

The Open University of Sri Lanka
B. Sc. Degree program – Level 04
Closed Book Test 2005/2006
CSU 2280 : Deductive Reasoning and PROLOG for AI



Duration : One and half hours

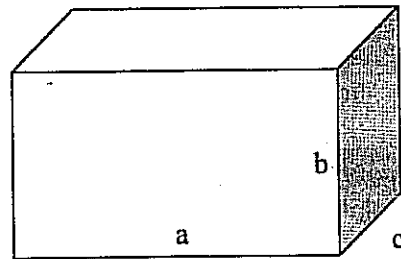
Date 19.09.2006

Time: 3.30 p.m. to 5.00 p.m.

Answer All Three Questions.

Q1.

Answer the following questions by using the picture given below.



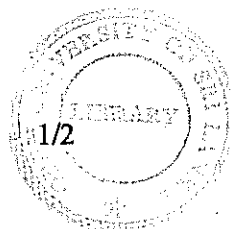
- a. Write a prolog predicate to read Length, Weight and Height of the given object (assume that all values are given in meter scale)
- b. Calculate the area of the above object.
- c. Calculate the volume of the above object
- d. Write a prolog rule to identify the following object types.
 - i. cube (Hint: $a = b = c$)
 - ii. Cuboid (if two axes are same)
 - iii. Other wise print normal object
- e. Convert the values of a, b, c into yard and print a, b and c in yards.
1 meter = 1.093yard

Q2.

- a. Answer the following questions using the rules given below

```
printlist([]).  
printlist([H|T]) :- write(H),nl, printlist(T).
```

- i. What is the output of the following.
? printlist([a,b,c,d,[f]]).
- ii. Describe briefly how prolog answer the above question (part i).



- b Write a prolog rules to perform following tasks.
- i. Check the membership of an item. If the item is in the list then print 'yes' else print 'no'.

```
? member(a, [d, a, c, f])
Yes
```
 - ii. Calculate the length of a given list

```
? lengthlist([a, b, c, d], X).
X = 4
```
 - iii. Calculate the summation of a number list

```
? Sumlist([1, 2, 3, 4], X).
X = 10
```

Q3.

- a. What are the advantages, disadvantages and features of 5th generation programming languages than 4th generation programming languages.

b.

Prolog can be used to create Artificial Intelligent games. There is a story about Gods who are playing this puzzle with 64 stone disks. The story claims that when the Gods finish moving the disks from one post to a second via the third post, time will end. Eschatology (concerns about the end of time) and Theology will be left to those better qualified; our interest is limited to the recursive solution to the problem. A stack of n disks of decreasing size is placed on one of the three posts. The task is to move the disks one at a time from the first post to the second. To do this, any disk can be moved from any post to any other post, subject to the rule that you can never place a larger disk over a smaller disk. The (spare) third post is provided to make the solution possible. This story named as *Towers of Hanoi*. Prolog implementation program of the above story is given below. Answer the following questions by using these prolog codes.

```
honi(0,_,_,_).
honi(N,L,M,R) :- N1 is N-1, honi(N1,L,R,M),
                 write('Move '),write(N),write(' from '),
                 write(L),write(' to '),write(R),nl,
                 honi(N1,M,L,R).
```

- i. What is the Prolog rule, that stops the Recursive action?
- ii. What is the output when you run the following command in consol window?

```
?- honi(2, left, center, right).
```

- iii. Explain how prolog answer the above question (part ii).

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