Concept learning :-

Concept learning is a learning task in which we train our machine to learn some concept by giving some pre-defined example.

General hypothesis Specific hypothesis

General hypothesis :-

$G = \{'?', '?', '?'\}$

→ Represented by '?'

→ No. of '?' depends on No. of attributes

Specific hypothesis :-

$S = \{'\phi', '\phi', '\phi'\}$

→ Represented by 'ϕ'

→ No. of 'ϕ' depends on No. of attributes.

Let's take a scenario for understanding General & Specific hypothesis.

↳ If you ask your friend to order Pizza without specifying ~~any~~ toppings ⇒ General hypothesis

↳ If you ask your friend to order Pizza with specified toppings ⇒ Specific hypothesis

In, General hypothesis he may choose any toppings.

Find - S algorithm :-

↳ The name itself suggests that algorithm is to find "Specific hypothesis".

↳ Also, it will consider only "positive example".

Algorithm :-

1) Initilize a hypothesis 'h0'

(i.e.,) $h_0 = \{\phi, \phi, \phi\}$

2) For each '+ve' example :

For each 'attribute' in example :

if attribute_value == hypothesis_values :

Do - nothing

else :

Replace hypothesis value with '?'

(General hypothesis)

Eg :- Days on which person enjoy Sport

Attribute → Label

	Sky	Temp	Humidity	Wind	Water	Forecast	Enjoy
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No (-ve)
4	Sunny	Warm	High	Strong	Cool	Same	Yes

Attribute = 6

Label = Enjoy

Step - 1 :- Initialize hypothesis 'h0'

Considering first '+ve' Instance as 'h0'

h0 = {'Sunny', 'Warm', 'Normal', 'Strong', 'Warm', 'Same'} (1)

Step -2 :-

⇒ Comparing with '+ve' instance

→ 'h0' with second instance, (2)

'h0' becomes,

h0 = { 'Sunny', 'Warm', '?', 'Strong',

'Warm', 'Same' }

→ 'h0' can't compare with third instance because it is negative (3)

→ 'h0' comparing with fourth instance

it becomes,

h0 = { 'Sunny', 'Warm', '?', 'Strong',

'?', 'Same' }

(most general hypothesis)

Disadvantage:-

→ consider only 'tve' values

→ it is not guarantee that it will match all the data because we ignored '-ve' samples. (most general hypothesis)