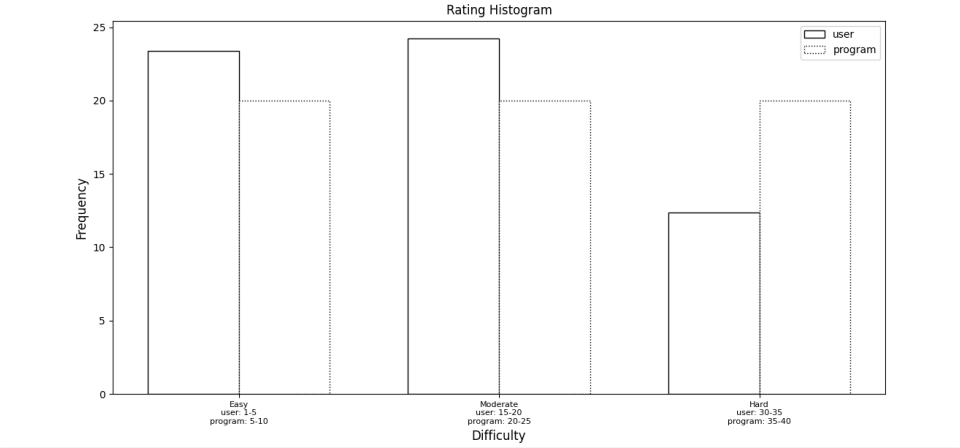
Histogram

Based on the survey it is observed how well a password performed with respect to different users.

To demonstrate the performance of the password a Histogram is plotted based on how many users rated a password as easy moderate or hard. Putting simply how many ratings were easy, moderate, or hard among all the sample space. Then it is compared with the rating provided by the machine algorithm. The Histogram for the same is as follows: -



The x- axis represents the different rating based on the range provided to each rating and the y- axis represents the frequency of each rating as provided by the machine and the user.

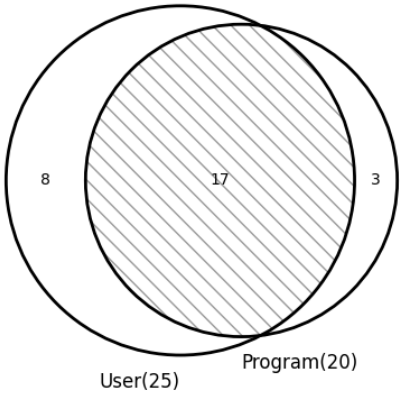
Venn Diagrams

Next based on the how majority of users rated a password, a Venn diagram is plotted representing how many users agreed on the difficulty of a password with respect to the program.

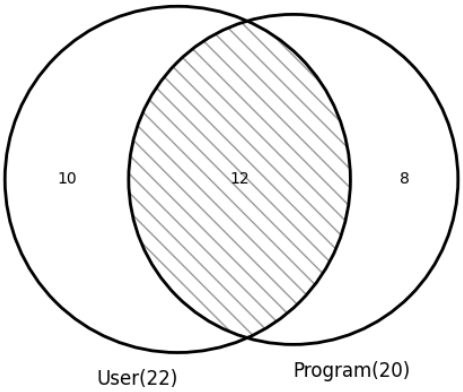
The program has already defined a password to be Easy, Moderate, or Hard, so it was necessary to see how many users agree with the program to test the applicability of the algorithm.

Venn diagram for Easy, Moderate, and Hard are as follows respectively: -

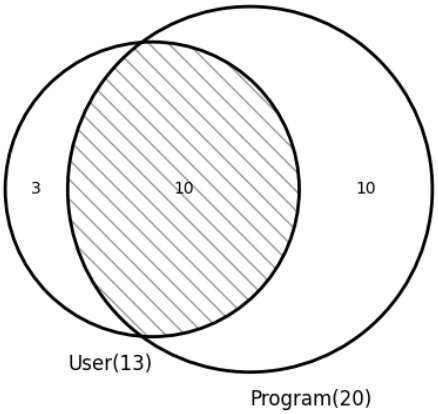
Easy Passwords Venn Diagram



Moderate Passwords Venn Diagram



Hard Passwords Venn Diagram



Scatterplot for Turing Distribution

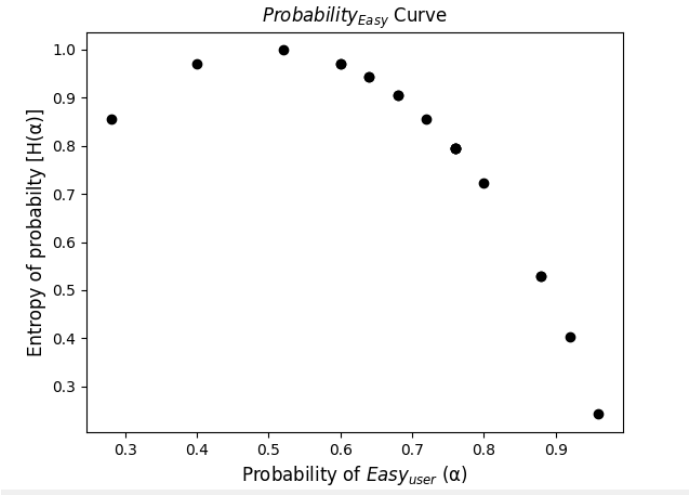
After checking the applicability of the algorithm to provide passwords that can be readily used by the users safely. A plot for Turing separation and Turing closeness is calculated by calculating the agreement and disagreement score of each password that how many users agree with the rating of the password as provided by the programand how many disagreements are there.

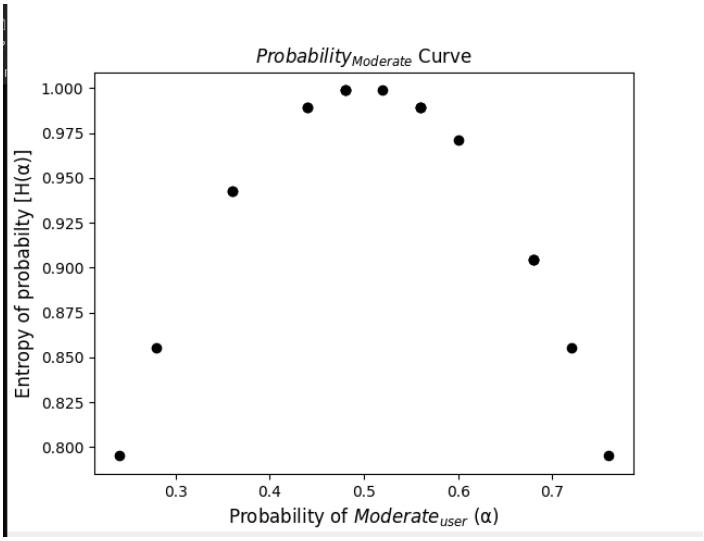
To do so, entropy is calculated for each password taking in account the agreement and disagreement for each by using the formula.

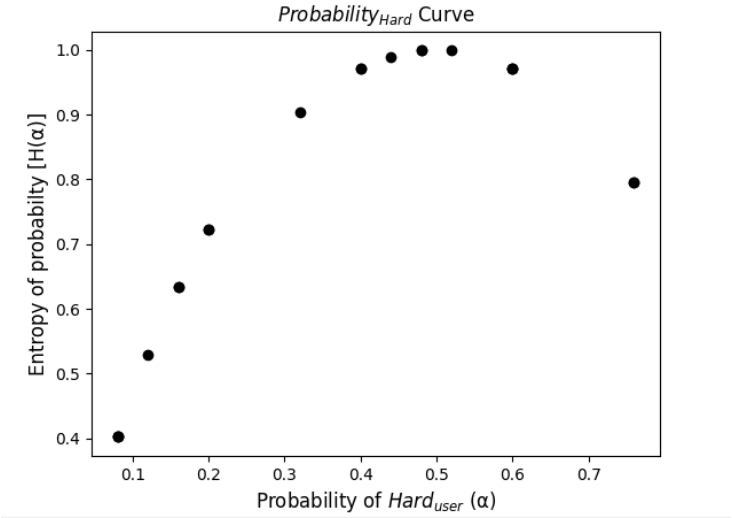
$$(-\alpha(log_2\,\alpha) - (1-\alpha)\,log_2(1-\alpha))$$

Where " α " is the no. of agreements and "(1- α)" is no. of disagreements for each password and a scatter plot is plotted based on the values calculated on basis of how many users agree and disagree with the programfor each password.

The scatter plot for each rating [Easy, Moderate, Hard] is as follows: -







Where x- axis represents the values of "α" calculated for each password and y- axis represents the Entropy thus calculated.