

Logic Programming

Assignment 2

Due: Next section.

Note: The lab Instructor should evaluate a running program for tasks 3,4, (Paper or email submission are not allowed).

1. (5 Points) True or False!

- a) "12abc" is a valid Atom name in prolog.
- b) "123" is a valid Integer name in prolog.
- c) "_" is a valid variable name in prolog.
- d) "_boy" is a valid Atom name in prolog.
- e) _123 is a valid Variable name in prolog.
- f) "xmen" is a valid Variable name in prolog.
- g) "fred%nezar" is a valid Atom name in prolog.

2. (5 Points) What does Prolog return to the following queries?

- a) $\text{sum}(X+Y) = \text{sum}(2+3)$
- b) $\text{sum}(2+3) = \text{sum}(X+Y)$
- c) $\text{sum}(X) = \text{sum}(2+3)$
- d) $\text{sum}(X+Y) = \text{sum}(3)$
- e) X is 2+3
- f) X is 3+Y.
- g) $X = 3+5$.
- h) X is f(3+5).
- i) $X=Y$
- j) $X=X$
- k) $[a,X] = [a,b,c,d]$.
- l) $[a,X] = [a,[b,c,d]]$.
- m) $[a,b|X] = [a,b,c,d]$.
- n) $[a,b|X] = [a,b,[c,d]]$.
- o) $[X|Y] = [a|b]$.
- p) $[X|Y] = [a,b]$.
- q) $[X,Y] = [a|b]$.
- r) $[X,Y] = [a,b]$.
- s) $[_|_|_] = [a,b,c,d]$.
- t) $[X,X|Y] = [a,b,c,d]$.

- u) $[_] = []$.
- v) $[_] = [a]$.
- w) $[_] = [a,b]$.
- x) $[_|_] = []$.
- y) $[_|_] = [a]$.
- z) $[_|_] = [a,b]$.

3. (5 Points) Given that , Celsius = (Fahrenheit - 32) / 1.8. Write a prolog program to accept a Fahrenheit degree and result the Celsius equivalent.

4. (5 Points) Decibel A-weighting (dBA) is an environmental noise measurement where the following table represent the noise influence .

dBA	Evaluation
20	Silent
30 – 40	Quiet
50 - 60	Moderate
70 - 80	Loud
90 – 100	Very noisy
110 - 140	Extremely noisy

Translate the pervious relation into prolog program then try to get the evaluation for the following dBA values (15, 75, 105).

5. (3 Points) From the lecture you know that “member” clauses used to search for item X in a list of items as following:

```
member(X,[X|_]).  
member(X,[_|_]):-member(X,[_]).
```

- a. Rename the “member” functor into “inList” and test the program with SWI. Is there any difference?, Is “member” a built in relation in Prolog?
 - b. Can we change the program as following?, (Whether yes or no, explain)

```
member(X,[X|_]).  
member(X,[_|_]).  
member(X,[_]).
```
 - c. Do we need to add the fact “member(X,[_]).” at the beginning of this program?, Explain.
6. (3 Points) Write the equivalent prolog form for the following relations then represent each as a tree.
- a. $a*b+c/c-e$.
 - b. $[a, b, c, e]$.
 - c. Ibn Sina is the author of the book “Al-Qanoon fi al-Tibb”