Lab 11 - IA

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1. Se da o matrice de numere. Sa se afiseze pe ecran (cu cate un spatiu intre ele) acele elemente din matrice care sunt mai mici sau egale decat suma indicilor liniei si coloanei acelui element (indicii incep de la 1).
2. Se da un arbore binar de numere. Sa se creeze (ca parametru al predicatului) o lista cu elementele din arbore care au numar egal de descendenti in subarborele stang si cel drept.
3. Se da urmatorul predicat:

```
om(popescu, ana, 20).
om(georgescu, alex, 53).
om(ionescu, george, 14).
om(popescu, denisa, 6).
om(ionescu, liliana, 78).
om(georgescu, oana, 35).
om(georgescu, vlad, 14).
om(ionescu, anca, 2).
om(popescu, ioana, 40).
om(ionescu, dan, 16).
```

Afisati in fisierul "familii.txt", pe cate o linie, numele de familie apoi prenumele si varsta pentru membrul cel mai tanar al acelei familii.

Exemplu:
popescu: denisa 6
georgescu: vlad 14
ionescu: anca 2

Given the following database:

```
score(josef,masopust,[eu(1960,1),wc(1962,1)]).
score(wayne,rooney,[eu(2004,2),eu(2012,1),wc(2014,1),eu(2016,1)]).
score(martin,peters,[wc(1966,1),wc(1970,1)]).
score(franz,beckenbauer,[wc(1966,4),wc(1970,1)]).
score(pak,seungzin,[wc(1966,2)]).
score(uwe,seeler,[wc(1958,2),wc(1962,2),wc(1966,2),wc(1970,3)]).
score(just,fontaine,[wc(1958,13)]).
```

The above database contains footballers names and a list of their scoring records in various football tournaments, where world cup tournaments are given as wc(year,goals) and European championships as eu(year,goals). For example, the entry for Martin Peters records that he scored 1 goal in the 1966 World Cup and 1 in the 1970 World Cup.

1. What will the result be of each of the following queries? (Note that if the query has multiple answers, then all answers should be given rather than just the first one.)

   (i) ?-score(martin,peters,L). [1 mark]
   (ii) ?-score(X,_,[wc(_,_)]). [2 marks]
   (iii) ?-score(X,Y,[_,_,_|_]).

2. In addition, the code base also contains this mystery predicate ('member' is Prolog's standard member-of-list predicate).

   mystery(wc(N)):- score(X,Y,XS), member(wc(N,M),XS), M>3.

What will the result be of each of the following queries?

(i) ?-mystery(wc(N)). [2 marks]
(ii) ?-mystery(eu(M)). [1 mark]
(iii) Explain in words: what does the mystery predicate compute?

3. Write a predicate tournament_score/1 which will check whether its argument could potentially be a tournament score. This means that it must be either of the form wc(M,N) or eu(M,N), where both M and N are positive integers. [3 marks]

4. Write a predicate tournament_scores/1 which will check whether its argument is a list of possible tournament scores. [2 marks]

5. Write a predicate sum_score/3 which produces us the total number of goals for a player across all tournaments.

e.g. ?-sum_score(martin,peters,S) should result in setting S to 2.