WEEKLY ACTIVE USERS SUMMARY

Submitted by: Tribhuvan Yakkala

After reading the article thoroughly, I had a look at the data "Active Users (4) (1).xls" file that was provided along with the assignment and performed analysis on it.

$$MAU(t) = new(t) + retained(t) + resurrected(t)$$

$$MAU(t - 1\,month) = retained(t) + churned(t)$$

Fig 1: Formulae

Figure 1 shows the formulae that are required to calculate the Active users in a given period. The formulae in the figure use "MAU(t)" implying the "Monthly Active Users at month **t**", whereas in our case, we calculated the "WAU(t)" implying the "Weekly Active Users at week **t"**.

Let's look at the amount of active users that are present each week. Figure 2 shows the weekly active users from week 1 to week 10. Analysis is done on the whole data i.e. week 1 to week 56, but just to keep it simple, for discussion and calculations, we shall talk about only week 1 to week 10.

w1	1759
w2	1654
w3	1732
w4	2116
w5	2193
w6	2157
w7	2551
w8	2875
w9	2795
w10	2821

Fig 2: WAU from week 1 to week 10

Here, the right column shows the total number of active users present in each week throughout the span of weeks 1 to 10. This data is taken directly from the dataset provided. So, in week 1, there were 1,759 active users, in week 2, there were 1,654 active users and so on.

Now, let's have a look at the definitions I have followed for analysis of the data.

1. New Users: User IDs that haven't shown up in previous weeks and have appeared for the first time in a given week.
2. Retained Users: User IDs that were active in week **t-1** and also in week **t**.
3. Resurrected Users: User IDs that weren't there in week **t-1**, but were active previously and have returned in week **t**.
4. Churned Users: User IDs that were present in week **t-1** but not in week **t**.

Figure 3 shows a numerical illustration for the above defined words from week 2 to week 10. We shall also perform calculations as per the formulae in Fig 1 to verify that the analysis is correct.

Week	New Users	Retained Users	Resurrected Users	Churned Users	Quick Ratio
w2	723	931	0	828	0.873188
w3	645	1000	87	654	1.119266
w4	722	1169	225	563	1.682060
w5	674	1394	125	722	1.106648
w6	489	1479	187	714	0.946779
w7	860	1487	202	668	1.589820
w8	1005	1677	193	872	1.373853
w9	719	1839	237	1036	0.922780
w10	621	1938	262	857	1.030338

Fig 3: Growth Data

Calculations:

w1:

Assuming that all the users in week 1 (w1) are new, there are no resurrected, retained or churned users for w1. So, WAU(w1) = 1,759.

w2:

WAU(w2) = new(w2) + retained(w2) + resurrected(w2) = 723 + 931 + 0 = 1,654
WAU(w2 - 1) = retained(w2) + churned(w2) = 931 + 828
=> WAU(w1) = 1,759 **(verified above)**.

Quick Ratio (w2) = new(w2) + resurrected(w2)/churned(w2) = (723 + 0)/828
= 0.8731

w3:

WAU(w3) = new(w3) + retained(w3) + resurrected(w3) = 645 + 1,000 + 87 = 1,732
WAU(w3 - 1) = retained(w3) + churned(w3) = 1000 + 654
=> WAU(w2) = 1,654 **(verified above)**.

Quick Ratio (w3) = new(w3) + resurrected(w3)/churned(w3) = (645 + 87)/654
= 1.119

w4:

WAU(w4) = new(w4) + retained(w4) + resurrected(w4) = 722 + 1,169 + 225 = 2,116
WAU(w4 - 1) = retained(w4) + churned(w4) = 1169 + 563
=> WAU(w3) = 1732 **(verified above)**.

Quick Ratio (w4) = new(w4) + resurrected(w4)/churned(w4) = (722 + 225)/563
= 1.682

Similarly, all the calculations can be checked. Let's verify for week 10, one last time and move on to the next topic.

w10:

WAU(w10) = new(w10) + retained(w10) + resurrected(w10) = 621 + 1,938 + 262 = 2821
WAU(w10 - 1) = retained(w10) + churned(w10) = 1,938 + 857
=> WAU(w9) = 2,795 **(verified from Fig 2)**.

Quick Ratio (w10) = new(w10) + resurrected(w10)/churned(w10) = (621 + 262)/857
= 1.030

Now, since the calculations have been verified, let's have a look at the WAU Growth Graph.

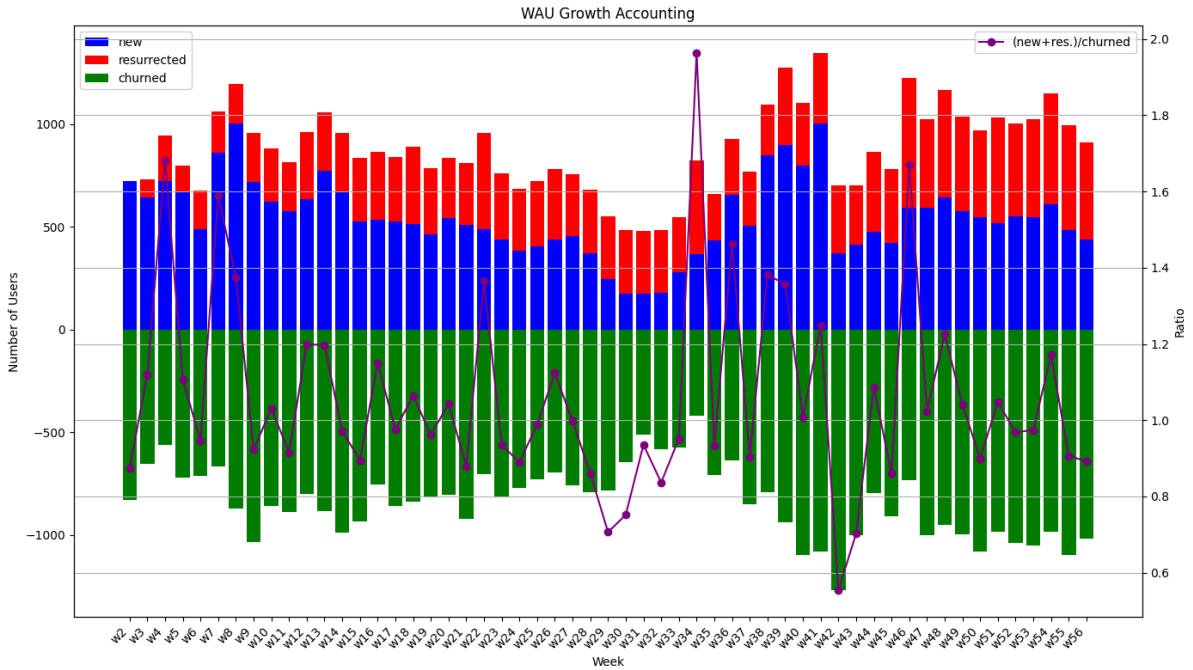

Fig 4: WAU Growth Accounting

Figure 4 is a graphical illustration of the data that was discussed in Figure 3. It shows the growth of the company and also displays the quick ratio line. All the necessary details of the data above can be seen below in Figure 5.

	New Users	Retained Users	Resurrected Users	Churned Users	Quick Ratio
count	55.000000	55.000000	55.000000	55.000000	55.000000
mean	546.636364	2226.672727	328.836364	840.254545	1.063973
std	185.520825	445.656364	115.635565	170.109357	0.260324
min	175.000000	931.000000	0.000000	420.000000	0.553980
25%	437.000000	2081.000000	272.000000	726.500000	0.904918
50%	527.000000	2289.000000	310.000000	828.000000	0.989056
75%	644.000000	2453.000000	383.000000	985.000000	1.160399
max	1006.000000	2825.000000	634.000000	1269.000000	1.964286

Fig 5: WAU growth insights

From the graph and the analysis, we can derive the insights. Let's have a look at the "mean" row that is illustrated in Fig 5. The mean of the quick ratio of weekly active users is seen to be "1.064". Maintaining a quick ratio of above "1" is essential because it shows a healthy growth of the organization as it implies that there are more incoming users (new + resurrected) than that of leaving (churned).
Other insights that can be drawn are, on an average, 2227 users are being retained every week signifying that users are interested to stay.

So, in conclusion, we can say that there is a steady growth that can be seen and maintaining this can lead to a very successful long term growth.