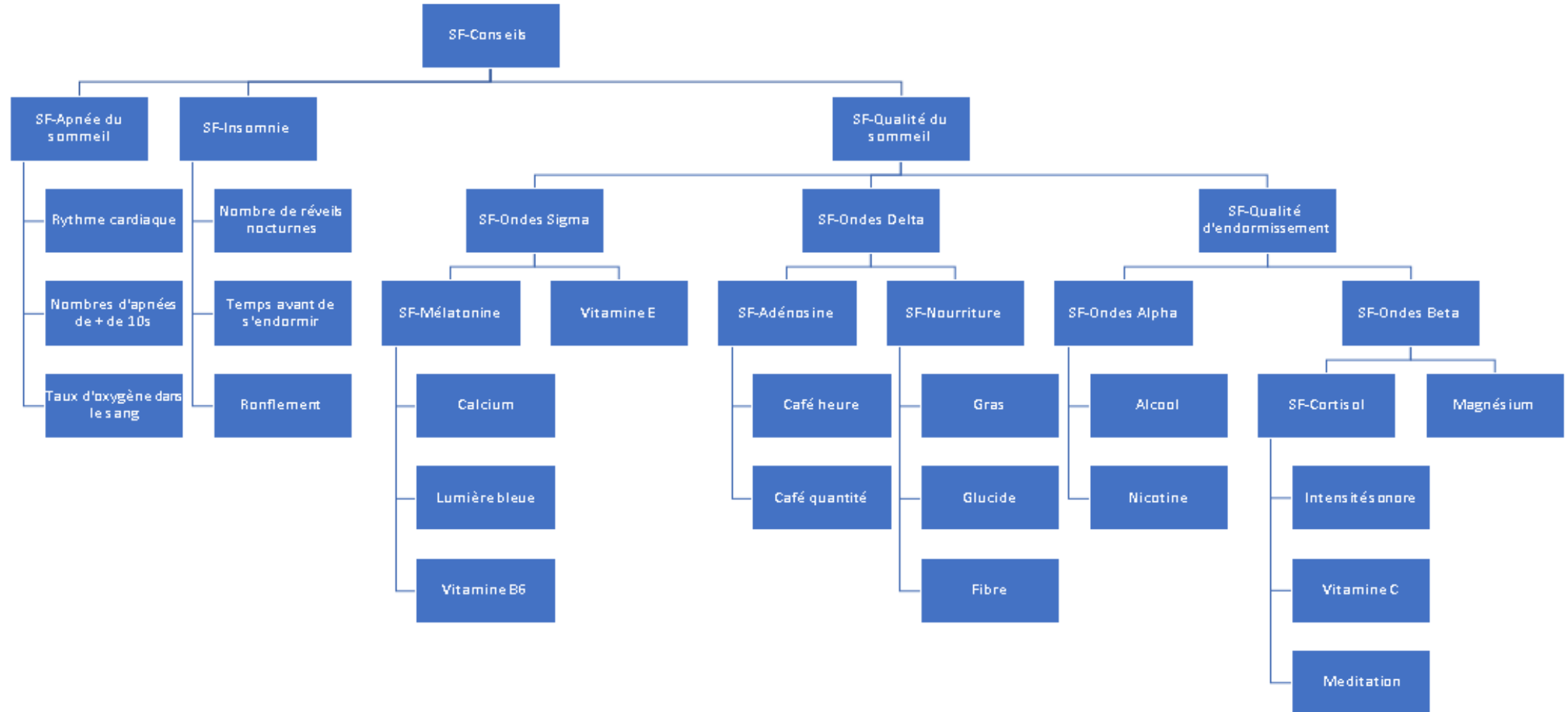# Issue

- Goal:
  - Evaluation of a patient's sleep quality (score/100)
  - Detection of diseases: sleep apnea and insomnia
  - Advice

- Definition Sleep:
  - Non-REM/REM sleep
  - Brain waves (alpha, delta, sigma, beta)

- Brief definition of sleep disorders

Variables

1. Magnesium content
2. Calcium level
3. Vitamin C levels
4. Vitamin B6 levels
5. Vitamin E level
6. Alcohol content
7. Nicotine rate
8. Fat content
9. Fiber content
10. Carbohydrate levels
11. Sound intensity
12. Meditation time
13. Time at which the coffee is consumed
14. Quantity of coffee
15. Time of day when we are confronted with the LB
16. Number of night wakings
17. Time to fall asleep
18. Snoring
19. Heart rate
20. No. of apneas longer than 10 seconds
21. Oxygen level in the blood

Organization chart

Man-Woman Method

```matlab
%Chosir son sexe

prompt ={'Tape 1 si homme, tape 0 si femme :'};

def ={'0'};
dlgtitle='Genre';
lineNo=1;
answer=inputdlg(prompt, dlgtitle, lineNo, def);
if isempty(answer),
    disp('Action annulée');
    return;
end;

reponse = str2num(answer{1});
```

```matlab
%La personne qui fait le test est un homme
if reponse == 1
```

Multi-night method

```matlab
% Choisir le nombre de nuits pour faire le test

prompt ={'Sur cb de nuits voulez-vous faire le test'};
def ={'1'};
dlgtitle='Nbr nuits';
lineNo=1;
answer=inputdlg(prompt, dlgtitle, lineNo, def);
if isempty(answer),
    disp('Action annulée');
    return;
end;
nb_nuits = str2num(answer{1});
```

```matlab
%Initialisation des entrées à 0, utile pour faire une moyenne ensuite
taux_alcool=0;
taux_nicotine=0;

%Boucle pour faire le test sur plusieurs nuits
for i=1: nb_nuits,
```

```matlab
%Si plusieurs nuits sont sélectionnées ont fait la moyenne
taux_alcool = str2num(answer{1})+ taux_alcool;
taux_nicotine = str2num(answer{2}) + taux_nicotine;
end;

taux_nicotine=taux_nicotine/nb_nuits;
taux_alcool=taux_alcool/nb_nuits;
```

Defuzzification method

```
%Deffuzzification de la qualité du sommeil par méthode du barycentre

ccl_sommeil=[ccl_sommeil(1) ccl_sommeil(2) ccl_sommeil(3)];
ccl_som = [0 50 100];
disp('La qualité sur 100 de votre sommeil est de :');
disp(sum(ccl_som.*ccl_sommeil)/sum(ccl_sommeil));
```

Output

- <u>Advice and Guidance</u>

- C1: "Your sleep quality is poor! However you are not insomniac, nor apneic! Please consult a general practitioner and if you can a neurologist so that he can help you to improve your life style.

- C2: "Your sleep quality is normal without being excellent! You are a bit insomniac but you are not apneic! It would be interesting to consult a general practitioner and if you can a neurologist so that he can help you to improve your lifestyle and find a solution to limit your little insomnia.

- C3: "The quality of your sleep is remarkable! Your lifestyle is excellent! You sleep like a baby! Keep it up!"

Case Study 1: Marc

Score : 0

Tip:
"Your sleep quality is poor! You have some insomnia but you are not apneic! Please consult a general practitioner and if you can a neurologist to help you improve your lifestyle and find a solution to limit insomnia.

Variables	Day 1	Day 2
Sound Intensity (dB)	35	35
Vitamin C level (mg/L)	70	70
Meditation (minutes)	10	10
Magnesium level (mg/day)	1000	1000
Calcium level (mmol/L)	2.4	2.4
Blue Light (hours)	2	2
Vitamin B6 level (mg/day)	1.8	1.8
Vitamin E level (IU)	22	22
Coffee Time (hour)	3	10
Coffee Quantity (no. of cups)	3	3
Carbohydrate content (g)	400	400
Fat content (g)	60	60
Fiber content (g)	35	35
Nicotine (Nb of cigarettes/day)	10	5
Alcohol (g/kg)	0.7	0.2
Number of night wakings	4	1
Time to fall asleep (minutes)	10	20
Snoring (dB)	15	15
Heart rate (beats/minutes)	50	50
No. of apneas longer than 10 seconds	2	2
Oxygen content (%)	95	95

Case Study 2: Charlotte

Score: 100 Tip:
"The quality of your sleep is remarkable! Your lifestyle is excellent! You sleep like a baby! Keep it up!"

Variables	Day 1
Sound Intensity (dB)	0
Vitamin C level (mg/L)	1000
Meditation (minutes)	50
Magnesium level (mg/day)	700
Calcium level (mmol/L)	2.8
Blue Light (hours)	20
Vitamin B6 level (mg/day)	150
Vitamin E level (IU)	300
Coffee Time (hour)	16
Coffee Quantity (no. of cups)	1
Carbohydrate content (g)	75
Fat content (g)	170
Fiber content (g)	70
Nicotine (Nb of cigarettes/day)	0
Alcohol (g/kg)	0
Number of night wakings	0
Time to fall asleep (minutes)	10
Snoring (dB)	0
Heart rate (beats/minutes)	50
Number of apneas longer than 10 seconds	0
Oxygen content (%)	98