MACHINE LEARNING

ASSIGNMENT # 1

AIMAH SIDDIQUE

**FA21-BSE-092**

SECTION B

# **QUESTION 1:** Using Candidate-Elimination algorithm, find (manually) the set of all hypotheses consistent with the following training instances. Show step-by-step complete working of the algorithm. (create and upload the PDF file)

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S= <∅ , ∅ , ∅ , ∅ , ∅>

G= <? , ? , ? , ? ,?>

Example 1: < J , H , B , 1980 , E > **+**

**S1 = < J , H , B , 1980 , E >**

**G1 = <? , ? , ? , ? ,?>**

Example 2: < J , T , G , 1970 , S > **-**

**S2 = < J , H , B , 1980 , E >**

**G2 = {<? , H , ? , ? ,?> , <? , ? , B , ? ,?> , <? , ? , ? , 1980 ,?> , <? , ? , ? , ? ,E> }**

Example 3: < J , T , B , 1990 , E > **+**

**S3 = < J , ? , B , ? , E >**

**G3 = {<? , ? , B , ? ,?> , <? , ? , ? , ? ,E> }**

Example 4: < V , C , R , 1990 , E > **-**

**S4 = < J , ? , B , ? , E >**

**G4 =**

**{<J , ? , B , ? ,?> ,**

**<? , T , B , ? ,?> ,**

**<? , H , B , ? ,?> ,**

**<? , ? , B , 1990 ,?> ,**

**<? , ? , B , 1970 ,?> ,**

**<? , ? , B , ? ,S> ,**

**<J , ? , ? ,? ,E> ,**

**<? , H , ? , ? ,E> ,**

**<? , T , ? ,? ,E> ,**

**<? , ? , B ,? ,E> ,**

**<? , ? , G ,? ,E> ,**

**<? , ? , ? , 1990 ,E> ,**

**, <? , ? , ? , 1970 ,E> }**

**After removing the hypothesis which are not consistent with x1, x2, x3 :**

**G4= { <J , ? , B , ? ,?> , <J , ? , ? ,? ,E> , <? , ? , B ,? ,E> }**

Example 5: < J , H , W , 1980 , E > **+**

**S5 = < J , ? , ? , ? , E >**

**G5 = { < J , ? , ? , ? ,E> }**

**As the specific and generic boundaries are lying on same hypothesis so, version space would be:**

**< J , ? , ? , ? , E >**

# Question # 2: Using Find-S algorithm, find (manually) a hypothesis that is consistent with the following dataset. Show step-by-step complete working of the algorithm. (create and upload the PDF file)

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Let training set =

**h1 : <circle, circle, yes, triangle, pink, up> +**

**h2 : <square, square, yes, square, green, down> -**

**h3 : <circle, triangle, yes, triangle, yellow, up> +**

Testing set =

**h4 : <circle, triangle, no, triangle, green, down> -**

**h5 : <circle, square, yes, square, yellow, up> +**

**S = < ∅ , ∅ , ∅ , ∅ , ∅ , ∅ >**

Training:-

**h0: < ∅, ∅ , ∅ , ∅ , ∅ , ∅ >**

**h1: <circle, circle, yes, triangle, pink, up>**

**h3: <circle, ?, yes, triangle, ? , up>**

**TRAINED MODEL:**

**h3: <circle, ?, yes, triangle, ? , up>**

**TESTING:**

h4 : <circle, triangle, no, triangle, green, down> - **(predictive output : negative || original output : negative)**

h5 : <circle, square, yes, square, yellow, up> +  **(predictive output : negative || original output : positive)**

**Accuracy = 50%**