Problem 2:

Problem Formulation :

- Observed states : Pixel values from the grid
- Hidden States : Characters
- Prior probability : Calculated from the train text file(Basic frequencies)
- Transition probability : Calculated using training text file. Created a dictionary storing tuples as keys and values are their frequencies in the text. Tuple has two characters considered for a transition.
- Emission probability : Calculated using property of independence from Bayes Law. For e.g. $P(P_1,P_2......P_n|Letters)=P(P_1|A).P(P_2|A)...P(P_n|A)$

Working of the Program :

- The program follows general algorithm used to solve sums related to Variable elimination and Viterbi Algorithm
- The functionality of the program is like the one mentioned in report for the problem one. The differences are in the way necessary probabilities are calculated.

Assumptions and Problems :

- We have not considered spaces as features as the number of spaces in the image is considerably more that stars. Also, stars are more prominent features compared spaces.
- In case of no match, we have used a low probability value of 0.0000001