CLINICAL DECISION SUPPORT SYSTEMS FOR CANCER MANAGEMENT

Exsys CORVID Software

By

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Piscataway, NJ

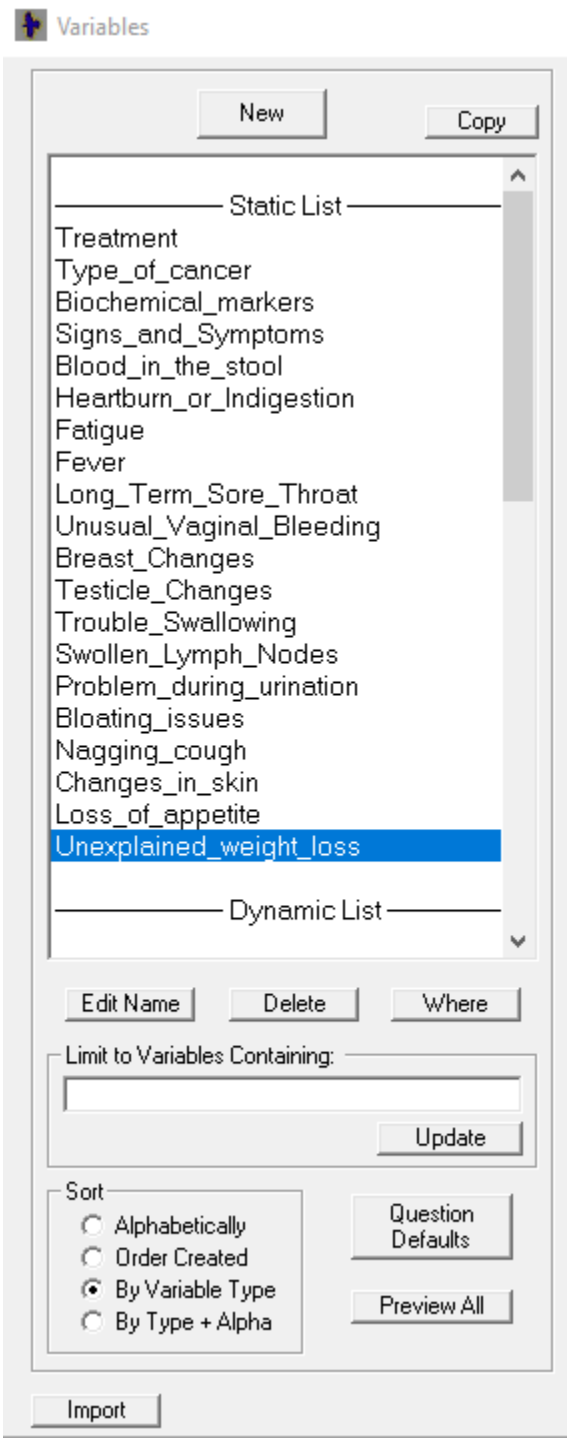
May 8, 2020

BINF 5325 - CLINICAL PROBLEM SOLVING AND DECISION MAKING SYSTEMS

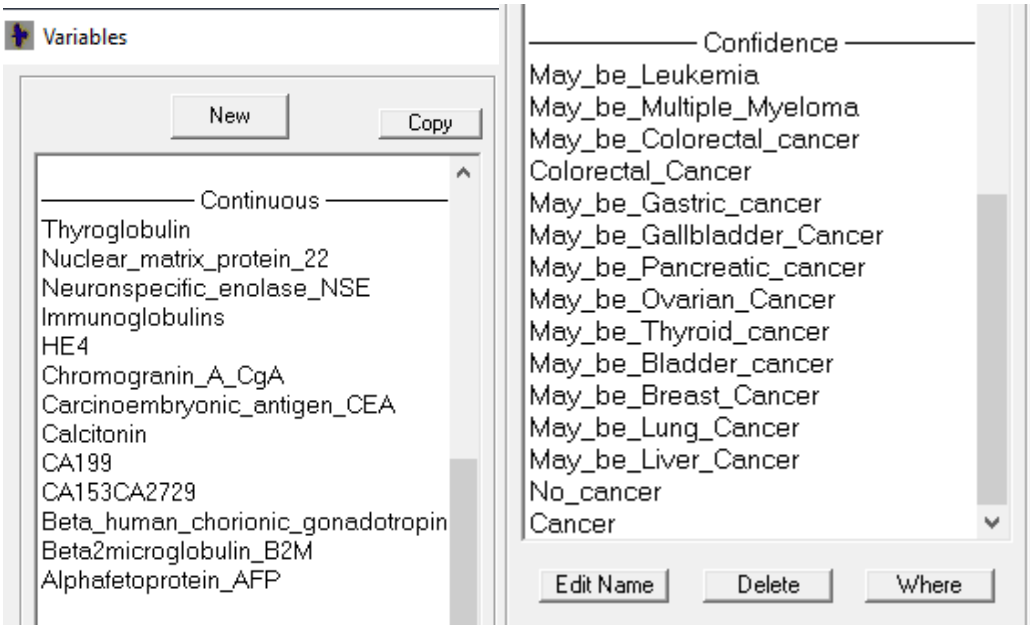
Professor: Dr. Dinesh P. Mital

1. DEFINING VARIABLES

Static variables

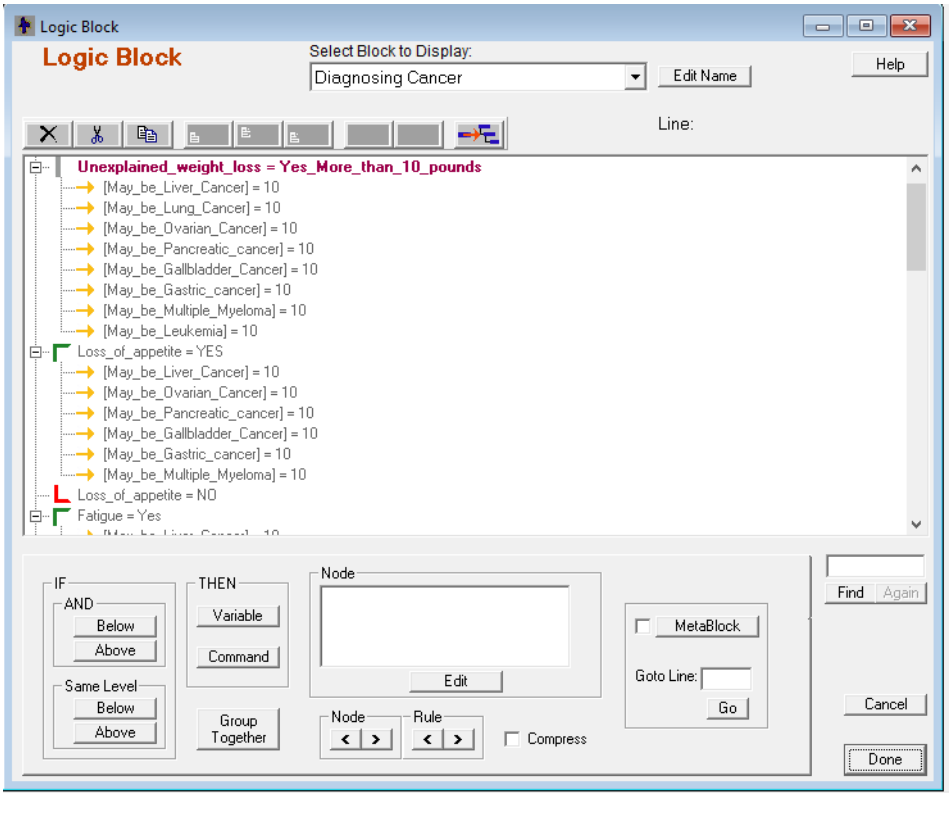


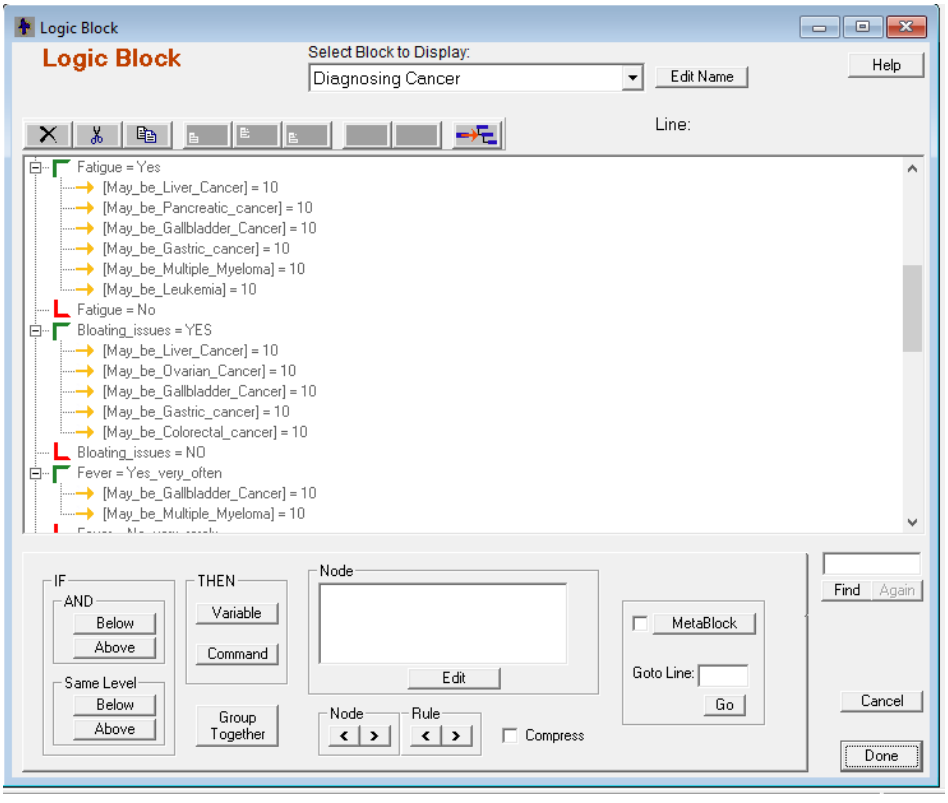
Numeric variables *Confidence variables*

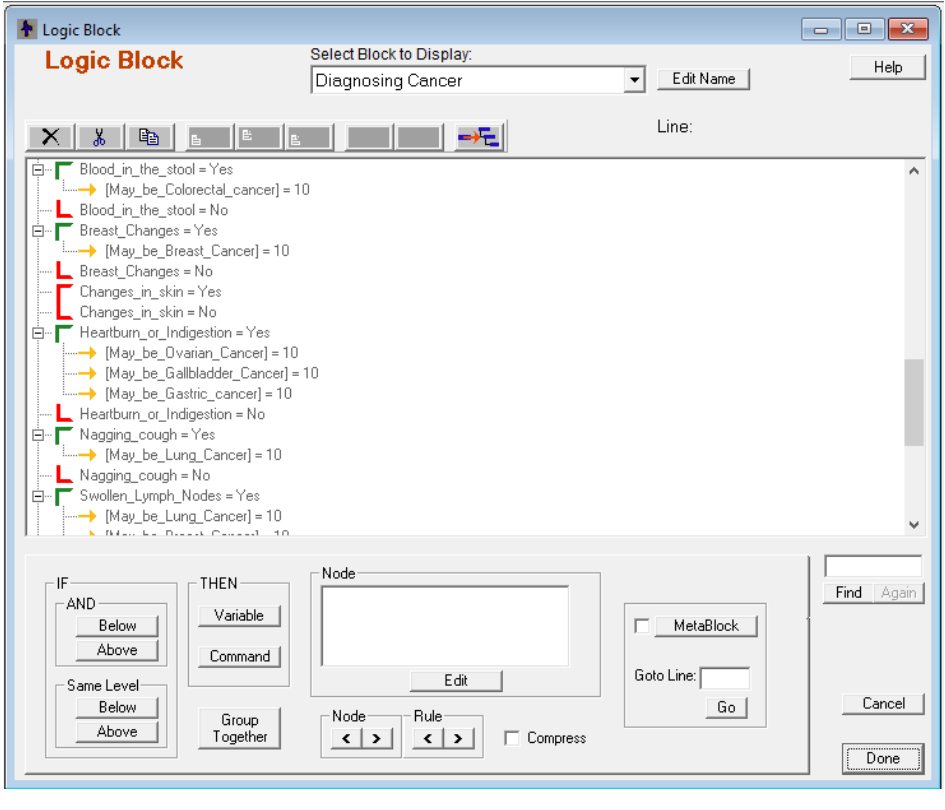


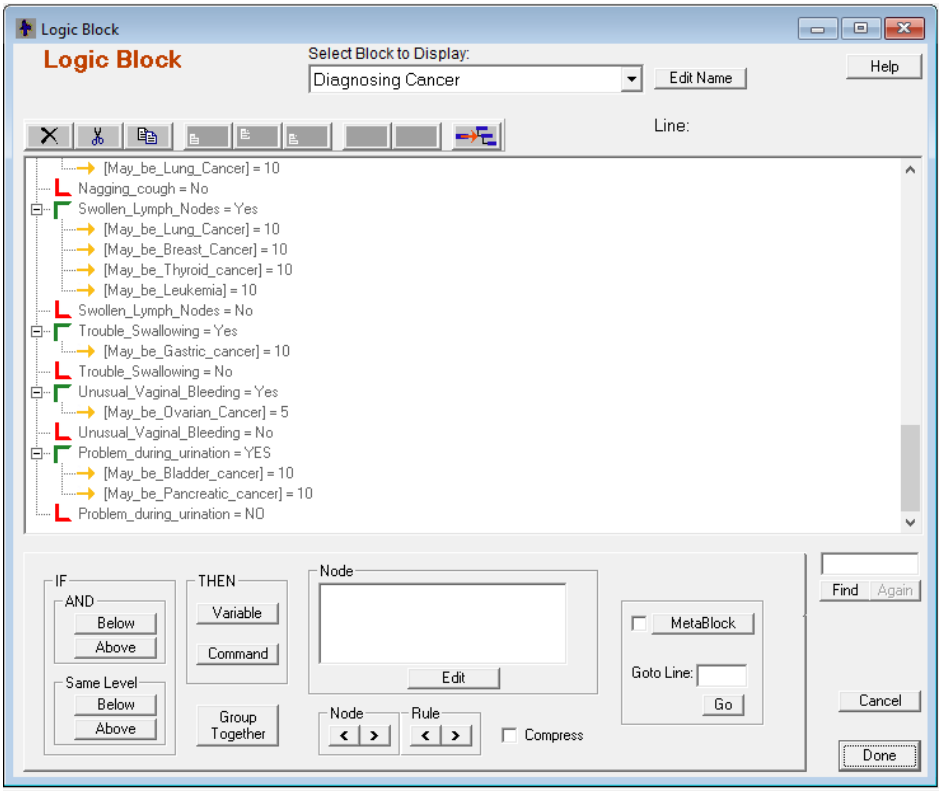
2. LOGIC BLOCKS

Signs and symptoms for diagnosing cancer

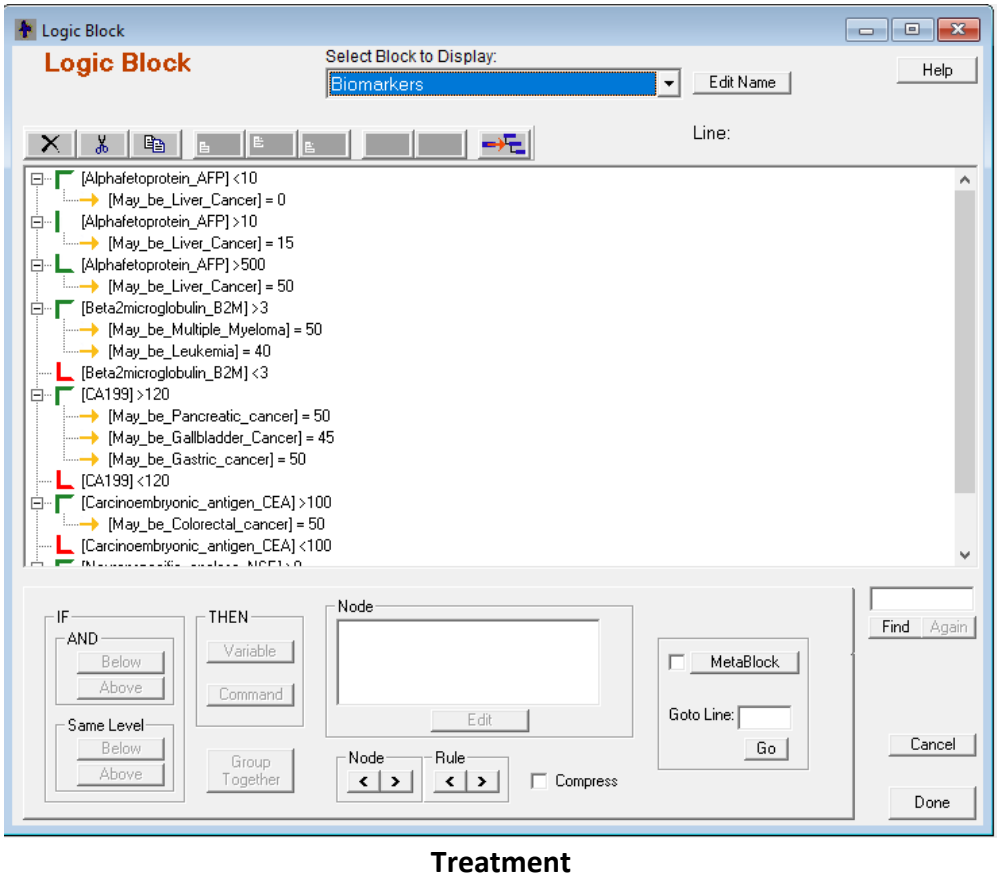



Logic Block
Logic Block
Select Block to Display:
Diagnosing Cancer
Edit Name
Help
Line:
Fatigue = Yes
[May_be_Liver_Cancer] = 10
[May_be_Pancreatic_cancer] = 10
[May_be_Gallbladder_Cancer] = 10
[May_be_Gastric_cancer] = 10
[May_be_Multiple_Myeloma] = 10
[May_be_Leukemia] = 10
Fatigue = No
Bloating_issues = YES
[May_be_Liver_Cancer] = 10
[May_be_Ovarian_Cancer] = 10
[May_be_Gallbladder_Cancer] = 10
[May_be_Gastric_cancer] = 10
[May_be_Colorectal_cancer] = 10
Bloating_issues = NO
Fever = Yes_very_often
[May_be_Gallbladder_Cancer] = 10
[May_be_Multiple_Myeloma] = 10
IF
AND
Below
Above
Same Level
Below
Above
THEN
Variable
Command
Group Together
Node
Edit
Node
Rule
Compress
MetaBlock
Goto Line:
Go
Find
Again
Cancel
Done

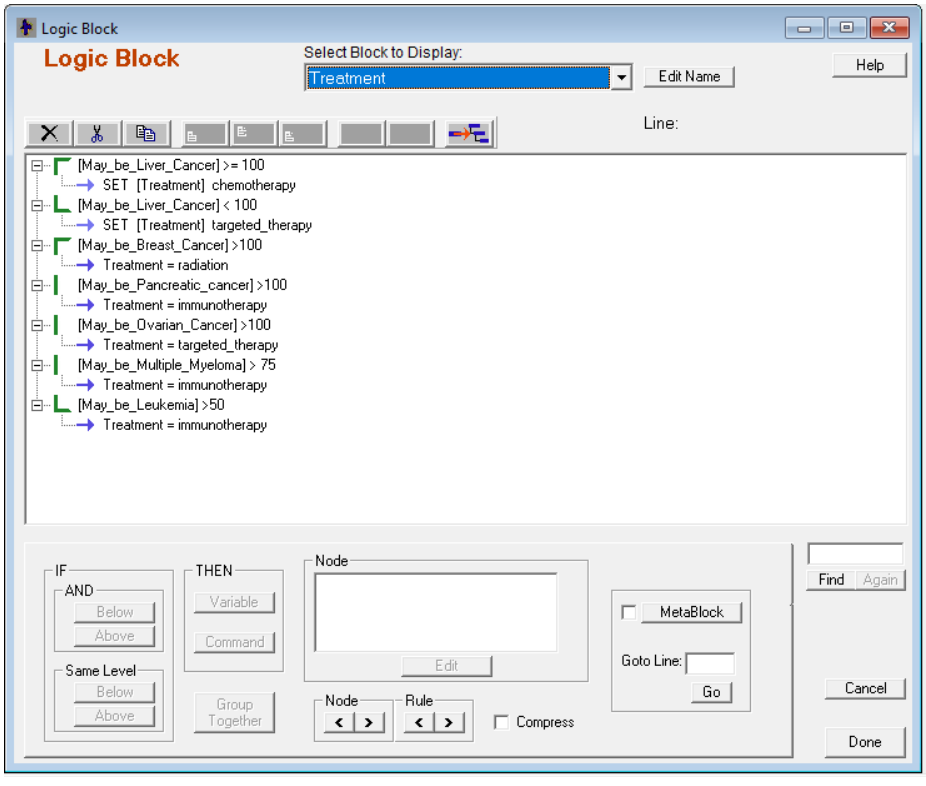

Logic Block
Logic Block
Select Block to Display:
Diagnosing Cancer
Edit Name
Help
Line:
Blood_in_the_stool = Yes
[May_be_Colorectal_cancer] = 10
Blood_in_the_stool = No
Breast_Changes = Yes
[May_be_Breast_Cancer] = 10
Breast_Changes = No
Changes_in_skin = Yes
Changes_in_skin = No
Heartburn_or_Indigestion = Yes
[May_be_Ovarian_Cancer] = 10
[May_be_Gallbladder_Cancer] = 10
[May_be_Gastric_cancer] = 10
Heartburn_or_Indigestion = No
Nagging_cough = Yes
[May_be_Lung_Cancer] = 10
Nagging_cough = No
Swollen_Lymph_Nodes = Yes
[May_be_Lung_Cancer] = 10
IF
AND
Below
Above
Same Level
Below
Above
THEN
Variable
Command
Group Together
Node
Edit
Node
Rule
Compress
MetaBlock
Goto Line:
Go
Find
Again
Cancel
Done



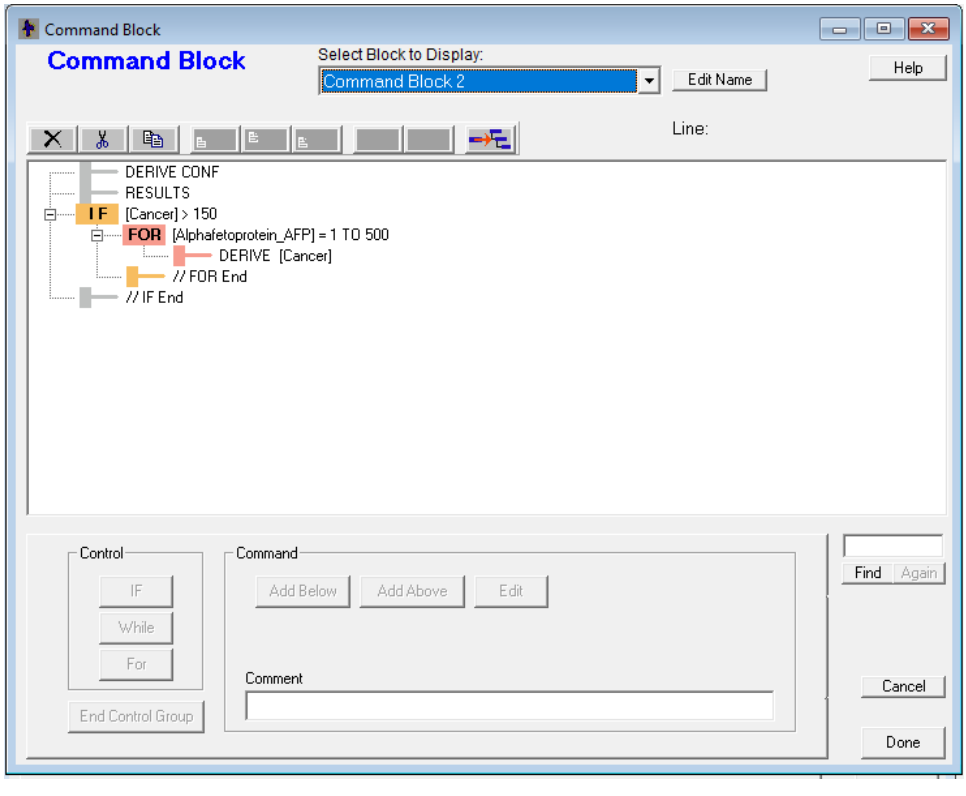
Biomarkers



Treatment

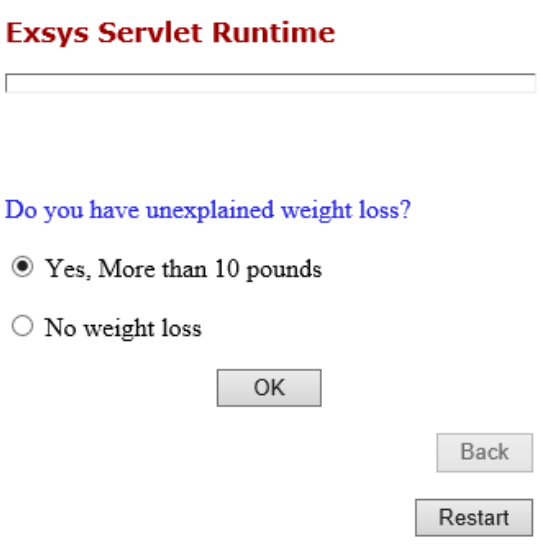


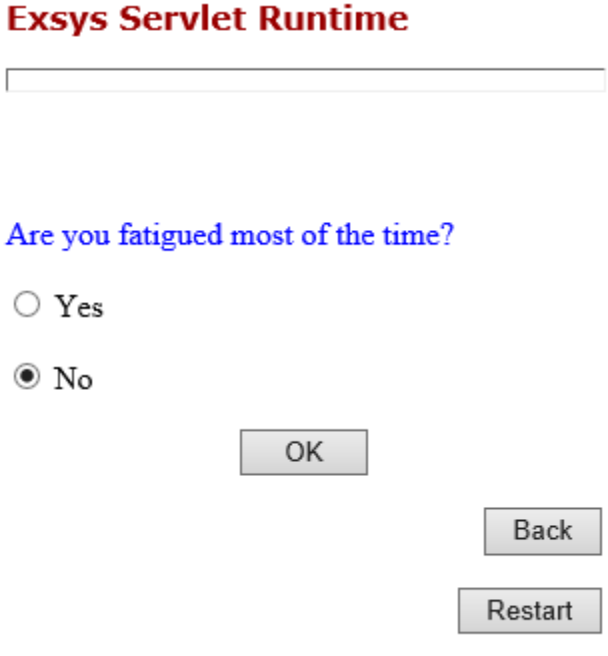
3. COMMAND BLOCKS

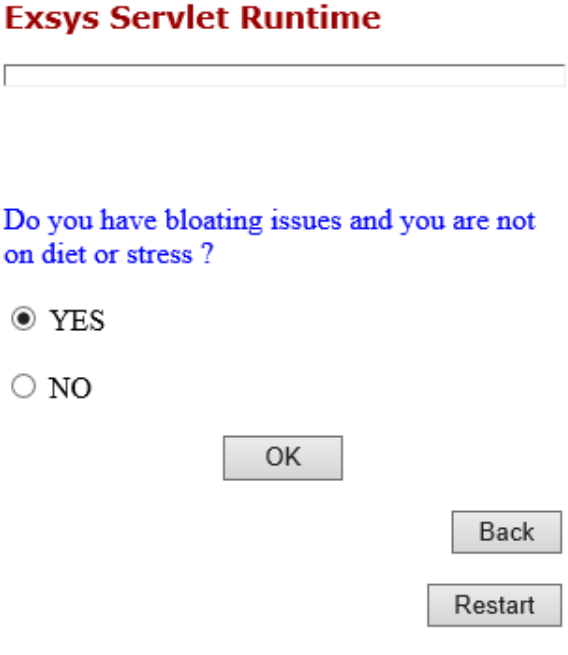


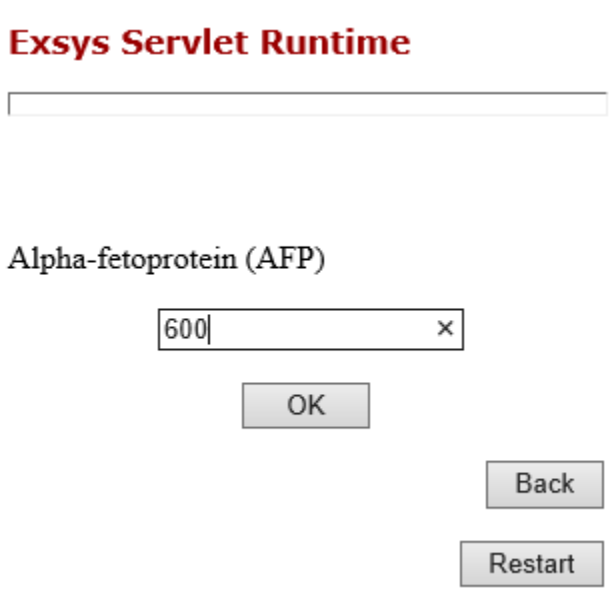
4. USER INTERFACE

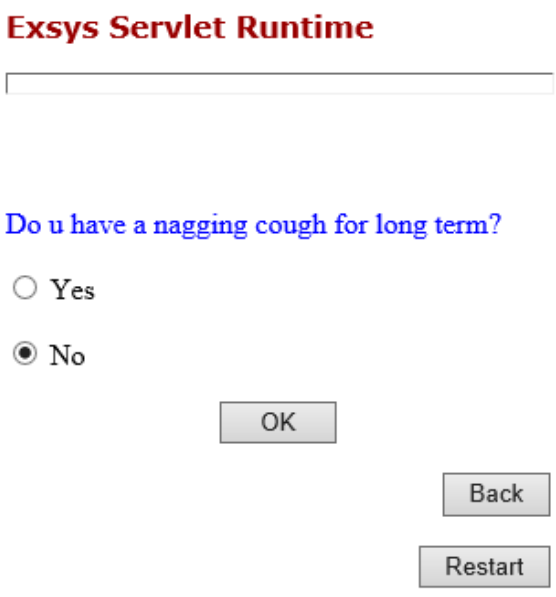
The user interface with the questionnaire to be filled

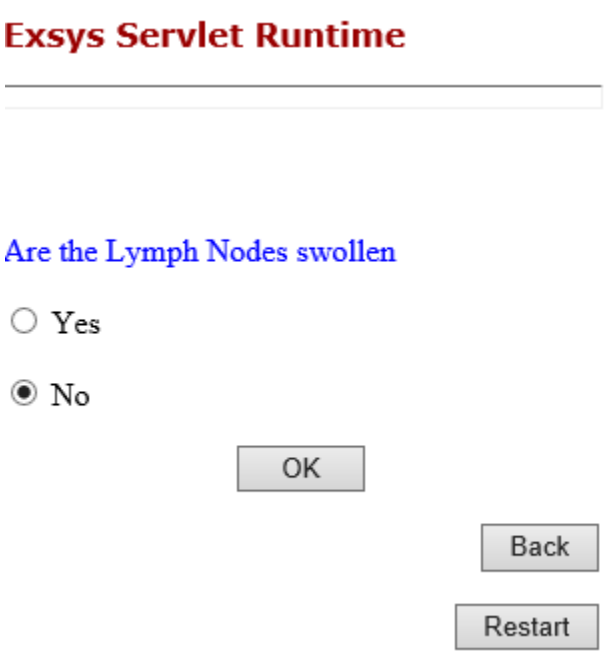


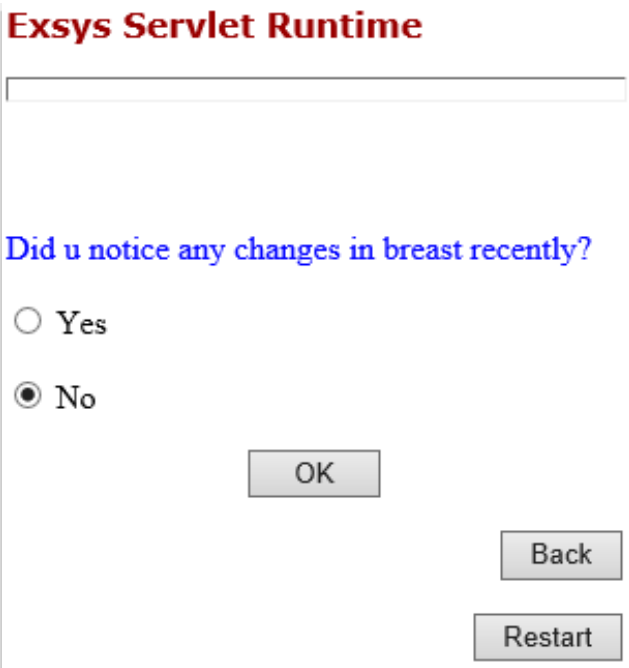


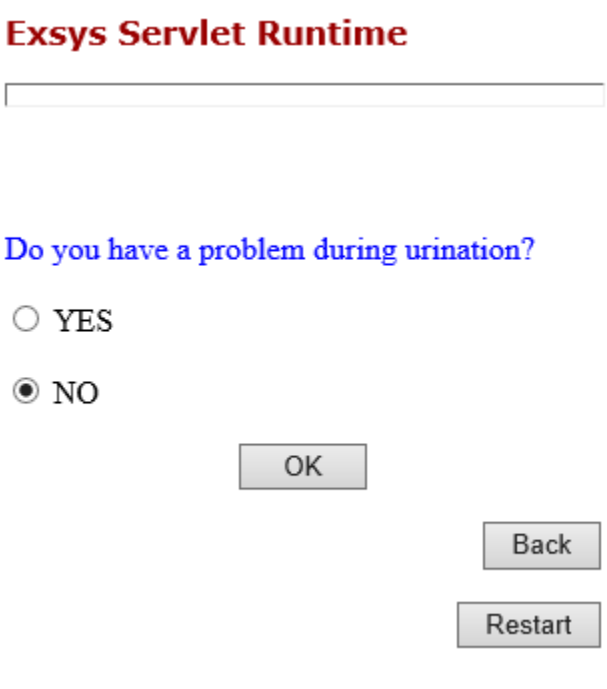


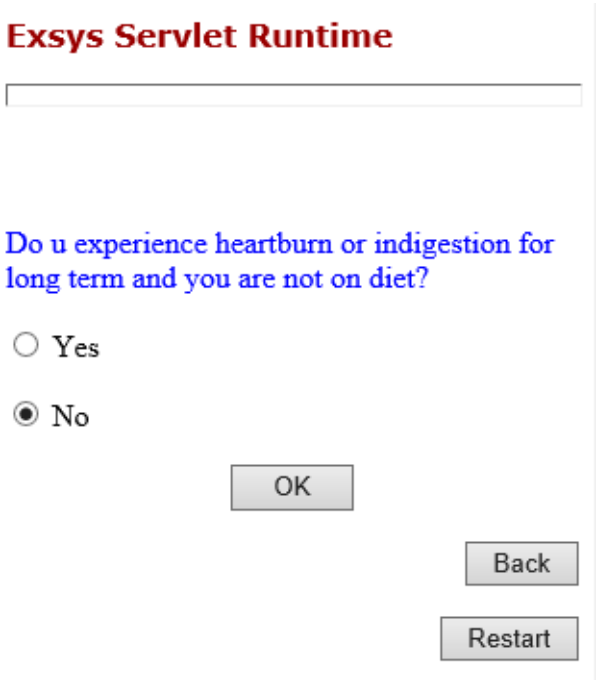

Exsys Servlet Runtime
Alpha-fetoprotein (AFP)
600
OK
Back
Restart

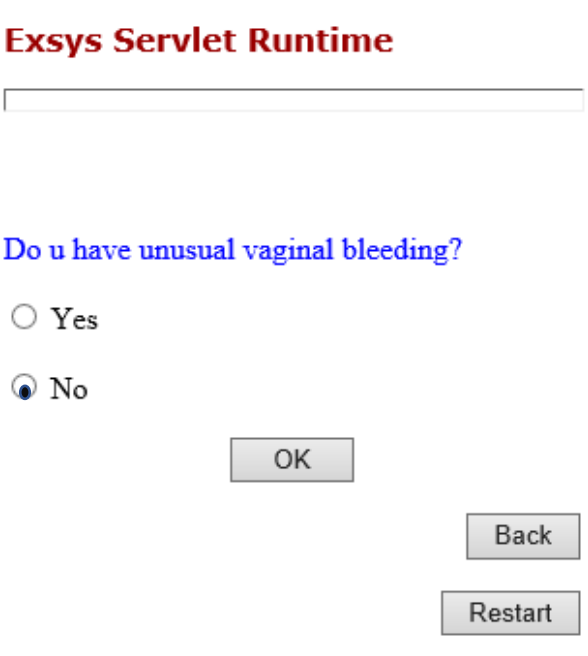

Exsys Servlet Runtime
Do u have a nagging cough for long term?
Yes
No
OK
Back
Restart

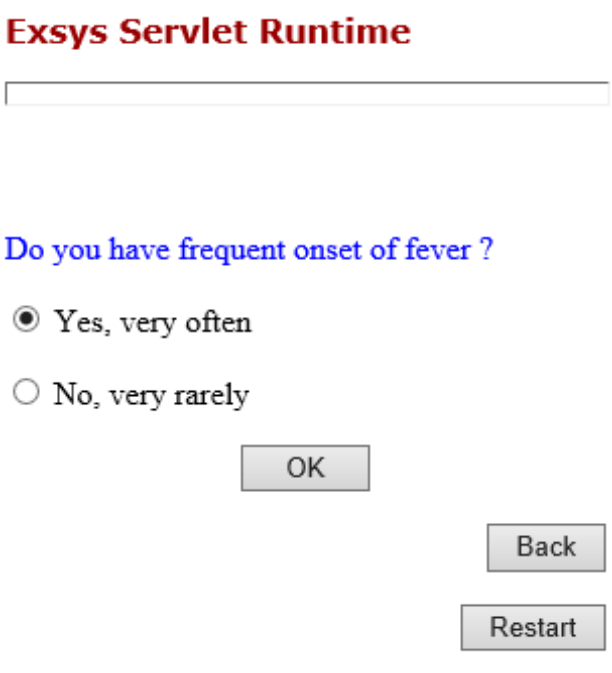

Exsys Servlet Runtime
Are the Lymph Nodes swollen
Yes
No
OK
Back
Restart


Exsys Servlet Runtime
Did u notice any changes in breast recently?
Yes
No
OK
Back
Restart


Exsys Servlet Runtime
Do you have a problem during urination?
YES
NO
OK
Back
Restart


Exsys Servlet Runtime
Do u experience heartburn or indigestion for long term and you are not on diet?
Yes
No
OK
Back
Restart


Exsys Servlet Runtime
Do u have unusual vaginal bleeding?
Yes
No
OK
Back
Restart


Exsys Servlet Runtime
Do you have frequent onset of fever ?
Yes, very often
No, very rarely
OK
Back
Restart

Exsys Servlet Runtime

Do you have a trouble swallowing?

- ○ Yes
- ◉ No

OK

Back

Restart

Exsys Servlet Runtime

Do u find any traces of blood in the stool?

- ○ Yes
- ○ No
- ◉ I did not notice

OK

Back

Restart

Exsys Servlet Runtime

Neuron-specific enolase (NSE)

4.5 ×

OK

Back

Restart

Exsys Servlet Runtime

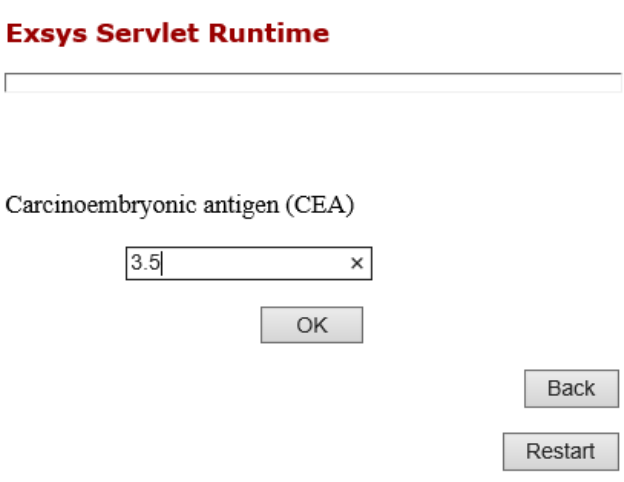
CA19-9

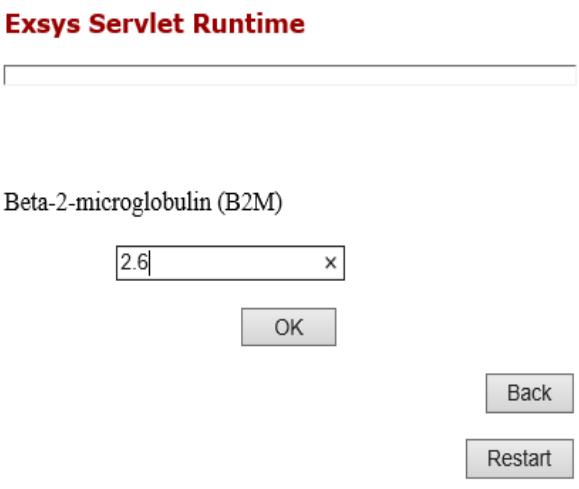
29 ×

OK

Back

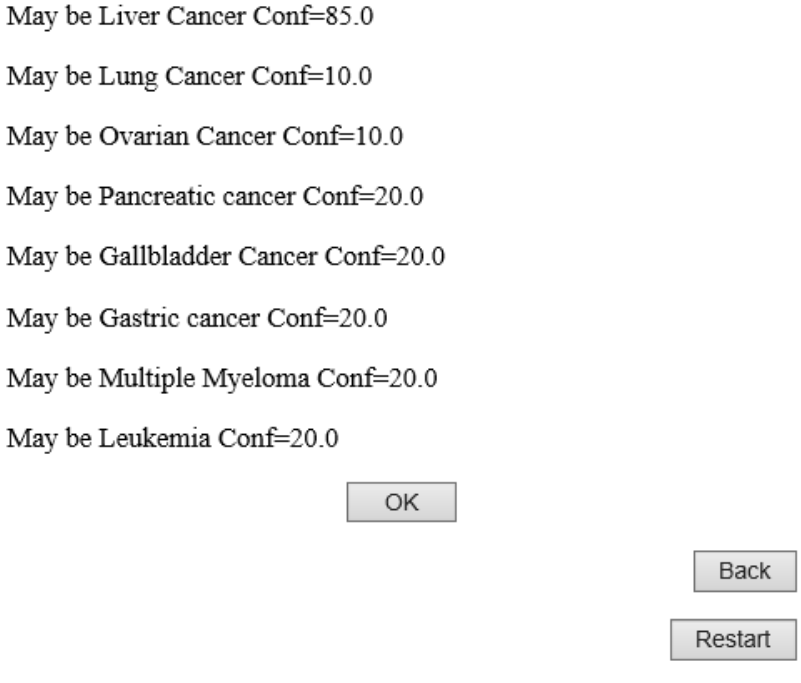
Restart





5. RESULTS

The results would be as follows showing the possible probabilities of the cancer.



The data from the questionnaire is as follows

Do you have unexplained weight loss? Yes, More than 10 pounds

Do you have a good appetite NO

Do u have a nagging cough for long term? No

Do you have bloating issues and you are not on diet or stress ? NO

Do you have a problem during urination? NO

Are the Lymph Nodes swollen No

Do you have a trouble swallowing? No

Did u notice any changes in breast recently? No

Do u have unusual vaginal bleeding? No

Do you have frequent onset of fever ? No, very rarely

Are you fatigued most of the time? Yes

Do u experience heartburn or indigestion for long term and you are not on diet? No

Do u find any traces of blood in the stool? I did not notice

Alpha-fetoprotein (AFP) 600.0

Beta-2-microglobulin (B2M) 2.6

CA19-9 29.0

Carcinoembryonic antigen (CEA) 3.5

Neuron-specific enolase (NSE) 4.5

The main decision support system was to identify the type of cancer and the with the signs and symptoms and the different biomarkers. The algorithm helped us to identify the probability of having liver cancer with the highest confidence of 85. It can be much more developed by adding more variable and hidden layers of knowledge to get desired output.