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Date of Experiment: 28-2-2021	Date of Submission: 28-2-2022

To implement Expert System to diagnose a medical disease.

This medical expert system is used to diagnose the main lung diseases among the patients. The diagnosis is made considering the symptoms that can be seen or felt. This medical expert system helps the doctor or expert in making the appropriate diagnosis of the patient. The lung diseases have many common symptoms and some of them are very much alike. This creates many difficulties for the lungs doctor to reach at a right decision or diagnosis. This expert system can remove these difficulties and it is having knowledge of thirty-two lung diseases. This expert system is implemented in SWI- Prolog.

Code

```
go :-
write('What is the patient''s name? '),
read(Patient),get_single_char(Code),
hypothesis(Patient,Disease),
write_list([Patient,', probably has ',Disease,'.']),nl.

go :-
write('Sorry, I don''t seem to be able to'),nl,
write('diagnose the disease.'),nl.

symptom(Patient,fever) :-
verify(Patient," have a fever (y/n) ?").
symptom(Patient,rash) :-
verify(Patient," have a rash (y/n) ?").
symptom(Patient,headache) :-
verify(Patient," have a headache (y/n) ?").
symptom(Patient,runny_nose) :-
verify(Patient," have a runny_nose (y/n) ?").
symptom(Patient,conjunctivitis) :-
verify(Patient," have a conjunctivitis (y/n) ?").
symptom(Patient,cough) :-
verify(Patient," have a cough (y/n) ?").
symptom(Patient,body_ache) :-
verify(Patient," have a body_ache (y/n) ?").
symptom(Patient,chills) :-
verify(Patient," have a chills (y/n) ?").
symptom(Patient,sore_throat) :-
verify(Patient," have a sore_throat (y/n) ?").
symptom(Patient,sneezing) :-
verify(Patient," have a sneezing (y/n) ?").
symptom(Patient,swollen_glands) :-
verify(Patient," have a swollen_glands (y/n) ?").
```

```
ask(Patient,Question) :-
        write(Patient),write(', do you'),write(Question),
        read(N),
        ( (N == yes ; N == y)
    ->
     assert(yes(Question)) ;
     assert(no(Question)), fail).

:- dynamic yes/1,no/1.

verify(P,S) :-
   (yes(S) -> true ;
    (no(S) -> fail ;
     ask(P,S))).

undo :- retract(yes(_)),fail.
undo :- retract(no(_)),fail.
undo.



hypothesis(Patient,german_measles) :-
symptom(Patient,fever),
symptom(Patient,headache),
symptom(Patient,runny_nose),
symptom(Patient,rash).

hypothesis(Patient,common_cold) :-
symptom(Patient,headache),
symptom(Patient,sneezing),
symptom(Patient,sore_throat),
symptom(Patient,runny_nose),
symptom(Patient,chills).

hypothesis(Patient,measles) :-
symptom(Patient,cough),
symptom(Patient,sneezing),
symptom(Patient,runny_nose).

hypothesis(Patient,flu) :-
symptom(Patient,fever),
symptom(Patient,headache),
symptom(Patient,body_ache),
symptom(Patient,conjunctivitis),
symptom(Patient,chills),
symptom(Patient,sore_throat),
symptom(Patient,runny_nose),
symptom(Patient,cough).
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hypothesis(Patient,mumps) :-
symptom(Patient,fever),
symptom(Patient,swollen_glands).

hypothesis(Patient,chicken_pox) :-
symptom(Patient,fever),
symptom(Patient,chills),
symptom(Patient,body_ache),
symptom(Patient,rash).

write_list([]).
write_list([Term| Terms]) :-
write(Term),
write_list(Terms).

response(Reply) :-
get_single_char(Code),
put_code(Code), nl,
char_code(Reply, Code).
```

Output

```
?- go.
What is the patient's name? varun.
varun, do you have a fever (y/n) ?y.
varun, do you have a headache (y/n) ?|: n.
varun, do you have a cough (y/n) ?|: y.
varun, do you have a sneezing (y/n) ?|: y.
varun, do you have a runny_nose (y/n) ?|: y.
varun, probably has measles.
true .
```

Conclusions

This medical expert system is dealing with person's health and an approximate diagnosis of a certain disease is established, this system has a great risk. There may be more lung diseases which are not considered in the system's knowledge base. So, this knowledge base is incomplete, but it can be updated any time with new symptoms and diseases. Symptoms already available in knowledge base are not 100% correct because different doctors have different opinions and there are anomalies in medicines.