**CMPS 270 Project Report**

* **Bot Strategy:**
* The hard Bot will proceed as follows:
* If the Bot has a chance to finish the game in the beginning, he will do so.
* The Bot will get the available list of words he can choose from, then he will pick the word that gives him the highest probability of winning the game.
* **Example:**
* The user starts picking from the list and he chooses: impedimenta.
* The available Bot words are: accio, aguamenti, alohomora, aparecium, avadaKedavra, avifors, and avis.
* The Bot in this case will examine all his available words and will check the available user words for each word.
* If the bot chooses accio, he will get the available user list of words : obliviate and orchideous.
* The Bot checks the last letter of the user's available words and checks if he can finish the game using a word from the Bot available word list that starts with the ending letter of the user’s word and increments a probability counter by 1.
* So in our example if the user chose "obliviate" we have a word that starts with "e" and ends in "y" which is "episkey", that ends the game due to no other word starting with "y", and we check that from the Tally array that keeps track of the available words that start in each letter of the alphabet.
* In this case we will mark our probability as 1/2 from the available user words

(probability = probability counter / count of user available words).

* We continue to examine "orchideous", and it turns out that we have a word that starts with "s" and ends in "y" which is "scourgify". In this case our probability will be 1 for choosing accio.
* To sum up, the bot will go over his available words and will choose the best word to finish off his opponent by predicting 3 steps further including his current turn (Bot, User, Bot).
* Now in case such a word does not exist (one that will end the game), the Bot will choose the word that will not help the user win the game.
* If the user chooses a word that the bot won't be able to predict his moves further and end the game, the Bot will make sure to choose a word that will prevent the user from winning immediately.
* If the user has a possibility of winning, the Bot will choose the word that has lowest probability of the user winning, for example: if the user starts with "accio", the Bot available words are: "obliviate" and "orchideous", if the bot chooses "obliviate", the user can end the game with "episkey", and if the Bot chooses "orchideous", the user can end the game with "scourgify" or "stupefy", so the probability of user winning if he uses "obliviate" is 1/6 ~ 0.167 and 2/7 ~ 0.286 if he uses "orchideous", so the Bot will choose obliviate.