

King Abdulaziz University  
Faculty of Computing and Information Technology  
Computer Science Department

**CPCS331, 1<sup>st</sup> Term 2019**  
**Due: Wednesday , Novmber 6<sup>th</sup>, 2019**



**Etention**

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**Section (EAR )**

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## TASK ASSIGNMENT

task	Waad alshanbari	Esraa turki	Wed alattas
introduction	33.3%	33.3%	33.3%
body	33.3%	33.3%	33.3%
References	33.3%	33.3%	33.3%
Appendix	33.3%	33.3%	33.3%

## Introduction:

### MEDICAL EXPERT SYSTEM

A huge figure of expert systems is medical. A medical expert system is built up of programs and medical knowledge base. The information obtained from medical expert system is similar to the information given by proficient in that particular area. Medical Knowledge of specialized doctor is vital for the growth of medical expert system.

### Purpose of the expert system

The main aim of any medical expert system is diagnosis and treatment of diseases.

A medical expert system is built up of programs and medical knowledge base.

The information obtained from medical expert system is similar to the information given by doctor or expert in that particular area. Our medical expert system has hypertension (high blood pressure) and hypotension (low blood pressure) symptoms in its knowledge base.

The user or patient is asked to answer with YES or NO, depending on the answer the system determine if the hypertension or hypertension and gave an advice. A limitation of this medical expert system is that only symptoms entered by the programmer in the knowledge base are available, it does not think and learn by itself.

Therefore, the knowledge base can be updated any time with new symptoms and new diseases.

### Users:

Patients

### Recourses:

- We build our knowledge base and the if then rules by interviewing people from medical field:
  - 1-doctors
  - 2-pharmacist
- scientific papers and research

body:

Rules:

**start:**

from this rule we will start the program (printing and calling functions)

**menu:**

This rule will print the menu for the patient

**menu2:**

This rule will print the advices menu

**User\_choice(integer):**

This rule have the user choice for the first menu

**User\_choice2(integer):**

This rule have the user choice for the second menu

**Disease(symbol):**

This rule is represented our knowledge-based information , where questions are stored into the system and gathered when needed it will be called if the patient choice is 1

**Ask(symbol, symbol)**

The rule have two parameters, the first one is for the question and the second is reading the answer from the patient either yes or no

**ans(symbol,symbol)**

this rule determine which disease depending on the answer (y or n) by if then

**infected(symbol)**

This rule calls ask(symbol,symbol) , when the patient answer the question with "yes" it displays all next predicates, while the answer "no" it will skip all next predicates to the other type , and its invoked in [Disease\(symbol\)](#)

**ninfected(symbol):**

This rule calls ask (symbol,symbol) , when the patient answer the question with "no" it displays all next predicates, while the answer "yes" it will skip all next predicates to the other type , and its invoked in. [Disease\(symbol\)](#)

**Assertz:**

Assert a clause (fact or rule) into database, assert the clause as last clause.

**Clear:**

This rule will allow patient to exit the prolog program

### If - then rules:

If the patient have these symptoms:

Sleeping problems and anxiety

Nose bleeding

headaches

chest pain

the agent will diagnosis the patient hypertension

If the patient have these symptoms:

Unsteadiness

Blurry vision

Lack of concentration

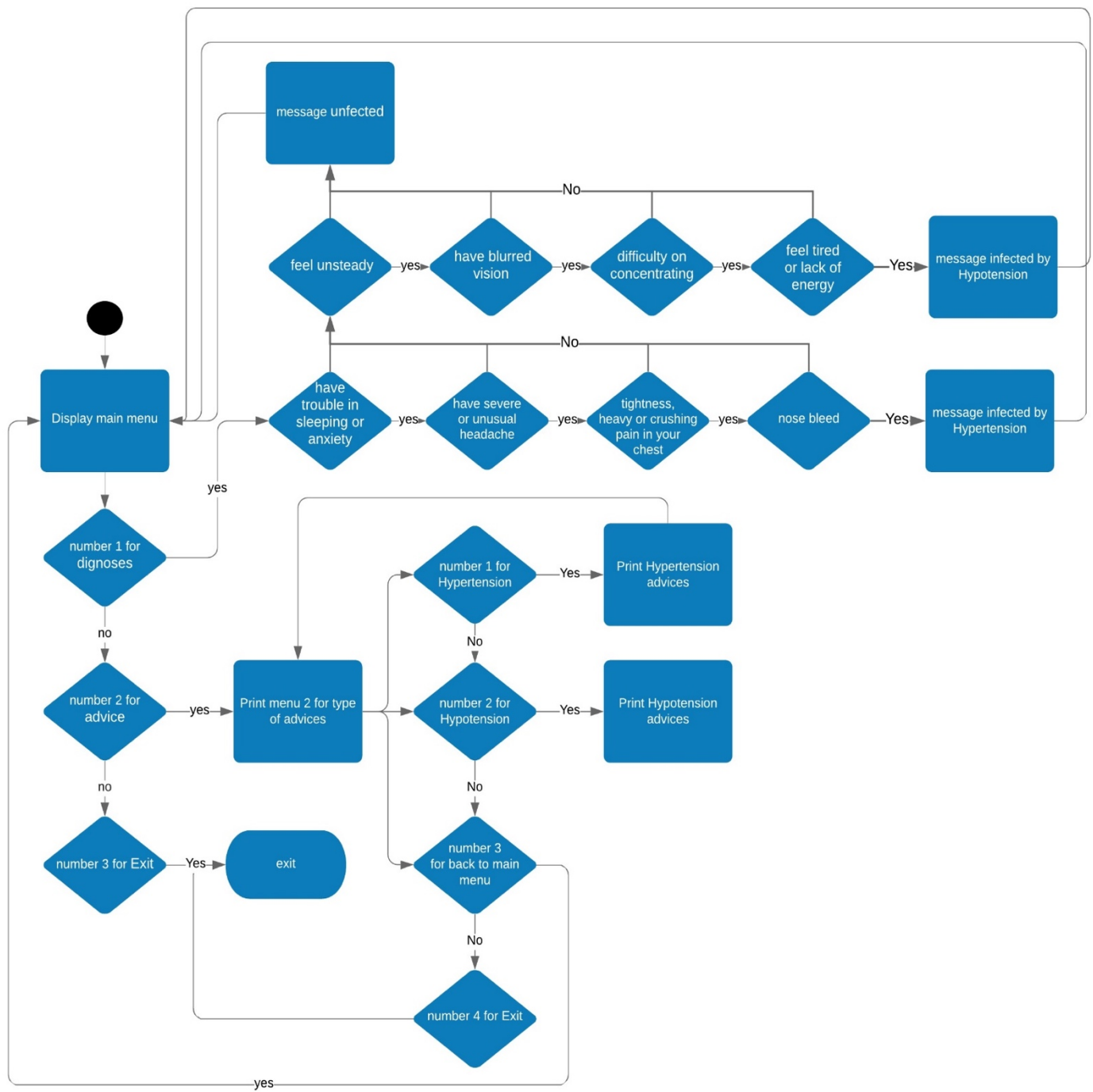
Fatigue

the agent will diagnosis the patient hypotension

### Technique used to acquire knowledge from the system:

We used backtrack Technique to acquire knowledge from the system

## System's Diagram



## References:

<https://www.swi-prolog.org/pldoc/man?predicate=assertz/1>

<https://www.webmd.com/heart/understanding-low-blood-pressure-basics#1>

<https://www.mayoclinic.org/diseases-conditions/high-blood-pressure/symptoms-causes/syc-20373410>

<https://www.healthline.com/health/high-blood-pressure-hypertension-symptoms>

<https://www.medscape.com>

## Appendices:

### Source code:

#### **FACTS**

xinfected(symbol)  
xninfected(symbol)

#### **DOMAINS**

choice =integer  
%name=symbol  
x=symbol

#### **PREDICATES**

start - determ ()  
menu -determ()  
menu2 -determ()  
user\_choice(choice)-determ(i)  
%user\_name(name)-determ(i)  
user\_choice2(choice)-determ(i)  
disease(x) - nondeterm (o)  
ask(x,x) - determ (i,i)  
ans(x,x) - determ (i,i)  
infected(x) - determ(i)  
ninfectd(x) - determ(i)  
clear - determ ()



## CLAUSES

disease("hypertension"):-

```
    infected("-do you have trouble in sleeping or anxiety?[y/n]"),nl,  
    infected("-do you have severe or unusual headache?[y/n]"),nl,  
    infected("-do you feel like having tightness, heavy or crushing pain in your chest?[y/n]"),nl,  
    infected("-does your nose bleed a lot?[y/n]").
```

disease("hypotension"):-

```
    infected("-when you are walking do you feel unsteady?[y/n]"),nl,  
    infected("-do you have blurred vision (loss of sharpness of eyesight)?[y/n]"),nl,  
    infected("-do you have difficulty on concentrating?[y/n]"),nl,  
    infected("-do you feel tired or lack of energy ? drowsy?[y/n]").
```

infected(Y):-

```
    xinfected(Y),!.
```

infected(Y):-

```
    not(xinfected(Y)),ask(Y,yes).
```

ninfected(Y):-

```
    xinfected(Y),!.
```

ninfected(Y):-

```
    not(xinfected(Y)),ask(Y,no).
```

ask(Y,yes):-

```
    !,nl,write(Y),readln(Replay),nl,  
    frontchar(Replay,'y',_),ans(Y,yes).
```

ask(Y,no):-

```
    !,nl, write(Y),readln(Replay),nl,  
    frontchar(Replay,'y',_),ans(Y,no).
```

ans(Y,yes):-

```
    assertz(xinfected(Y)).
```

ans(Y,no):-

```
    assertz(xninfected(Y)).
```

```

%////////////////////////////////////advice menu////////////////////////////////////
user_choice2('4'):-
    clear.
user_choice2('3'):-
    menu.
user_choice2('2'):-
    nl,write("-----advices for hypertension-----"),nl,
    write("eat some fruits such as apple, banana or orange"),nl,
    write("do aerobics and cardio for 30 minutes\n"),
    write("-----"),nl,menu2.

user_choice2('1'):-
    nl,write("-----advices for hypotension-----"),nl,
    write("eat something salty\n"),
    write("avoid heavy lifting and have some rest you deserve it !\n"),
    write("-----"),nl,menu2.

menu2:-
    nl,write("-----advice menu-----"),nl,
    write("    Enter 1 if you want advices for hypotension \n"),
    write("    Enter 2 if you want advices for hypertension\n"),
    write("    Enter 3 to get back to main menu \n"),
    write("    Enter 4 to exit \n"),
    write("    -----"),nl,
    write("    Enter number - "),
    readchar(Z) , write(Z), nl,
    user_choice2(Z), nl.

%////////////////////////////////////exit function////////////////////////////////////
clear:-
    write("\n wish you a life full of health, good bye.. "),
    exit.

```

```
%////////////////// printing diagnosis result //////////////////
```

```
start:-
```

```
    disease(X),!,
    write("\n----- Under diagnosis . . . -----"),nl,
    %write("\n DEAR",E),
    write("\n The diagnosis indicates that you have ",X),
    write("\n\n Get well soon :) "),nl,
    write("\n-----\n"),
    ,menu.
```

```
start:-
```

```
    write("\n----- Under diagnosis . . . -----\n"),
    write("\n it seems that you are uninfected , take care \n"),
    write("\n-----\n"),
    nl,menu.
```

```
%//////////////////main menu////////////////////////
```

```
user_choice('3'):-
```

```
    clear.
```

```
user_choice('2'):-
```

```
    menu2.
```

```
user_choice('1'):-
```

```
nl,write("Please answer the questions with yes or no to see the dignoses ") ,nl,
write("-----"),nl,
start.
```

```
menu:-
```

```
write("\n ----- main menu -----"),nl,
write(" Enter 1 for dignoses \n"),
write(" Enter 2 to show advice\n"),
write(" Enter 3 to exit\n"),
write("-----"),nl,
write(" Enter number - "),
readchar(W) , write(W), nl,
user_choice(W), nl,
menu.
```

```
GOAL
```

```
write("***** welcome to Etention Expert system *****"), nl
```

```
,menu.
```

## Screenshots:

### Hypertension diagnosis :

\*\*\*\*\* welcome to Etention Expert system \*\*\*\*\*

\_\_\_\_\_ main menu \_\_\_\_\_

Enter 1 for dignoses

Enter 2 to show advice

Enter 3 to exit

\_\_\_\_\_

Enter number - 1

Please answer the questions with yes or no to see the dignoses

\_\_\_\_\_

-do you have trouble in sleeping or anxiety?[y/n]y

-do you have severe or unusual headache?[y/n]y

-do you feel like having tightness, heavy or crushing pain in your chest?[y/n]y

-does your nose bleed a lot?[y/n]y

\_\_\_\_\_ Under diagnosis . . . . \_\_\_\_\_

The diagnosis indicates that you have hypertension

Get well soon :) \_\_\_\_\_

\_\_\_\_\_ main menu \_\_\_\_\_

Enter 1 for dignoses

Enter 2 to show advice

## hypotension diagnosis :

\*\*\*\*\* welcome to Etention Expert system \*\*\*\*\*

\_\_\_\_\_ main menu \_\_\_\_\_

Enter 1 for dignoses  
Enter 2 to show advice  
Enter 3 to exit

\_\_\_\_\_

Enter number - 1

Please answer the questions with yes or no to see the dignoses

\_\_\_\_\_

-do you have trouble in sleeping or anxiety?[y/n]n

-when you are walking do you feel unsteady?[y/n]y

-do you have blurred vision (loss of sharpness of eyesight)?[y/n]y

-do you have difficulty on concentrating?[y/n]y

-do you feel tired or lack of energy ? drowsy?[y/n]y

\_\_\_\_\_ Under diagnosis . . . . \_\_\_\_\_

The diagnosis indicates that you have hypotension

Get well soon :)

## uninfected :

\*\*\*\*\* welcome to Etention Expert system \*\*\*\*\*

\_\_\_\_\_ main menu \_\_\_\_\_

Enter 1 for dignoses  
Enter 2 to show advice  
Enter 3 to exit

\_\_\_\_\_

Enter number - 1

Please answer the questions with yes or no to see the dignoses

\_\_\_\_\_

-do you have trouble in sleeping or anxiety?[y/n]n

-when you are walking do you feel unsteady?[y/n]n

\_\_\_\_\_ Under diagnosis . . . . \_\_\_\_\_

it seems that you are uninfected , take care

\_\_\_\_\_ main menu \_\_\_\_\_

Enter 1 for dignoses  
Enter 2 to show advice  
Enter 3 to exit

\_\_\_\_\_

Enter number - 2

\_\_\_\_\_ advice menu \_\_\_\_\_

Enter 1 if you want advices for hypotension  
Enter 2 if you want advices for hypertension  
Enter 3 to get back to main menu  
Enter 4 to exit

\_\_\_\_\_

Enter number - 3

\_\_\_\_\_ main menu \_\_\_\_\_

## Advices menu:

```
————— main menu —————  
Enter 1 for dignoses  
Enter 2 to show advice  
Enter 3 to exit  
—————  
Enter number - 2  
  
————— advice menu —————  
Enter 1 if you want advices for hypotension  
Enter 2 if you want advices for hypertension  
Enter 3 to get back to main menu  
Enter 4 to exit  
—————  
Enter number - 1  
  
————— advices for hypotension —————  
eat something salty  
avoid heavy lifting and have some rest you deserve it !  
—————  
  
————— advice menu —————  
Enter 1 if you want advices for hypotension  
Enter 2 if you want advices for hypertension  
Enter 3 to get back to main menu  
Enter 4 to exit  
—————  
Enter number - 2  
  
————— advices for hypertension —————  
eat some fruits such as apple, banana or orange  
do aerobics and cardio for 30 minutes  
—————  
  
————— advice menu —————  
Enter 1 if you want advices for hypotension
```

## Back to main menu + exit the system:

```
————— advice menu —————  
Enter 1 if you want advices for hypotension  
Enter 2 if you want advices for hypertension  
Enter 3 to get back to main menu  
Enter 4 to exit  
—————  
Enter number - 3  
  
————— main menu —————  
Enter 1 for dignoses  
Enter 2 to show advice  
Enter 3 to exit  
—————  
Enter number - 3  
  
wish you a life full of health, good bye.. |
```