026|44462|2912|32652
02-03-2020|80151|47204|2943|30004
03-03-2020|80270|49856|2981|27433
04-03-2020|80409|52045|3021|25352
05-03-2020|80552|53726|3042|23784
06-03-2020|80651|55404|3070|22177
07-03-2020|80651|57065|3097|20533
08-03-2020|80695|58600|3119|19016
09-03-2020|80754|59897|3136|17721
10-03-2020|80778|61475|3158|16145
11-03-2020|80793|62793|3169|14831
12-03-2020|80813|64111|3176|13526
13-03-2020|80824|65541|3189|12094
14-03-2020|80844|66911|3199|10734
15-03-2020|80860|67749|3213|9898
16-03-2020|80881|68679|3226|8976
30
78711.5
42742.06666666667
2788.066666666667
70548
```

Introducing Set Theory in SQL: we take two sets A and B containing the data from the resource and then we translate this data of two sets A and B into two tables. Then we perform set operators such as Union, Intersect and Difference.

Here is the SQL code:

```

Execute | > Share | main.sql | STDIN
1 CREATE TABLE A (Dates VARCHAR(20),Total_cases NUMBER(8),recovered_cases NUMBER(8),deaths
  NUMBER(6), Tested_cd NUMBER(8));
2
3 INSERT INTO A VALUES("16-02-2020",70548,10844,1770,57934);
4 INSERT INTO A VALUES("17-02-2020",72436,12545,1868,58023);
5 INSERT INTO A VALUES("18-02-2020",74185,14376,2004,58023);
6 INSERT INTO A VALUES("19-02-2020",75002,16155,2118,56729);
7 INSERT INTO A VALUES("20-02-2020",75891,18264,2236,55391);
8 INSERT INTO B VALUES("21-02-2020",76288,20659,2345,53284);
9
10 SELECT * FROM A;
11
12 CREATE TABLE B (Dates VARCHAR(20),Total_cases NUMBER(8),recovered_cases NUMBER(8),deaths
  NUMBER(6), Tested_cd NUMBER(8));
13
14 INSERT INTO B VALUES("21-02-2020",76288,20659,2345,53284);
15 INSERT INTO B VALUES("22-02-2020",76936,22410,2443,52092);
16 INSERT INTO B VALUES("23-02-2020",77150,24734,2592,49824);
17 INSERT INTO B VALUES("24-02-2020",78064,27323,2663,47672);
18 INSERT INTO B VALUES("25-02-2020",78497,29745,2715,45604);
19
20 SELECT * FROM B;
21
22 SELECT * FROM A WHERE deaths>2000 AND deaths<2500 UNION SELECT * FROM B WHERE deaths>2000
  AND deaths<2500;
23
24 SELECT * FROM A CROSS JOIN B;
25
26 SELECT * FROM A WHERE Total_cases>75000 INTERSECT SELECT * FROM B WHERE Total_cases>75000;
27
28 SELECT * FROM A WHERE recovered_cases >14000 EXCEPT SELECT * FROM B WHERE recovered_cases
  <25000;

```

Output:

SET A in SQL in the form of table:

16-02-2020	70548	10844	1770	57934
17-02-2020	72436	12545	1868	58023
18-02-2020	74185	14376	2004	58023
19-02-2020	75002	16155	2118	56729
20-02-2020	75891	18264	2236	55391
21-02-2020	76288	20659	2345	53284

SET B in SQL in the form of table:

21-02-2020	76288	20659	2345	53284
22-02-2020	76936	22410	2443	52092
23-02-2020	77150	24734	2592	49824
24-02-2020	78064	27323	2663	47672
25-02-2020	78497	29745	2715	45604

UNION operation: - ($A \cup B$)

SELECT * FROM A WHERE deaths>2000 AND deaths<2500 UNION SELECT *
FROM B WHERE deaths>2000 AND deaths<2500;

18-02-2020	74185	14376	2004	58023
19-02-2020	75002	16155	2118	56729
20-02-2020	75891	18264	2236	55391
21-02-2020	76288	20659	2345	53284
22-02-2020	76936	22410	2443	52092

INTERSECTION operation: - $(A \cap B)$

SELECT * FROM A WHERE Total_cases>75000 **INTERSECT** SELECT * FROM B
WHERE Total_cases>75000;

21-02-2020	76288	20659	2345	53284
------------	-------	-------	------	-------

DIFFERENCE operation: - $(A - B)$

SELECT * FROM A WHERE recovered_cases >14000 **EXCEPT** SELECT * FROM
B WHERE recovered_cases <25000;

18-02-2020	74185	14376	2004	58023
19-02-2020	75002	16155	2118	56729
20-02-2020	75891	18264	2236	55391

CARTESIAN PRODUCT operation: - $(A \times B)$

SELECT * FROM A CROSS JOIN B;

16-02-2020	70548	10844	1770	57934	21-02-2020	76288	20659	2345	53284
16-02-2020	70548	10844	1770	57934	22-02-2020	76936	22410	2443	52092
16-02-2020	70548	10844	1770	57934	23-02-2020	77150	24734	2592	49824
16-02-2020	70548	10844	1770	57934	24-02-2020	78064	27323	2663	47672
16-02-2020	70548	10844	1770	57934	25-02-2020	78497	29745	2715	45604
17-02-2020	72436	12545	1868	58023	21-02-2020	76288	20659	2345	53284
17-02-2020	72436	12545	1868	58023	22-02-2020	76936	22410	2443	52092
17-02-2020	72436	12545	1868	58023	23-02-2020	77150	24734	2592	49824
17-02-2020	72436	12545	1868	58023	24-02-2020	78064	27323	2663	47672
17-02-2020	72436	12545	1868	58023	25-02-2020	78497	29745	2715	45604
18-02-2020	74185	14376	2004	58023	21-02-2020	76288	20659	2345	53284
18-02-2020	74185	14376	2004	58023	22-02-2020	76936	22410	2443	52092
18-02-2020	74185	14376	2004	58023	23-02-2020	77150	24734	2592	49824
18-02-2020	74185	14376	2004	58023	24-02-2020	78064	27323	2663	47672
18-02-2020	74185	14376	2004	58023	25-02-2020	78497	29745	2715	45604
19-02-2020	75002	16155	2118	56729	21-02-2020	76288	20659	2345	53284
19-02-2020	75002	16155	2118	56729	22-02-2020	76936	22410	2443	52092
19-02-2020	75002	16155	2118	56729	23-02-2020	77150	24734	2592	49824
19-02-2020	75002	16155	2118	56729	24-02-2020	78064	27323	2663	47672
19-02-2020	75002	16155	2118	56729	25-02-2020	78497	29745	2715	45604
20-02-2020	75891	18264	2236	55391	21-02-2020	76288	20659	2345	53284
20-02-2020	75891	18264	2236	55391	22-02-2020	76936	22410	2443	52092
20-02-2020	75891	18264	2236	55391	23-02-2020	77150	24734	2592	49824
20-02-2020	75891	18264	2236	55391	24-02-2020	78064	27323	2663	47672
20-02-2020	75891	18264	2236	55391	25-02-2020	78497	29745	2715	45604

The output here compares each day with the other.