

## **Assignment-01**

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**COURSE:** CSC354 – ML – Concept Learning

**NAME:** YAHYA IRFAN MUFTI

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**Question-01:** 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.

Origin	Manufacturer	Color	Decade	Type	Target
Japan	Honda	Blue	1980	Economy	+
Japan	Toyota	Green	1970	Sports	-
Japan	Toyota	Blue	1990	Economy	+
USA	Chrysler	Red	1980	Economy	-
Japan	Honda	White	1980	Economy	+

**SOL:**

**S0**=  $\langle \emptyset, \emptyset, \emptyset, \emptyset, \emptyset \rangle$

**G0**=  $\langle ?, ?, ?, ?, ? \rangle$

**Training Instances Example 01:**

**X1**= $\langle \text{Japan, Honda, Blue, 1980, Economy} \rangle$  (+ve)

**S1**= $\langle \text{Japan, Honda, Blue, 1980, Economy} \rangle$

**G1**= $\langle ?, ?, ?, ?, ? \rangle$

**Training Instances Example 02:**

**X2**= $\langle \text{Japan, Toyota, Green, 1970, Sports} \rangle$  (-ve)

**S2**= $\langle \text{Japan, Honda, Blue, 1980, Economy} \rangle$

**G2=** <?,Honda,?,?,?>, <?,?,Blue,?,?>, <?,?,?,1980,?>,  
<?,?,?,?,Economy>

**Training Instances Example 03:**

**X3=**<Japan,Toyota,blue,1990,Economy> (+ve)

**S3=**<Japan,?,Blue,?,Economy>

**G3=**<?,?,Blue,?,?>,<?,?,?,?,Economy>

**Training Instances Example 04:**

**X4=**<USA,Chrysler,Red,1980,Economy> (-ve)

**S4=**<Japan,?,Blue,?,Economy>

**G4=**<Japan,?,Blue,?,?>,<Japan,?,?,?,Economy>,<?,?,Blue,?,Economy>

**Training Instances Example 05:**

**X5=**<Japan,Honda,White,1980,Economy> (+ve)

**S5=**<Japan,?,?,?,Economy>

**G5=**<Japan,?,?,?,Economy>

**Question 02:** Using Find-S algorithm, find (manually) a hypothesis that is consistent with the following dataset. Show stepby-step complete working of the algorithm.

Face Shape	Eyes Shape	Nose Shape	Hairs	Face Color	Expression
Circle	Circle	Triangle	Yes	Pink	Happy(+ve)
Square	Square	Square	Yes	Green	Sad(-ve)
Circle	Square	Triangle	Yes	Yellow	Happy(+ve)
Circle	Circle	Triangle	No	Green	Sad(-ve)
Circle	Square	Square	Yes	Yellow	Happy(+ve)

**SOL:**

**BY FIND-S ALOGRITHM:**

**H0=** <  $\emptyset$ , $\emptyset$ , $\emptyset$ , $\emptyset$ , $\emptyset$ >

**EX 01:** <Circle,Circle,Triangle,Yes,Pink> (+ve)

**H1 =** <Circle,Circle,Triangle,Yes,Pink>

**EX 02:** <Square,Square,Square,Yes,Green> (-ve) ignore

**H2 =** <Circle,Circle,Triangle,Yes,Pink>

**EX 03:** <Circle,Square,Triangle,Yes,Yellow> (+ve)

**H3=**<Circle,?,Triangle,Yes,?>

**EX 04: <Circle,Circle,Triangle,No,Green>(-ve)**

**ignonre**

**H4=<Circle,?,Triangle,Yes,?>**

**EX 05: <Circle,Square,Square,Yes,Yellow> (+ve)**

**H5= <Circle,?,?,Yes,?>**